



**Annual Report for National Pollutant Discharge Elimination System (NPDES)
General Permit 3-9007 for Stormwater Runoff from the State Transportation Separate Storm
Sewer System (TS4; 2017)**

Prepared by:

Vermont Agency of Transportation
Water Quality Unit
1736 US Rt 302
Berlin, VT 05602

April 1, 2023

Table of Contents

1.0	REGULATORY OVERVIEW	2
1.1	BACKGROUND.....	2
2.0	COVERAGE UNDER THIS PERMIT	3
3.0	ANNUAL REPORTING REQUIREMENTS.....	3
4.0	DISCHARGE REQUIREMENTS	4
4.1	DISCHARGES TO IMPAIRED WATERS WITH AN APPROVED TOTAL MAXIMUM DAILY LOAD WITH WASTELOAD ALLOCATION	5
4.2	DISCHARGES TO IMPAIRED WATERS WITH AN APPROVED TOTAL MAXIMUM DAILY LOAD WITHOUT WASTELOAD ALLOCATION	5
4.3	DISCHARGES TO IMPAIRED WATERS WITHOUT AN APPROVED TOTAL MAXIMUM DAILY LOAD.....	5
5.0	STORMWATER MANAGEMENT PROGRAM.....	5
6.0	MINIMUM CONTROL MEASURES.....	6
7.0	INDUSTRIAL ACTIVITY CONTROL MEASURES	6
8.0	STORMWATER DISCHARGES FROM IMPERVIOUS SURFACES	7
9.0	TOTAL MAXIMUM DAILY LOAD IMPLEMENTATION	7
9.1	FLOW RESTORATION PLAN	7
9.2	PHOSPHORUS CONTROL PLAN	8
10.0	RECORD KEEPING AND REPORTING	8

APPENDICES

**Appendix A: CHITTENDEN COUNTY REGIONAL STORMWATER EDUCATION PROGRAM
(RSEP)**

**Appendix B: CHITTENDEN COUNTY REGIONAL STORMWATER PUBLIC INVOLVEMENT
AND PARTICIPATION PROGRAM (“STREAM TEAM”)**

Appendix C: Illicit Discharge Detection and Elimination Testing Plan

Appendix D: Lake Champlain Basin Phosphorus Control Plan Progress Report Memo

1.0 REGULATORY OVERVIEW

In November 2017, the Vermont Agency of Natural Resources (VT ANR) Department of Environmental Conservation (DEC) issued the National Pollutant Discharge Elimination System (NPDES) General Permit 3-9007 (GP 3-9007) for Stormwater Discharges from the State Transportation Separate Storm Sewer System (TS4; the Permit) for stormwater discharges from the Vermont Agency of Transportation (VTrans; the Agency) owned or controlled impervious surfaces. Per Part 1 of the Permit, the purpose of the Permit is to provide efficiencies in overall program management by combining post-construction operational stormwater requirements for VTrans that are associated with its designated regulated small municipal separate storm sewer systems (MS4s); industrial activities, commonly regulated under the Multi-Sector General Permit 3-9003 (MSGP 3-9003); and previously permitted, new, redeveloped, and/or expanded impervious surfaces, commonly regulated under State Operational Stormwater Permits (e.g., General Permit 3-9015, General Permit 3-9010, and Individual Stormwater Discharge Permit [INDS]). The Permit is issued pursuant to the Vermont Water Pollution Control statute, 10 V.S.A. Chapter 47, specifically §§ 1258 and 1264; the Vermont Water Pollution Control Permit Regulations (Environmental Protection Rules, Chapter 13), including the rule governing general permits in Section 13.12; the Vermont Stormwater Management Rule (Environmental Protection Rules, Chapter 18); the Vermont Stormwater Management Rule for Stormwater-Impaired Waters (Environmental Protection Rules, Chapter 22); the federal Clean Water Act (CWA), as amended, 33 U.S.C. § 1251 *et seq.*; and related regulations of the United States Environmental Protection Agency (U.S. EPA) at 40 C.F.R. 122.

1.1 BACKGROUND

In December 2017, VTrans filed a Notice of Intent (NOI) for General Permit 3-9007 to the VT ANR DEC. The NOI included a Stormwater Management Program (SWMP 2017), which includes a comprehensive plan to manage the quality of stormwater discharged from the TS4 in accordance with Part 5 of the Permit. Attachments with the SWMP include:

- Attachment A: List of Waters (Table 1 and Table 2)
- Attachment B: Chittenden County MS4 Stormwater Program Agreement (July 1, 2018)
- Attachment C: VTrans Bridge Washing Best Management Practices and VT ANR Vehicle Washing Policy
- Attachment D: VTrans Flow Restoration Plan
- Attachment E: VTrans Phosphorus Control Plan (to be provided by April 2020)
- Attachment F: Incorporation of Previously Permitted Stormwater Systems
- Attachment G: Stormwater Program Evaluation Top 13 Actions
- Attachment H: Gap Procedure

2.0 COVERAGE UNDER THIS PERMIT

As outlined in Part 2 of the Permit, the Permit applies to:

- VTrans-owned or controlled state highways, sidewalks, multi-use pedestrian paths, welcome centers, airports, gravel pits, mineral mining, maintenance facilities, park & rides, truck weigh stations, and VTrans-owned facilities leased to third parties, including welcome centers and airport facilities (hangars and terminals), and excludes rail lines, rail yards, public transit facilities, and rail trails.
- State highways and VTrans-owned or controlled non-road impervious surfaces in the urbanized areas and stormwater-impaired watersheds of Burlington, Colchester, Essex, Essex Junction, Milton, Shelburne, South Burlington, Williston, Winooski, the University of Vermont, the Burlington International Airport, Jericho, Underhill, St. Albans, the Town of St. Albans, the Town of Rutland, and the City of Rutland.
- VTrans-owned or controlled airport facilities and non-metallic mineral mining facilities.

3.0 ANNUAL REPORTING REQUIREMENTS

In accordance with Subpart 10.2 Annual Report of GP 3-9007, VTrans shall submit annual reports to the DEC Watershed Management Division, Stormwater Management Program by April 1st each year. Flow Restoration Plan (FRP) and Phosphorus Control Plan (PCP) reports may be included with the annual report when reporting deadlines coincide. In addition to FRP and PCP reporting requirements, the annual report shall include reporting requirements under Parts 4, 5, 6, and 7 of the Permit, as well as:

- A. The status of VTrans' compliance with permit conditions, an assessment of the appropriateness of the identified Best Management Practices (BMPs), progress towards achieving implementation of BMPs necessary to meet Total Maximum Daily Load (TMDL) requirements and progress towards achieving the statutory goal for the six minimum measures of reducing the discharge of pollutants to the Maximum Extent Practicable (MEP), and the measurable goals for each of the minimum control measures and TMDL implementation measures;
- B. An inspection report on the condition of VTrans' stormwater management systems that notes all problem areas and all measures taken to correct any problems and to prevent future problems;
- C. Results of information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the program at meeting TMDL requirements and the success of the six minimum measures;

- D. A summary of the stormwater activities VTrans plans to undertake during the next reporting cycle (including an implementation schedule);
- E. Proposed changes to VTrans' SWMP, including changes to any BMPs or any identified measurable goals that apply to the program elements; and
- F. Notice that VTrans is relying on another government entity to satisfy some of its permit obligations (if applicable).

In the following sections of this annual report, as well as the accompanying Annual Report Workbook, VTrans is providing a summary of activities as they are associated with the annual reporting requirements listed above. In addition to the information provided in this annual report, the accompanying Annual Report Workbook includes the following tabs with relevant updates:

- Tab 4.0: Discharge Requirements Annual Reporting
- Tab 6.0: Minimum Control Measure (MCM) Annual Reporting
- Tab 6.1: Trainings Summary
- Tab 6.3.a: Facilities Updates
- Tab 7.0: Industrial Activities Summary
- Tab 8.0: Operational Stormwater Management System Annual Inspections Summary
- Tab 9.1: Flow Restoration Plan (FRP) Implementation Summary
- Tab 9.2: Phosphorus Control Plan (PCP) Development Reporting

4.0 DISCHARGE REQUIREMENTS

Impaired waters are those waters that VT ANR has identified pursuant to Section 303(d) of the Clean Water Act (CWA) as not meeting the Vermont Water Quality Standards (VWQS). Impaired waters encompass both those with approved TMDLs or Water Quality Restoration Plans (WQRPs), and those for which TMDL development is necessary but has not yet been approved by the U.S. EPA. Per the Permit, except for Part 9, a VTrans project is considered to discharge to an impaired water if the first water of the State to which runoff discharges is identified as an impaired water. For discharges that enter a separate storm sewer system prior to discharge, the first water of the State to which runoff is discharged is the waterbody that receives the stormwater discharge from the storm sewer system. To address this requirement, VTrans has developed and provided a complete list of first waters to which designated MS4/TS4 areas discharge; included as Table 1 in Attachment A of the SWMP (2018).

4.1 DISCHARGES TO IMPAIRED WATERS WITH AN APPROVED TOTAL MAXIMUM DAILY LOAD WITH WASTELOAD ALLOCATION

Discharges from the TS4 to impaired waters with an approved TMDL and wasteload allocation, including descriptions of the measures being used to address requirements where applicable, are listed in Tables 1 and 2 in Attachment A of the SWMP (2018). Progress on measures VTrans is implementing can be found in Tab 4.0 of the Annual Report Workbook.

4.2 DISCHARGES TO IMPAIRED WATERS WITH AN APPROVED TOTAL MAXIMUM DAILY LOAD WITHOUT WASTELOAD ALLOCATION

Discharges from the TS4 to impaired waters with approved TMDLs, where the TMDL does not specify a WLA or other requirements for the TS4 discharge, are listed in Tables 1 and 2 in Attachment A of the SWMP (2018). These tables include a summary of VT ANR-approved measures that VTrans is implementing to address the pollutant(s) of concern addressed by the TMDL. Progress on measures VTrans is implementing can be found in Tab 4.0 of the Annual Report Workbook.

4.3 DISCHARGES TO IMPAIRED WATERS WITHOUT AN APPROVED TOTAL MAXIMUM DAILY LOAD

Identified and mapped discharges from the TS4 to impaired waters that are listed on the "State of Vermont 303(d) List of Impaired Waters, Part A – Impaired Surface Waters in Need of TMDL" are listed in Tables 1 and 2 in Attachment A of the SWMP (2018). These tables include a summary of measures that VTrans is implementing to ensure compliance with the VWQS. Progress on measures VTrans is implementing can be found in Tab 4.0 of the Annual Report Workbook.

5.0 STORMWATER MANAGEMENT PROGRAM

Per Subpart 5.1 of the Permit, VTrans has developed a written SWMP (2018) to include information required, as necessary, under Part 3 of the Permit; the information required under Part 4 of the Permit to address discharges to impaired waters; the required elements under the six minimum control measures in Part 6 of the Permit; the industrial control measures in Part 7 of the Permit, including the Stormwater Pollution Prevention Plan (SWPPP); the operational stormwater requirements under Part 8 of the Permit; and the Flow Restoration Plan (FRP) and Phosphorus Control Plan (PCP) developed in accordance with Part 9 of the Permit.

To meet requirements of Subpart 5.2 of the Permit, VTrans has performed an annual review of the SWMP and has no changes for this reporting period.

6.0 MINIMUM CONTROL MEASURES

Per Part 6 of the Permit, VTrans has developed and is implementing and enforcing a SWMP (2018), which includes the six minimum control measures that are designed to reduce the discharge of pollutants from the TS4 to the MEP, to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. For purposes of the six minimum control measures, implementation of BMPs consistent with the provisions of the SWMP constitute compliance with the standard of reducing pollutants to the MEP. The six minimum control measures include:

1. Public Education and Outreach on Stormwater Impacts (MCM 6.A)
2. Public Involvement and Participation (MCM 6.B)
3. Illicit Discharge Detection and Elimination (MCM 6.C)
4. Construction Site Stormwater Runoff Control (MCM 6.D)
5. Post-Construction Stormwater Management for New Development and Redevelopment (MCM 6.E)
6. Pollution Prevention and Good Housekeeping for VTrans' Operations (MCM 6.F)

The BMPs that are being implemented by VTrans to address these six minimum control measures are included in Part 6.0 of the SWMP (2018). A summary of annual reporting requirements and progress for each MCM is provided in Tabs 6.0, 6.1, and 6.3.a of the Annual Report Workbook.

7.0 INDUSTRIAL ACTIVITY CONTROL MEASURES

Per Part 7 of the Permit, VTrans has developed and is implementing Stormwater Pollution Prevention Plans (SWPPPs) for its airport transportation facilities and facilities that conduct non-metallic mineral mining and dressing as the primary activity on site and that have the SIC Codes listed in the Permit. VTrans has selected, designed, installed, and implemented control measures, including BMPs, to minimize pollutant discharges that address the selection and design considerations, meet the nonnumeric effluent limits, meet limits contained in applicable effluent limitations, and meet the water quality-based effluent limitations per the relevant subparts of Part 7 of the Permit. A table that lists airport transportation facilities and non-metallic mineral mining and dressing facilities that are included in the VTrans TS4 and that were previously issued an MSGP 3-9003 by VT ANR is provided in Part 7.0 of the SWMP (2018). A link to the SWPPPs that have been prepared for these facilities can be found at:

<https://outside.vermont.gov/agency/VTRANS/external/docs/stormwater/Forms/AllItems.aspx>

A summary of trainings, inspections, monitoring, and any corrective actions taken is provided on Tab 7.0 of the Annual Report Workbook.

8.0 STORMWATER DISCHARGES FROM IMPERVIOUS SURFACES

Per Part 8 of the Permit, permit coverage is provided for: (1) previously permitted stormwater runoff discharges and proposed new stormwater runoff discharges from impervious surfaces that trigger jurisdiction as outlined in Subpart 8.1.A of the Permit, (2) stormwater discharges to waters of the State that are not impaired by stormwater and to waters of the State that are listed as principally impaired due to stormwater runoff with a stormwater WQRP or TMDL on the EPA-approved State of Vermont List of Priority Surface Waters (Part D, Impaired Surface Waters with Completed and Approved TMDLs) and that have an approved FRP or other approved implementation plan.

A list of projects in the TS4 with VTANR operational coverage including status, inspections, and corrective actions needed or taken is provided on Tab 8.0 of the Annual Report Workbook.

9.0 TOTAL MAXIMUM DAILY LOAD IMPLEMENTATION

9.1 FLOW RESTORATION PLAN

VTrans maintains infrastructure within the watersheds of the following stormwater-impaired waters: Allen, Bartlett, Centennial, Indian, Moon, Munroe, Potash, Rugg, Stevens, and Sunderland Brooks. Per Subpart 9.1 of the Permit, VTrans submitted an FRP to VT ANR in October 2016 (FRP 2016) to address requirements of General Permit 3-9014 for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2012) associated with these watersheds; see Attachment D of the SWMP (2018). Upon approval by VT ANR, the FRP will become a part of the SWMP (2018).

Supporting information per annual reporting requirements of the TS4 are provided in Tab 9.1 of the Annual Report Workbook.

Per Subpart 9.1 of the Permit, VTrans, along with other MS4s, funded a Flow Monitoring Program to address flow and precipitation monitoring in its respective stormwater-impaired watersheds. Stream flow and precipitation monitoring data that are collected through this program are available at the following links:

- Flow monitoring data: <http://vt-ms4-flow.stone-env.com/FlowDev/index.html>
- Precipitation data: <http://vt-ms4-flow.stone-env.com/Precip/index.html>

In 2021, VT DEC decided to discontinue this monitoring requirement and therefore this monitoring is complete.

9.2 PHOSPHORUS CONTROL PLAN

VTrans maintains infrastructure in all 13 lake segments within the Lake Champlain Basin. Per Subpart 9.2 of the Permit, VTrans will develop and implement a comprehensive PCP for the TS4 within the Lake Champlain Basin in phases, beginning with the establishment of baseline phosphorus loading and calculation of the phosphorus load reductions needed to achieve its percent reduction from the TS4 for each Lake segment. Development and implementation of the remaining phases of the PCP, and submittal to VT ANR, will be conducted per the schedule outlined in Subpart 9.2.C of the Permit.

A summary of progress towards meeting the milestones established for phosphorus control planning is provided in Tab 9.2 of the Annual Report Workbook.

10.0 RECORD KEEPING AND REPORTING

Per subpart 10.1 of the Permit, VTrans is retaining records of monitoring information, copies of reports required by the Permit, copies of Discharge Monitoring Reports (DRMs), a copy of its authorization and amended authorizations under this Permit, and records of data used to complete the NOI for this Permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this Permit, whichever is longer. VTrans is retaining copies of written records relating to the stormwater collection, treatment, and control systems, and BMPs, including calculations used to size STPs, authorized under this Permit. VTrans is submitting its records to VT ANR when specifically asked to do so. VTrans is retaining a copy of the SWMP and a copy of the Permit language at a location accessible to VT ANR. VTrans is making its records, including the NOI and SWMP, available to the public, if requested to do so in writing.

Per subpart 10.2 of the Permit, VTrans is submitting its annual reports to the VT DEC, Watershed Management Division, Stormwater Management Program by April 1st each year. FRP and PCP reports may be included with the annual report when reporting deadlines coincide.

APPENDICES

Appendix A CHITTENDEN COUNTY REGIONAL STORMWATER EDUCATION PROGRAM (RSEP)

Minimum Control Measure #1:

Public Education & Outreach

REGIONAL STORMWATER EDUCATION PROGRAM
RETHINK RUNOFF

JANUARY–DECEMBER 2022
ANNUAL REPORT

Prepared by:

Pluck

Introduction

This 2022 calendar year report recaps the work done primarily related to Minimum Control Measure #1. As in prior years, this work was developed through coordination with CCRPC and its MS4 subcommittee of the Clean Water Advisory Committee.

History

Since 2003, Chittenden County's 12 MS4s have worked to pool resources to professionally engage the public in a one message, one outreach effort, first known as the Regional Stormwater Education Program. Through regular spring and summer advertisements to drive people to the program's first website, www.smartwaterways.org, this cooperative approach to fulfill its NPDES Permit Minimum Control Measure #1 (Public Education & Outreach) requirements built a regional awareness among the public of the need for individual action to assist in fighting stormwater problems. In the summer of 2016, the MS4s contracted with Tally Ho through its Lead Agency, the Chittenden County Regional Planning Commission to rebrand the Smart Waterways campaign and coordinate it with the MS4's Minimum Control Measure #2 (public involvement and participation) regional effort, known as the Chittenden County Stream Team, which had begun in 2011. The goal was to create one cohesive organization and outreach effort to educate the public about stormwater and boost public participation implementing projects to combat the negative impacts of stormwater. In the spring of 2017, implementation of the MCM #1 aspects of this joint effort, Rethink Runoff, was publicly launched, which included a new website, www.rethinkrunoff.org and revised creative by Pluck (previously Tally Ho Design).

Pluck has been responsible for the management and creative development of Rethink Runoff since late 2017 while the Winooski Natural Resources Conservation District has overseen and implemented MCM #2. This 2022 calendar year report recaps the work done primarily related to Minimum Control Measure #1.

2022 Initiatives

Pluck maintained existing creative for advertising in 2022. We increased social media content development during key advertising time periods throughout the year and boosted Google Search campaigns to complement existing display advertising.

In addition to previous Google Search campaigns highlighting Rain Barrels, Rain Gardens, and Fertilizers, we introduced a Search campaign targeting Pet Waste, with spends in May, June, and September/October.

Pluck reviewed content across the entire site and refreshed and refined messaging—adjusting SEO and other key components—in spring 2022.

In social media, we posted across Facebook and Instagram (averaging 1-2 times per week Jan-Jun and once every 1-2 weeks July-December), boosting posts through key points in the year. In mid-2022, we stopped posting Ms. Drop's Tips of the Month and began to focus on specific highlights, such as fall fertilizer application.

As Adopt-A-Drain launched, we provided support via digital outreach and advertising to increase sign-ups across participating towns.

Media Buy Breakdown

We continued refining our year-round approach to our media spend, eliminating cable broadcast buys and reducing our WCAX media buys in the fall, reallocating that money to targeted digital advertising.

Digital media buys include Google ads: Display, Search and YouTube as well as Facebook and VTDigger. We continued our radio spots on WVMT and VPR (underwriting).

2022 CREATIVE

PET WASTE SEARCH ADS

Ad · www.rethinkrunoff.org/

Pick Up Your Dog Poop | Don't Leave Dog Poop Behind | Keep Our Beaches Open

Dog poop on the ground can lead to beach closings & E.coli outbreaks on Lake Champlain. Take the time to pick up dog poop. Doing so will help keep Lake Champlain clean.

Ad · www.rethinkrunoff.org/

Pet Waste = E.coli Outbreaks | Dog Poop Goes In The Trash | Pick Up Your Dog...

Pet waste left behind can end up in rivers, lakes and streams, causing water pollution. Pick up your dog poop on trails and in the woods while hiking or exploring the outdoors.

Ad · www.rethinkrunoff.org/

Pick Up Your Dog Poop | Dog Poop Goes In The Trash | Bag And Throw Out Dog...

Take the time to pick up dog poop. Doing so will help keep Lake Champlain clean. Pet waste left behind can end up in rivers, lakes and streams, causing water pollution.

Ad · www.rethinkrunoff.org/

Pet Waste = Beach Closings | Pick Up Your Dog Poop | Keep Our Beaches...

Pet waste left behind can end up in rivers, lakes and streams, causing water pollution. Take the time to pick up dog poop. Doing so will help keep Lake Champlain clean.

Pet Waste = E.coli Outbreaks

Bag And Throw Out Dog Poop

Keep Our Beaches Open

Dog Poop Leads To E. coli

Pick Up Your Dog Poop

Don't Leave Dog Poop Behind

Dog Poop Goes In The Trash

Pet Waste = Beach Closings

Pick up your dog poop on trails and in the woods while hiking or exploring the outdoors.

Pet waste left behind can end up in rivers, lakes and streams, causing water pollution.

Take the time to pick up dog poop. Doing so will help keep Lake Champlain clean.

Dog poop on the ground can lead to beach closings & E.coli outbreaks on Lake Champlain.

MS., DROP TIP OF THE MONTH ANIMATIONS

Rethink Runoff Stream Team posted a video to playlist Ms. Drop's Tip of the Month.

Published by David Barron · April 25, 2022 ·

Do you live in Burlington, Colchester, Essex Town, Essex Junction, or Milton? Rethink Runoff has partnered with Hamline University to launch Adopt-a-Drain.

You can adopt a storm drain this spring and help keep pollutants and other materials out of our storm drain systems.

Adopt-a-Drain asks residents to adopt a storm drain in their neighborhood and keep it clear of leaves, trash, and other debris.

Rethink Runoff Stream Team posted a video to playlist Ms. Drop's Tip of the Month.

