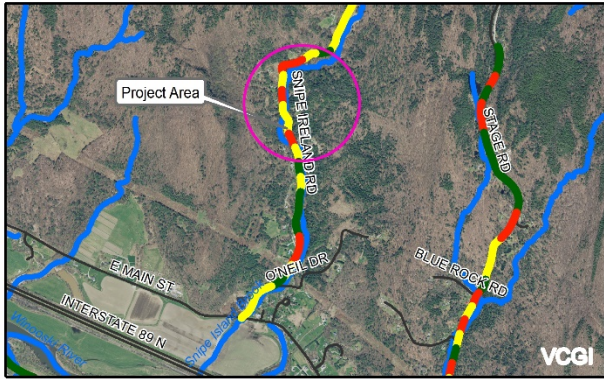


Town: Richmond	Road Name: Snipe Ireland Road	Date Visited: 5/15/2019
-----------------------	--------------------------------------	--------------------------------

Road Segment IDs: 169102 – 169111 (10 segments) – Section 2 (two map pages)



Existing Conditions
 Field Determined Slope: 0.5-6%
 Road Type: Gravel
 Conveyance Area/Turnout: Mix of Good, Need improvement, and Missing
 Erosion Types Present: Rill and Gully
 Drainage Culverts: 4
 Driveway Culverts: 0

Municipal Road General Permit Standards:

+ Meets Standard, -- Partially Meets Standard (needs work), X Does Not Meet Standard

Roadway Crown/Travel Lane	+	Grader Berm/Windrow	X
Road Drainage	X	Conveyance Area/Turnout	X
Municipal Drainage Culverts	X	Driveway Culverts (within ROW)	X

Existing Conditions Notes: This section of Snipe Ireland Road is gravel with a well-maintained surface and crown. In most locations water can sheet off the road and only a few short berms will need attention. Many of the existing swales meet the standard. New grass and stone lined swales need to be installed where they are not currently located. A long section of swale will need improvement and either rock lining or installation of a cross culvert to meet the standard for moderate sloped roads. One of the short sections missing swales is exempt because installation would require removal of large trees. Multiple culverts along the section need improvement to correct erosion or size issues including four culverts that will need to be installed.



Photo 1: Short section of road with no swales that has a conflice with large trees and is therefore exempt.



Photo 2: Existing undersized culvert and downstream gully erosion.

Proposed Scope of Work

Roadway/Travel Lane Practices

	Improve Road Crown		Adjust Road Grade
X	Remove Grader Berm		Edge of Road Stabilization/Maintenance

Roadway Drainage Practices

X	Install New Ditch	X	Improve Existing Ditch
X	Side Slope Excavation for New Ditch		

