

Better Roads Program FY2017



Alan May & Rachel Beauregard

Program Goals

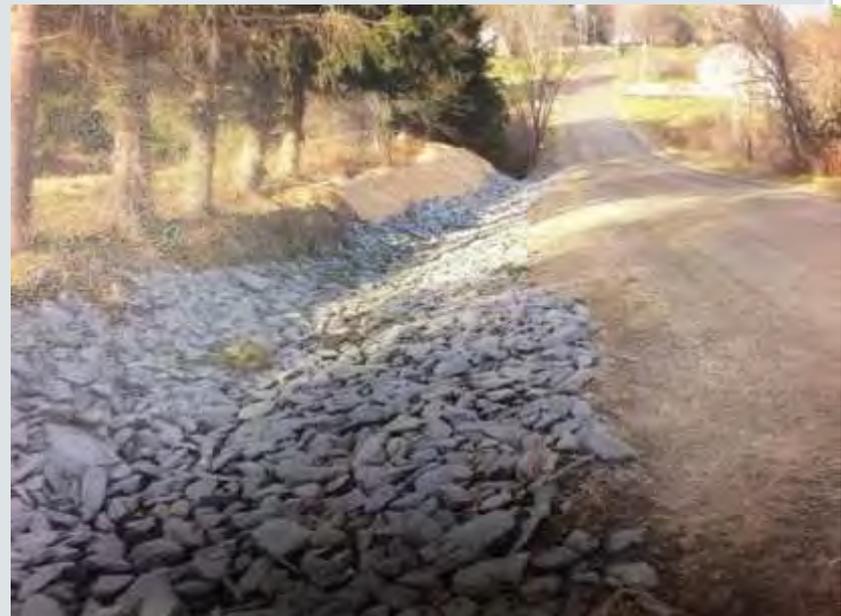
Promote the use of erosion control and maintenance techniques to:

- Save money on maintenance
- Provide lasting fixes to erosion and maintenance issues
- Enhance and protect Vermont's lakes and streams



Program Purpose

- Get water off the road quickly
- Stabilize and revegetate disturbed areas
- Divert runoff/sediment from surface waters
- Save money
- Reduce susceptibility to flood damages

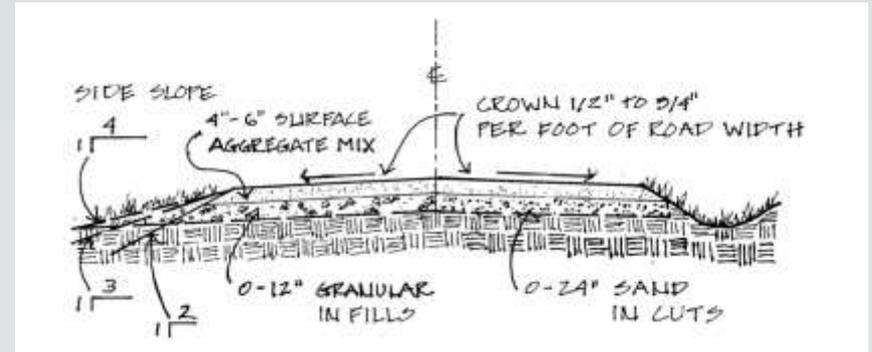


Things to consider.....

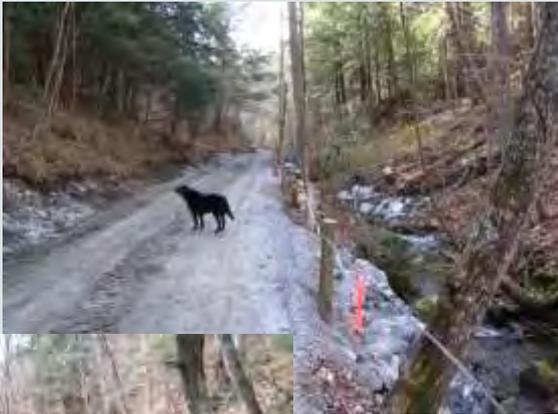


Road Crowning & Shoulder Grading

- Consider re-surfacing and road crowning during road improvement projects to improve on-road drainage
- Water should easily run from road surface to ditch



Road Shoulder Erosion

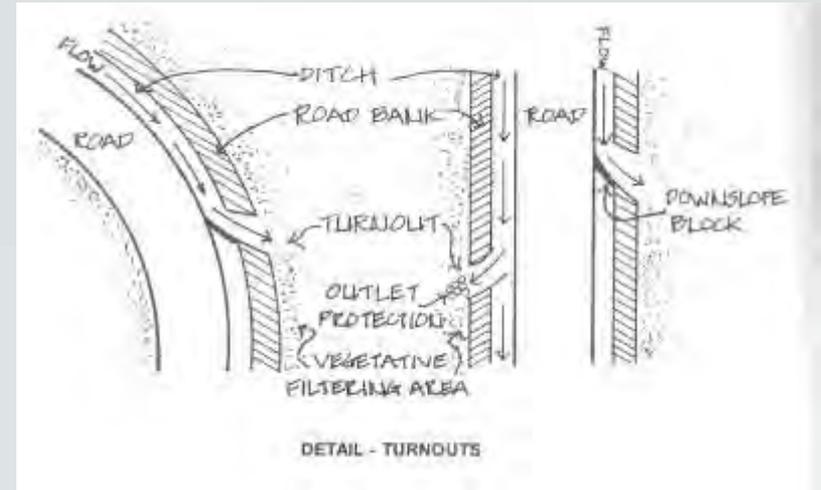


- Is road shoulder erosion due to streambank toe erosion or overland flow?
- Is work going to increase encroachment on stream channel cross section with riprap?
- Address overland drainage sources