Published by David Barron · March 10, 2022 ·

During the spring melt, keep an eye out for clogged downspouts. Ice and other debris can block the flow of stormwater this time of year, allowing water to collect around your home's foundation.

Keeping your downspouts clear is a simple way to prevent water damage.

Rethink Runoff Stream Team posted a video to playlist Ms. Drop's Tip of the Month.

Published by David Barron · February 8, 2022 ·

You might not think much about water pollution this time of year, but your actions in winter can have a lasting impact on water quality in the warmer months.

Don't forget to pick up dog poop when you're walking your dog, even when you are on trails or in the woods.

Pet waste left on the ground will find its way into rivers, lakes and streams in spring, leading to an increase in algae blooms and other water pollution.... See more

TH ADD K DO

VT.ADOPT-A-DRAIN.ORG
Ms. Drop's Tip of the

RETHINKRUNOFF.ORG
Ms. Drop's Tip for M

PICK UP YOUR DOG POOP THIS WINTER

RETHINKRUNOFF.ORG
Ms. Drop's Tip for February: Pick Up Your Dog Poop this Winter! Learn more

GENERAL CALENDAR-BASED SOCIAL MEDIA CONTENT DEVELOPMENT

Rethink Runoff Stream Team

Published by David Barron · July 26, 2022 ·

As summer gets warmer, more beaches are impacted by cyanobacteria, commonly referred to as algae blooms.

But what are algae blooms, and what causes them?

Learn more about how to identify and prevent algae blooms.

RETHINKRUNOFF.ORG

Lake Champlain Algae Blooms & Phosphorus

Elevated levels of nitrogen and phosphorus can promote the growth of cyanobacteria to hi...

2 ·

art winter salt use, courtesy of the Minnesota



CBSNEWS.COM

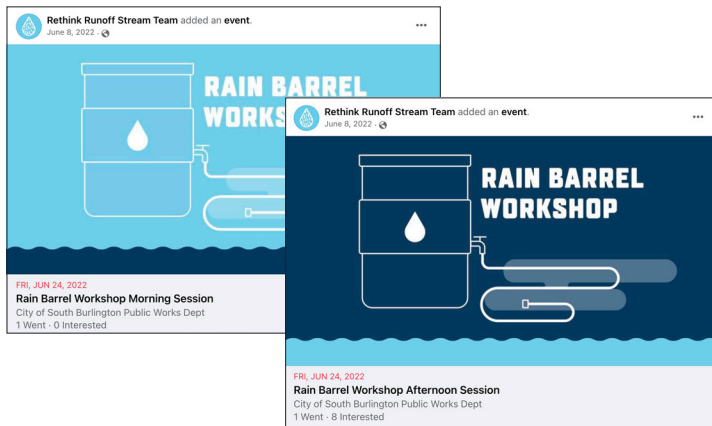
MPCA officials advise "less is more" approach for smart salting during winter

The Minnesota Pollution Control Agency has released some tips to help with de-icing this w...

MCM #1, RSEP, Annual Report 2022

3

STREAM TEAM EVENTS



GENERAL EVENTS

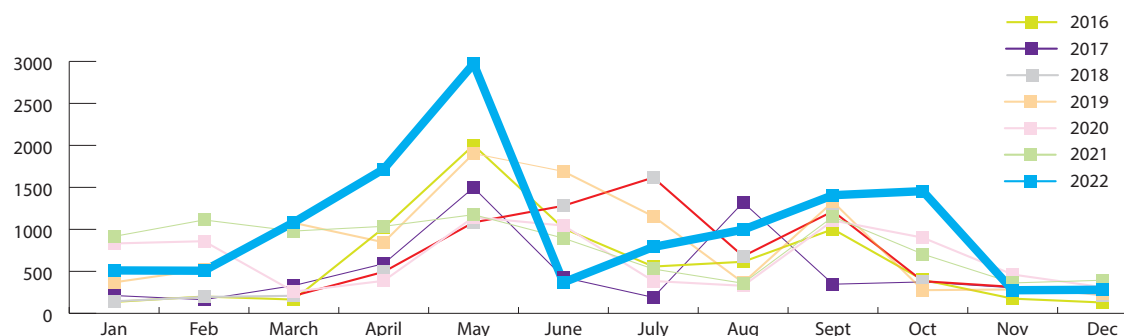


FALL FERTILIZER SOCIAL MEDIA MINI-CAMPAIGN



Website Metrics for 2016–2022

Overall website sessions continued to climb, surpassing our pre-COVID metrics. From 2021 to 2022, we had a 17% increase in sessions and a 12% increase in users.



Year to Year Metrics

	2022	2021	2020	2019
SESSIONS	12,365	10,557	8,908	10,111
USERS	10,537	9,436	7,861	8,531
PAGEVIEWS	16,634	16,001	13,112	15,769

Website Visits by Device

DEVICE	2022	2021	2020	2019	2018	2017	2016
DESKTOP	43.9%	46.9%	51.25	40.2%	50.1%	52.8%	65.7%
MOBILE	48.6%	44.6%	41.28%	44%	40.6%	36.4%	24.5%
TABLET	7.5%	8.5%	7.47%	15.8%	9.3%	10.8%	9.8%

Total Sessions/Visits (1/1–12/31)

TOTAL	TIME PERIOD
12,365	2022
10,557	2021
8,908	2020
10,111	2019
7,832	2018
7,407	2017
6,004	2016
4,659	2015

Most Visited Pages

PAGE	TOTAL
/WHAT-YOU-CAN-DO/PICK-UP-DOG-POOP/	4650
HOMEPAGE	3887
/THE-STREAM-TEAM/	870
/WHAT-YOU-CAN-DO/	505
/EXPLORE-THE-LAKE-CHAMPLAIN-BASIN/ALGAE-BLOOMS-LAKE-CHAMPLAIN/	469
/WHAT-YOU-CAN-DO/INSTALL-A-RAIN-BARREL/	454
/ABOUT-RETHINK-RUNOFF/	379
/WHAT-YOU-CAN-DO/REDUCE-FERTILIZER-USE/	378
/WHAT-YOU-CAN-DO/FOR-KIDS/WHAT-IS-A-WATERSHED/	373
/WHAT-YOU-CAN-DO/PLANT-A-RAIN-GARDEN/	335

Top Vermont Cities and Towns

TOTAL	USERS
BURLINGTON*	1,263
SOUTH BURLINGTON*	818
COLCHESTER*	637
ESSEX*†	600
SHELBURNE*	208
WILLISTON	193
MIDDLEBURY	69
ST. ALBANS	51
MILTON	60
RICHMOND	42
WINOOSKI	31

Website Event Tracking

CALL-TO-ACTION	2022	2021	2020
MAILCHIMP FORM	66	48	61
RAIN GARDEN PDF	68	56	N/A
RAIN BARREL PDF	75	17	8
SOIL TEST CTA	5	18	5
SCIENCE EXPERIMENT PDF	26	15	N/A

* SAME POSITION AS LAST YEAR

† INCLUDES TOWN AND CITY

Overall Media Spend

YEAR	SPEND
2021-2022	\$22,174*
2020-2021	\$26,870
2019-2020	\$25,918
2018-2019	\$27,135

Google Advertising Metric

CAMPAIGN	IMPRESSIONS	INTERACTIONS	INTERACTION RATE	COST
DISPLAY	3,804,298	3,725	0.10%	\$7,563.85
VIDEO	481,719	319,430	66.31%	\$4,855.84
SEARCH	34,204	772	2.26%	\$948.80

Impressions are the number of times the ads are served to web users. For Display and Search, Interactions are the number of times a web user clicks on the ad.

Video ads are considered pre-roll or mid-roll, meaning they are shown either directly before or in the middle of a video the web user is watching. These ads are typically skipable after the first five seconds. Interactions include web users who click on the ads or watch the entire ad.

Facebook Advertising Metrics

CAMPAIGN	ENGAGEMENT	REACH	IMPRESSIONS
MS. DROP	N/A	10,552	36,917
SEPT/OCT/NOV 2022	671	9,280	44,475
SUMMER 2022	477	15,007	58,725
WORKSHOPS AND EVENTS	144	8,106	21,481
ADOPT A DRAIN	348	8,302	26,848
JAN/FEB 2022	283	3388	15,059

Impressions are the number of ads served to Facebook users. Clicks are the number of people who click on an ads. Reach is the number of individual Facebook users that see the ad.

Our increased focus on social media also provides us with age-and gender-related information about users who like our Facebook page (Likes) and individuals who follow our Instagram page (Followers).

In this case, reach refers to the overall unique users in each platform that have seen our posts, either through other users liking and sharing our content, users using the Explore features, or users who see promoted posts.

Facebook Likes Demographics

	2022	2021
REACH	33,412	60,666
NEW LIKES	33	32
PROFILE VISITS	266	204

Instagram Follower Demographics

	2022	2021
REACH	17,495	19,384
NEW LIKES	440	349
PROFILE VISITS	392	189

Overall, while we had an increase in both frequency and page likes, our organic reach dropped considerably. At the same time, our profile visits and likes/follows increased in 2022. At first glance, I would attribute this to privacy features introduced in iOS 13, which severely prevents apps from tracking users data for algorithmic purposes, as well as an overall shift in Facebook's methodology, to a more "pay to play" scenario, encouraging businesses and organizations to spend more.

While organic reach may continue to move downward, Facebook and Instagram remain important part of our advertising and outreach. Unlike traditional print and digital advertising, social media allows for two-way communication with residents in our MS-4 communities.

* In past years, our July/August digital spends have been credited to the previous fiscal year (i.e. July/August 2020 is counted toward 2019-2020, not FY2021-2022). In FY2021-2022, our July/August spends are now being counted as FY2022-2023, thus the overall drop in media spending for FY2021-2022.

**Appendix B CHITTENDEN COUNTY REGIONAL STORMWATER
PUBLIC INVOLVEMENT AND PARTICIPATION
PROGRAM (“STREAM TEAM”)**

Minimum Control Measure #2: Public Involvement & Participation Rethink Runoff Stream Team Summary of Activities



Prepared by Winooski Natural Resources Conservation District 2022 Calendar Year

Overview

Since July 2011, Winooski Natural Resources Conservation District (WNRCD) has been subcontracted by the Chittenden County Regional Planning Commission (CCRPC) to implement Minimum Control Measure #2: Public Involvement & Participation program on behalf of twelve MS4 permittees in the county. Administrative staff changes within WNRCD in 2022, the Stream Team engaged many residents in meaningful actions to improve stormwater in their community. Upon the departure of former project coordinator Kristen Balschunat, District Manager Remy Crettol stood as the interim project coordinator before Adelaide Dumm was hired in April 2022 as the conservation Specialist for the District and was elected Project Coordinator for the Stream Team for the remainder of the WNRCD contract. Collectively, the team organized a rain barrel workshop in South Burlington, continued our volunteer water quality monitoring program, launched the Adopt-a-Drain program, partnered with the South End Arts and Business Association to bring the program to life through a storm drain mural at the 30th annual ArtHop and hosted a stream clean up in Winooski on Morehouse Brook.

RRST Estimated Impact by Municipality

The table below depicts the estimated number of individuals engaged in each MS4 municipality in 2022. This table reflects **in-person** interactions where it was possible to log participants' town of residence. We were not able to track the exact number of community interactions at large events including the Storm Drain Mural at the 30th annual Art Hop in Burlington, as the project coordinator chatted briefly with hundreds of guests about the Stream Team as they passed by the display. For information about residents reached through digital efforts on the website and social media outlets, see the MCM #1 final report from Pluck.

Table 1: Interaction with the Stream Team by municipality

Municipality	# of people reached in - person in 2022
Burlington	75
Colchester	26

Essex	20
Essex Junction	16
Milton	5
Shelburne	4
South Burlington	9
Williston	1
Winooski	11
Total	167

Organizational Partnerships

The Rethink Runoff Stream Team partnered with **4** non-municipal organizations in 2022:

1. [Hamline University](#): Created the Adopt-a-Drain website based on social science research to engage more volunteers in maintaining the health of storm drains in MS4 communities across the country. This year RRST municipalities engaged in a discussion about joining the Adopt-a-Drain program. See "Projects" section for more details.
2. [South End Arts and Business Association \(SEABA\)](#): A storm drain mural was painted by a local Burlington artist to raise awareness for the Adopt-a-Drain program that was launched on Earth Day in 2022. The mural was painted on Pine Street during the 30th annual Art Hop, and program coordinator Adelaide Dumm attended on Friday September 9th and Saturday September 10th and spoke with hundreds of attendees about the program. This project resulted in a storm drain mural that will last for several years and continue to advocate for the program as well as a consistent uptick in storm drain adoptions.
3. [Lake Champlain Basin Program - Resource Room](#): A continued partnership with the LCBP that staffs and operates the Resources Room at the ECHO Leahy Center for Lake Champlain has benefited the RRST through increased public awareness about Stream Team events. The Resources Room staff spreads the word to community members about RRST projects and distributes Stream Team literature to enhance participation and education about stormwater management within the Lake Champlain Basin.
4. [Boves Inc](#) : In 2022 we secured a sustainable partnership with a local pasta sauce company that provides the Stream Team with blue 55 gallon drums with removable lids that can be recycled into rain barrels. This new partnership filled a significant need as the old barrel supplier is no longer in business and these can be quite expensive when

purchased new or even second hand. This partnership with Boves in Milton is especially valuable because we get the barrels for FREE!

Outreach -----

Social Media

The Stream Team coordinator consistently updated the social media platforms including RREST Facebook and Instagram pages with information about upcoming outreach events or volunteer opportunities.



Figure 1. RREST Facebook post about the Adopt-a-Drain mural at the 30th annual Art Hop and



Figure 2. Facebook post about the stream clean up on Morehouse Book in Winooski

RREST Website

We maintained the "[events](#)" section of the website and occasionally helped to develop ideas for new web content in collaboration with Pluck Design. The events that were added to the website included content on the rain barrel construction workshop held in South Burlington in June, a request for Adopt-a-Rain Garden stewards in July, a call for artists to participate in the Stream Team Art Hop mural held in Burlington in August, and an invitation for volunteers to participate in the stream clean up along Morehouse Brook in Winooski in September. In addition, there has been regional advocacy for participants to join the Adopt-a-Drain initiative. For more information on the website and the ongoing projects of the Stream Team please visit: <https://rethinkrunoff.org/>

Newsletter

Quarterly newsletters were released and kept the RRST community informed of events and ongoing projects. At the end of 2022 there were **794** subscribers to the RRST newsletter, in an effort to increase newsletter subscriptions we have coordinated with Pluck Design Professional, Dave Barron to create a social media post encouraging followers to subscribe to the newsletter and added a popup to the website prompting visitors to subscribe.

- [Summer newsletter](#), June 2022
- [Fall newsletter](#), September 2022
- [Reminder about the Morehouse brook stream clean up](#), September 2022
- [Winter newsletter](#), December 2022

Outreach Events

The RRST "outreach" events held in 2022 consisted mainly of tabling efforts at which the project coordinator spoke to residents about the Stream Team. These tabling efforts took place at the Rain barrel workshop, Adopt a drain mural, and Morehouse Brook stream clean up programs. Each event is described in more detail below in the project section.

Outreach efforts also included informing local media outlets prior to major programs and posting volunteer opportunities on social media calendars, Front Porch Forum, etc. District Manager, Remy Crettol and Burlington Stormwater Program Coordinator, James Sherrard both provided interviews on behalf of the Adopt-a-Drain program to local news outlets in 2022.



Figure 3. Tabling event at the Winooski stream clean up along Morehouse Brook

Projects -----

Five in-person "project" events were held in 2022 and plans were made for a sixth rain garden sign installation for spring 2023. A total of **167** people participated in hands-on volunteer events in their communities. The projects are described in detail below:

1. Stream Team Water Quality Sampling (10 volunteers)
2. Rain Barrel Construction workshop (20 attendees)
3. Adopt-a-Rain Garden Program (4 rain garden stewards)
4. Launch of the Adopt-a-Drain Program (124 storm drain adopters) and the Art Hop Mural (1 locally contracted artist)
5. Stream clean up on Morehouse Brook (9 volunteers from MS4 towns)
6. Planning for a spring sign installation at the Milton Rain Garden

Water Quality Monitoring

Summary: The Stream Team has maintained an ongoing water quality monitoring program since 2012. Community science volunteers collect water samples in urban or suburban streams that are impacted by excessive nutrient loading, high chloride and other pollution.

In 2021 the VT DEC's LaRosa Program provided financial support for analysis of the water samples at the Vermont Agriculture and Environmental Laboratory (VAEL), wrote the Quality Assurance Project Plan (QAPP), transported samples from partners' offices to the lab, and took on the responsibility of analyzing data from all state-wide partners. This change allowed us to focus more on volunteer recruitment and engagement in 2022 and less on behind-the-scenes paperwork. Of note, the state-wide data analysis has not been published yet, so a Stream Team Data Analysis document is not available with this report. The estimated report release date will be in January- February 2023 and will be distributed to the MS4 town representatives and Stream Team volunteers when it becomes publicly available.

Ten dedicated Stream Team volunteers collected biweekly water quality samples at twelve sites on seven streams during the sampling season from April-August 2022. The sampling sites were located along Alder Brook in Essex, Allen Brook in Milton, Centennial Brook in Burlington and South Burlington, Englesby Brook in Burlington, Indian Brook in Colchester, Morehouse Brook in Winooski, and Munroe Brook in Shelburne. Volunteers collected biweekly grab samples from April 12th-August 2nd. Grab samples were analyzed for total phosphorus and chloride. These parameters were also sampled at all sites after two high flow events.. Some sites required special equipment for sampling like a throw-bucket or dipper stick. Appropriate tools were purchased and/or created to assist with sampling while maintaining volunteer safety around swift waters. To show our appreciation for the Stream Team volunteers who have participated in the water quality monitoring, each volunteer was delivered a hand written thank you note, along with a \$20 gift card to Gardeners Supply Company, Stream Team sticker, hat and tee-shirt.

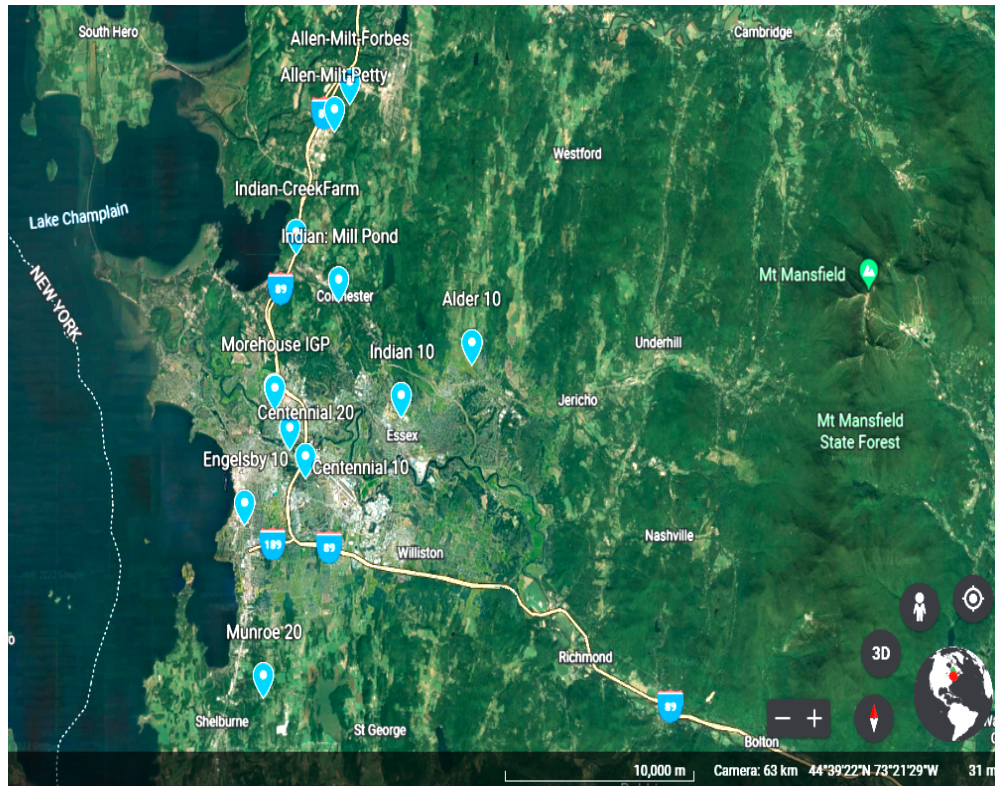


Figure 4. Stream Team Water Quality Sampling sites map.

See interactive online version here: [Stream Team Sampling Map 2022](#)

The training day for volunteer samplers took place in May. This year two sessions were offered - one in person at the stream adjacent to the WNRCD Williston Office and one online - to accommodate volunteers' schedules and comfort with gathering in-person. Most volunteers were returning from previous seasons and opted for the online training, a few new volunteers were met at their sampling site and received demonstration and training on sampling procedures. During both trainings the Stream Team coordinator demonstrated proper sampling technique, described the data collection sheets, explained how the collected data would be used and answered questions. Throughout the season, volunteers returned their samples through a contactless dropoff system to the WNRCD office. The Stream Team coordinator ensured all samples were properly checked-in and prepared for delivery to the lab. The Stream Team coordinator sent bi-weekly emails to WQ volunteers to check in about sampling procedure and share interesting local water tidbits, and other ways to get involved.

Advertising: Advertising was completed through direct email outreach to our list of active volunteers. We also sent out a volunteer sign up form through the newsletters, on social media, Front Porch Forum and on the Rethink Runoff website. Primarily, we targeted past volunteers for this program who had prior experience with water quality monitoring. We were also able to add two new volunteers to the Stream Team during 2022.

Impact: In total volunteers collected 282 individual samples including regular biweekly samples for total phosphorus and chloride, two high flow samples for each site, and routine lab duplicate samples. This data provides information about long term trends that may help towns analyze effectiveness of stormwater BMPs or identify new opportunities for action. Perhaps more importantly, we believe that engaging community members directly in clean - water work creates greater public understanding of the issues VT watersheds are facing and creates greater public support for clean - water initiatives like GSI installation or wastewater treatment plant improvements. In 2023 we plan to add data from this sampling season to the Stream Storytelling online map and use it as an educational tool during outreach events.