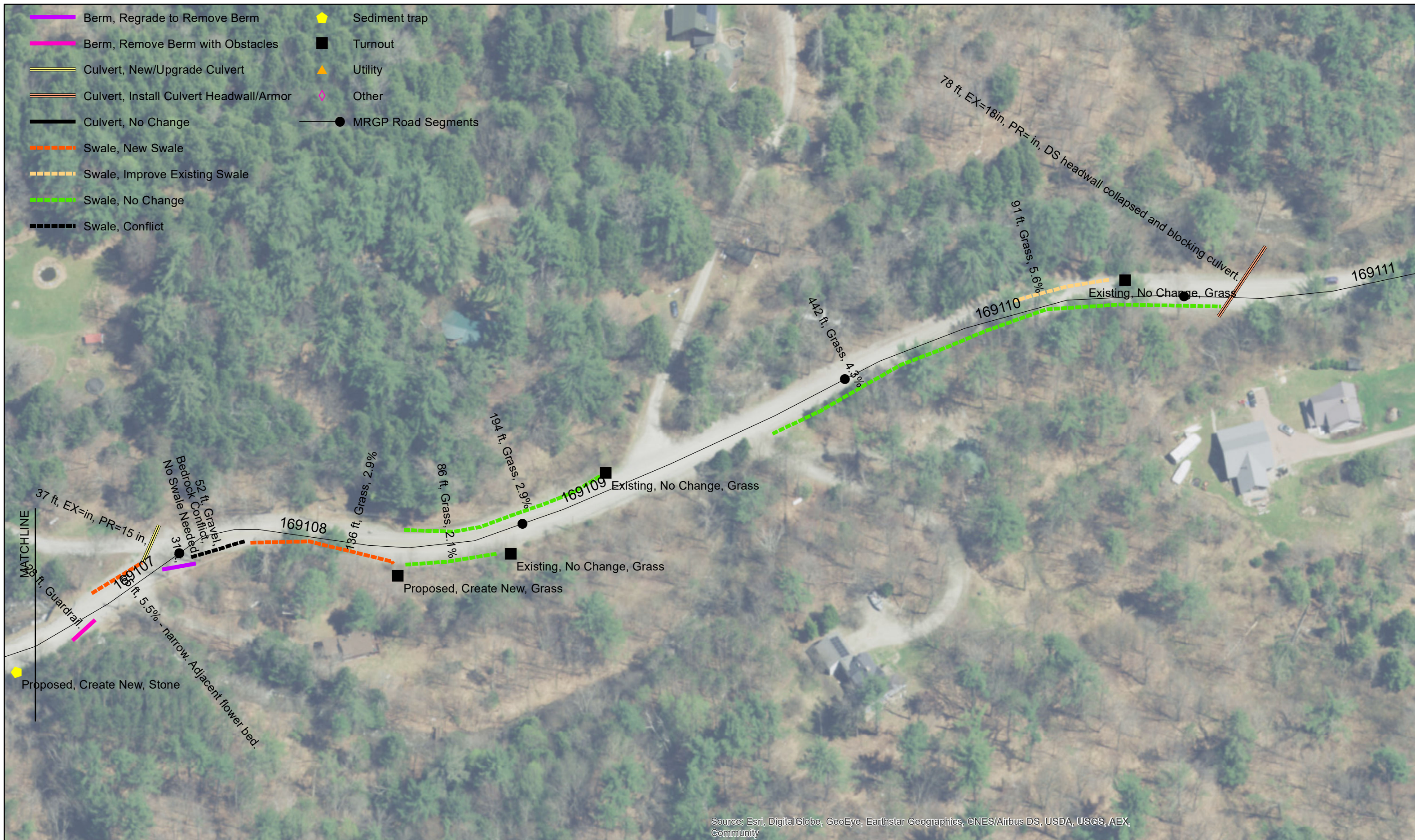
Conveyance/Turnout Practices

X	Install Turnout	X	Stabilize/Improve Existing Turnout
X	Install Sediment Trap		Stone Armor on Bank/Slope
	Install Check Dams in Existing Feature		

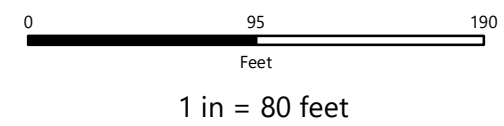
Culvert Practices

X	New Municipal Culvert		Upgrade Municipal Culvert
X	New Driveway Culvert		Upgrade Driveway Culvert
X	Headwall or Armor at Culvert Inlet/Outlet		Clean Sediment/Debris from Culvert

Estimated Project Costs				
Practice	Units	Unit Cost	Quantity	Total
Improve Road Crown	Linear Foot	\$ 5		\$ -
Raise Road Grade	Cubic Yard	\$ 30		\$ -
Remove Grader Berm/Lower Shoulder	Linear Foot	\$ 5	61	\$ 305
Remove Berm with Obstacles	Linear Foot	\$ 10	28	\$ 280
Edge of Road Stabilization/Maintenance	Linear Foot	\$ 8		\$ -
New Stone-Lined Ditch	Linear Foot	\$ 25	270	\$ 6,750
New Grass-Lined Ditch	Linear Foot	\$ 8	600	\$ 4,800
Side Slope Excavation for New Ditch	Linear Foot	\$ 10	66	\$ 660
Improve Existing Ditch (Stone)	Linear Foot	\$ 20		\$ -
Improve Existing Ditch (Grass)	Linear Foot	\$ 5	483	\$ 2,415
Install/Improve Turnout	Each	\$ 200	4	\$ 800
Install Sediment Trap	Each	\$ 750	1	\$ 750
Install Stone Armor (Bank/Slope)	Cubic Yard	\$ 40		\$ -
Install Check Dam	Each	\$ 40		\$ -
New/Upgrade Conveyance Culvert (30")	Each	\$ 2,500	1	\$ 2,500
New/Upgrade Cross-Culvert (18" to 24")	Each	\$ 1,500	1	\$ 1,500
New/Upgrade Driveway Culvert	Each	\$ 750	2	\$ 1,500
Install Culvert Headwall/Armor	Each	\$ 300	3	\$ 900
Remove Sediment/Debris from Culvert	Each	\$ 100		\$ -
			Total Cost:	\$ 23,160