Turnouts & Cross Culverts

Turnouts & Cross Culverts

- The number of turnouts & cross culverts is based upon linear footage, discharge, & gradient
- Turnout & cross culvert locations are chosen based on best drainage location, soil types, & adjacent land use
- Turnouts should be designed to be stable – either grass or stone lined
- Cross culvert outlets should be stable



Driveway Entrances & Culverts



- Contact private landowners if private drive culverts need to be upgraded
- Private drive culverts should follow same criteria as public roads
- Work with municipalities in improving zoning related driveway culvert sizes and road entrances

Undersized & Plugged Culverts



- Contact DEC River Management Engineer regarding permit requirements
- Check if Bridge & Culvert survey data exists (also bankfull info)
- Contact Vtrans District office for help in sizing new structures
- Contact culvert suppliers for cost estimates & length availability
- Include compaction & quality backfill materials in cost

Culvert Outfalls and Headwalls



- Include materials for culvert headers & outlet stabilization if necessary



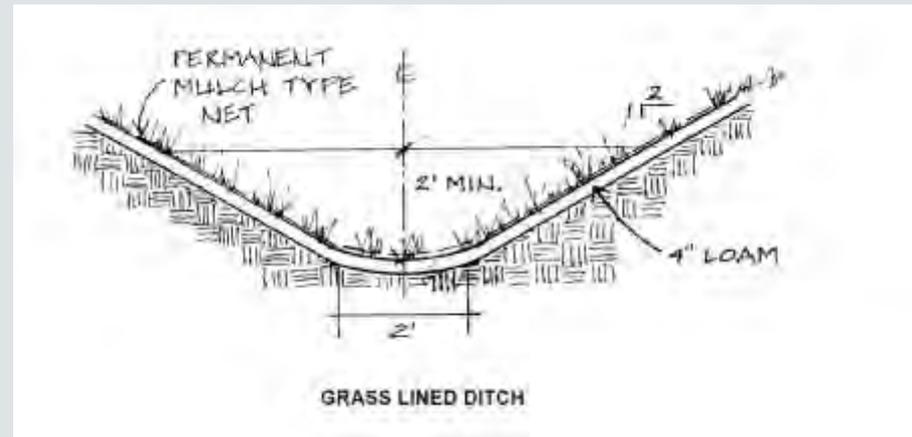
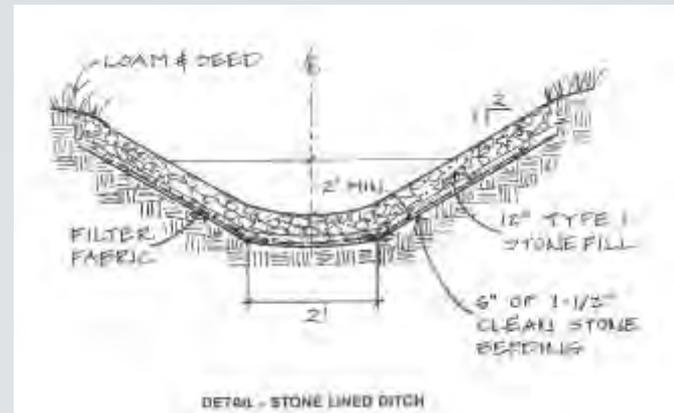
Address Headcutting Adjacent to Road Drainages & Culverts if Possible



- Headcutting waterways can cause excessive amounts of sediment which may plug culverts
- Stabilize incising streams with rock and/or timber check dams if possible- check with DEC River Management Engineer for possible permitting
- Inventory possible upstream & watershed scale sources of sediment & concentrated flow – DEC Watershed coordinator can assist

Ditching

- Should be slightly parabolic
- Size ditches to handle runoff from drainage area
- Outlet into vegetated areas where possible
- Follow your town's Road and Bridge Standards



Retaining Walls

- We HIGHLY recommend hiring someone to design your wall so you know it's going to hold
- Remember to consider drainage behind walls as well as block type
- Key and/or pin into slope
- Choice of material is key for proper drainage and wall movement



Stormwater Mitigation/Retrofits

- Hydraulic studies should be conducted to ensure project will handle flow
- Consider hiring a designer for more complicated projects
- Maintenance of your project will become an issue in the future if not properly designed
 - Leave areas for cleanouts
 - Make sure cleanouts are easily accessible
 - Make sure your town has the resources to properly maintain these features
- ANR DEC Stormwater plans are a great start and there are many great Green Stormwater sizing tools online





Maintenance

Considerations:

- Where and how will I clean out my project when it fills with sediment?
- Do I have the resources and equipment I need to maintain this feature?
- Is there a better solution that is more maintenance friendly?
- Have I resolved sediment issues uphill of my project so they won't cause issues on this project?
- Will the culverts downstream of my replacement be able to handle additional flow? If not, should I replace those that are downstream first?
- Will I need a maintenance easement or agreement from adjacent property owners?