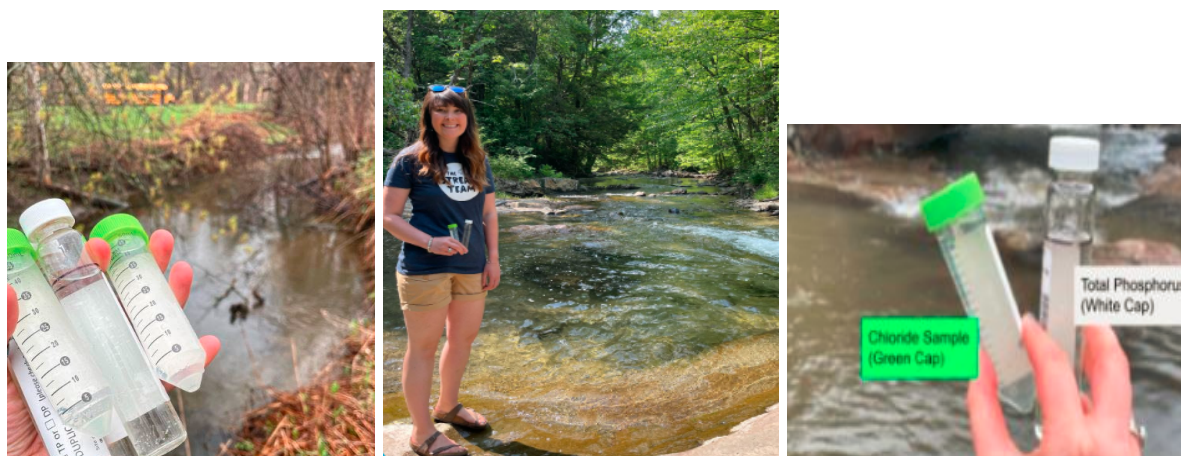


Figure 5. Stream Team water samples collected at various sites across the RRSST service area

Table 2: Stream Team Water Quality Sampling Volunteers by town

Municipality	# of volunteer water quality monitors by town
Burlington	1
Colchester	1
Essex	1
Essex Junction	0
Milton	1
Shelburne	1
South Burlington	4

Williston	0
Winooski	1
Total	10

Rain Barrel Construction Workshop



20 Chittenden County residents joined in the fun and created rain barrels!



Figure 6. Rain Barrel Workshop in June 2022

Summary: A rain barrel construction workshop was hosted at the City of South Burlington Department of Public Works, at 104 Landfill Road on Friday, June 24th, 2022. Participants paid \$40 to attend the workshop which included the cost of the barrel, associated hardware needed to build the rain barrel and time for workshop coordination. Project coordinator, Adelaide Dumm had help from WNRCD staff, Kathleen Lewis and Remy Crettol at this event. This event was held in two sessions -a morning session and an afternoon session- to accommodate the number of people able to use tools at the same time. Participants were greeted and given a brief demonstration of how to drill the holes and assemble the hardware. The rain barrels were sourced for free from Bove's in Milton, and this is a sustainable source for future programs. The program coordinator engaged with each participant and even had a walk up resident join in at this event. Several employees of the Public Works Department also came over to learn more about the Stream Team. Light refreshments were offered to workshop participants and each participant was offered a stream team tee shirt and sticker as an added benefit for attending this event.

Advertising: This event was advertised on the Rethink Runoff website and on social media platforms including Facebook and Instagram. There was also a press release sent to local media

outlets to help spread the word about this event. In addition, MS4 municipal representatives were asked to distribute a message on their respective Front Porch Forum pages to advertise this event.

Impact: In total, 20 residents participated in the event, 10 people in each session. At this event the project coordinator described that by installing a rain barrel you can save water, save money, and help your local streams all at the same time. This event taught participants how to build, install and maintain their own rain barrel. When it rains, stormwater moves quickly over impervious surfaces such as buildings and roads, picking up pollutants like nutrients, sediment, oil, chemicals, road salt, and metals. By capturing stormwater in a rain barrel before it flows over roads residents can help decrease the amount of pollutants entering Lake Champlain. The water participants save in a rain barrel can be used for watering lawns and flower gardens, and washing their car or tools. Rain barrels help decrease runoff to Lake Champlain by capturing and holding rain water during a storm, and that means cleaner water for everyone.



Figure 7. Action shots from the 2022 Rain Barrel workshop in South Burlington in June 2022

Adopt - a- RainGarden Program Summary

The Stream Team's Adopt-a-Rain Garden program is an opportunity for individuals to assist in keeping public rain gardens in their community functional and attractive. This involves basic maintenance activities like picking up trash, pruning, pulling weeds, installing new mulch, and informing the coordinator of non-functioning gardens. There are currently eleven public rain gardens managed by Stream Team. In 2022 the rain gardens were cared for by approximately 4 volunteers, a decline from the 10 volunteers in 2021. Four of the gardens are now cared for by municipal staff or hired landscaping crews, so recruitment for community volunteers stopped in 2021. We have 3 rain gardens that could use a steward. Outreach efforts to recruit volunteers included social media posts, posts on the RRST website, and Front Porch Forum posts for Rain garden adopters. We plan to continue advertising these gardens for adoption in 2023. See table below for more details. Several of these gardens need RRST informative signage replaced. There will be an inventory conducted in 2023 and signs installed in the spring.

Table 3: 2021 Rain Garden Adopters 2022

Location	Adopter Name
Chamberlin School (262 White St, South Burlington, VT)	Chris P.
Coast Guard Station (1 Depot St, Burlington, VT)	Larry K.
Williston Annex (7900 Williston Rd, Williston, VT)	Rita D.
Callahan Park, Burlington (45 Locust St, Burlington, VT)	Brad K.
Farrell Park (95 Swift St, South Burlington, VT)	Open for Adoption!
Brownell Library (6 Lincoln St, Essex Junction, VT)	Maintained by Essex Junction
South Burlington Library/ South Burlington High School (180 Market St, South Burlington, VT)	Maintained by South Burlington
Dorothy Alling Memorial Library (21 Library Ln, Williston, VT)	Maintained by Library
South Burlington Fire Dept. (575 Dorset St, South Burlington, VT)	Open for Adoption!
South Burlington High School (550 Dorset St, South Burlington, VT)	Open for Adoption!
Milton (43 Bombardier Rd, Milton, VT)	Maintained by Milton

Regional: Adopt-a-Drain Launch & 30th annual Art Hop Mural

Summary: Adopt-a-Drain is an exciting new initiative in Chittenden County that made its debut on Earth Day, April 22nd, 2022! Storm drains flow directly to lakes and streams, acting as a conduit for trash and pollutants. Adopt-a-Drain asks residents to adopt a storm drain in their neighborhood and keep it clear of leaves, trash, and other debris to reduce water pollution. Rethink Runoff, an ongoing awareness and public outreach effort to reduce dirt and pollutants from stormwater runoff entering Lake Champlain and local streams, partnered with Hamline University to launch Adopt-a-Drain in Chittenden County. Hamline University, in Saint Paul MN, first developed this program and it has been used in six states (Minnesota, Washington, Louisiana, New Jersey, Massachusetts, and Vermont) across the country. Currently, the program has been adopted by five municipalities in Vermont including Burlington, Colchester, Essex, Essex Junction, and Milton. Volunteers choose how frequently to clear their drain and report how much debris is collected. They receive a welcome packet, small yard sign, and the clever perk of getting to name a drain!



Figure 8. A yard sign created by Hamline University displayed in front of a storm drain that has been adopted as part of the Adopt-a-Drain initiative.

Advertising: The Adopt-a-Drain program has been advertised on social media pages including Facebook and Instagram, through press releases to local media outlets, Front Porch Forum posts,

and on the Rethink Runoff website. Remy Crettol, WNRCD District Manager and James Sherrard, Burlington stormwater Program Coordinator have provided interviews advocating for the Adopt-a-Drain program to local news stations. Towns who have chosen to participate in the program have contributed to advertising efforts by including a flier about the program that was included in residents' water bills. A pamphlet was also distributed at the annual WNRCD tree sale to help spread the word.

Quite noticeably there was a spike in participation after the ArtHop Event on September 9th and 10th at which the RRST contracted a Burlington artist to paint a storm drain mural while Adelaide, the project coordinator, recruited new adopters. The 30th annual SEABA Art Hop event was held on Pine street in Burlington. The storm drain mural was painted in front of ArtsRiot, a prime location for engaging with the public. This event was very successful and 11 residents signed up on the spot after seeing the storm drain mural. As of December 31st 2022 there have been 124 adopters, 181 storm drains adopted, and at least 741.22 lbs of debris removed from drains. The Art Hop event drew a large crowd and people from all over attended the event and many of the people Adelaide spoke with were residents of towns that were not currently participating in the adopt-a-drain program, as well as people throughout VT, NY, NH, MA, and even international travelers! Many of whom pledged to informally adopt their storm drains and participate in water conservation practices after learning about the important role they can have in preserving their watershed! We hope that the artwork continues to grab onlookers' attention and draw them to adopt a drain website.



Figure 9. Finished Adopt-a-Drain Mural at the Art Hop event in September 2022



Figure 10. Collection of photos taken during the Art Hop event as the mural was painted by resident artist Jamie Bedard.

Impact: The main goal of the program has been to recruit volunteers to care for storm drains in their neighborhood by clearing trash, sediment, salt and other pollutants on a regular basis. Launching the Adopt-a-Storm-Drain program has been a great fit for the involved communities as residents have continued to be impacted by COVID 19 and this opportunity is a remote option to be involved in the Stream Team and maintain a comfortable level for physical distancing for those who choose to do so. Outreach and engagement efforts for this program have led to 124 storm drain adopters signed up to participate in the program (less than $\frac{1}{2}$ the anticipated 300 volunteers that was forecasted in 2021 at the launch of the program). We are confident that this program will continue to grow as residents become more aware of the impact they can make. Adopting a storm drain is a small and simple action that may inspire community members to participate in other Rethink Runoff activities in the years to come and consider the ways water flows through their neighborhood. For additional information please refer to the [Adopt-a-Drain annual report for 2022](#) prepared by Hamline University.

Table 4. Adopt-a-Drain data for 2022

Participating Adopt-a-Drain MS4s	Number of Storm Drain Adopters	Lbs of Debris Removed	Number of Drains Adopted
Burlington	69	262.5	105
Colchester	22	195.36	32

Essex	18	202.56	28
Essex Junction	11	12.5	13
Milton	4	115.4	4
Total:	124	788	182

Adopted Storm Drains Vermont, 2022

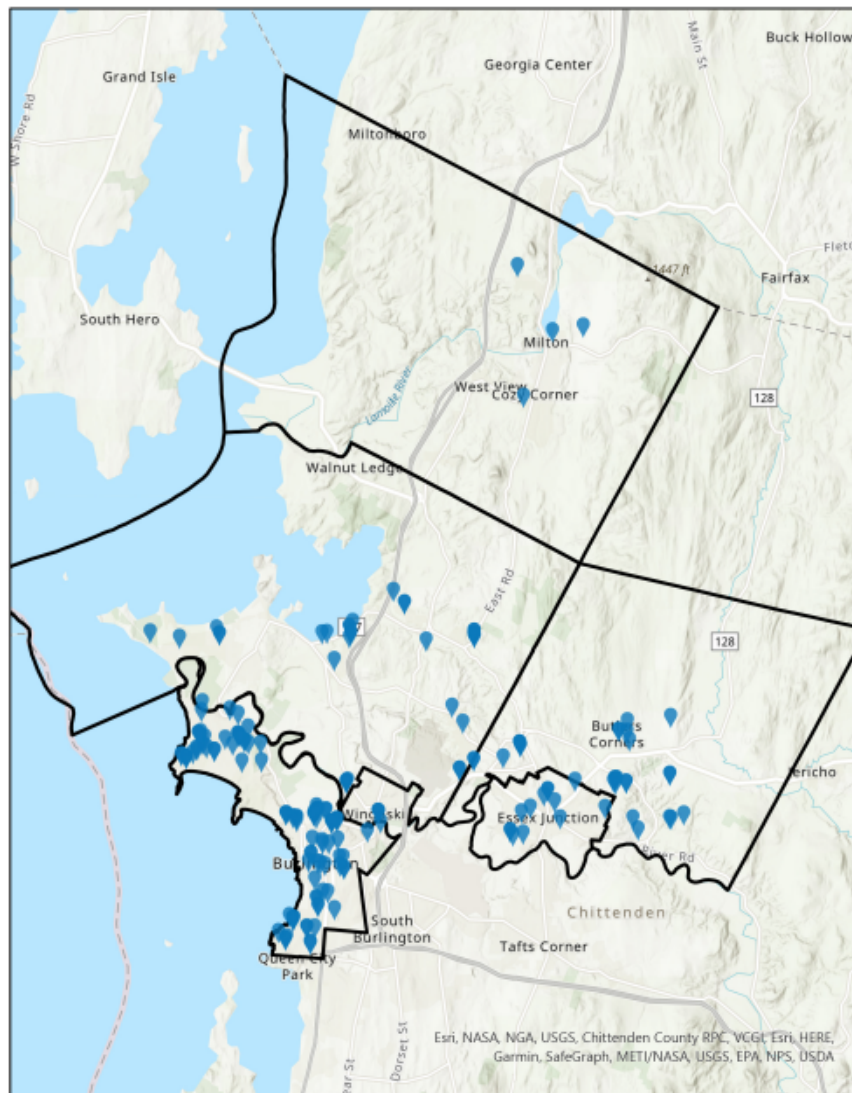


Figure 11. Map of the adopted drains in each respective town, as of 12/31/22.

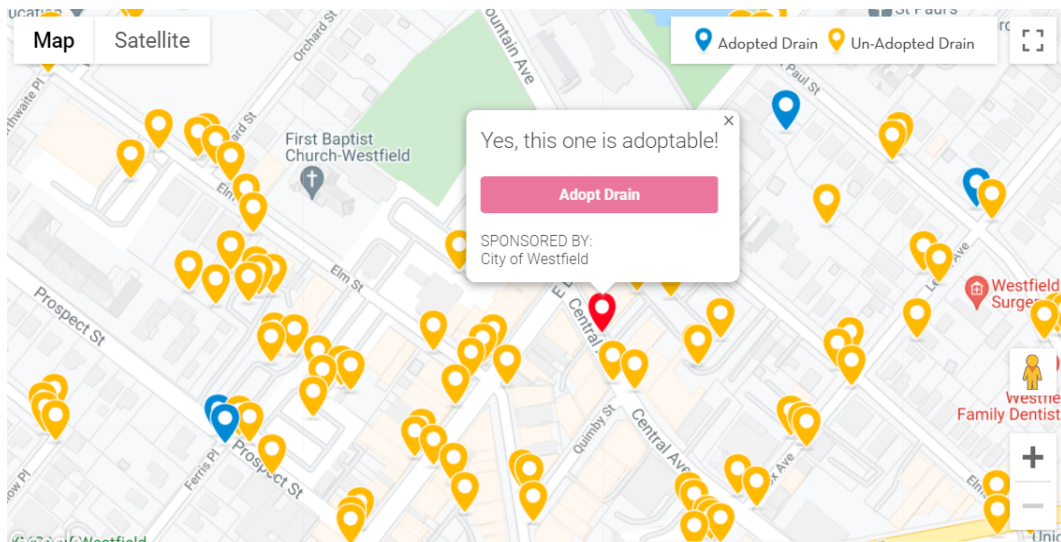


Figure 12. Screenshot from Adopt-a-Drain Website illustrating volunteer sign-up map format

Stream Clean up on Morehouse Brook

Summary: Every year, trash illegally discarded or swept downstream, litters our streams and rivers. In an effort to protect and preserve these important riparian habitats, the state formally recognized September as Vermont's River Clean Up month. The Stream Team chose to take part in this effort by hosting a stream clean up in Winooski. The Stream Team invited local volunteers to join in the effort on Saturday September 24th from 10am till noon. Volunteers met at Landry Park and began the stream clean up at the edge of the wooded area just behind the skate park and walked Morehouse Brook, which had a low flow during this time of year, and collected litter in five gallon buckets. The 12 volunteers who attended this event were advised to wear protective footwear, and bring a bucket for litter if possible. Light refreshments, gloves, and trash bags were provided for volunteers. After two quick hours on the stream, the volunteers emerged with buckets overflowing with junk - enough to fill the back of a pick up truck! The refuse were sorted and disposed of properly at the Chittenden Solid Waste Department in Essex Junction. Rethink Runoff had an information table setup for easy navigation to the site and project coordinator Adelaide Dumm engaged with several community members who were enjoying the park that morning.

Advertising: This event was advertised on the Rethink Runoff website and on social media platforms including Facebook and Instagram. There was also a press release sent to local media outlets to help spread the word about this event. In addition, MS4 representatives were asked to distribute a message on their respective Front Porch Forum pages to advertise this event. Finally, flyers were hung around town to garner interest from Winooski residents. The Winooski high school was contacted to invite any environmental clubs, but they did not participate in this event.

Impact: Through this event the Stream Team was able to recover a large quantity of litter from Morehouse Brook - an entire pick up truck bed full!. This event serves as an opportunity for

residents to take stewardship over their local waterways and facilitates the possibility for community engagement as residents who were enjoying the park noticed the amount of trash being removed from a stream that many did not even know was there. This type of event was less about the amount of debris removed from the stream, as it was a small two mile stretch and there was still a lot of garbage that was not able to be removed, and more focused on community education and engagement. Volunteers were surprised by the amount of debris that they were able to remove in just two hours and empowered to continue to seek opportunities to make an impact on the health of their local environments. Of the 12 volunteers at this event, 7 were Winooski residents and 5 were from neighboring communities including Colchester, Essex Junction and Jeffersonville. All the stream team volunteers were offered a Stream Team hat and tee shirt, light refreshments were also provided as a thank you for helping out!



Figure 13. Project Coordinator Adelaide Dumm with a tire from Morehouse Brook stream clean up and the contents from the Stream Clean up ready to be disposed of at the Chittenden Solid Waste District Drop-off center.

Milton Project: Rain Garden Planning and Installation

Summary: RRST assisted staff at the Town of Milton with the design and installation of a new rain garden at the Municipal Building on Bombardier Road in 2021. The Stream Team Coordinator worked with graphic design professionals from Pluck in 2022 to create an informative sign to be installed in spring 2023.

Stream Team Merchandise

The Stream Team coordinated with Pluck to generate a new Stream Team tee shirt and hat to be distributed to the stream Team and program volunteers.



Figure 14. New stream Team merchandise

Volunteer Appreciation Summary

All volunteers were offered Stream Team tee shirts and stickers at the time of the event and many accepted one or both. We also delivered handwritten thank-you notes and a \$20 gift card to Gardeners Supply Company, and a Stream Team tee shirt and hat to our most dedicated volunteers who participated in the Stream Team as water quality monitors.



This document was prepared by the Winooski Natural Resources Conservation District, which is contracted by CCRPC's MS4 Committee to run the RRSST program.

Appendix C Illicit Discharge Detection and Elimination Testing Plan

Vermont Agency of Transportation

Illicit Discharge Detection and Elimination Testing Plan

DRAFT

To be updated and finalized after field tested over 2-year period

December, 2022

Table of Contents

1.0 Introduction

- 1.1 Definitions
- 1.2 Regulation

2.0 Identify and Target Priority Areas

- 2.1 Methods for Identifying Potential Illicit Discharges (selecting outfalls)
- 2.2 Other Sources to Identify Illicit Discharges
 - Districts
 - Plan review
 - Public/ other agencies

3.0 Sampling

- 3.1 Selecting testing locations
- 3.2 Sampling parameters/methodologies and equipment

4.0 Post Sampling Tracking

5.0 Illicit Discharge Reporting Procedure

6.0 Enforcement limitations

Appendix A: Supporting Documents

- VTrans Illicit Discharge Policy
- Outfall selection procedure
- Documentation of why we can't accept Illicit Discharges
- Procedure of testing and reporting
- Testing procedure
- Outfall List
- Example Notice Letter to Property Owner (Johnson and Mike's template letters)

1.0 Introduction

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by VTrans to address the requirements of the 2017 General Permit 3-9007 for Stormwater Discharges from the State Transportation Separate Storm Sewer System (TS4). This plan is intended to be a living document, subject to change from time to time based on available data and lessons learned implementing it. The plan will be evaluated throughout the summer as the document is being used and annually to determine if any changes are needed.

As part of the TS4 permit VTrans has developed an IDDE policy that prohibits illicit discharges onto VTrans owned and controlled land. This Plan supports the Policy. See Appendix A VTrans Illicit Discharge Policy.

2.0 Definitions

Illicit Discharge – An illicit discharge is any discharge to the stormwater systems of the Transportation Storm Sewer System (TS4) that is not authorized by the TS4 permit or another discharge permit. Illicit discharges can enter into the VTrans maintained drainage system via overland flow, direct connection, infiltration from nearby leaking sanitary sewers, or direct dumping into a catch basin. If a connection has been reviewed by VTrans and has been determined that it is not an illicit discharge and is allowable, a discharge to VTrans' storm drainage system can be considered for approval under Title 19, Section 1111 Highway Access Permit.

Allowed Non-Stormwater Discharge – An allowable non-stormwater discharge is a discharge that does not originate from a storm event and is permitted under the VTrans TS4 permit. Per EPA, Allowed Non-Stormwater Discharges are limited to the following.

1. Potable water, including water line flushings;
2. Landscape watering, provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling;
3. Diverted stream flows;
4. Uncontaminated ground water, including pumped ground water, or spring water;
5. Foundation or footing drains where flows are not contaminated with process materials, and to which there are no floor drain, septic wastewater, or grey water connections;
6. Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids;
7. Irrigation drainage;
8. Uncontaminated water from crawl space pumps;
9. Flows from riparian habitats and wetlands;
10. Discharges from emergency/unplanned fire-fighting activities;
11. Fire hydrant flushing;
12. Pavement wash waters where no detergents or hazardous cleaning products are used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols), and the wash

waters do not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities, or any other toxic or hazardous materials, unless residues are first cleaned-up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags) and where appropriate control measures have been implemented to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention; settlement);

13. Routine external building washdown/power wash water that does not use detergents or hazardous cleaning products (e.g., those containing bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols); and
14. Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of a facility, but not intentional discharges from the cooling tower (e.g., “piped” cooling tower blowdown or drains).

1.2 Regulation

The TS4 requires that VTrans shall develop, implement, and enforce a program to detect and eliminate illicit discharges into the stormwater systems of the TS4. As a part of VTrans’ program to detect and eliminate illicit discharges, VTrans shall develop and implement a plan to detect and address non-stormwater discharges, with emphasis on outfalls in the stormwater-impaired watersheds, and random illegal dumping to the stormwater systems of the TS4, such as the dumping of RV wastes, used oil, and paint. In developing the plan VTrans shall collect or utilize existing local or Agency data. VTrans may conduct such investigations itself, contract with independent entities to conduct such investigations, coordinate such investigations with others, such as regulated small MS4s, or any combination of these approaches. The plan shall:

1. Include dry weather field screening for non-stormwater flows and field tests of selected chemical parameters as indicators of discharge sources,
2. Address on-site sewage disposal systems that flow into the storm drainage system,
3. Include procedures for locating priority areas likely to have illicit discharges, which include those areas with a higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines), and procedures for conducting ambient sampling to locate impacted reaches,
4. Include procedures, including the specific techniques used, for tracing the source of an illicit discharge,
5. Include procedures for removing the source of the illicit discharge, and
6. Include procedures for program evaluation and assessment.