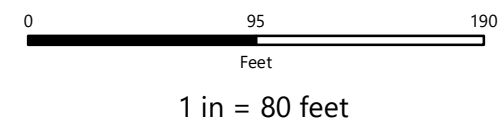


CONCEPT DESIGN - SNIPE IRELAND ROAD - SECTION 2A
 MUNICIPAL ROAD SEGMENT 169107, 169108, 169109, 169110, & 169111
 RICHMOND, VERMONT



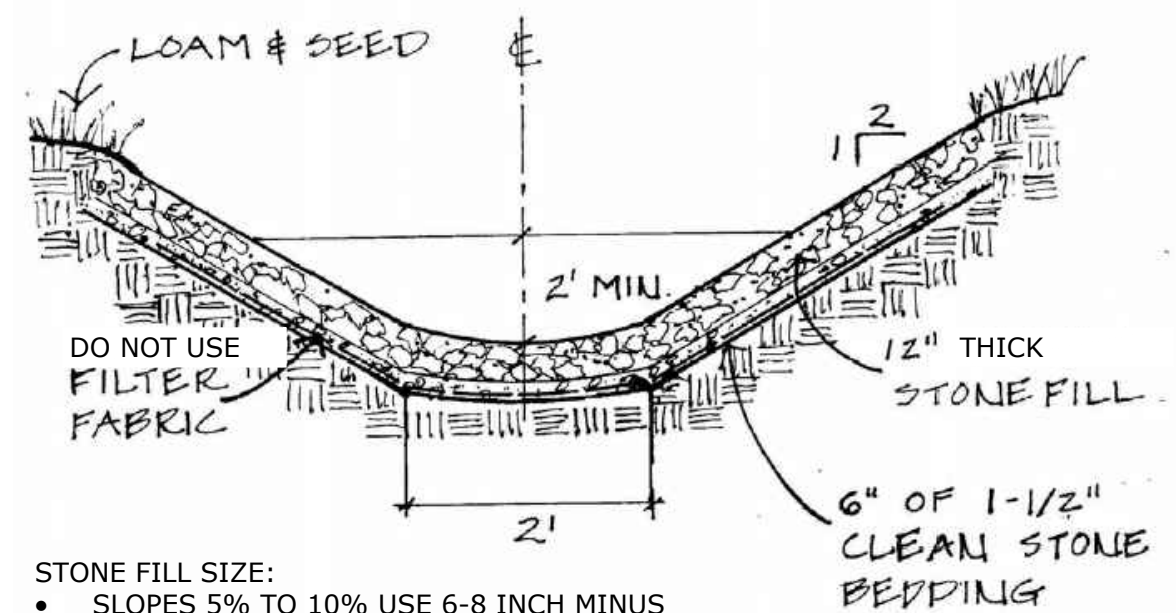
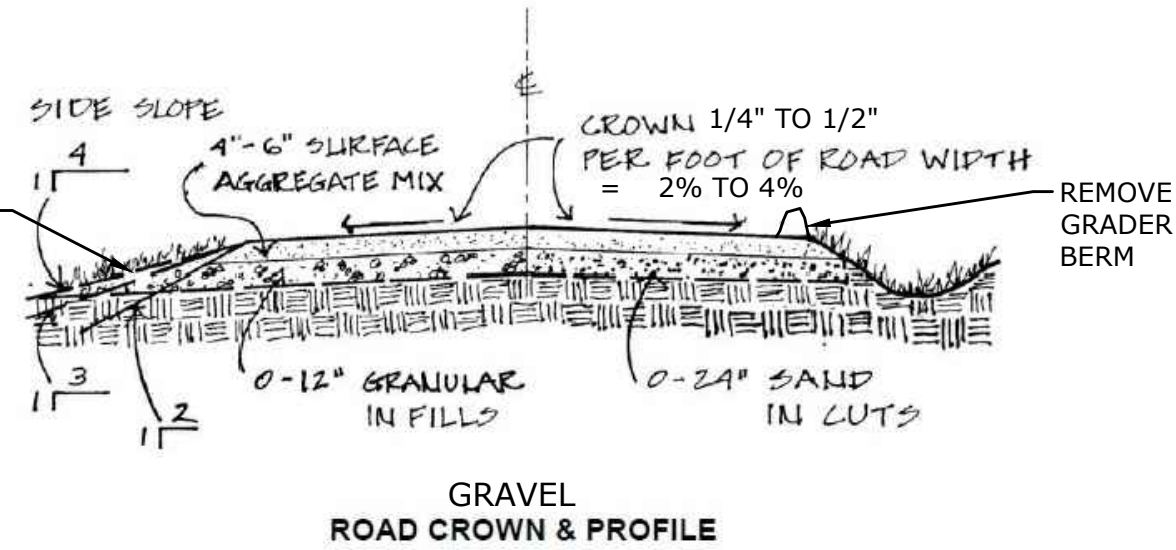