Construction

- Work from the top of the problem area/site down. This prevents sediment and debris from entering the completed portion of your project.
- Safety: Please remember to wear safety vests at all times and hard hats if there are overhead hazards. Excavators are considered overhead hazards and VOSHA won't look kindly upon these violations!
- Traffic Control: Please remember to follow the MUTCD Guidelines! If you're out there working you need signs, cones, and possibly even flaggers! MUTCD Part 6 has all of the information you might need. Please let us know if you need any assistance with this.



Grant Categories

Total Funding: Approx. \$1.3 million, or +/- 50 projects

- Category A - Road Inventory And Capital Budget Plan
 - Maximum grant of \$8,000 with \$2,000 local match
 - Prioritized inventory of road related erosion problems
 - Capital plan to correct areas over a period of time
- Category B - Correction of Road Related Erosion Problem
 - Maximum grant of \$20,000 with \$5,000 local match
- Category C- Correction of a Stream Bank or Slope Related Problem
 - Maximum grant of \$40,000 with \$10,000 local match
- Category D- Structure/culvert upgrades
 - Maximum grant of \$40,000 with \$10,000 local match

Better Backroads Grant Application Guidance



Completed BBR Application includes:

- Construction quantities & cost estimates
- Site location map
- Before photos
- Site sketch
- Completed highway administration and release forms
- Letters of Support or Permits, if applicable

Category A

Maximum Grant Amount: \$8,000 with \$2,000 local match

Project includes:

1. Inventory of roads and/or culverts and identification of road related erosion and/or stormwater problems affecting water quality
Can be completed for a watershed or for the whole town
2. Identification and prioritization of problem areas for future repair
3. Development of a capital budget plan

You may contract this out to the RPC if you wish. Please contact your RPC to make sure they have the time and resources to complete your inventory before checking this box on your application.

Category A Example



FY17 Vermont Better Roads Grant Application

Please complete this page ONCE and return with your Grant Category Application(s)

Town/Organization: Roadville Contact Person(s): Rachel Beauvois
Address: National Life Dr Roadville VT 05621
Street Address Town ZIP
E-mail: townie_email.com Phone: 802 828-5608
DUNS #: 991683501 Fiscal Year End Month (MM): 06
Accounting System: Automated Manual Combination

Please use the suggested documentation checklist below to ensure that all of the relevant items regarding your application have been included.

- Grant application cover sheet (Only submit one)
- Grant application form (One per category/project)
- Itemized Cost estimate for labor, equipment, and materials (see enclosed Cost Estimate Worksheet). If applicable, please break down funding by source (i.e. different grant sources)
- Project Location Map (please show location of affected water)
- Sketch of proposed erosion control measures or other management practices, including distances in feet
Also show approximate location of town/other right-of-way and/or property lines
- Photo(s) of the project area
- Letters of Support (RPC, VTrans District Technical Staff, ANR Rivers and Streams Engineers, etc.)
- If Category C River/Road Conflict or Category D River/Stream Structure or Culvert, you must attach ANR/ACDE consultation



Vermont Better Roads Grant Program Application

CATEGORY A: ROAD INVENTORY AND CAPITAL BUDGET PLANNING PROJECT

Town/Organization: Roadville

Project Name: Roadville Road Inventory and Capital Budget

Inventory Type: Town wide Watershed (please list): Smith River

Describe how the grant funds will be spent and attach a project budget: Roadville will inventory road erosion sites in the Smith River watershed using ANR DEC's road erosion inventory assessment. Sites will be prioritized by amount of erosion and high/medium/low risk ratings. Capital budgets will be developed for high priority sites.

How do you plan to meet the required 20% match on this grant?

Town will use road crew staff time as well as transportation fund money from town budget set aside.

Requested Grant Amount (\$8,000 max): \$8,000

Estimated Total Project Cost (including 20% local match): \$10,000

Estimated Completion Date: 10/20/2016

Please check this box if you would like to contract your project through your RPC

REQUIRED ATTACHMENTS: a) Project budget b) Appropriate supporting documents.

By signing this application I certify that all the information provided is accurate to the best of my knowledge. We will comply with all the requirements of the grant including making our books available for audit if required.