2.0 Identify and Target Priority Areas

2.1 Methods for Identifying Potential Illicit Discharges

Identifying all VTrans outfalls is the first step to creating a testing procedure statewide. The VTrans drainage network contains more than 37,800 culverts. To make a practical illicit discharge outfall testing program, the following procedure is used to identify all outfalls in priority areas and eliminate outfalls in areas of low priority.

Identifying outfalls is most effectively completed in a desktop analysis using ArcGIS. Over 37,800 culverts were analyzed to identify outfalls that were part of a drainage network rather than identifying outfalls at a single cross culvert where the probability of finding an illicit discharge would be smaller.

Areas that were eliminated due to low probability of illicit discharges included interstates and ramps, airports, and garages. The airports are inspected through the Multi-Sector General Permit requirements, and the garages are inspected through the TS4 requirements under section 6.3F.

2.2 Other Sources to Identify Illicit Discharges

Doing a desktop analysis of outfalls with potential illicit discharges is a good way to narrow down locations to perform testing but there are other ways that illicit discharges can be found.

VTrans District staff performing road maintenance typically are the best eyes on the ground to identify illicit discharges. During routine roadside litter picking, ditching, and roadside inspections are how most of our illicit discharges get identified. The Water Quality Unit in VTrans trains District staff on what to look for and how to report an illicit discharge. Appendix D is a document for the Districts and the Water Quality Unit to reference that outlines the process for reporting and handling a potential illicit discharge. VTrans Construction Section is also aware of what to look for and who to report illicit discharges to.

VTrans Water Quality Unit perform plan reviews for projects that are being designed in house and by consultants that are within the VTrans rights-of-way. VTrans Water Quality Unit and District staff also review Title 19 Section 1111 Highway Access Permit Applications which may reveal potential sources of illegal connections or illicit discharges.

VTrans also gets notified by the public and other State Agencies of potential illicit discharges. Having others looking for illicit discharges is the best way to find them.

3.0 Sampling

3.1 Selecting Testing Locations

Testing locations are selected by grouping outfalls into a manageable work area. Time is a factor that must be considered when selecting outfalls. Some of the samples must be kept cold and brought to the lab in Colchester within 24 hours of collection. In a typical workday there is only enough time to collect a few different samples in different locations and have time to make it to the lab in time. Testing outfalls can occur on a day dedicated to testing or it can also happen if you plan to be in an area for other reasons and there are outfalls to test.

3.2 Sampling Parameters/Methodologies and Equipment

Methods: The following includes a description of three separate water sampling test kit protocols as well as a description of disposal of material and chemical waste once water quality tests are completed.

Material and Chemical Waste Disposal: After each separate water quality test is completed it is necessary to dispose of all chemical and material waste which could potentially be harmful to testers in the field. Glass, plastic, and liquid waste will all be disposed of in the same disposal bucket following completion of each test. Testers in transit should be sure to both secure the screw top on the disposal bucket and position the bucket so that it will not overturn within the vehicle.

Water Sampling for Burlington Lab Tests: Before beginning any part of the sampling process, make sure to be wearing gloves (latex gloves are sufficient). Next, print the date and time of collection on the top of the sample bottle, then print last name and phone number on the side label of the bottle. Make sure the paper seal on the sample bottle is unbroken before sampling begins. Break the seal after the bottle is labeled and collect a sample by holding the opening of the bottle towards the current of the stream/outfall, tilting the bottle slightly upwards to allow air to escape it. At least 100 mL of water is necessary for testing. Take care to keep as much of the white powder preservative inside the bottle as possible, filling the bottle to the marked line. Replace the screw cap on the bottle and tighten firmly to prevent leakage. Fill out the requisition form completely. The following information is required to ensure accurate and efficient processing of the specimen and reporting of test results: date of sample collection, time of sample collection (note a.m. or p.m.), location of sample collection, sampler name and day telephone number. Place the sample bottle and completed Water Sample Collection Form in the cardboard mailer and screw the cap on tightly. Place the entire capsule in a cooler. Get the sample to the testing lab by the fastest means possible, but the testing is recommended within 6 and 24 hours of collection for optimal results (must begin within 30 hours of collection). Water

samples must be received at the lab by 4 p.m. on regular workdays for testing to begin the same day. Samples received later than 30 hours after sampling time will be rejected.

Chlorine (Cl₂) Test Kit Protocol (Low Range):

1. Set instrument to low range (LR)
2. Fill a “blank” sample cell (bottle) to the 10 mL line with the water sample and cap it
3. Clean the exterior of the prepared blank and insert it into the instrument with the diamond mark facing the keypad
4. Place the instrument cap over the “blank”
5. Press the “ZERO” button; the display will read “0.00”
6. Remove the “blank” sample cell from the instrument
7. Prepare the second sample cell, filling it once again to the 10 mL mark with the sample
8. Add one “10 mL DPD Total Chlorine Reagent Powder Pillow” to the sample cell and cap it
9. Shake the sample cell for approx. 20 seconds until the reagent powder is mostly dissolved; undissolved powder will not affect accuracy; the solution will turn pink if chlorine is present in the sample
10. Clean the prepared sample cell and set a timer for 3 minutes
11. After 3 minutes and within 6 minutes of adding the reagent powder, insert the sample cell into the instrument making sure that the diamond mark on the sample cell is facing the keypad of the instrument
12. Place the instrument cap over the sample cell and push the READ button (looks like a check mark); the resulting total chlorine (Cl₂) content in mg/L will be displayed
13. Dispose of the solution after results are recorded and clean both sample cells thoroughly

Ammonia (NH₃) Test Kit Protocol:

1. Fill one of the included sample vials with desired water sample
2. Dip a test strip into the sample and “vigorously” move the strip up and down in the sample for 30 seconds making sure both pads on the test strip are always submerged.
3. Remove the test strip and shake off excess water
4. Hold the test strip level, with the pad side up, for 30 seconds
5. To read the results, turn the test strip over so that the pad side of the strip is facing away from you
6. Compare the color of the **small pad** to the color chart on the back of the test strip bottle. Read the result through the clear plastic of the test strip and record results in mg/L
7. Rinse the sample vial with tap water after each use and dispose of the test strip

Detergent Test Kit Protocol:

1. Rinse the reaction tube (has a red cap) with the sample to be tested, and then fill the tube to the 5 mL mark with the sample

2. While holding the double-tipped ampoule in a vertical position, snap the upper tip using the blue tip breaking tool
3. Invert the ampoule and position the open end over the reaction tube. Snap the upper tip and allow the contents to drain into the reaction tube
4. Cap the reaction tube and shake it vigorously for 30 seconds. Allow the tube to stand undisturbed for 1 minute
5. Obtain one of the thinner CHEMets ampoules and make sure that the included flexible tubing is firmly affixed to the ampoule tip.
6. Insert the CHEMets assembly (tubing first) into the reaction tube making sure that the end of the flexible tubing is at the bottom of the tube. Break the tip of the CHEMets ampoule by gently pressing it against the side of the reaction tube. The ampoule should draw in fluid only from the “organic phase” (bottom layer of the reaction tube)
7. When filling is complete, remove the CHEMets assembly from the reaction tube
8. Remove the flexible tubing from the CHEMets ampoule and wipe all liquid from the exterior of the ampoule. Place an ampoule cap firmly onto the tip of the CHEMets ampoule. Invert the ampoule several times, allowing the bubble to travel from end to end
9. Obtain a test result by placing the ampoule, flat end first, into the comparator. Hold the comparator up toward a source of light and view from the bottom. Rotate the comparator until the best color match is found. Record results measured in ppm (mg/Liter)
10. Dispose of all glass and liquid waste

YSI Meter Protocol:

1. The YSI meter is capable of detecting relative levels of temperature, conductivity, and specific conductivity.
2. Salinity (total dissolved solids or TDS) must be calculated separately.
3. The meter’s probe is placed in a water sample and desired values are yielded on the device’s screen.
4. Before recording, values must stabilize; this could take 15 to 20 seconds.
5. Simple function of the device is as simple as turning it on and placing the probe in the sample.
6. For more information on the device’s higher functions, refer to its user manual.

Vermont Water Quality Reporting Limits and Criteria		
Parameter	Reporting Limits	Water Quality Criteria or Guidelines
pH	4 to 10 units	6.5-8.5
temp	0 to +40°C	<20°C

sp cond	0 to 100 mS/cm	NA
DO	0.5 mg/L to Sat	≥7 mg/L , ≥75% saturation
surfactants	0.25 mg/L	0.25 mg/L
ammonia (NH3)	0.25 mg/L	1.0 mg/L
E. Coli	4 col./100 mL	<235 cfu/100 mL
Enterococcus	1 col./100 mL	<35 cfu/100 mL
chlorine (Cl2)	0.02 mg/L	NA
turbidity	NA	<25 NTU

Figure 3. Results recorded from each water quality test will be compared to Vermont water quality standards which are outlined in the following table based off of EPA and VT ANR water quality standard data.

(Source: City of St. Albans: Illicit Discharge Detection and Elimination)

Above is a section of the document dedicated to outfall testing procedures. This testing is reserved for outfall testing to determine if there is presence of a variety of pollutants. Sometimes illicit discharges are reported from other sources and the testing is selected based on the observed probable pollutant. For example, if a site visit confirms that there is blue water that smells like laundry soap, we may only test for detergents. If the site is clearly a problem, a test can be forgone, and reporting can occur.

4.0 Post Sampling Tracking

Through the process of illicit discharge reporting, testing, and referral to ANR, tracking is an important aspect that needs to happen. We use an ArcGIS Online map to track spatial information along with detailed information about the testing, the conditions at the time of testing, results, and other information. The tracking is used as a tool to make sure there is resolution on reported illicit discharges. We can also export information from the map to use for TS4 annual reporting.

Below is information about the map that illicit discharges are tracked on.

The illicit discharge map uses the results field to draw from. There are three selections in the results field:

1. Positive-ANR (this means the results are high and ANR has been notified),
2. Negative –District/S1111 (the results are low or no contaminants are detected and the discharge is in the hands of the districts to follow the S1111 permit process), or
3. Processing, this is used when a location is first entered until lab results are received.

Other fields within the illicit discharge reporting layer include locational information, route, town, mile marker. Route and Town are linked to the databases domains. Approximate address is also a field to use to help narrow down the location of the discharge, this address is not to be viewed as the address of the source of discharge it is only to be used as a locating tool.

There are a few date fields to keep a timetable from the start to the end of the process. The date fields include date reported, date sampled, and date tested. Date reported is the date the discharge was entered into the map. Some discharges are difficult to collect a sample from, sometimes they are visited multiple times before a sample can be obtained. The collection issue field is to be used during these times. This, with the use of the comment field, will give some background on discharges that were reported at an earlier date and either still have not been collected or have a large time gap between date reported and date sampled.

Date and time sampled is when the grab sample was collected. Sampler name should also be recorded in case there are follow up questions. Sample ID is a way to keep track of total samples collected. This is developed by using the sampler's initials and a three-digit number, the sampler is to keep track of what sample numbers they are to use. Each sample number should be different. Date tested and test time is in reference to the date and time the lab tested the grab sample, this will appear on the lab results and should be conducted within 24 hours of the grab sample collection.

When collecting a grab sample the sampler should also record weather conditions, air temp, water temp, any smells or odors, color, and floatables. Sample source should also be collected. The selection for this field includes culvert size 12-72 in, pipe size <10 in, and other, if other is selected the comment field should be used to describe.

Lab name and test type are auto filled to Vermont Department of Health Lab and Enumeration of Total Coliform and E. Coli (NU). The Health lab is the only lab in the state that we can bring our samples to and the majority of our testing is for number of coliform and e. coli. The other drop down for the test types include Nitrate & Nitrite . (source: MOB Environmental Program Illicit Discharge Reporting)

5.0 Illicit Discharge Reporting Procedure

Below is a procedure that the VTrans Water Quality Unit, the District, and Construction staff use to report a potential illicit discharge found.

1. Possible illicit discharge is found
2. Record Location
 - a. Route, Town, Mile Marker (any additional specific location information to narrow down search time)
 - b. Picture if possible
 - c. Description of pipe and discharge
 - i. Color of pipe
 - ii. Color if discharge if applicable
3. Contact the Regional Water Quality Technician with above information.
4. The water quality technician will document the possible illicit discharge in MOB_EPWQ_IllicitDischargeReporting database. Data can be viewed on ArcGIS Online (AGO) the name of the map is **Illegal Connections & Illicit Discharges**.
5. The technician will collect a grab sample of the discharge within a reasonable time and bring it to the Vermont Department of Health Laboratory to be analyzed within 24 hours of collection.

Physical:

Vermont Department of Health
Laboratory
359 S Park Dr
Colchester, VT 05446

Mailing:

Vermont Department of Health
Laboratory
PO Box 1125
Burlington, VT 05402-1125

6. The lab results will fall into one of two categories, positive or negative.
 - a. If the results return positive (testing above the allowable concentration threshold) the water quality technician will forward the results and location to ANR Environmental Enforcement Officer and Town Health Officer/Select Board, as well as the District.
 - b. If the results return negative (testing below the allowable concentration threshold, suggesting the discharge is stormwater) the water quality tech will forward results to the district to follow the Title 19 Section 1111 permitting process.
7. The lab results will also be documented in the database and map.

Map can be found here:

<https://vtrans.maps.arcgis.com/apps/webappviewer/index.html?id=df9091f0a35d4da0b85b468d7185473b>

(Source: MOB Environmental Program Illicit Discharge Standard Operating Process)

6.0 Enforcement limitations

VTrans has legal authority to restrict what is allowed in the state rights-of-way through the section 1111 access permit process. Through the access permit process VTrans has the right to protect the state infrastructure by controlling what is not allowed within the rights-of-way. We do not have the authority to enforce against property owners who are discharging illicit material into the state right of way. VTrans will rely on ANR enforcement to follow through with a confirmed illicit discharge. VTrans will track and follow up with confirmation that the report is closed out.

Appendix: Supporting Document
Appendix A: VTrans Illicit Discharge Policy

VERMONT AGENCY OF TRANSPORTATION	ORIGINAL POLICY ADOPTED N/A	ORIGINAL POLICY IDENTIFIER N/A
POLICY MANUAL	EFFECTIVE DATE January 15, 2022	IDENTIFIER 3025
	RESPONSIBLE SECTION DMF Technical Services Pollution Prevention & Compliance Section	SUPERSEDES N/A
SUBJECT: Prohibition on Illicit (non-stormwater) discharges into VTrans TS4		SCREEN/PAGE 1 OF 5

STATUTORY REFERENCE/OTHER AUTHORITY:

19 V.S.A. Section 1111(b) Driveway entrances, highway grades; drainage.

VTrans has common-law authority to prohibit significant unnatural flows on to any property that it owns or controls.

- Common Law Trespass (See Restatement (Second) of Torts § 158; *Harris v. Carbonneau*, 165 Vt. 433, 437, 685 A.2d 296, 299 (1996))
- Common Law Nuisance (See Restatement (Second) of Torts § 833; *Canton v. Graniteville Fire Dist. No. 4*, 171 Vt. 551, 552, 762 A.2d 808, 810 (2000))

Various federal regulations require VTrans to keep its highway rights of way free and clear of non-transportation uses, subject to limited exceptions. See, e.g., 23 C.F.R. §§ 1.23, 710.401 to 710.409.

Transportation Separate Storm Sewer System (TS4) Permit:

The TS4 permit is issued pursuant to the Vermont Water Pollution Control statute, 10 V.S.A. Chapter 47, specifically §§ 1258 and 1264; the Vermont Water Pollution Control Permit Regulations (Environmental Protection Rules, Chapter 13), including the rule governing general permits in Section 13.12; the Vermont Stormwater Management Rule (Environmental Protection Rules, Chapter 18); the Vermont Stormwater Management Rule for Stormwater-Impaired Waters (Environmental Protection Rules, Chapter 22); the federal Clean Water Act (CWA), as amended, 33 U.S.C. § 1251 *et seq.*; and related regulations of the United States Environmental Protection Agency (U.S. EPA) at 40 C.F.R. Part 122. The TS4 permit meets the minimum requirements for stormwater permits issued by the State of Vermont as the delegated authority to administer the federal National Pollutant Discharge Elimination System (NPDES) and also complies with state-specific permitting requirements for regulated stormwater runoff from impervious surfaces.

DISCUSSION:

An investigation into the need for Legislative action, Rule Making under Title 19 Section 1111 or Policy has resulted in the following findings:

1. Section 1111 is limited to highway ROW and does not regulate discharges to VTrans parcel-based development.
2. Section 1111 is clear on when a permit is necessary but does not specifically prohibit illicit discharges.
3. VTrans has sufficient legal authority under Common Law to regulate non-highway/ROW land holdings (no need for new/amended law or rule).
4. TS4 Permit requires policy adoption.
5. A written policy is the most appropriate next step to comply with the TS4 Permit.

APPROVAL DATE: January 15, 2022 **APPROVED BY:** Joe Flynn, Secretary of Transportation

PURPOSE:

The purpose of this policy is to establish an Agency of Transportation (VTrans) policy, applicable to statewide VTrans TS4, prohibiting illicit (non-stormwater) discharges into the state highway rights-of-way, into its stormwater collection, conveyance and treatment systems (“stormwater management systems”), and onto its other non-highway land holdings as required under VTrans TS4 Permit from the State of Vermont Agency of Natural Resources (VTANR)

Regarding compliance with state and federal law. The Vermont Department of Environmental Conservation’s TS4 General Permit states under Minimum Control Measure #3, relating to Illicit Discharge Detection and Elimination (IDDE), as follows:

VTrans shall develop, implement, and enforce a program to detect and eliminate illicit discharges into the stormwater systems of the TS4. As a part of VTrans’ program to detect and eliminate illicit discharges, VTrans shall Adopt a policy prohibiting non-stormwater discharges, except for those listed in Subpart 2.2.B of the Permit, into the stormwater systems of the TS4 and implement appropriate enforcement procedures and actions.

This policy proposes to:

1. Provide for the health, safety, and general welfare of the citizens of Vermont.
2. Reduce water quality impairment and prevent the degradation of receiving water quality.
3. Protect aquatic, wildlife, and human health.
4. Comply with Federal & State Regulations in the designated VTrans TS4 under the NPDES Phase II Final Rule MS4 (TS4) General Permit.
5. Limit VTrans’ liability.
6. Protect transportation infrastructure.
7. Create a consistent statewide approach to managing illicit (non-stormwater) discharges.
8. Satisfy FHWA’s requirement that highway rights-of-way be preserved for transportation use.
9. Support the VTrans efforts to prohibit illegal connections and illicit discharges under the Title 19, Section 1111 “Highway Access Permit” provisions.

APPLICABILITY AND JURISDICTIONAL LIMITS:

This policy applies to VTrans ROW and other Land Holdings covered under the TS4 ([permit link](#)), including:

1. VTrans-owned or -controlled state highways, sidewalks, multi-use pedestrian paths, welcome centers, airports, gravel pits, mineral mining, maintenance facilities, park & rides, truck weigh stations, and other impervious surfaces.
2. VTrans-owned facilities leased to third parties, including welcome centers and airport facilities (hangars and terminals)

This policy does not apply to VTrans-owned rail lines, rail yards, public transit facilities, and rail trails leased to third parties.

DEFINITIONS:

Illicit Discharge – means any discharge not composed entirely of stormwater runoff to VTrans TS4 that is not authorized under the TS4 Permit or another Federal or State Discharge Permit.

The result of illicit discharges is untreated water that could contribute pollutants to Vermont surface receiving waters and groundwater.

Sources of Illicit Discharges include, but are not limited to: sanitary wastewater, effluent from septic tanks, car wash wastewaters, improper oil disposal, radiator flushing disposal, laundry wastewaters, spills from roadway accidents, floor drain connections, industrial process wastewater, and improper disposal of auto and household toxics.

Types of Illicit Discharges include three (3) categories based on frequency of discharge:

1. Transitory Illicit Discharge: These are typically a one-time event. They can result from spills, dumping, and line breaks.
2. Intermittent Illicit Discharge: These are typically discharges that occur occasionally. They can occur several hours per day, week or over the course of a year. They can happen as the result of line breaks or cross connections.
3. Continuous Illicit Discharge: These direct connections into the MS4/TS4 can be from sanitary sewers, cross connections, infrastructure problems with a sanitary sewer system, or malfunctioning household sewage treatment systems.

Reference resource: EPA Stormwater Phase II Final Rule Fact Sheet addressing Illicit Discharges. <https://www3.epa.gov/npdes/pubs/fact2-5.pdf>

Pollutant – means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquids and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coli form and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from construction practices; and noxious or offensive matter of any kind.

Stormwater – means stormwater runoff, snow melt runoff, and surface runoff and drainage [40 CFR 122.26(b)(13)].

VTrans Stormwater Management System – means VTrans-owned and operated drainage facilities by which stormwater is collected, treated, conveyed, and/or discharged, including but not limited to: curbs, inlets, piped storm drains, retention and detention basins, natural and human-made or altered drainage ditches, swales, culverts, and other drainage structures.

POLICY STATEMENT:

VTrans prohibits illicit (non-stormwater) discharges into the state highway rights-of-way, into its stormwater collection, conveyance and treatment systems ("stormwater management systems"), and onto its other land holdings, except for those discharges listed in Subpart 2.2.B of the Transportation Separate Storm Sewer System (TS4) Permit and noted below under Policy Exclusions.

No person shall discharge or cause to be discharged into the VTrans statewide stormwater management system, rights-of-way or other land holdings any materials, including but not limited to pollutants or waters containing pollutants, other than stormwater (subject to Title 19 Section 1111 review and permitting and any other Federal, State, or Local regulations). Exceptions do apply and are noted below under Policy Exclusions.

VTrans will not connect, reconnect, nor allow known or discovered connections of any illicit discharges to the VTrans statewide stormwater management system, rights-of-way or other land holdings. This prohibition expressly includes, without limitation, illicit connections or discharges made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

More specifically, this prohibition applies to:

- 1. VTrans-owned or -controlled state highways, sidewalks, multi-use pedestrian paths, welcome centers, airports, gravel pits, mineral mining, maintenance facilities, park & rides, truck weigh stations, and other impervious surfaces.*
- 2. VTrans-owned facilities leased to third parties, including welcome centers and airport facilities (hangers and terminals)*

This policy does not apply to VTrans-owned rail lines, rail yards, public transit facilities, and rail trails leased to third parties.

POLICY EXCLUSIONS:

This policy does not apply to:

1. VTrans-owned rail lines, rail yards, public transit facilities, and rail trails leased to third parties.
2. Commingled discharges from the following non-stormwater sources with discharges of stormwater, provided that these sources are not substantial contributors of pollutants to the waters of the State as determined by VTrans and/or directed by Vermont ANR.

Non-Stormwater Discharges: The following discharges are exempt from this policy. However, they may be subject to other Federal, State, or Local Regulations or VTrans Policies or Procedures and may require prior written approval under VTrans Title 19, Section 1111 "Highway Access" Authority.