CONCEPT DESIGN - SNIPE IRELAND ROAD - SECTION 2B
 MUNICIPAL ROAD SEGMENT 169102, 169103, 169104, 169105, 169106, & 169107
 RICHMOND, VERMONT

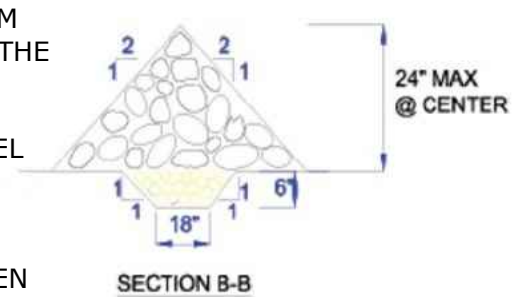
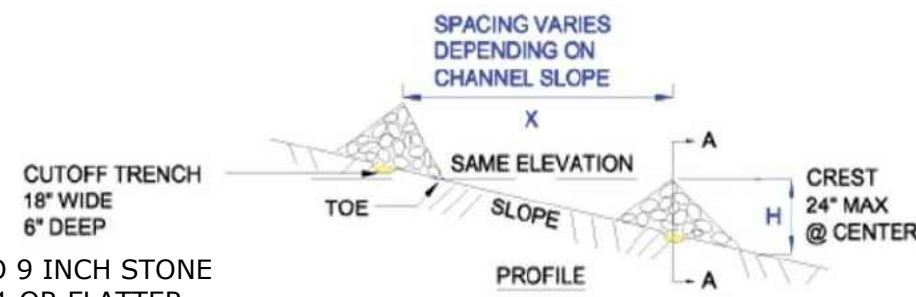
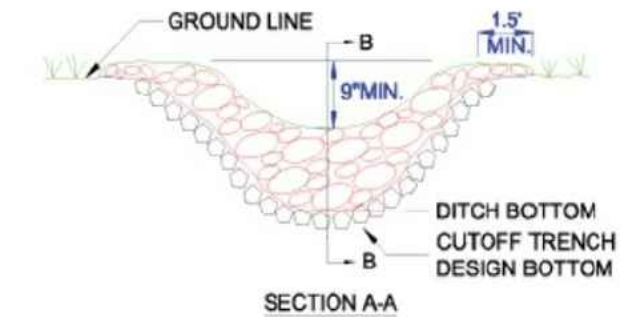


Drawing: V:\DESIGN\4294-03-DE\ROAD\WR-DTALS.DWG Layout: ROAD SECTION
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SHOULDER WILL BE LOWER THAN TRAVEL LANE AND RUNOFF SHALL FLOW IN A DISTRIBUTED MANNER TO GRASS OR FORESTED AREA WHERE POSSIBLE