SIGNATURE OF APPLICANT: (Must be Town Administrator/Manager or Select Board Chair)

Name: [Signature] Title: 4/1/2016
Town Administrator

General Observations

General observations of the roads in the town of Burke are included below to assist with the overall understanding of road erosion and its unique challenges, and overall strategies that can be employed throughout town to reduce erosion risks. A prevalence of gravel berms between the road and the top of the ditch, causing water to run on the road-side of the berm and limit the ability of stormwater to shed off the road into the ditch was observed in several locations throughout town. This generally occurs as a result of grading practices, and builds up over time preventing stormwater from entering the ditch.



Berm blocking ditch access

Stormwater runoff occurring on road instead of entering ditch



Left: Newly graded road with berm between road and ditch. Stormwater will not be able to enter ditch and will cause road erosion.

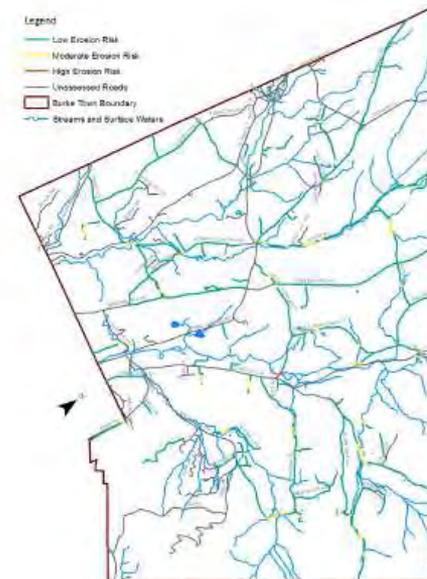
The town of Burke is also challenged by the type of road material that is locally sourced, which is quite fine and sandy and is easily mobilized by rain events. The Town may consider alternative, more cohesive gravel material for steep roads or higher risk that are prone to erosion.

It was observed in many locations where culverts cross under the road that there is little gravel material covering the culverts. The general rule is to have equal cover for the diameter of the crossover culvert. Adding road materials at culvert crossings would help maintain the culvert over its functional life, and limit seeps and damage to the culvert.

Identified Priority Road Project Sites				
Site #	Location	TH#	Priority	Cost Estimate
1	Pinkham Road – East Side of Dishmill Brook Crossing	41	H	15,989.00
2	Pinkham Road At Washburn Road Junction	41	H	12,687.40
3	Upper Victory Road, near Burke Town Line	5	M/H	16,343.40
4	Bumps Road at Bugbee Crossing	45	H	13,847.40
5	Carter Road, Hill down from Burke Green Road	17	H	18,696.10
6	Carter Road, Hill down from Walters Farm Rd	17	H	14,013.00
7	Pinkham Road – North Hill	41	H	184,860.00
8	Dashney Road	50	H	5176.00
Total Estimated Budget (including town match)				\$281,612.30
Identified Priority Culverts				
9	Carter Road, near Brook Rd	14	H	\$40,000 - \$50,000
10	Carter Road, near Marshall Newland Rd	17	H	\$55,000 - \$60,000
11	Sugarhouse Road	29	H	\$6000
12	Pinkham Road	41	H	\$30,000 - \$40,000
13	Old Farm Road	26	H	\$30,000 - \$40,000
14	Old Farm Road	26	M	\$45,000 - \$55,000
15	Old Farm Road	26	M	\$75,000 - \$85,000
				\$30,000.00

Road Erosion Risk Analysis

A component of the methodology of this inventory was to reference the Vermont Agency of Natural Resource's Road Erosion Risk Analysis data layer, developed in 2014 and shown below. Through the analysis of the road's slope, soil erodability, and proximity to stream, the data show segments of roads in Burke that were assessed to have a low, moderate or high risk of road erosion. Referencing road segments that are moderate to high risk is helpful in determining if current management is adequate or as a consideration for project design in areas that are at higher risk levels.



Site #1: Pinkham Road (TH41): East Side of Dishmill Brook Crossing



Figure 1: Location of Site #1



Figure 2: Looking down Pinkham Road from the east side of Dishmill Brook Crossing, near Kingdom Farm Lodge

Description of Problem

Dishmill Brook crosses Pinkham Road in this location, and this project addresses the east side of the Bridge over Dishmill Brook, the hill leading from the so-called "Kingdom Farm Lodge" down to the Bridge. Inadequate ditches lacking access and treatment, along with highly erodible sediments are running off toward Bridge, causing sediment to build up at bridge, general road erosion, and sediment to runoff into stream. Crossover culverts are plugged, and ditches are filled with sediment. Undersized crossover culverts and the lack of adequate driveway culverts are also contributing to the erosion problems in this location. The state's Water Quality Assessment Report flagged Dishmill Brook as stressed due to hydrologic scour at development and roads, and noted habitat degradation from a high sand bedload.

Current Management

The road foremen grades this site several times a year, and culvert inlets are cleaned out. We have been contacted about driveway improvements.