- a) Potable water, including water line flushings;
- b) Landscape watering, provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling;
- c) Diverted stream flows;
- d) Uncontaminated ground water, including pumped ground water, or spring water;
- e) Foundation or footing drains where flows are not contaminated with process materials, and to which there are no floor drain, septic wastewater, or grey water connections;

- f) Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids;
- g) Irrigation drainage;
- h) Uncontaminated water from crawl space pumps;
- i) Flows from riparian habitats and wetlands;
- j) Discharges from emergency/unplanned fire-fighting activities;
- k) Fire hydrant flushing;
- l) Pavement wash waters where no detergents or hazardous cleaning products are used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols), and the wash waters do not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities, or any other toxic or hazardous materials, unless residues are first cleaned-up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags) and where appropriate control measures have been implemented to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention; settlement);
- m) Routine external building washdown/power wash water that does not use detergents or hazardous cleaning products (e.g., those containing bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols); and
- n) Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of a facility, but not intentional discharges from the cooling tower (e.g., "piped" cooling tower blowdown or drains).

DocuSigned by:
APPROVED: Joe Flynn **DATE** 12/27/2021
 EBBFF896AB5C4E8...

Joe Flynn, Secretary of Transportation

POLICY HISTORY

ORIGINAL POLICY ADOPTION DATE: **January 15, 2022**

REVISION NO: **EFFECTIVE DATE:** **REASON:**

REVISION NO: **EFFECTIVE DATE:** **REASON:**

Appendix D Lake Champlain Basin Phosphorus Control Plan Progress Report Memo



April 10, 2023

To: Christy Witters, Chris Gianfagna, and Emily Schelley
Vermont DEC Stormwater Program

From: Amy Macrellis, Stone Environmental
Jenn Callahan, Vermont Agency of Transportation

MEMO

Stone Project No. 20231008

Subject: Lake Champlain Basin Phosphorus Control Plan, Vermont Agency of Transportation –
Progress Report

On behalf of VTTrans and in accordance with *NPDES General Permit 3-9007 for Stormwater Discharges from the State Transportation Separate Storm Sewer System (TS4)* Section 9.2.D, Stone is pleased to submit this Progress Report summarizing actions taken to implement all Phosphorus Control Plan (PCP) components. This submittal includes a progress report on crediting for impervious and pervious acres managed, and BMPs implemented, through December 31, 2022 and provides updates to estimated extent of completion for remaining items and schedule as of December 31, 2022.

1. Extent of BMP implementation

In the last progress report (submitted September 28, 2022), documentation of historic and current operations, and projection of current operations through the term of the first VTTrans Phosphorus Control Implementation Plan (PCIP)¹ (submitted October 1, 2020) was updated in the implementation model to account for capital projects and maintenance activities completed through December 31, 2021. Plan review, maintenance activity review, and culvert and swale inventory review and crediting activities are in progress for reductions achieved by VTTrans between Jan. 1 and December 31, 2022 with accounting completion anticipated in September 2023.

Below, we briefly summarize activities undertaken and progress documented in July-December 2022, organized by the suite of necessary BMPs set forth in the PCIP.

1.1 Tracking and Accounting

VTTrans continued development of a tracking and accounting system, working to integrate with and build from its asset inventories and the Vermont Asset Management Information System (VAMIS). TS4 ditch inventory refinements that were field-tested in the 2021 field season, including dividing swales to correspond to road

¹ https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/TS4/VTTrans_PC_Implementation_Plan_2020_10_01_2021_03_12.pdf

segments and to Small Culverts Inventory (SCI) cross culverts, were completed for swale assets in the Lake Champlain Basin (LCB) in May 2022. Swale asset re-inventory utilizing the refined TS4 ditch inventory for features located within the LCB commenced in the 2022 field season. All TS4 swales north of I-89 in Richmond and from Bakersfield west north to the border were re-inventoried, constituting 6,849 of 25,999 (27%) of the mapped swales in the LCB (see Attachment 1 for a map of re-inventoried swale extents).

VTrans commenced development of an automated system for tracking and accounting for structural corrections to road drainage deficiencies in July 2022. Scripting for tracking SCI asset conditions comparison and standards compliance re-calculation on a 2-week recurrence was established. Tracking system steps in development during July-December 2022 included:

- Coding for adding or subtracting culverts and establishing relationships between new culverts and road segments.
- Establishing comparisons and re-calculation of standards compliance for swales, similar to culverts.

1.2 Structural Correction of Road Drainage Deficiencies

The *VTrans Phosphorus Control Highway Drainage Management Standards (August 3, 2021)* were revised effective July 1, 2022 to integrate the VTrans Short Structures asset inventory into the existing drainage standards and phosphorus crediting framework (Attachment 2). Larger culverts, including many concrete box culverts now being installed by VTrans to replace undersized structures, are tracked in the VTrans Short Structures asset inventory instead of in the Small Culverts Inventory (SCI), which includes only culverts that are six feet in diameter or smaller.

These standards, and the menu of standard BMPs and maintenance activities that may be undertaken to bring road segments and related assets ‘up to standards’, are living documents and will be updated periodically as conditions warrant.

Analysis of phosphorus load reductions achieved through correction of road drainage deficiencies, as documented in MATS and in programmed capital projects during calendar 2022 is underway, with completion of summaries and credit accounting in the implementation model estimated by September 2023.

1.3 Structural Correction of Road Erosion Issues

Specific crediting mechanisms for stabilization and treatment of areas of localized erosion caused by roadway runoff were adopted by ANR DEC effective June 28, 2022. VTrans anticipates adopting the P crediting methodology for outlet and gully restoration BMPs as represented in ANR’s *Standard Operating Procedures for*

Tracking & Accounting of Developed Lands Regulatory Projects & Non-Regulatory Clean Water Projects² as appropriate as it accounts for road-erosion related improvements completed in calendar 2022.

Correction of minor areas of localized erosion as documented in MATS and in programmed capital projects during calendar 2022 are being summarized and credited in the implementation model, with completion of summaries and credit accounting in the implementation model estimated in September 2023.

1.4 Non-Structural Controls

Lane miles swept and drop inlets (DIs) cleaned in calendar 2022 are being summarized and credited in the implementation model, with completion estimated by September 2023.

1.5 Structural Stormwater Treatment Practices

Information about existing and planned structural stormwater treatment practices (STPs) throughout the TS4 is updated in the TS4's BMP Tracking Table and in the implementation model as practices move through design or are constructed. The current BMP Tracking Table is being submitted as part of the 2022 TS4 Annual Report. Updates to the PCP implementation model are underway for completed structural STPs following the 2022 construction season.

VTrans is presently advancing an innovative research project with the University of Vermont, evaluating the potential to enhance P removal in select stormwater treatment practices using drinking water treatment residuals (DWTRs), which are a by-product of drinking water processing³. The project began in the fall of 2022 and will continue through the 2023 field season.

1.6 Natural Resource Restoration Projects

Natural resource restoration projects, and particularly floodplain restoration projects, may be credited as stormwater treatment practices in the context of the VTrans PCP if the floodplain area to be restored is also connected to a TS4 roadway or other VTrans-controlled contributing drainage. Since the PICP submittal, VTrans has continued to complete preliminary evaluations of specific floodplain restoration projects for P reduction credit as opportunities arise.

More comprehensive evaluation of how to execute and credit floodplain reconnection will be possible through application of results from Vermont's Functioning Floodplains Initiative (FFI). The initiative is developing and applying methodologies for evaluating river reach and watershed-scale restoration of stream, riparian, wetland, and floodplain function. Public release of the web-based application is anticipated in the summer of 2023.

² [https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/TrackingAccounting/Standard Operating Procedures for Tracking & Accounting of Developed Lands Regulatory Projects & Non-Regulatory Clean Water Projects.pdf](https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/TrackingAccounting/Standard%20Operating%20Procedures%20for%20Tracking%20&%20Accounting%20of%20Developed%20Lands%20Regulatory%20Projects%20&%20Non-Regulatory%20Clean%20Water%20Projects.pdf)

³ <https://vtrans.vermont.gov/planning/research/projects/22-3>

Phosphorus crediting tracking and accounting methodologies for natural resource restoration projects are reflected in ANR's *Standard Operating Procedures for Tracking & Accounting of Natural Resources Restoration Projects*⁴, effective June 28, 2022. In the SOP, floodplain storage credits are proposed to be distributed between the load allocation (LA) and wasteload allocation (WLA) upstream of floodplain storage sites based on the contribution of a) regulated vs. non-regulated loads, and b) the percent sector contribution to the base load, as reported in the TMDL for each Lake Champlain subbasin by default (EPA, 2016) or by site-specific percentages of sector contributions as identified during project design (pp. 47-48 of the SOP). VTrans is presently exploring whether and how VTrans may apply these crediting methodologies.

2. Estimate of extent of completion for remaining items

The draft implementation schedule as presented in the October 1, 2020 PCIP remains generally accurate. Both the schedule and the implementation model are planning-level documents only and will be subject to continued adjustment as the implementation plan is executed. The base assumptions used to populate the model remain unchanged from the Generalized PCP submittal. Updates to those assumptions, particularly assumptions related to implementation costs, will continue as plan execution proceeds.

The implementation model submitted with the September 30, 2022 progress report is being updated to summarize activities completed and crediting for calendar 2022, with accounting completion estimated by September 2023. Planning for the Phase 2 PCIP is anticipated to begin in the spring of 2023, with limited field screening as necessary to adjust the suite of recommended BMPs to be completed in the 2023 field season.

3. Assessment of ability to meet remaining schedule items

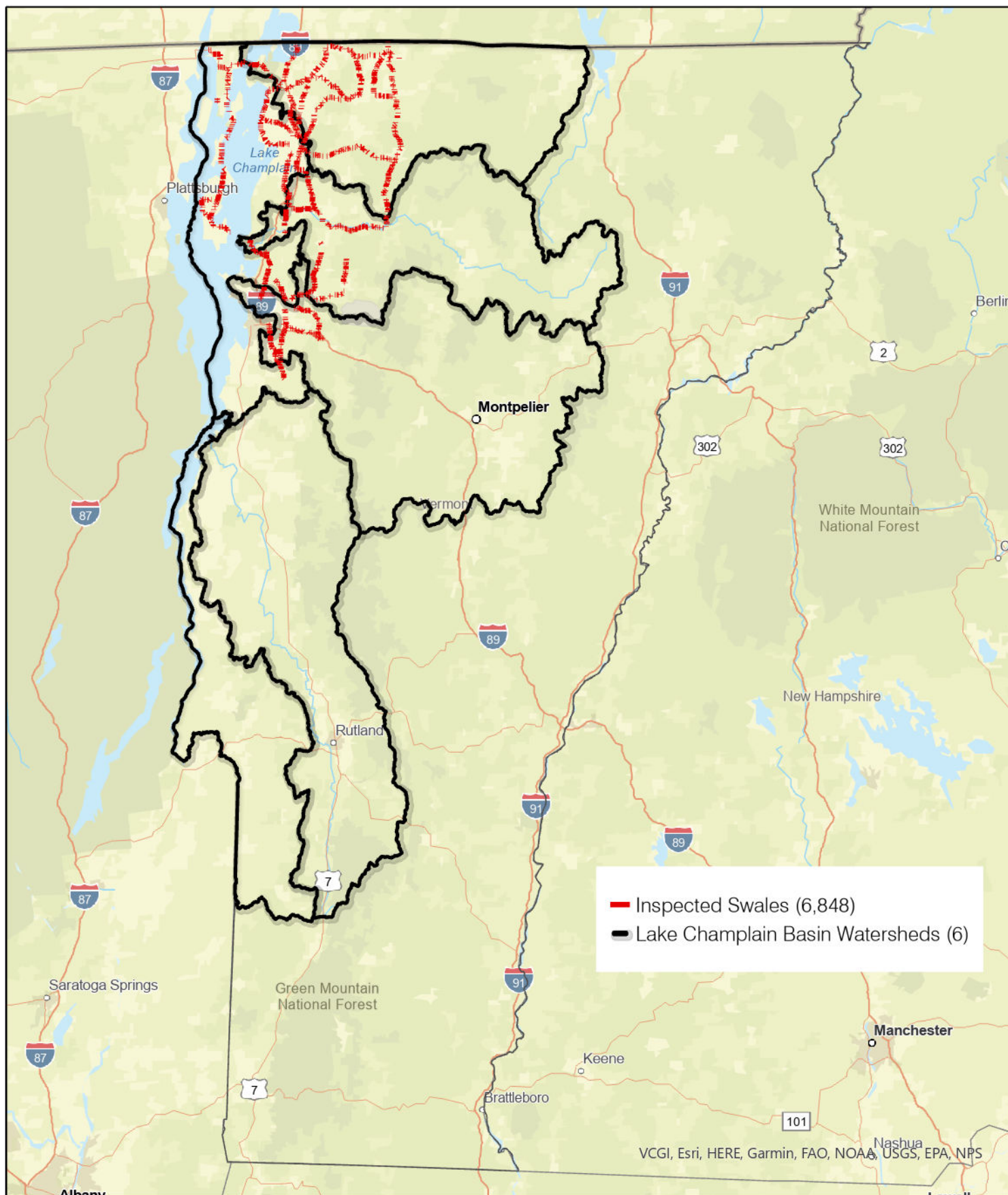
VTrans is presently on or slightly ahead of schedule and is capable of meeting remaining schedule items. As implementation of the PCPs proceeds, if any changes in ability to meet schedule items arise, VTrans will report on schedule adjustments as warranted.

4. Written designer statements

Subpart 9.2.D.4 of the TS4 General Permit requires submittal of *a written statement signed by a designer acceptable to the Secretary that any structural BMP build or implemented within the preceding 6 month period was constructed in compliance with the approved plans*. No structural BMPs requiring written designer statements were completed explicitly for the VTrans PCP within the preceding 6-month period.

O:\PROJ-18\WRM\18-008-D-E VTrans PCP Implementation Support\Reports\Interim reports\PCP Progress Report 2023 03 27\VTrans PCP Progress Report 2023 04 10.docx

⁴ <https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/TrackingAccounting/Standard Operating Procedures for Tracking & Accounting of Natural Resources Restoration Projects.pdf>



2022 Swale Inventory Inspection in the Vermont Lake Champlain Basin

VTrans Phosphorus Control Plan Progress Report July-December 2022

VTRANS PHOSPHORUS CONTROL HIGHWAY DRAINAGE MANAGEMENT STANDARDS (July 1, 2022)

1.0 Applicability

- A. The standards listed below constitute minimum performance expectations applicable to “hydrologically-connected” VTrans roads in the Lake Champlain Basin portion of VTrans’ Transportation Separate Storm Sewer System (TS4)-permitted area. Road segments where associated culverts, swales, and/or closed drainage systems do not meet the standards outlined below, as detailed in the VTrans Generalized Phosphorus Control Plan, may be improved in order to meet the standards, restore function, and improve water quality. When road drainage asset conditions are improved to meet these standards, the improvements result in reduced sediment and phosphorus loading to surface waters and to Lake Champlain, and thus may be credited towards achievement of VTrans’ target phosphorus load reductions under the Vermont Lake Champlain Phosphorus TMDLs.

2.0 Feasibility

- A. VTrans may implement these standards to the extent feasible as one component of the overall Phosphorus Control Plan implementation strategy. In determining feasibility, VTrans may consider that the implementation of a standard or BMP listed in this document shall not require:
 - i. acquisition of additional state or federal permits or noncompliance with such permits;
 - ii. noncompliance with any other state or federal law;
 - iii. acquisition or condemnation of real property;
 - iv. impacts to significant environmental and historic resources, including historic stone walls, historic structures, historic landscapes, or vegetation within 250 feet of a lakeshore;
 - v. impacts to utilities; or
 - vi. excessive ledge removal.
- B. VTrans may document in an Implementation Table, or other data management and tracking system, each instance where feasibility constraints affect implementation of the standards.

3.0 Standards for Construction and Soil Disturbing Activities

- A. Following soil disturbance on a hydrologically-connected road segment, all bare or unvegetated areas shall be revegetated with seed and mulch, hydroseeded, or stone lined within 48 hours of reaching final grade. Activities shall follow the current version of the VTrans Erosion Prevention and Sediment Control (EPSC) Protocol,¹ as specified in the VTrans SWMP².

¹ <https://vtrans.vermont.gov/working/enviro/erosion-prevent>

² [https://anrweb.vt.gov/PubDocs/DEC/Stormwater/PublicNotice/7892-9007/VTrans_Final_SWMP - December 5 2017.pdf](https://anrweb.vt.gov/PubDocs/DEC/Stormwater/PublicNotice/7892-9007/VTrans_Final_SWMP_-_December_5_2017.pdf)

4.0 Standards for Travel Lanes, Shoulders, and Guardrails

A. Roadway Crown, Cross-slope, and Superelevation

- i. Roads shall be designed and constructed with appropriate crown, cross-slope, and superelevation during new construction, redevelopment, or repaving where repaving involves removal of the existing paving. Recommended cross slope is average 2%³⁴.

B. Roadway Shoulders

- i. Roadway runoff shall flow in a distributed manner to a vegetated or forested area.
- ii. There shall be no shoulder berms, except where installed to prevent slope failure or direct runoff away from steep slopes. Shoulder berms may be removed to allow precipitation to shed from the travel lane to a vegetated or forested area or into a road drainage system.
- iii. There shall be no evidence of a “secondary ditch”, or other erosion of the road shoulder. Where shoulder erosion is identified, it may be corrected to meet standards by implementing repairs including but not limited to those illustrated in the following standard details and related resources:
 - a. LE-5: Riprap Slope Protection
 - b. LE-6: Armored Shoulder Protection
 - c. District Maintenance and Fleet Division Work Activity Guidelines⁵:
 - a. 4570, Protecting Banks and Slopes (ton)
 - b. 4180, Maintaining Gravel Surfaces (lane miles)
 - c. 4360, Ditching (lin. foot)

C. Guardrails

- i. Where guardrails without curb board are present, the standards for Roadway Shoulders shall apply (Section 4.B).
- ii. Where guardrails with curbing, curb board, and/or drop inlets are present, the standards for Roadway Shoulders (Section 4.B), Culverts (Section 6.0), and Outlets and Turnouts (Section 7.0) shall apply as appropriate.
- iii. Guardrails shall be evaluated during the development process for VTrans construction projects, and curb removed if feasible per the following references:
 - a. Vermont Stormwater Management Manual Figure 6-1, Curb Removal (Detail)⁶
 - b. District Maintenance and Fleet Division Work Activity Guidelines for Activity 4480, Eliminating Guardrail (lin. foot)

³ https://vtrans.vermont.gov/sites/aot/files/highway/documents/publications/VTrans_Roadway_Design_Manual.zip

⁴ <https://vtrans.vermont.gov/sites/aot/files/highway/documents/publications/VermontStateDesignStandards.pdf>

⁵ MATS Complete Activity Book / Work Activity Guidelines document, updated September 2019; available via internal VTrans network or by request.

⁶ https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/2017_VSMM_Rule_and_Design_Guidance_04172017.pdf

- iv. If curb board is removed, the adjacent shoulder and slope must have adequate stabilization measures to handle the flows. In some cases, larger stone may be needed. Following curb board removal, the roadway draining to the guardrail and the downslope right-of-way area may be tracked and managed as a disconnection structural stormwater treatment practice.

5.0 Standards for Ditches

- A. If it is not possible for runoff to flow from the roadway in a distributed manner, runoff may enter a drainage ditch.
- B. Ditches adjacent to hydrologically connected road segments shall be constructed and maintained consistent with the standards and guidance provided in the VTrans Hydraulics Manual⁷ and the VTrans Highway System Ditching Best Management Practices (BMPs)⁸.
- C. Ditches identified in the TS4 Swales Inventory⁹ as being in “Critical” or “Poor” condition, or otherwise exhibiting bare soil, erosion, sediment accumulation, or substantial deficiencies in geometry (trapezoidal or parabolic cross section with mild side slopes of two feet horizontal per one foot vertical or flatter, 2-foot minimum ditch bottom width, and 2 foot ditch depth) do not meet standards.
- D. Best management practices that may be utilized to improve ditches to meet standards include but are not limited to those listed in Table 1.
- E. The listed BMPs may be supplemented with or replaced with armored shoulders, step pool conveyances, or sub-surface drainage practices as warranted. The following standard details and related references may also be utilized:
 - i. DD-3: Plunge Pool
 - ii. DD-4: Outlet Protection (No Defined Channel)
 - iii. DD-7: Rock Step and Riffle
 - iv. LE-1: Seed and Mulch Guidelines
 - v. LE-2: Stone Check Dam
 - vi. LE-3: Stone-Lined Ditch
 - vii. LE-4: Grass-Lined Ditch
 - viii. LE-7: Clearing Debris/Clogging
 - ix. District Maintenance and Fleet Division Work Activity Guidelines¹⁰:
 - a. 4360, Ditching (lin. ft.)

⁷ https://vtrans.vermont.gov/sites/aot/files/highway/documents/structures/VTrans_Hydraulics_Manual.pdf

⁸ https://vtrans.vermont.gov/sites/aot/files/DitchingBMP_FINAL_SIGNED_1_12_21.pdf

⁹ https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fmaps.vtrans.vermont.gov%2Farcgis%2Frest%2Fservices%2FHWY%2FMOB_EPWQ_TS4_Inventory%2FFeatureServer&source=sd

¹⁰ MATS Complete Activity Book / Work Activity Guidelines document, updated September 2019; available via internal VTrans network or by request.