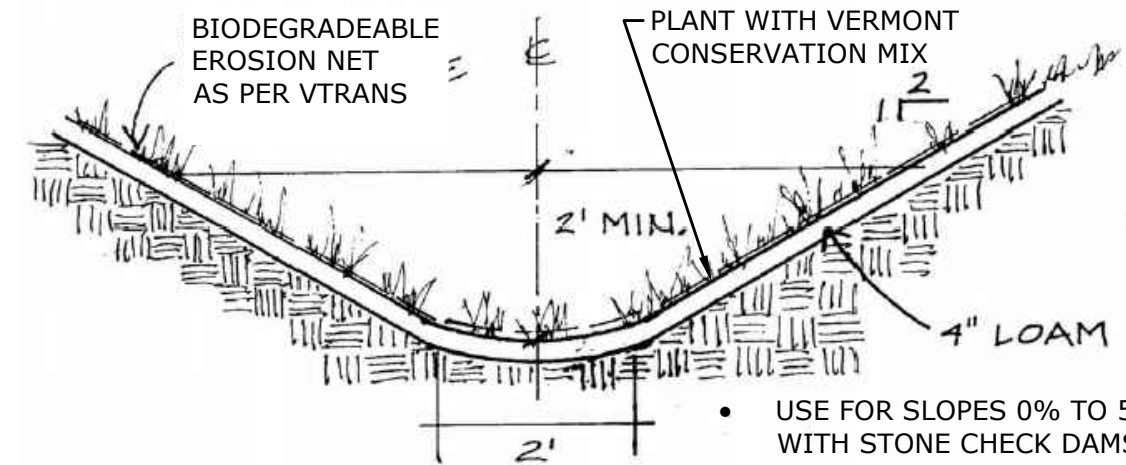


- STONE FILL SIZE:
- SLOPES 5% TO 10% USE 6-8 INCH MINUS
 - SLOPES MORE THAN 10% USE 12 INCH MINUS



STONE CHECK DAM

- USE MIX OF 2 TO 9 INCH STONE
- SIDE SLOPES 2:1 OR FLATTER
- SPAN WIDTH OF CHANNEL AND UP SIDES OF BANKS
- SPACE SO THAT THE TOE OF THE UPSTREAM DAM IS THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM
- PERIODICALLY REMOVE ACCUMULATED SEDIMENT AND DEBRIS TO ALLOW CHANNEL TO DRAIN THROUGH THE STONE AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM
- IF SIGNIFICANT EROSION OCCURS BETWEEN DAMS, A LINER OF STONE SHOULD BE INSTALLED



- USE FOR SLOPES 0% TO 5% OR 5% TO 8% WITH STONE CHECK DAMS OR DISCONNECTION PRACTICES EVERY 164 FEET
- NO BARE SOILS ALLOWED
- USE TRAPEZOIDAL OR PARABOLIC CROSS SECTION

REFERENCE NOTE: ADAPTED FROM "VERMONT BETTER BACKROADS MANUAL, CLEAN WATER YOU CAN AFFORD" A PUBLICATION OF THE NORTHERN VERMONT & GEORGE D. AIKEN RESOURCE CONSERVATION DEVELOPMENT (R C & D) COUNCILS, NOVEMBER 1995, UPDATED 2002, 2009.

STONE CHECK DAM DETAIL FROM STATE OF VERMONT AGENCY OF NATURAL RESOURCES DEPARTMENT OF ENVIRONMENTAL CONSERVATION VERMONT POLLUTION DISCHARGE ELIMINATION SYSTEM (VPDES) GENERAL PERMIT 3-9040 FOR STORMWATER DISCHARGES FROM MUNICIPAL ROADS, FINAL DRAFT.