Description of Project/Corrective Measures Site #1

Install 100' of stone-lined ditching to driveway at Kingdom Farm Lodge. At driveway, replace crossover culvert to 18" x 40'. Install 18" x 30" driveway culvert, and discuss landowner installing additional culvert on second driveway that's eroding into road. Install 400' of stone-lined ditching on left side to Bridge. Replace two additional crossover culverts to 18" x 40'. Stabilize inlets and outlets of new structures. Install 75' of stone lined ditching on right side near bridge (575' ditch total).

Cost Estimates

Site #1: Pinkham Road (TH41) - East Side of Dishmill Brook Crossing

Item	Rate	Qty	Total
Equipment			
Excavator & Operator	150/hr	30	4500.00
Town Truck (2)	75/hr	75	4500.00
Materials			
18" x 40' steel corrugated culvert	620.00	3	1860.00
Type 1 stone	513/cy	128cy	1664.00
18" x 30' steel corrugated culvert	465.00	1	465.00
Labor			
Town Crew (3)	30/hr	100	3000.00
Total Project Budget			15,989.00

Sketch of Site #1: Pinkham Road, East Side of Dishmill Brook Crossing

Photos of Site #1 Pinkham Road (TH41) East Side of Dishmill Brook Crossing



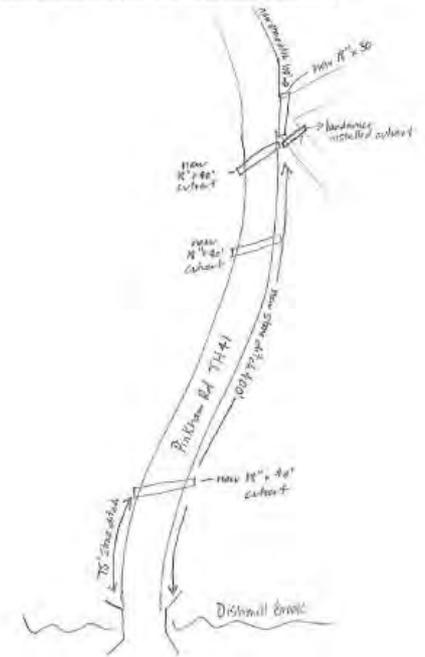
Figure 3: Pinkham Road ditch in front of Kingdom Farm, east and uphill from Dishmill Brook Crossing, plugged culvert inlet



Figure 4: Pinkham Road hill toward Bridge at Dishmill Brook Crossing, showing erosion and lack of adequate ditching



Figure 5: Left - Pinkham Road at Dishmill Brook crossing, east side, sediment buildup at Bridge from road erosion



Site Description

Long Hill Road project area has native soils of Cabot to Cabot-Colonel Complex of poorly to somewhat poorly drained silt loamy till. The road is 2.66 mile ~7% slope class 3 road with narrow road surface, high vegetated banks and small to no ditching. There has been recent residential development in the higher section of the road. The section of from this new house down ~800' to a poor condition cross culvert the has road surface and ditch erosion that directly deposits to unnamed brook that drains to the Moose River and runs parallel to road.

Recommended Treatment

Starting approximately .5 mile up from the bottom of the road at existing cross culvert up to first driveway ~300' remove vegetation and push back banks to the R.O.W. on the north side of the road. Install properly lined ditches, install a metal 24" cross culvert at the top of the section and a 30" culvert at the bottom of the section ~20' up from existing cross culvert. Install a sediment detention basin/pool at the outlet of each to decrease velocity and capture sediment.

This treatment will only address the bottom section of the area with issue but will address the direct loading to the stream and will give the town a place to start in getting this road into better shape.

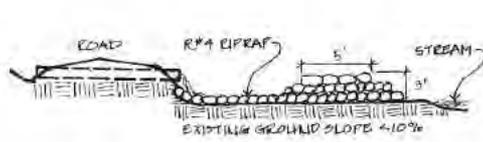
Construction Notes:

- Construction Specification guidelines for culverts, ditches and outlet structures- See the *Vermont Better Back Roads Manual*, 2009, the *Vermont Standards and Specifications for Erosion Prevention and Sediment Control* 2006 & the *VTrans Hydraulic Manual* 1998
- Meet adopted *codes and standards*
- Buried Cable/Utilities- Buried cable/utilities may be on site. Call dig safe 1-888-DIG-SAFE to locate buried utilizes prior to construction.
- Stabilize all disturbed areas with seed and mulch.