Table 1. Summary of Ditch and Outlet Protection Treatments

Ditch or Outlet Slope	Acceptable Treatments						
	Seed & Mulch*	Hydro-seeding*	Rolled Erosion Control Product Type I (Natural Matting & Seed)	Rolled Erosion Control Product Type II (Permanent)	Stone Check Dam	Type I Stone	Type II Stone
0 - 2.5%	X	X	X				
2.5 - 5%	X	X	X	X			
5 - 10%	X	X	X	X	X	X	
> 10%		X	X	X	X		X
* Treatment not recommended for application in areas of concentrated flow							

6.0 Standards for Culverts (Ultra Short and some Short Structures)

- A. If it is not possible for runoff to flow from the roadway in a distributed manner, runoff may enter and flow through a culvert.
- B. VTrans cross culverts or lateral culverts adjacent to hydrologically connected road segments shall be constructed and maintained consistent with the standards and guidance provided in the VTrans Hydraulics Manual or other applicable design guidance.
- C. VTrans culverts identified in the AMB Small Culverts Inventory (Ultra-Short Structures) as exhibiting one or more of the following asset conditions, or otherwise exhibiting bare soil, erosion, sediment accumulation, or other substantial deficiencies that may impact water quality, do not meet standards:
 - i. Culvert condition = critical or poor
 - ii. Culvert erosion = severe or moderate
 - iii. Culvert sediment = plugged or heavy
 - iv. Culvert sink hole = severe or major
 - v. Road settling = grade
- D. VTrans culverts identified in the AMB Short Structures Inventory as exhibiting one or more of the following asset conditions, or otherwise exhibiting bare soil, erosion, sediment accumulation, or other substantial deficiencies that may impact water quality, do not meet standards:
 - i. Channel and Channel Protection = condition rating of 5 or lower
 - ii. Culverts = condition rating of 5 or lower
 - iii. Culvert Wing/Header Rating = condition rating of 5 or lower
- E. Best management practices that may be utilized to improve VTrans culverts to meet standards include but are not limited to:
 - i. Culvert end treatment or headwall, if erosion is due to absence of these structures and the treatment can be installed while maintaining the safety of the traveling public (standard detail DD-1 Dry Laid Field Stone Header)
 - ii. Stabilize outlet such that there will be no scour erosion (standard details DD-3 Plunge Pool, DD-4 Outlet Protection, DD-7 Rock Step and Riffle) . Stone aprons

- or plunge pools required for new construction on slopes 5% or greater per the VTrans Hydraulics Manual¹¹
- iii. Upgrade to 18” culvert (minimum) if erosion is due to inadequate size or absence of structure (standard details DD-2 Culvert Replacement, DD-5 Upsize Culvert, DD-6 Partial Culvert Replacement)
 - iv. District Maintenance and Fleet Division Work Activity Guidelines¹²:
 - a. 4610, Maintaining Culverts (culvert)
 - b. 4620, Installing Culverts (lin. foot)
 - c. 4640, Stormwater/Drainage Work (each)
 - d. 5130, Repairing Structures (each)
 - e. 5150, Repairing Culvert Headwalls (each)
 - f. 5170, Small Structures Culvert Liners (lin. foot)
 - g. 5171, Small Structures Culvert Invert (lin. foot)
 - h. 5172, Small Structures Replacement (lin. foot)
 - i. 4640, Maintaining Drainage Structures (each)
 - v. Where feasible, culverts shall be installed, repaired, or replaced with minimal slope (1%) to reduce outlet velocity and outlet erosion.
- F. In some instances, intermittent streams enter the VTrans road drainage network. In these cases, culvert sizing may be based on the VTrans Hydraulics Manual¹¹. VTrans culverts conveying perennial waters are not subject to the DEC Stream Alteration General Permit, and instead are subject to Title 19 consultation¹³ if alterations are considered.
- G. An underdrain (also called a French Drain) sub-surface drainage practice may be substituted for a VTrans lateral culvert.
- H. Driveway Culverts within the VTrans ROW
- i. All driveway culverts, and their construction and maintenance within the VTrans ROW, are the responsibility of the property owner. Driveway culverts and other aspects of residential and commercial access to the VTrans ROW are permitted through the VTrans State Highway Access and Work Permit¹⁴, and as specified in the VTrans TS4 SWMP .
 - ii. Access to a state highway shall be constructed and maintained by property owners consistent with minimum VTrans standards for driveway access (Standard B-71a¹⁵ or B-71b¹⁶)
 - iii. VTrans may consider the following recommended BMPs as permit conditions

¹¹ https://vtrans.vermont.gov/sites/aot/files/highway/documents/structures/VTrans_Hydraulics_Manual.pdf

¹² MATS Complete Activity Book / Work Activity Guidelines document, updated September 2019; available via internal VTrans network or by request.

¹³ <https://vtrans.vermont.gov/environmental-manual/permitting/wetlands/stream-alteration>

¹⁴ <https://vtrans.vermont.gov/planning/permitting>

¹⁵ <https://outside.vermont.gov/agency/vtrans/external/CADD/WebFiles/Downloads/Standards/English/PDF/stdb71a.pdf>

¹⁶ <https://outside.vermont.gov/agency/vtrans/external/CADD/WebFiles/Downloads/Standards/English/PDF/stdb71b.pdf>

during review of VSA Title 19 Section 1111 Permit applications for alterations to existing access points:

- a. Culvert end treatment recommended for areas with slopes of 5% or greater if erosion is due to absence of these structures.
- b. Stabilize outlet such that there will be no scour erosion if erosion is due to absence or inadequacy of outlet stabilization.
- c. Upgrade to minimum 15" culvert, if erosion is due to inadequate size or absence of structure.
- iv. VTrans may review issued VSA Title 19 Section 1111 Permits during VTrans project development¹⁷. If a driveway culvert in the VTrans ROW has not been issued an 1111 Permit, the property owner may be required to obtain the appropriate permit for access and to make improvements consistent with permit conditions. Otherwise, the access may be considered abandoned and be eliminated during the project's construction phase.

7.0 Standards for Outlets and Turnouts

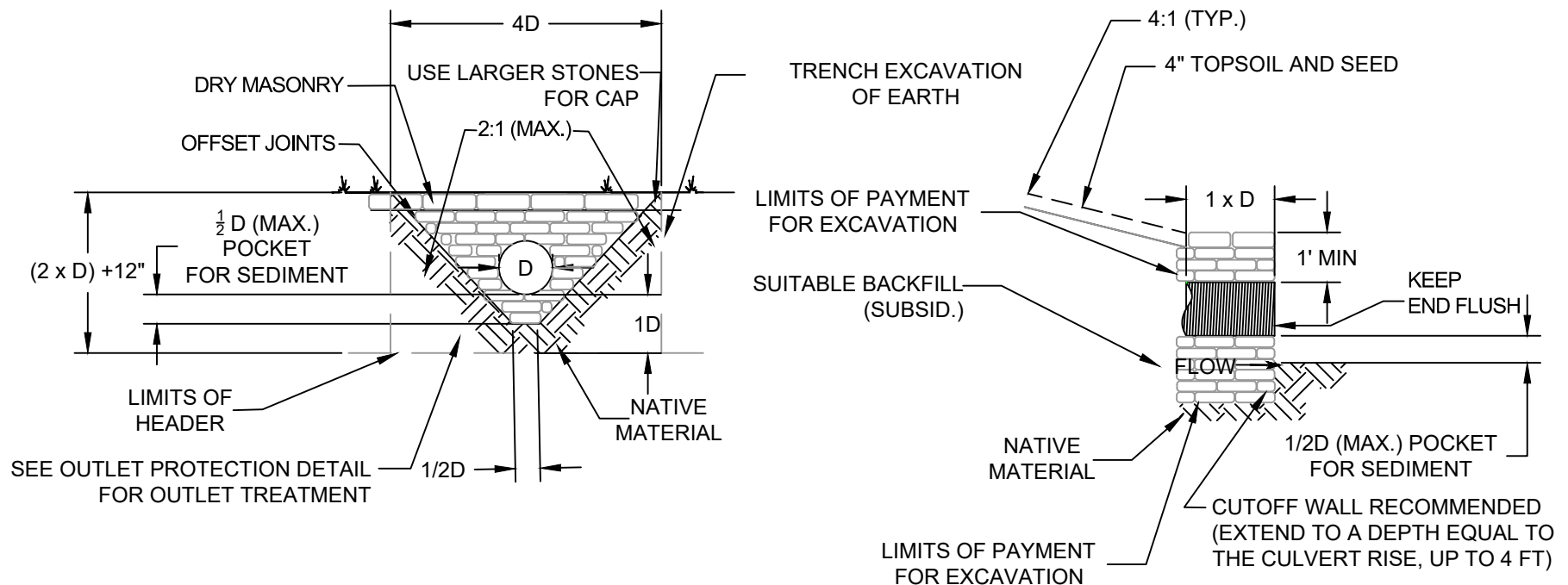
- A. Roadway drainage shall be disconnected from or turned out to avoid direct outlet to waterbodies and defined channels where feasible. Hydrologically-connected drop inlet and closed drainage system outlets, culvert and ditch outlets, turnouts, and conveyance areas shall be constructed and maintained consistent with the standards and guidance provided in the VTrans Hydraulics Manual¹⁸ or other applicable design guidance.
- B. Adequate outlet protection must be provided at the outlet or turnout, consistent with slope ranges provided in Table 1. Outlet and turnout slopes shall be measured on the bank where the practice is located.
- C. Closed drainage or culvert outlets, ditch outlets, or turnouts exhibiting bare soil, erosion, or sediment accumulation do not meet standards. Best management practices that may be utilized to meet standards include but are not limited to those listed for ditches in Table 1. The listed BMPs may be supplemented with or replaced with level spreaders, plunge pools (standard detail DD-3), step pool conveyances (standard detail DD-7) or other BMPs as warranted.

¹⁷ <https://vtrans.vermont.gov/sites/aot/files/highway/documents/publications/PDManual.pdf>

¹⁸ [https://vtrans.vermont.gov/sites/aot/files/highway/documents/structures/VTrans Hydraulics Manual.pdf](https://vtrans.vermont.gov/sites/aot/files/highway/documents/structures/VTrans_Hydraulics_Manual.pdf)

NOTES:

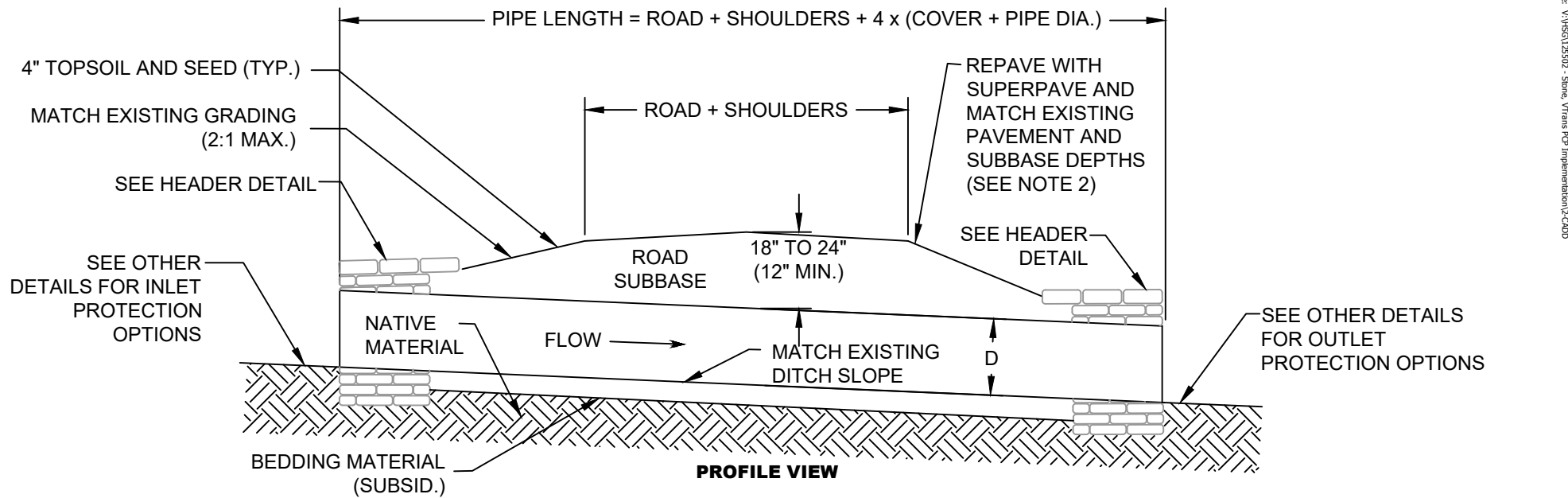
1. DRY LAID FIELD STONE HEADERS ARE RECOMMENDED. SEE VTRANS STANDARD DETAILS D-33 AND D-34 FOR REINFORCED CONCRETE HEADWALL OPTIONS.
2. PRIOR TO INSTALLATION OF A HEADER TO A CULVERT END, DESIGNER SHALL REVIEW THE VTRANS HYDRAULICS MANUAL SECTION 6.4.3.5 TO DETERMINE PROPER PIPE END TREATMENT.
3. EXISTING NATIVE MATERIAL SHALL BE USED AS BACKFILL UNLESS UNSUITABLE MATERIAL IS DISCOVERED DURING EXCAVATION AND PLACEMENT OF HEADER. UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL PER VTRANS STANDARD SPECIFICATIONS.



DRY LAID FIELD STONE HEADER DETAIL

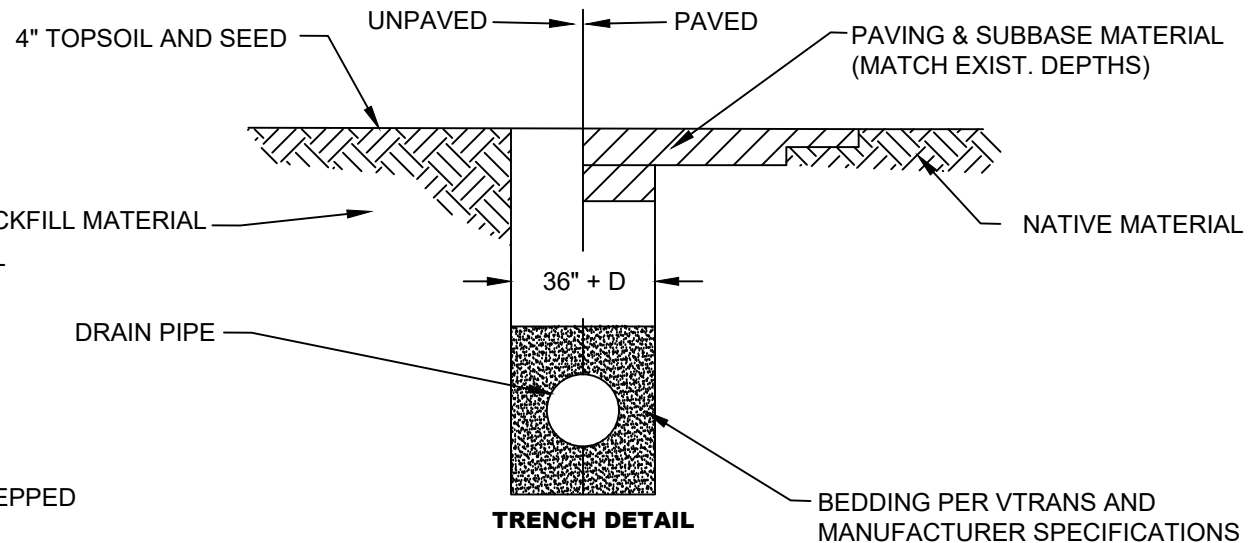
Not To Scale





NOTES:

1. EXISTING NATIVE MATERIAL SHALL BE USED AS BACKFILL UNLESS UNSUITABLE MATERIAL IS DISCOVERED DURING EXCAVATION AND PLACEMENT OF HEADER. UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL PER VTRANS STANDARD SPECIFICATIONS.
2. SUPERPAVE SHALL BE UTILIZED MATCHING EXISTING PAVEMENT DEPTHS. PAVEMENT COURSES SHALL BE STEPPED TO AVOID A SINGLE PAVEMENT JOINT AND EMULSIFIED ASPHALT SHALL BE USED PER VTRANS STANDARD SPECIFICATIONS.



CULVERT REPLACEMENT DETAIL

Not To Scale



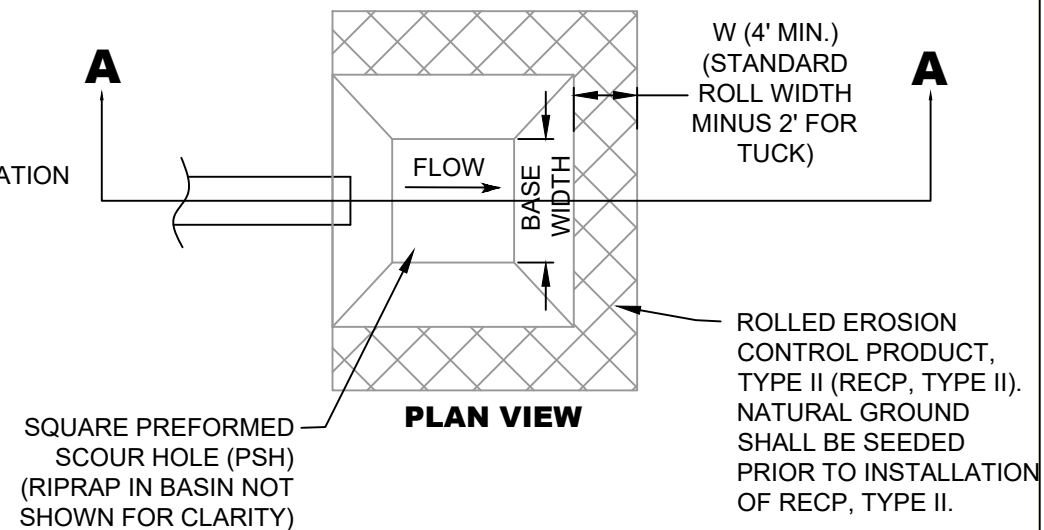
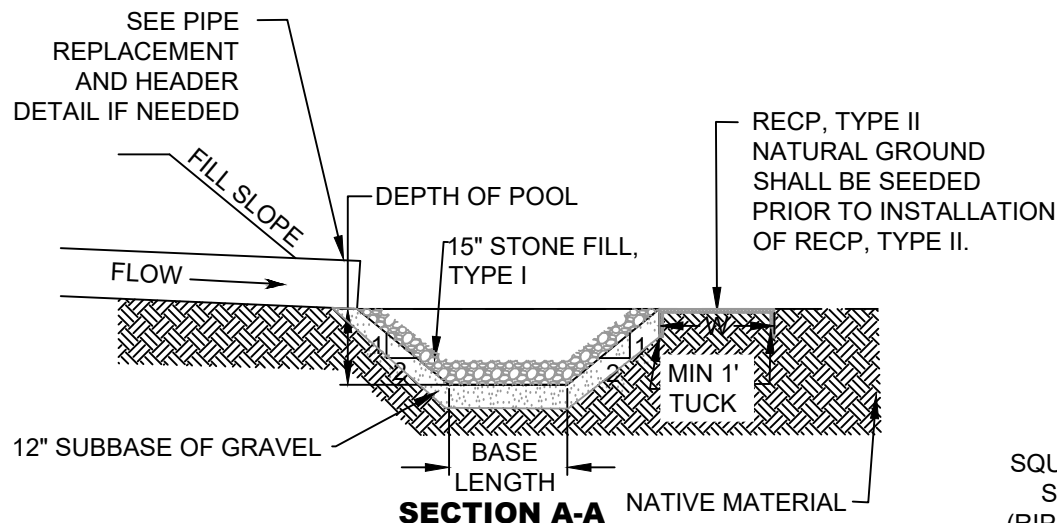
TABLE 1

PIPE SIZE/FLOW	BASE WIDTH (W) (FT)	BASE LENGTH (L) (FT)	DEPTH OF POOL (FT)	L:W RATIO
PIPE ≤ 18" DIA AND FLOWS ≤ 9 CFS	3 x D	3 x D	1' MIN/3' MAX	1:1
PIPE > 18" DIA AND FLOWS > 9 CFS	SEE TABLE 2	SEE TABLE 2	3' MIN/5' MAX	2:1 MIN/6:1 MAX

TABLE 2

PIPE SIZE/FLOW	IMPERVIOUS AREA (SF)	CALCULATED VOLUME (CF)	BASE WIDTH (W) (FT)	BASE LENGTH (L) (FT)	DEPTH OF POOL (FT)	ACTUAL VOLUME (CF)
PIPE > 18" DIA AND FLOWS > 9 CFS	LESS THAN 60,000	500	4	8	3	512
	BETWEEN 60,000 AND 110,000	917	4	8	4	939
	BETWEEN 110,000 AND 180,000	1500	4	8	5	1547

IMPERVIOUS AREA DRAINING TO PRACTICE.
SIZE IS BASED ON VOLUME ASSOCIATED WITH 0.1 IN OF RUNOFF FOR THE IMPERVIOUS AREA WITHIN THE CONTRIBUTING DRAINAGE AREA



NOTES:

- EXISTING NATIVE MATERIAL SHALL BE USED AS BACKFILL UNLESS UNSUITABLE MATERIAL IS DISCOVERED DURING EXCAVATION AND PLACEMENT OF PLUNGE POOL. UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL PER VTRANS STANDARD SPECIFICATIONS.
- PLUNGE POOLS SHALL BE LIMITED TO AREAS WITH <10% SLOPE.
- THE GRAVEL LAYER SHALL BE REPLACED WITH FILTER FABRIC IN CLAY AND SILT SOILS.
- PLUNGE POOLS SHALL BE INSTALLED WHERE EXISTING STORMWATER HAS ERODED A HOLE IN THE NATIVE MATERIAL AT THE PIPE OUTLET. PLUNGE POOLS CAN NOT BE INSTALLED ON SLOPES.
- PLUNGE POOLS SHALL BE CONSTRUCTED IN UNDISTURBED SOILS INSTEAD OF IN FILL MATERIAL.
- PLUNGE POOLS SHALL BE CONSTRUCTED OUTSIDE OF CLEAR RECOVERY ZONES AND ENVIRONMENTALLY SENSITIVE AREAS AND SHALL BE DESIGNED PER THE VERMONT STORMWATER TREATMENT STANDARDS.