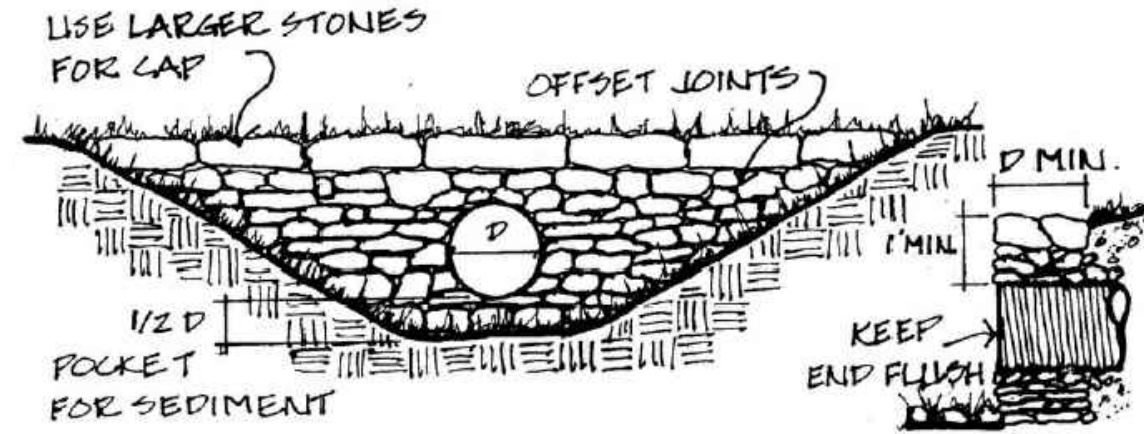
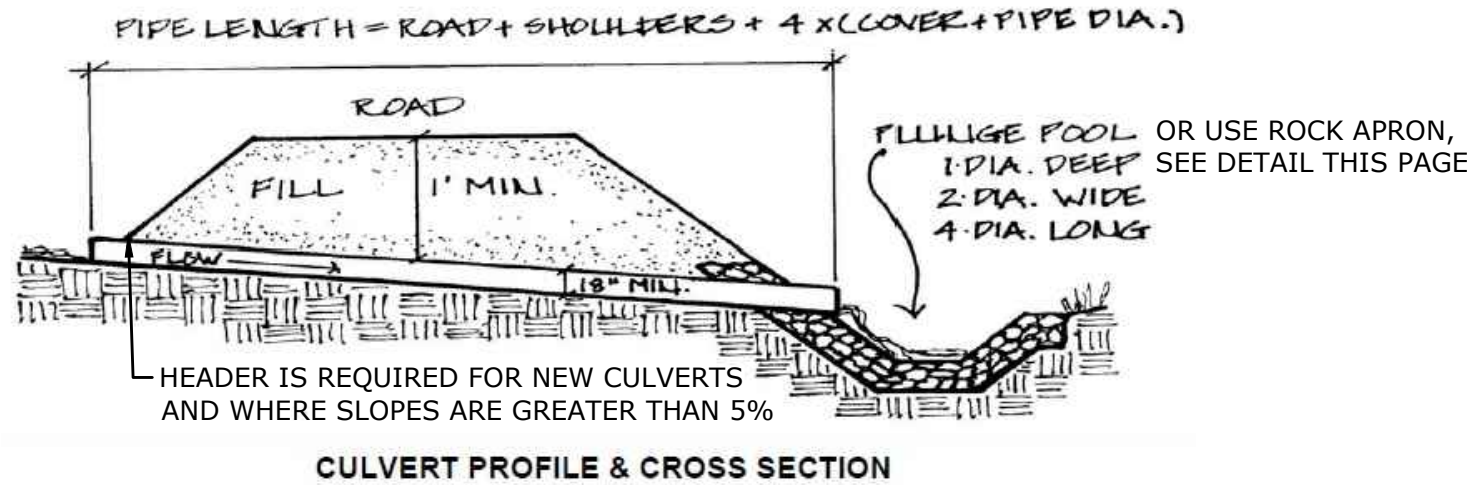
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REVISIONS