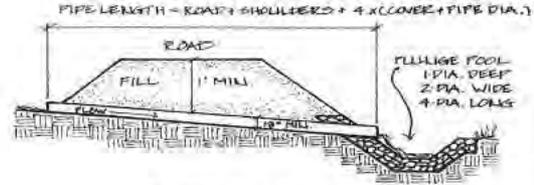
Cost Estimate for Treatment

<u>Item</u>	<u>Quantity</u>	<u>Cost per unit</u>	<u>Total</u>
Labor	60hrs	\$25	\$1500
Chipper	20hrs	\$30	\$600
Excavation	25hrs	\$135	\$3,375
Move Truck	40hrs	\$80	\$3,200
24" Culvert	30'	\$15.50	\$465
30" Culvert	30'	\$25	\$750
Ledge	105 T	\$12	\$1,260
Total			\$11,350

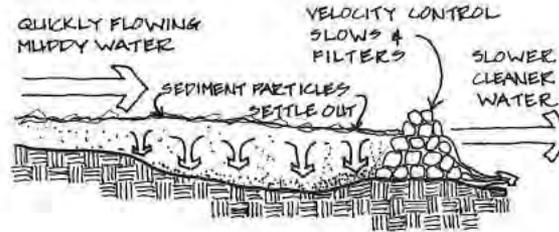
Conceptual Drawing of example culvert outlet treatments



SPLASH/PLUNGE POOL



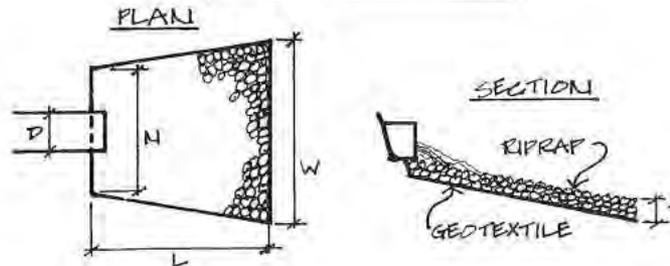
CULVERT PROFILE & CROSS SECTION



VELOCITY CONTROL

Rock Apron Specifications					
Culvert Diameter (D)	Riprap Size	T (in.)	N (ft.)	W (ft.)	L (ft.)
18 inches	(3-12 inch)	18	4.5	14.5	10.0
24 inches	(3-12 inch)	18	6.0	20.0	14.0

D= diameter of culvert
 T= depth of stone in apron
 N= width of apron near culvert
 W= width at downhill end of apron
 L= length of apron



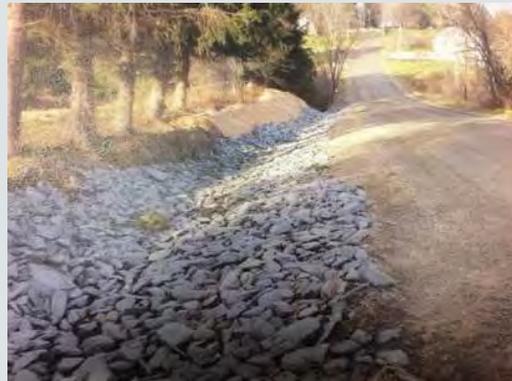
ROCK APRON

Category B

Maximum Grant Amount: \$20,000 with \$5,000 local match

Correction of a Road Related Erosion Problem and/or Stormwater Mitigation/Retrofit for both gravel and paved roads

- Rock or grass lined ditches
- Road drainage turnouts
- Check dams and splash pools
- Rain gardens
- Swirl Concentrator Devices
- Dry Wells
- Gravel Wetlands
- Green Stormwater Infrastructure
- Infiltration Practices
- Level Spreaders
- Drop inlet rehab or replacement
- Stormwater system rehab or replacement





FY17 Vermont Better Roads Grant Application

Please complete this page ONCE and return with your Grant Category Application(s)

Town/Organization: Roadville Contact Person(s): Rachel Beauvais

Address: 1 National Life Dr Roadville 05621
Street Address Town Zip

Email: town@emul.com Phone: 802-828-5608

DUNS #: 991683501 Fiscal Year End Month (MM): 06

Accounting System: Automated Manual Combination

Please use the suggested documentation checklist below to ensure that all of the relevant items regarding your application have been included.

- Grant application cover sheet (Only submit one)
- Grant application form (One per category/project)
- Itemized Cost estimate for labor, equipment, and materials (see enclosed Cost Estimate Worksheet). If applicable, please break down funding by source (i.e. different grant sources)
- Project Location Map (please show location of affected water)
- Sketch of proposed erosion control measures or other management practices, including distances in feet
Also show approximate location of town/other right-of-way and/or property lines
- Photo(s) of the project area
- Letters of Support (RPC, VTans District Technical Staff, ANR Rivers and Streams Engineers, etc.)
- If Category C River/Road Conflict or Category D River/Stream Structure or Culvert, you must attach ANR/ACOE consultation

Category B Example



Vermont Better Roads Grant Program Application

Please complete one application per category and/or project you are applying for. You may make copies of the application for multiple applications per category and/or multiple categories.

Please check the Category you are applying for:

- B. Correction of a Road Related Erosion Problem and/or Stormwater Mitigation Retrofit for both gravel and paved roads
- C. Correction of a Stream Bank or Slope Related Problem
- D. Structure/culvert upgrades

Town/Organization: Boakville

Project Name: Main Road Hock lined ditch and gravel wetland

Road Name: Main Rd TH #: 1 Structure # (if applicable): _____

Road Type: Paved or Unpaved (circle one) Curbed or Uncurbed (circle one)

Class 1 Class 2 Class 3 Class 4 (circle one)

Watershed: Smuttie River

Please provide a thorough description of the problem (ex. Roadway has steep slope with no ditch which is causing roadway erosion):

Roadway has steep slope (7%) with no ditch causing roadway erosion. Water continues down road and turns into nearby pond.