PLUNGE POOL DETAIL

Not To Scale



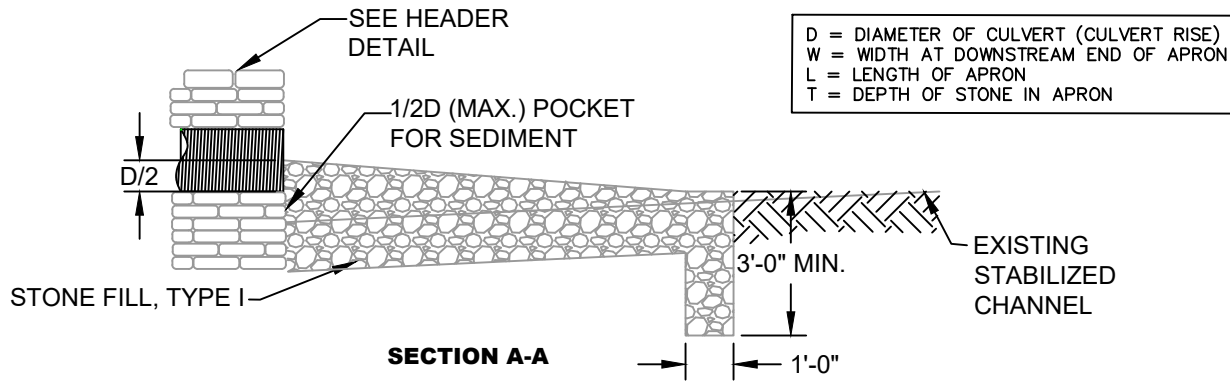


TABLE 1: STONE FILL TYPE REQUIRED AT CULVERT
OUTLETS

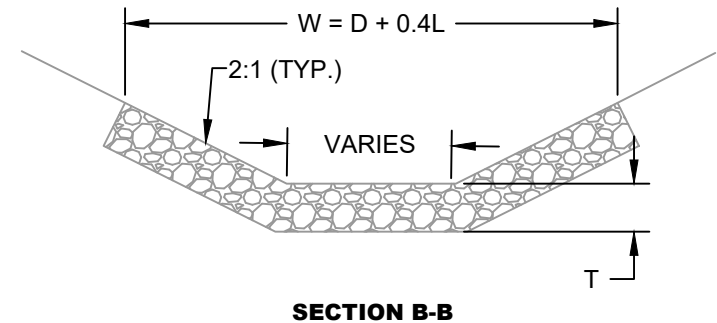
CULVERT RISE (FT)	DESIGN DISCHARGE (CFS)			
	10	20	30	40
2	I	II	II	IV
3	I	I	II	II
4	I	I	I	I

SEE VTRANS HYDRAULICS MANUAL FOR ADDITIONAL PIPE SIZE
AND DISCHARGE OPTIONS (TABLE 6-4)

TABLE 2: STONE APRON DIMENSIONS AT CULVERT
OUTLETS WITH COMMERCIAL END SECTIONS

STONE FILL TYPE	D ₅₀	APRON LENGTH	APRON DEPTH
	(IN)	(L) (FT)	(T) (FT)
TYPE I	4	4 x D	1.2
TYPE II	12	5.5 x D	2.3
TYPE III	16	6.5 x D	2.8
TYPE IV	20	7 x D	3.3

NOTE: FOR CULVERTS WITHOUT COMMERCIAL END SECTIONS, ADD AN
ADDITIONAL 3 FT ONTO THE APRON LENGTH
REFERENCE: VTRANS HYDRAULICS MANUAL

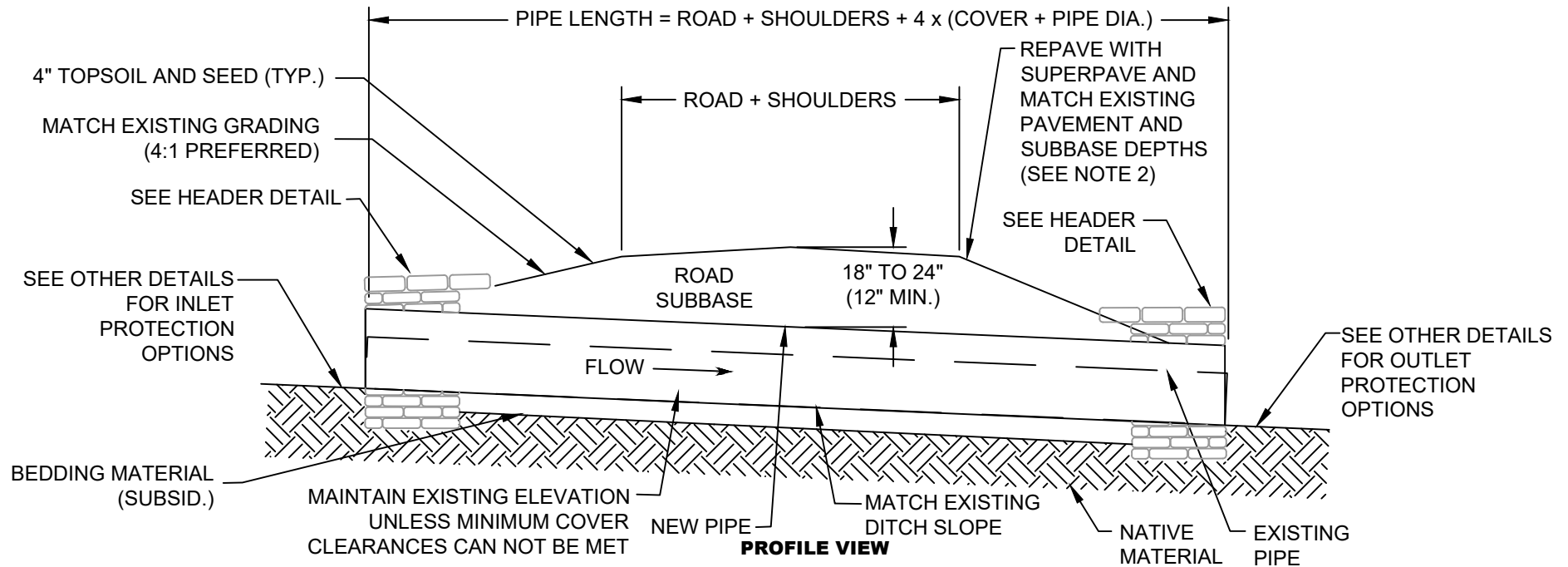


OUTLET PROTECTION DETAIL (NO DEFINED CHANNEL)

Not To Scale

NOTES:

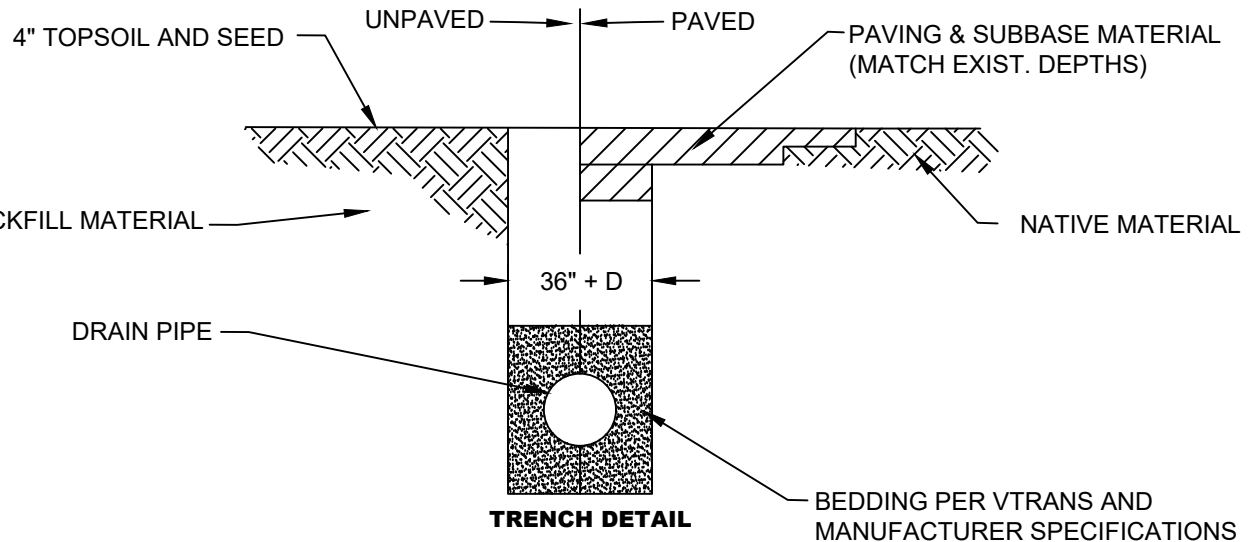
1. MINIMUM LENGTH (L) SHALL BE A DISTANCE EQUAL TO THE CULVERT RISE UPSTREAM OR DOWNSTREAM.
2. ENERGY DISSIPATORS SHALL BE UTILIZED IF EXISTING OUTLET HAS EROSION OF AN EXISTING STONE OUTLET PROTECTION AREA. SEE VTRANS STANDARD DETAIL D-16 FOR ADDITIONAL INFORMATION ON ENERGY DISSIPATORS FOR CULVERTS.
3. IF FLOW THROUGH CULVERT IS CAUSING EROSION TO AN EXISTING ENERGY DISSIPATER AS DESIGNED BY VTRANS STANDARD DETAIL D-16, REVISED OUTLET PROTECTION AND ENERGY DISSIPATORS SHALL BE DESIGNED IN ACCORDANCE WITH THE DESIGN GUIDELINES PUBLISHED IN FHWA'S HEC-14, "HYDRAULIC DESIGN OF ENERGY DISSIPATORS FOR CULVERTS AND CHANNELS."



NOTES:

1. EXISTING NATIVE MATERIAL SHALL BE USED AS BACKFILL UNLESS UNSUITABLE MATERIAL IS DISCOVERED DURING EXCAVATION AND PLACEMENT OF PIPE. UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL PER VTRANS STANDARD SPECIFICATIONS.
2. SUPERPAVE SHALL BE UTILIZED MATCHING EXISTING PAVEMENT DEPTHS. PAVEMENT COURSES SHALL BE STEPPED TO AVOID A SINGLE PAVEMENT JOINT AND EMULSIFIED ASPHALT SHALL BE USED PER VTRANS SPECIFICATIONS.

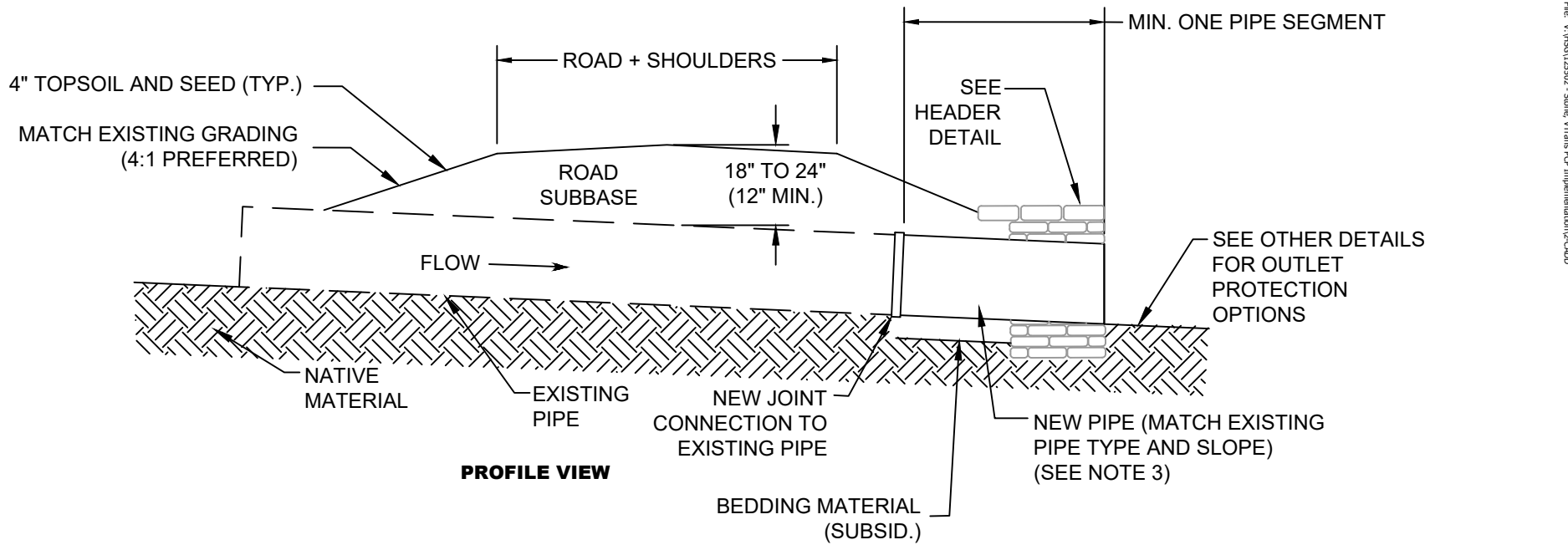
SUITABLE BACKFILL MATERIAL



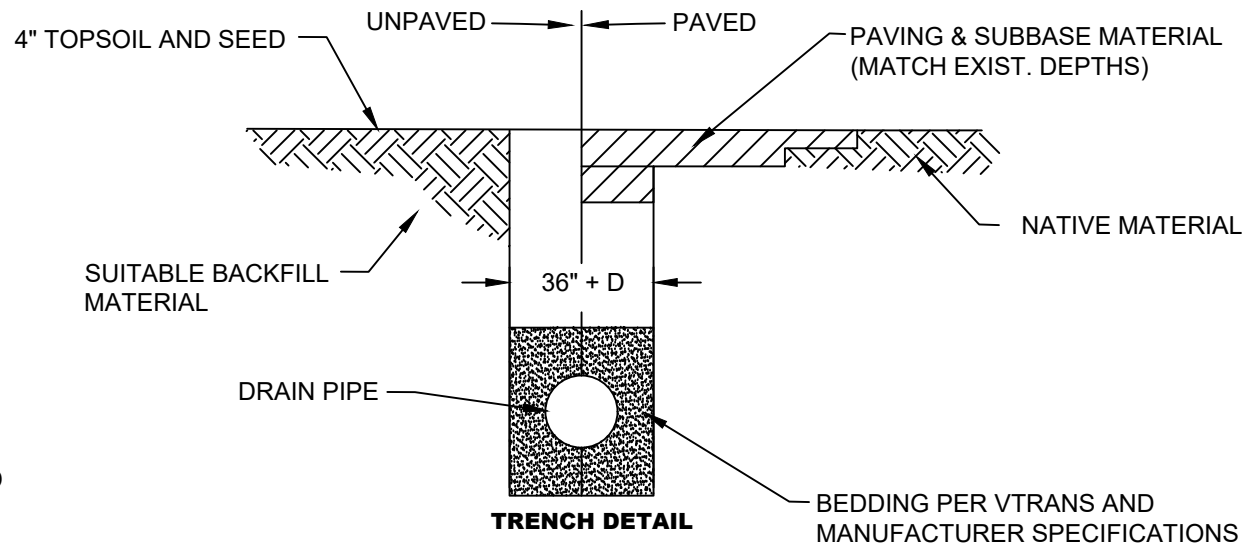
UPSIZING CULVERT DETAIL

Not To Scale





PROFILE VIEW



TRENCH DETAIL

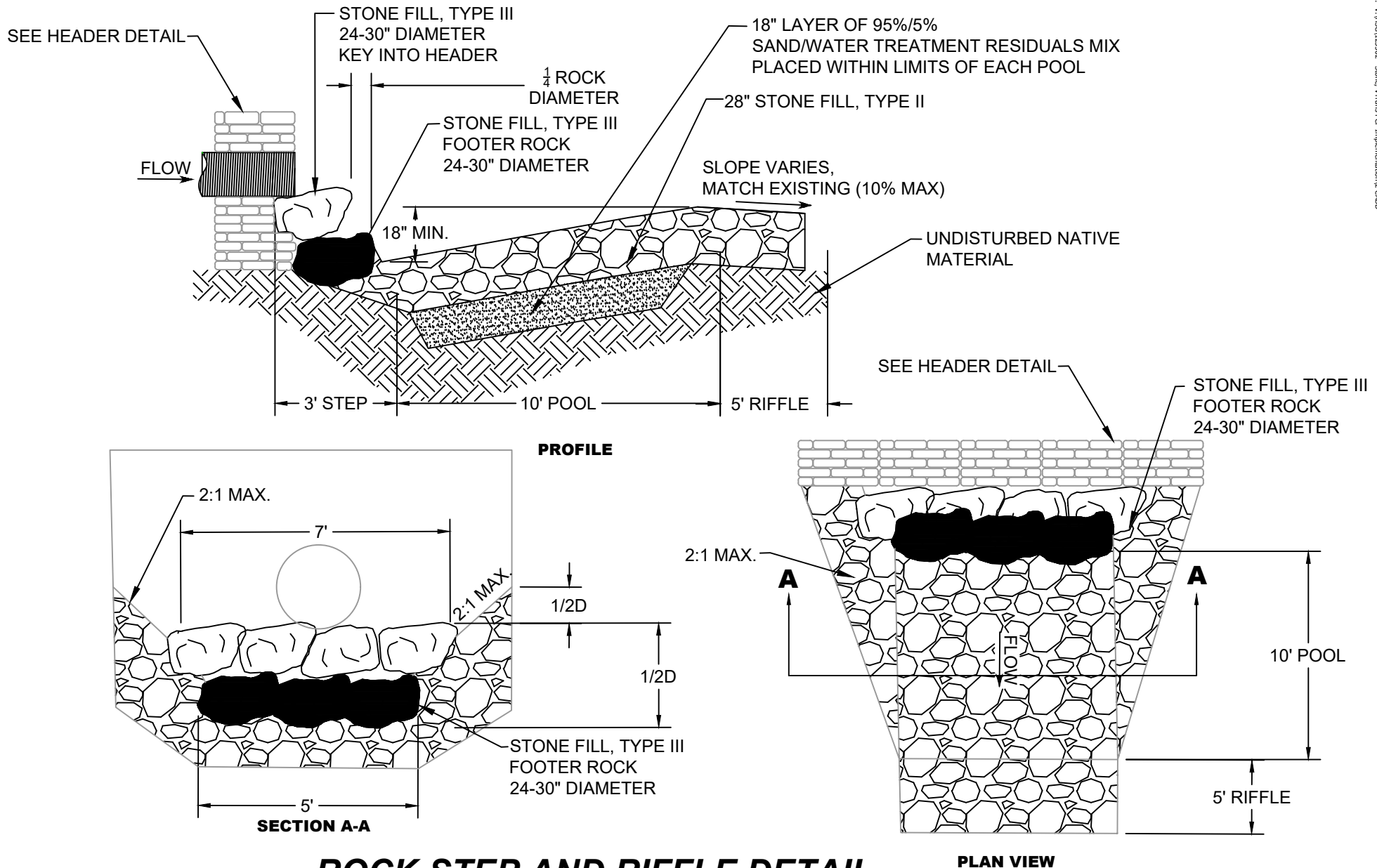
NOTES:

1. EXISTING NATIVE MATERIAL SHALL BE USED AS BACKFILL UNLESS UNSUITABLE MATERIAL IS DISCOVERED DURING EXCAVATION AND PLACEMENT OF PIPE. UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROVED MATERIAL PER VTRANS STANDARD SPECIFICATIONS.
2. SUPERPAVE SHALL BE UTILIZED MATCHING EXISTING PAVEMENT DEPTHS. PAVEMENT COURSES SHALL BE STEPPED TO AVOID A SINGLE PAVEMENT JOINT AND EMULSIFIED ASPHALT SHALL BE USED PER VTRANS SPECIFICATIONS.
3. PARTIAL CULVERT REPLACEMENTS SHALL ONLY BE USED FOR PLASTIC OR RC PIPES. CORRUGATED METAL PIPES SHOULD BE FULLY REPLACED.

PARTIAL CULVERT REPLACEMENT DETAIL

Not To Scale





NOTES:

1. DETAIL CAN BE USED IN SUCCESSION AS NEEDED.

ROCK STEP AND RIFFLE DETAIL

Not To Scale



DITCH GUIDELINES

LONGITUDINAL SLOPE (S) RANGE	APPROPRIATE DITCH TREATMENTS
$0\% < S < 5\%$	GRASS-LINED DITCH
$5\% \leq S < 8\%$	GRASS-LINED DITCH WITH STONE CHECK DAMS
	GRASS-LINED DITCH WITH DISCONNECTION PRACTICES
	STONE-LINED DITCH
$8\% \leq S < 10\%$	STONE-LINED DITCH (6" TO 8" MINUS STONE)
$10\% \leq S$	STONE-LINED DITCH (12" MINUS STONE)

NOTES:

1. GRASS-LINED DITCHES SHALL BE INSTALLED WHENEVER POSSIBLE AND WHENEVER GRASS CAN BE ESTABLISHED NO MATTER THE SLOPE.
2. IF GRASS CANNOT BE ESTABLISHED ON SLOPES LESS THAN 5%, STONE-LINED DITCHES SHALL BE INSTALLED.
3. FOR ADDITIONAL SEEDING INFORMATION SEE VTRANS EPSC TURF ESTABLISHMENT DETAIL.

CULVERT GUIDELINES

NOTES:

1. REPLACE CULVERTS WITH THE SAME SIZE PIPE IF IT IS HANDLING THE FLOW ADEQUATELY.
2. INCREASE CULVERT SIZE AS DEVELOPMENT ALONG A ROAD INCREASES OR IF THE CULVERT IS MORE THAN HALF FULL DURING HIGH FLOWS.

SEED MIXTURES

MIXTURES	RATE PER ACRE (LBS)	RATE PER 1,000 SF (LBS)
A. BIRDSFOOT TREFOIL OR LADINO CLOVER*	8	0.20
TALL FESCUE OR SMOOTH BROMEGRASS	20	0.45
REDTOP**	2	0.05
	30	0.70
OR		
B. KENTUCKY BLUEGRASS***	25	0.60
CREEPING RED FESCUE	20	0.50
PERENNIAL RYEGRASS	10	0.20
	55	1.30

REFERENCE: THE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL 2019.

- * INOCULATE WITH APPROPRIATE INOCULUM IMMEDIATELY PRIOR TO SEEDING. LADINO OR COMMON WHITE CLOVER MAY BE SUBSTITUTED FOR BIRDSFOOT TREFOIL AND SEEDED AT THE SAME RATE.
- ** PERENNIAL RYEGRASS MAY BE SUBSTITUTED FOR THE REDTOP BUT INCREASE SEEDING RATE TO 5 LBS/ACRE (0.1 LB/1,000 SF).
- *** USE THIS MIXTURE IN AREAS WHICH ARE MOWED FREQUENTLY. COMMON WHITE CLOVER MAY BE ADDED IF DESIRED AND SEEDED AT 8 LBS/ACRE (0.2 LB/1,000 SF).

GUIDELINES, SEED AND MULCH DETAIL

Not To Scale



STONE ENVIRONMENTAL

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

Hoyle, Tanner
& Associates, Inc.

125 College Street, 4th Floor
Burlington, Vermont 05401
802-860-1331
802-860-6499 fax
www.hoyletanner.com



LOCALIZED EROSION
GUIDELINES, SEED AND MULCH
PCP IMPLEMENTATION PLAN

VERMONT

DRAWING CREDITS

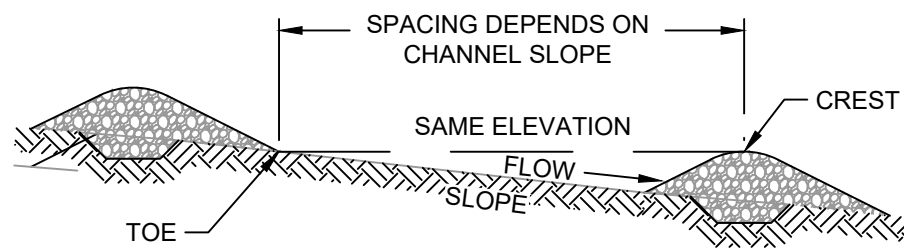
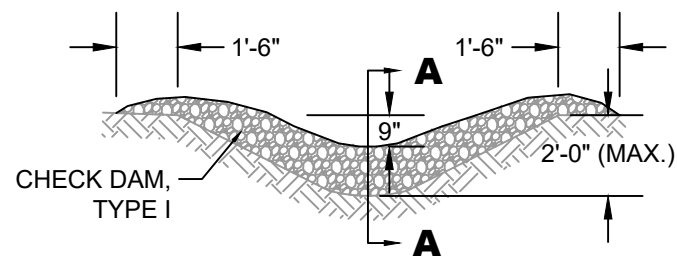
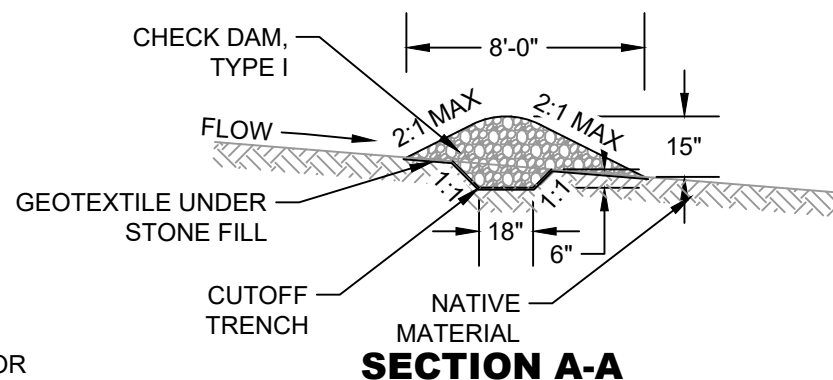
Drawn On: 8/19/2020
Drawn By: JFMS
Checked On: 8/19/2020
Checked By: AGB
Project No.: 18-008-C

NOTES:

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. CHECK DAMS SHALL NOT BE INSTALLED IN LIVE STREAMS OR CHANNELS.
4. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
6. MAXIMUM DRAINAGE AREA IS 2 ACRES.