DETAILS - ROAD SECTION
 CCRPC ROAD EROSION INVENTORY
 CHITTENDEN COUNTY, VERMONT

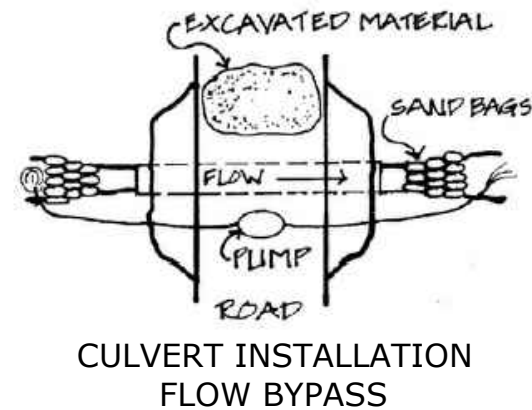
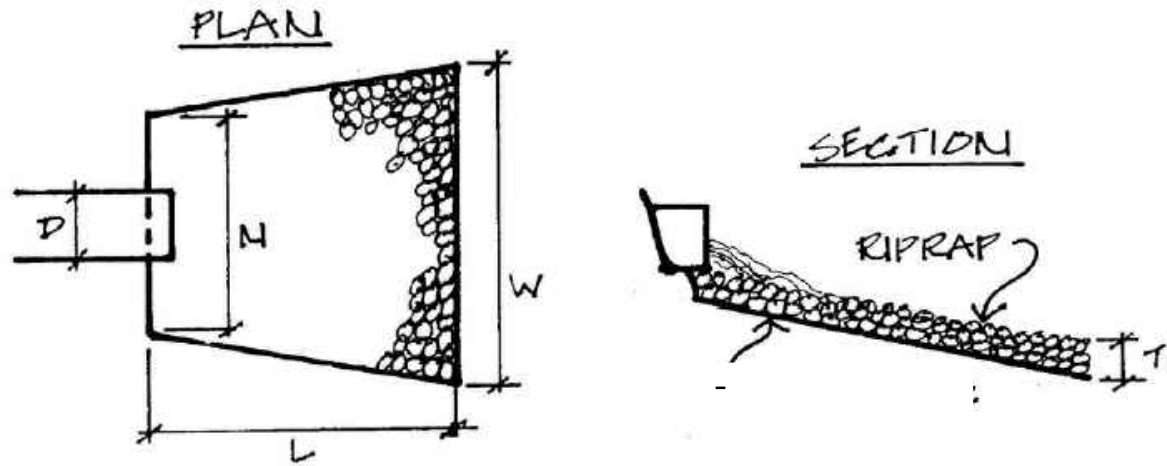
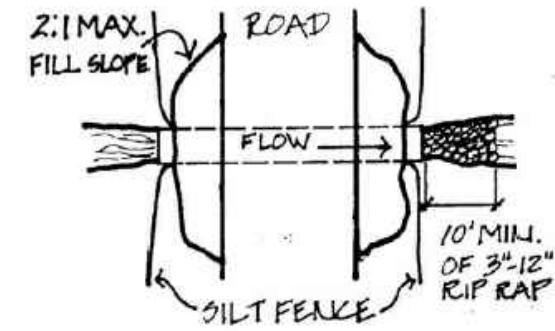
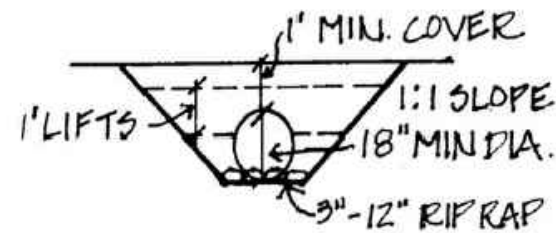
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SEPTEMBER 28, 2017		
DATE		
PROJECT NO. 4294-03		
SHEET NO. D-1		

Drawing: V-DESIGN-4294-03-DE-ROAD-MR-DETAILS-DWG Layout: ROAD-CULVERT
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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



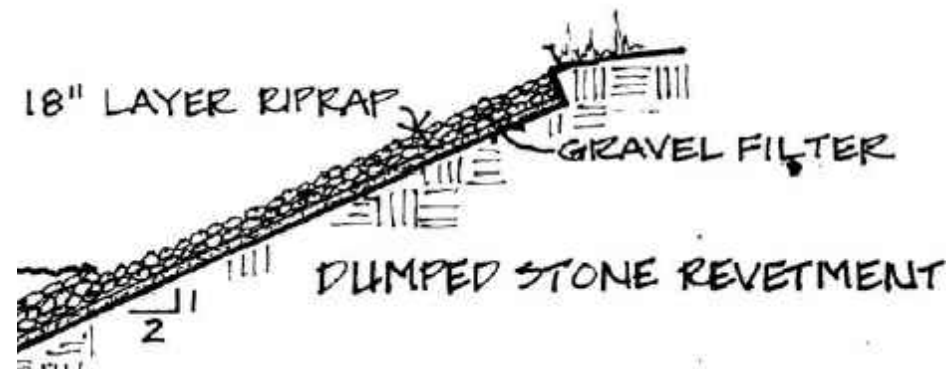
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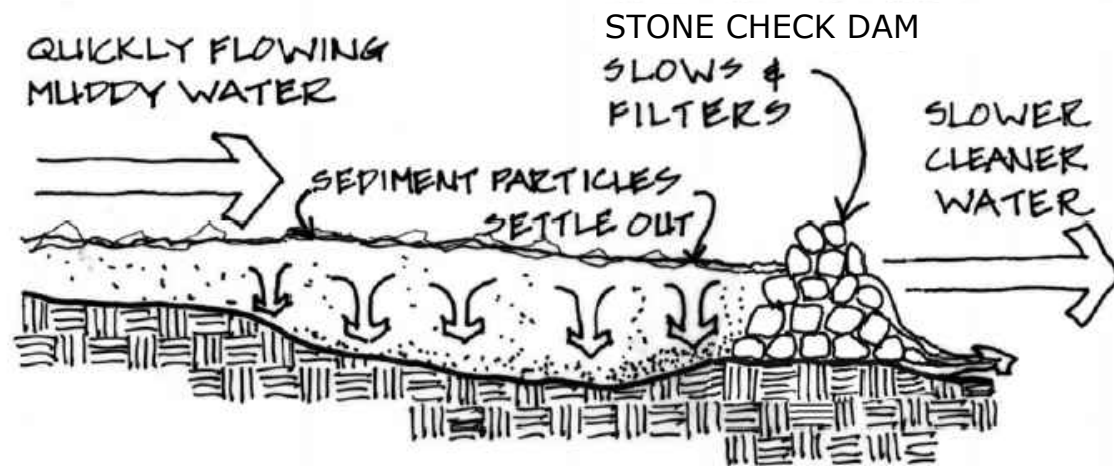
DETAILS - CULVERT
 CCRPC ROAD EROSION INVENTORY
 CHITTENDEN COUNTY, VERMONT