Description of Project and how you plan to complete the work (ex. Stone line 500' of ditch by reshaping ditch and stone lining, working from the top of the project down to the bottom):

Stone line 500' of ditch working from top to bottom, then install gravel wetland at end of ditch in nearby field to treat runoff. See attached design.

Expected Effects (+ & -) on water quality (ex. Erosion will be eliminated by placing the stone ditch):

Erosion will be eliminated by placing a stone lined ditch and gravel wetland at bottom of slope will prevent most sediment from entering pond.



Distance from end of project to nearest water (stream, lake, or stormwater system that outlets directly to water). Please circle one: 0-50' 50-250' 250'+

Progress to Date:

Design work for gravel wetland complete + Right of Entry + ROW Acquired

Is there an emergency reason this project must be completed quickly? If yes, please explain:

No, but high priority due to large volume of sediment entering pond.

Has this project been identified through a municipal road inventory, capital budget plan, tactical basin plan, culvert inventory, or other management plan? If yes, please list which.

Yes: 2015 Capital Budget Plan No
Smith River Basin Plan

Please list any professionals you may have contacted for assistance with this project (ANR River Management Engineer, Army Corps of Engineers, VTtrans District Technical Staff, Basin Planner etc.):

Chris Brunelle - ANR River Engineer : No permit needed
Dick Hosking - VTtrans District 5 : Letter of Support Attached
Smith River Basin Planner : Letter of Support Attached

Is the project located in the town "Right of Way?" Yes, No, Both (if "Both" please explain further).

Both. Ditch is in ROW, gravel wetland required easement which has been acquired for project and is attached.

Will the town road crew complete this work? Yes, No, Some (if "some" please explain further).

Some. Town will do ditching work and will hire contractor to construct gravel wetland.



Describe how the grant funds will be spent and/or attach a project budget: Project budget attached.

How do you plan to meet the required 20% match on this grant?
Town will provide labor, equipment, + materials for ditching and partial materials for gravel wetland.

Requested Grant Amount (\$20,000 max Category B, \$40,000 max Categories C & D): \$20,000

Estimated Total Project Cost (including 20% local match): \$39,000

Estimated Completion Date: 10/15/2016

REQUIRED ATTACHMENTS:

- Itemized Cost Estimate (labor, equipment, materials)
(For assistance, call Senior District at 802-628-4425)
- Project Location Map
(Please show location of affected water) (1:500 scale map, if possible)
- Sketch of proposed erosion control measures, including:
 - Distances (ft.)
 - Estimate of waste & borrow quantities
 - Approx. location of town/other right-of-way and/or property lines
- Photo(s) of the project area.
- Agreement for Entry and/or Deed of Easement (if project is outside Town ROW).
- If project involves stream or river/road conflict, include documentation of consultation with a River Management Engineer.
- Other appropriate supporting documents.

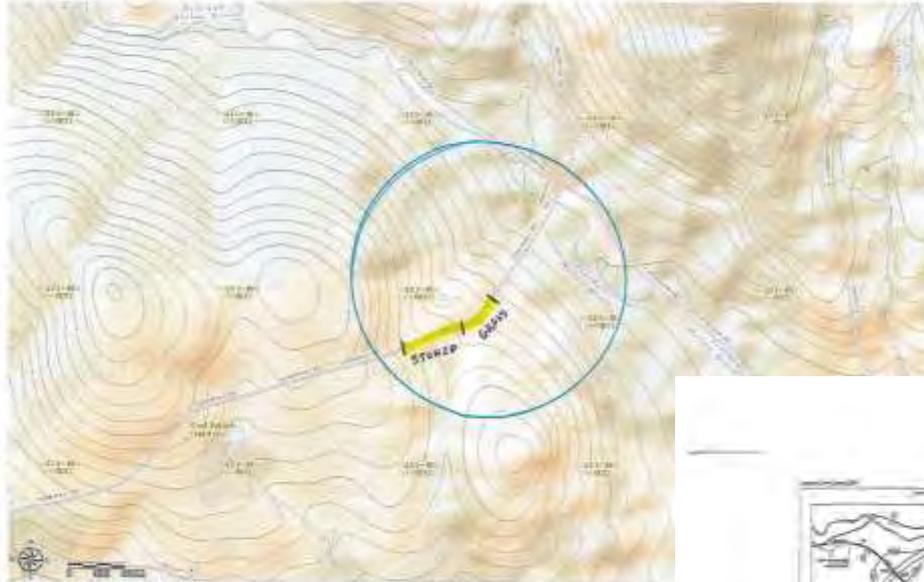
By signing this application I certify that all the information provided is accurate to the best of my knowledge. We will comply with all the requirements of the grant including making our books available for audit (if required).