MAINTENANCE:

1. REMOVE SEDIMENT ACCUMULATED BEHIND THE DAM AS NEEDED TO ALLOW CHANNEL TO DRAIN THROUGH THE STONE CHECK DAM AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM. IF SIGNIFICANT EROSION OCCURS BETWEEN CHECK DAMS, A LINER OF STONE SHOULD BE INSTALLED.

**SPACING BETWEEN CHECK DAMS****STONE CHECK DAM DETAIL***Not To Scale***SAMPLE SPACING FOR 2' HIGH CHECK DAMS**

SLOPE	SPACING
1%	200
2%	100
5%	40
8%	25
10%	20

**STONE ENVIRONMENTAL**

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

Hoyle, Tanner
& Associates, Inc.

125 College Street, 4th Floor
Burlington, Vermont 05401
802-860-1331
802-860-6499 fax
www.hoyletanner.com



VERMONT
AGENCY OF TRANSPORTATION

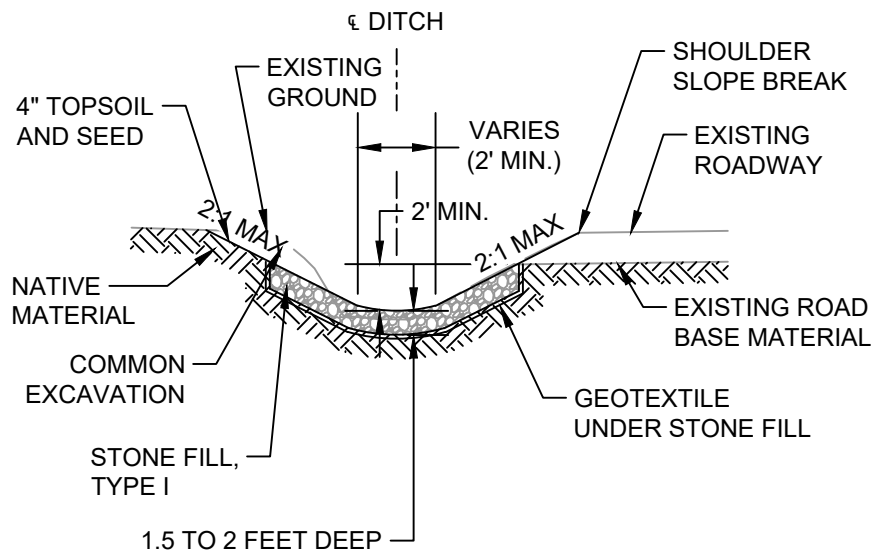
LOCALIZED EROSION
STONE CHECK DAM DETAIL
PCP IMPLEMENTATION PLAN

VERMONT

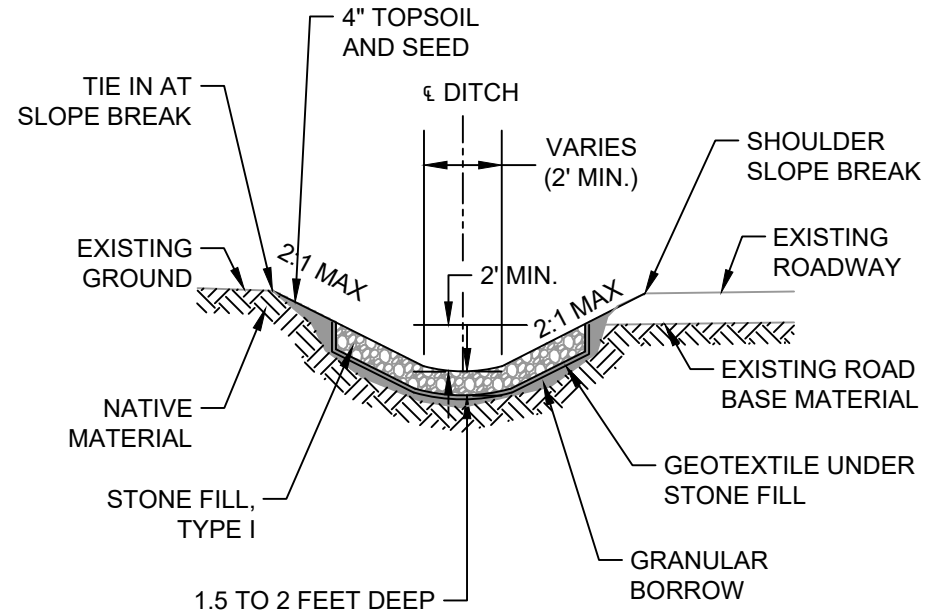
Drawn On: 8/19/2020
Drawn By: JFMS
Checked On: 8/19/2020
Checked By: AGB
Project No.: 18-008-C

NOTES:

1. SEE SEED AND MULCH DETAIL FOR SEEDING MIXTURE.
2. THE MAXIMUM CAPACITY OF THE WATERWAY FLOWING AT DESIGN DEPTH SHALL NOT EXCEED 100 CUBIC FEET PER SECOND.
3. THE MINIMUM CAPACITY SHALL BE ADEQUATE TO CARRY THE PEAK RATE OF RUNOFF FROM A 10-YEAR, 24-HOUR STORM.
4. SEE THE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL FOR ADDITIONAL INFORMATION.



TYPICAL CUT SECTION

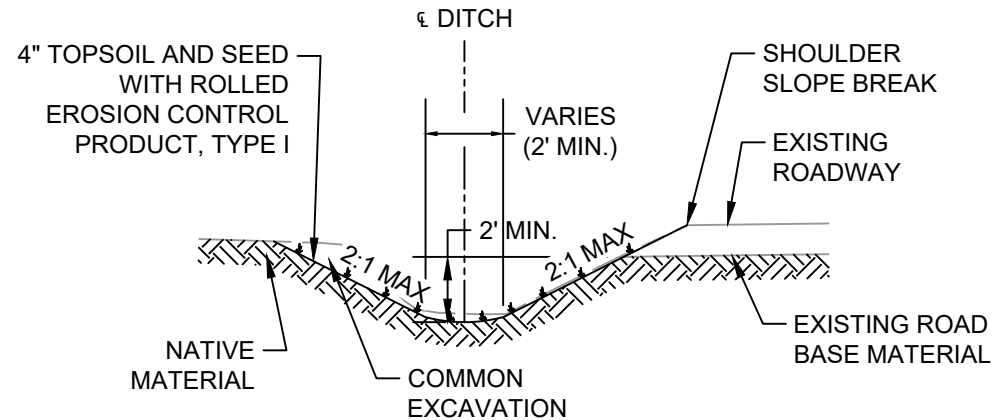
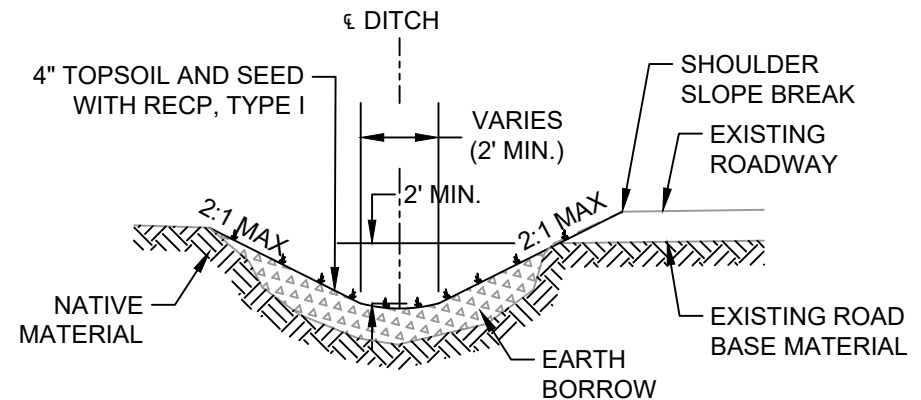


TYPICAL FILL SECTION

STONE-LINED DITCH DETAIL
Not To Scale

NOTES:

1. THE WATERWAY SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
2. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE WATERWAY.
3. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE WATERWAY.
4. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
 - 4.1. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY WATERWAYS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE WATERWAY DURING THE ESTABLISHMENT OF THE VEGETATION.
 - 4.2. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE WATERWAY SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR OTHER MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.
5. SEE SEED AND MULCH DETAIL FOR ADDITIONAL INFORMATION.

**TYPICAL CUT SECTION****TYPICAL FILL SECTION**

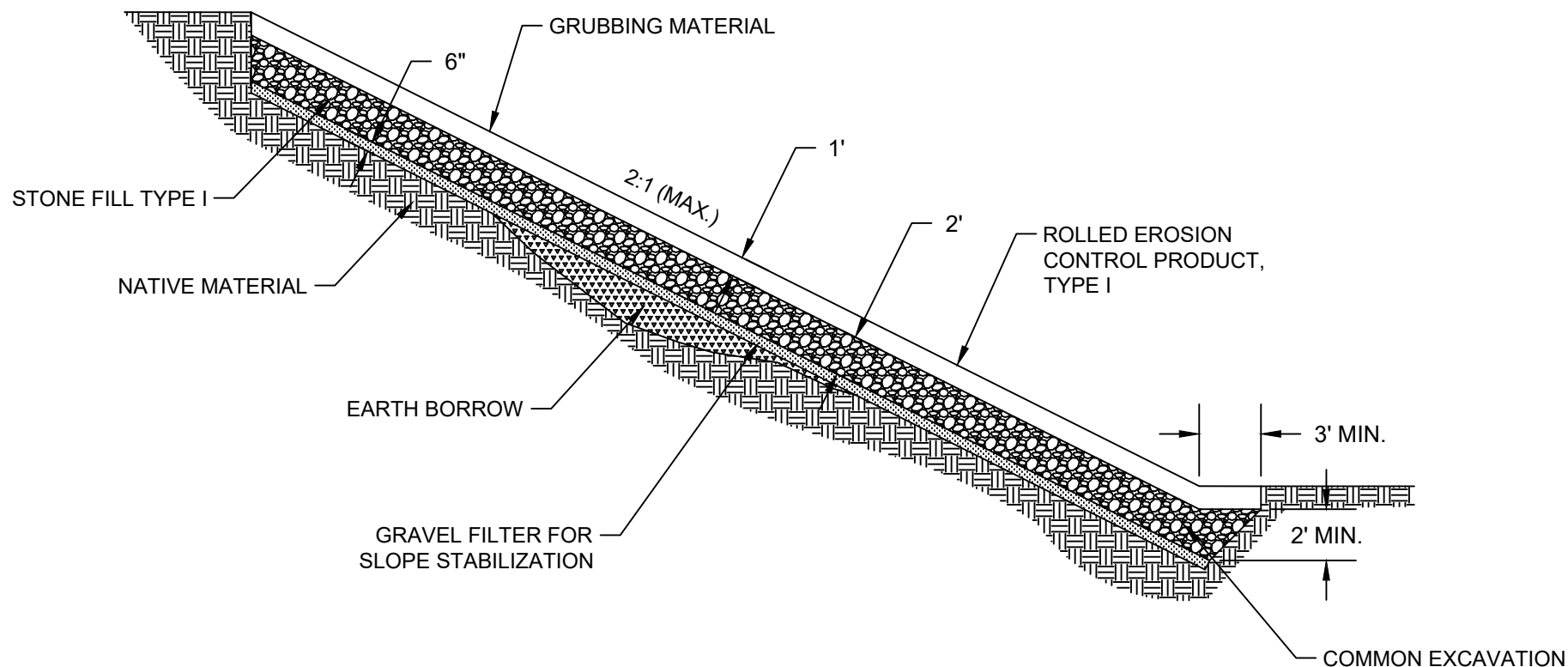
GRASS-LINED DITCH DETAIL

Not To Scale



NOTES:

1. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL STONE OR CLUSTERS OF LARGER STONES.
2. HAND PLACING MAY BE NECESSARY TO ACHIEVE PROPER DISTRIBUTION OF STONE SIZES TO PRODUCE A RELATIVELY SMOOTH, UNIFORM SURFACE.



RIPRAP SLOPE PROTECTION DETAIL

Not To Scale


STONE ENVIRONMENTAL

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

Hoyle, Tanner
& Associates, Inc.

125 College Street, 4th Floor
Burlington, Vermont 05401
802-860-1331
802-860-6499 fax
www.hoyletanner.com


VERMONT
AGENCY OF TRANSPORTATION

LOCALIZED EROSION
SLOPE PROTECTION DETAIL
PCP IMPLEMENTATION PLAN

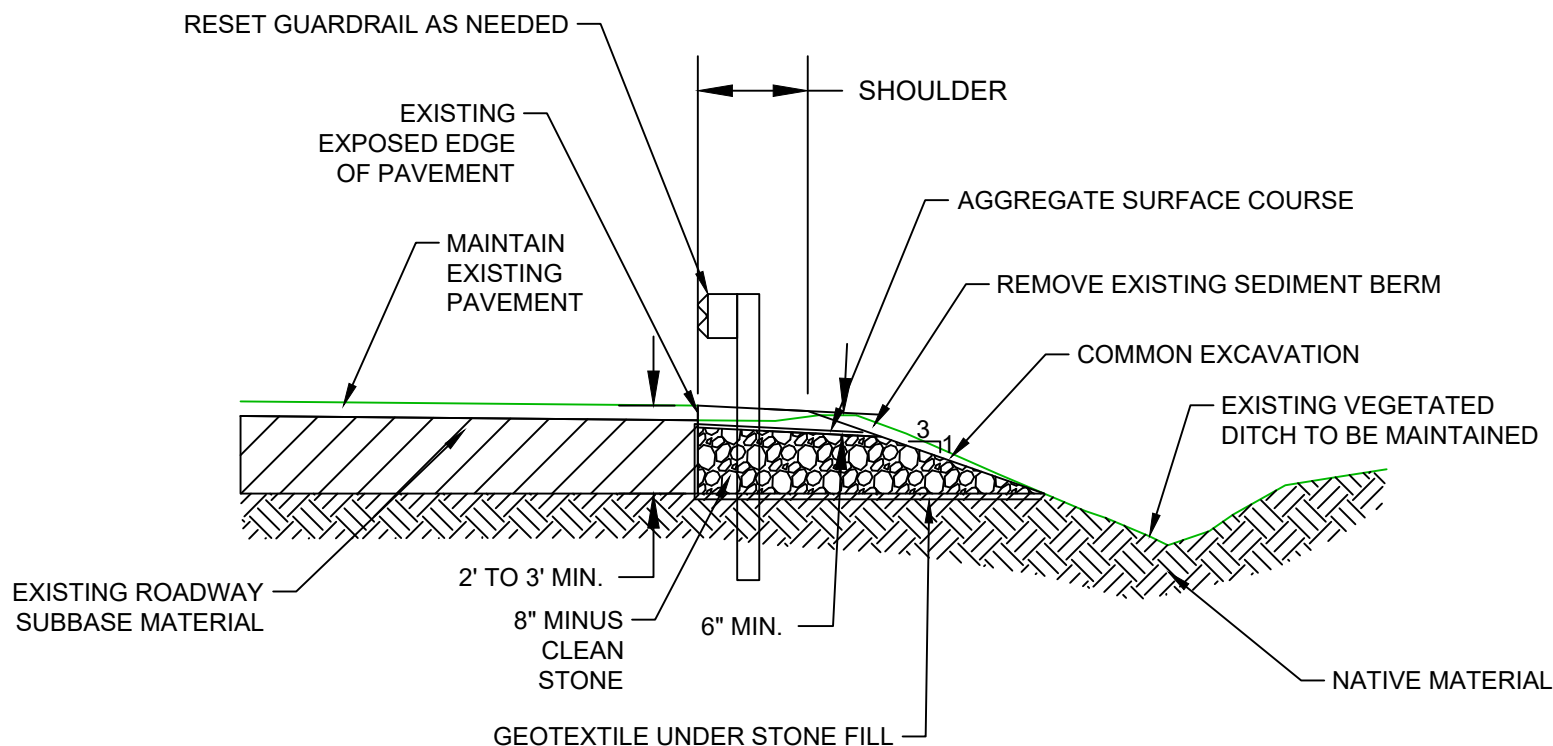
VERMONT

DRAWING CREDITS

Drawn On: 9/3/2020
Drawn By: AGB
Checked On: 9/3/2020
Checked By: KDW
Project No.: 18-008-C

NOTES:

1. FOR GRAVEL ROADS, SHOULDER GRADES SHOULD BE 6-8% TO ENSURE QUICK RUNOFF AND VISUAL BREAK BETWEEN TRAVEL LAND AND SHOULDER.
2. THE SHOULDER NEEDS TO BE ADEQUATELY COMPACTED TO SUPPORT COMMERCIAL AND AGRICULTURAL VEHICLES.



ARMORED SHOULDER PROTECTION DETAIL

Not To Scale


STONE ENVIRONMENTAL

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

Hoyle, Tanner & Associates, Inc.

125 College Street, 4th Floor
Burlington, Vermont 05401
802-860-1331
802-860-6499 fax
www.hoyletanner.com


VERMONT
AGENCY OF TRANSPORTATION

LOCALIZED EROSION
SHOULDER PROTECTION DETAIL
PCP IMPLEMENTATION PLAN

VERMONT

DRAWING CREDITS

Drawn On: 9/24/2020
Drawn By: AGB
Checked On: 9/24/2020
Checked By: JFMS
Project No.: 18-008-C

NOTES:

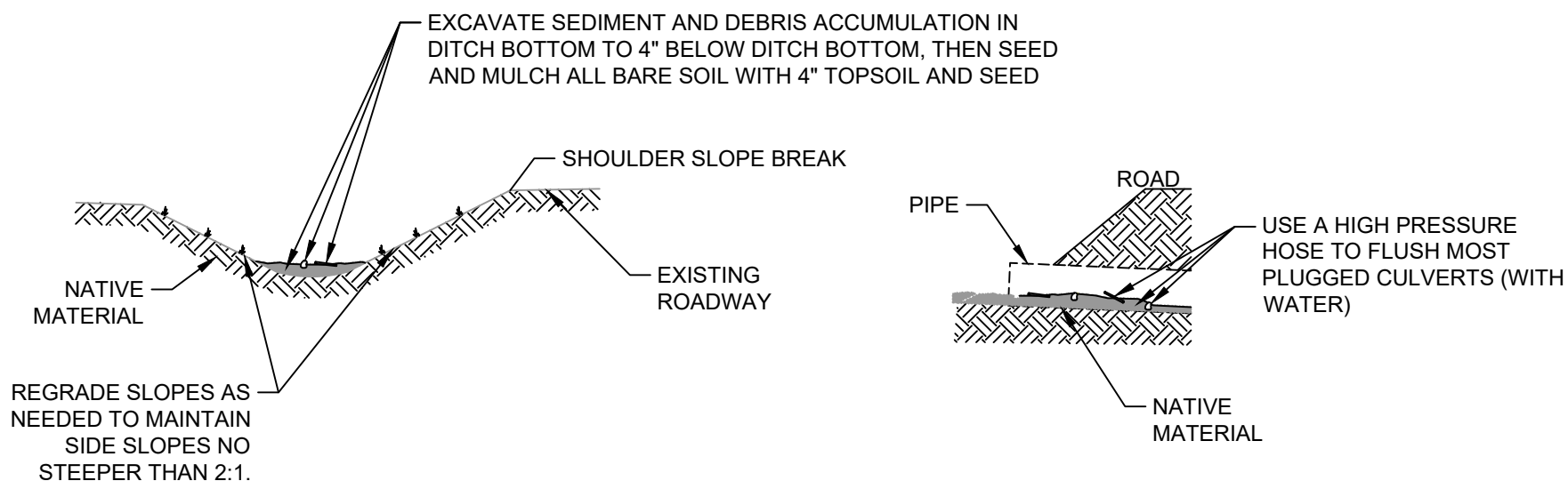
1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE WATERWAY.
2. SEE SEED AND MULCH DETAIL FOR ADDITIONAL INFORMATION.

DITCH CLEANING & MAINTENANCE:

1. CLEAN DITCHES WHEN THEY BECOME CLOGGED WITH SEDIMENTS OR DEBRIS TO PREVENT OVERFLOWS AND WASHOUTS.
2. CHECK DITCHES AFTER MAJOR STORM EVENTS AS THEY MAY HAVE OBSTRUCTIONS, EROSION, OR COLLAPSED BANKS.
3. REGRADE DITCHES ONLY WHEN ABSOLUTELY NECESSARY AND LINE WITH VEGETATION AS SOON AS POSSIBLE.
4. PREVENTING EROSION FROM UPHILL OR ON BACKSLOPES CAN LENGTHEN THE TIME NEEDED BETWEEN DITCH CLEANINGS.

CULVERT CLEANING & MAINTENANCE:

1. INSPECT CULVERTS AS OFTEN AS POSSIBLE, BUT AT LEAST IN THE SPRING, FALL AND AFTER MAJOR STORMS.
2. CULVERTS SHOULD BE FLUSHED FROM THE OUTLET END.
3. THE OUTLET DITCH SHOULD BE CLEANED AFTER CULVERT FLUSHING.



CLEARING DEBRIS/CLOGGING DETAIL

Not To Scale



STONE ENVIRONMENTAL

535 Stone Cutters Way / Montpelier / VT / 05602 / USA
802.229.4541 / info@stone-env.com / www.stone-env.com

Hoyle, Tanner
& Associates, Inc.

125 College Street, 4th Floor
Burlington, Vermont 05401
802-860-1331
802-860-6499 fax
www.hoyletanner.com



VERMONT
AGENCY OF TRANSPORTATION

LOCALIZED EROSION
DEBRIS/CLOGGING DETAIL
PCP IMPLEMENTATION PLAN

VERMONT

Drawn On: 8/19/2020
Drawn By: JFMS
Checked On: 8/19/2020
Checked By: AGB
Project No.: 18-008-C