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SEPTEMBER 28, 2017 DATE		
4294-03 PROJECT NO.		
D-2 SHEET NO.		



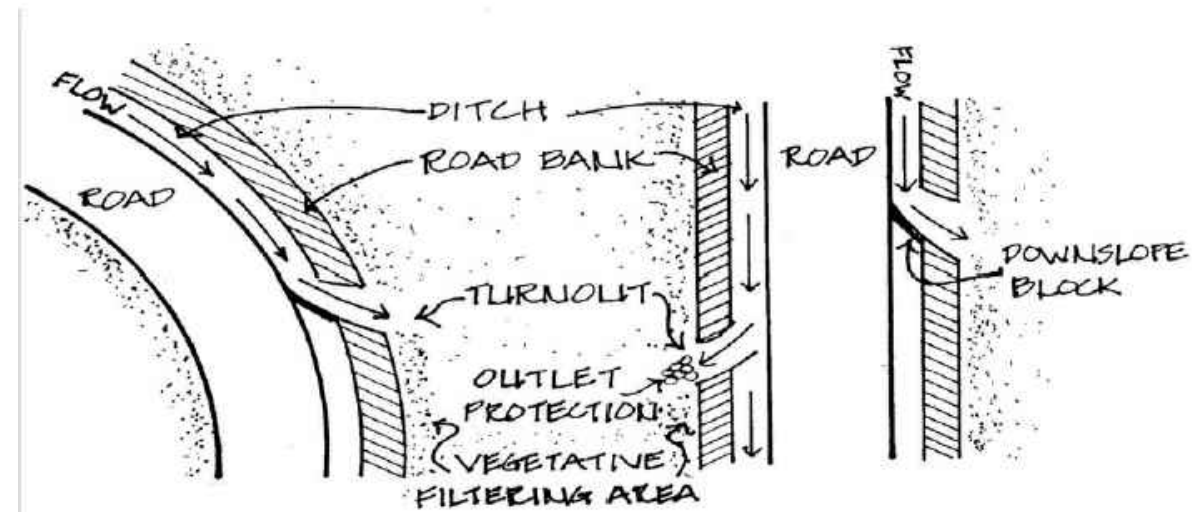
STONE ARMOR (BANK/SLOPE)

- RIPRAP SIZE IS BASED ON QUANTITY AND VELOCITY OF WATER
- ALWAYS CONTACT A STREAM ALTERNATION ENGINEER BEFORE INSTALLING RIPRAP AT A STREAM BANK
- USE ANGULAR STONE
- COVER WITH GRUBBINGS OR TOPSOIL AND SEED. IF ON A STREAM BANK, ONLY APPLY ABOVE ORDINARY HIGH WATER.
- CONSIDER PLANTING WITH ADDITIONAL VEGETATION



SEDIMENT TRAP

- INSPECT ANNUALLY AND AFTER LARGE STORMS
- REMOVE ACCUMULATED SEDIMENT WHEN HALF FULL.



TURN-OUT

- AVOID DIRECT OUTLET TO SURFACE WATERS
- STABILIZE OUTLET BASED ON SLOPE:
 - 0% TO 5% STABILIZE WITH GRASS
 - 5% TO 10% STABILIZE WITH 6-8 INCH MINUS STONE
 - GREATER THAN 10% STABILIZE WITH 12 INCH MINUS STONE

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SEPTEMBER 28, 2017 DATE		
4294-03 PROJECT NO.		

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