SIGNATURE OF APPLICANT: (Must be Town Administrator/Manager or Select Board Chair)

Name: [Signature] Title: 4/1/2016
Town Administrator

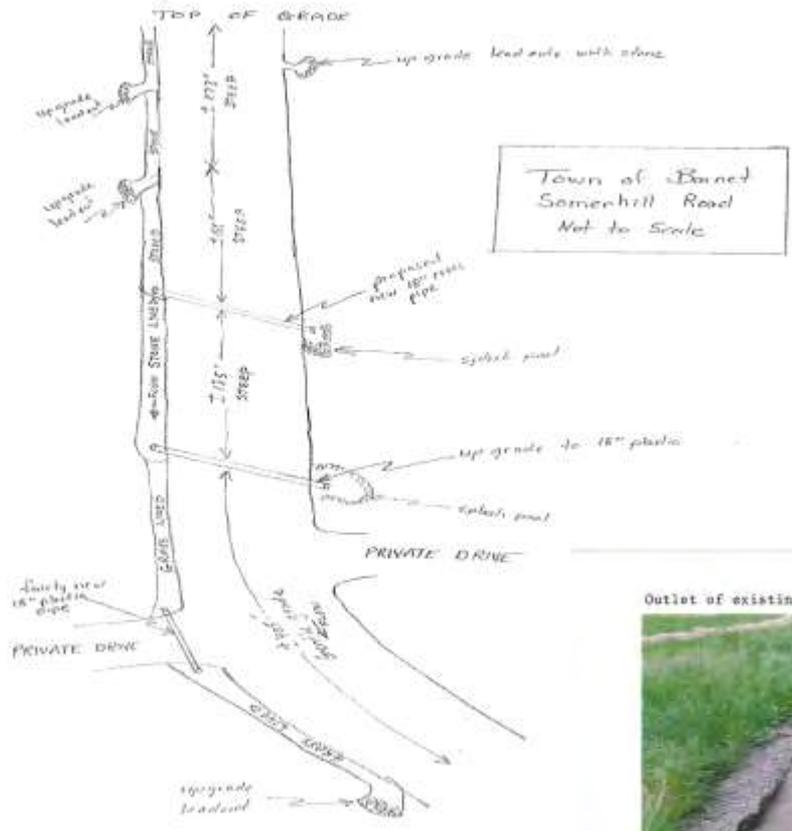
Better Backroads Grant Map

NOTES: Data available from U.S. Geological Survey, National Geospatial Program.



View of the National Map Center





Outlet of existing pipe



Inlet of existing pipe



Outlet of existing pipe



Looking up at proposed stoned area

Before Barnet Project

Outlet of existing pipe



Inlet of existing pipe



Outlet of existing pipe



Looking up at proposed stoned area

During

During project work



Barnet Project



After

Category C

Maximum Grant Amount: \$40,000 with \$10,000 local match

Correction of a Stream Bank or Slope Related Problem

- Stream bank stabilization
- Slope stabilization
- Retaining walls or stacked walls



Category D

Maximum Grant Amount: \$40,000 with \$10,000 local match

Structure/culvert upgrades

- Undersized culvert or structure
- Culvert or structure replacement
- Culvert headcut and gully stabilization in direct proximity to roadway



What if my project fits more than one category?

You have several options!

1. Choose the category that best fits the overall project

Ex. Gary has a project that includes rock lining 500' of ditch and replacing one undersized culvert. Total project cost is \$15,000. Most of the project is ditching, so he applied for a Category B project

2. Choose the category that best fits the project budget.

Ex. John has a project that includes a box culvert and drop inlet rehab. Total project cost is \$55,000. The project could be a Category B because of the drop inlets, but John chooses Category D as the maximum grant amount is higher and will get him a better bang for his buck.

3. Split the project up into two smaller projects and apply to one in each category

Ex. Sandy has a project that includes a box culvert (\$40,000) and 2500' of ditching (\$20,000). Sandy applies to a Category D for the box culvert and a Category B for the ditching.

Who can you call if you need help?

- Better Roads
 - Alan May
- VTrans District Office
- County Conservation District
- Watershed Coordinator



Interim Guidance For Completing Municipal Road Erosion Inventories And Capital Budgets 2016-2018

- **Interim Road Erosion Inventory Guidance- The 5 C's**
 - **Connectivity**
 - **Culverts**
 - **Crowns**
 - **Conveyance**
 - **Capital Budgets**
- The *Road Erosion Risk Ranking* Layer on the ANR Natural Resources Atlas
<http://anrmaps.vermont.gov/websites/anra/>
- *Better Backroads Manual, 2009*
<http://vtransengineering.vermont.gov/bureaus/mab/better-back-roads>
- *Town and Bridge Standards, 2013* (VTrans Orange Book p. 7-6)
http://vtransoperations.vermont.gov/sites/aot_operations/files/The%20Orange%20Book-online%20version%202014-2016%2004May15%20REV2.pdf
- DEC and Watershed Consulting Associates Road Erosion Inventory and Capital Budget Template <http://watershedca.com/>

Questions?

