



FY17 Vermont Better Roads Grant Application

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

Town/Organization: Town of Wallingford Contact Person(s): Sandi Switzer

Address: 75 School Street, Wallingford, VT 05773

Email: townadmin@wallingfordvt.com Phone: (802) 446 - 2872

DUNS #: 35959568 Fiscal Year End Month (MM): 6

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, VT Trans 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



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: Town of Wallingford, VT

Project Name: Culvert Replacement

Road Name: Earl Wade Road TH #: 72 Structure # (if applicable): 370

Road Type: Unpaved Uncurbed
Class 3

Watershed: Mill River and tributary to Mill River

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

There is too much water flowing down Seward Hill through the existing undersized culvert resulting in the flooding of Earl Wade Road and area properties. The existing culvert is not long enough and silt from the road washes into the stream, which flows to Mill River and eventually Otter Creek.

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):

Replacing the undersized culvert with a 117"X79" culvert 40-feet in length. The project will include grading the bank, riprap on edges and re-stoning any areas of the bank disturbed during the project. No new ditching.

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

Decrease flooding on roadway, which will decrease the amount of silt into the river. The culvert will be in the stream beneath Earl Wade Road.



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

Progress to Date:

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

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: Culvert Inventory

No

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.):
Agency of Natural Resources - Josh Carvajal, VTtrans District Coordinator Brian Sanderson

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

Will the town road crew complete this work? Yes, No, Some (if "some" please explain further).
Some. Wallingford has a two-man road crew. Therefore, the town plans to utilize the road crew and municipal equipment to assist a subcontractor.



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

Purchase a 117"X97" culvert that is 40-feet long, culvert freight, subcontractor, permit fees, miscellaneous materials.

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

Municipal labor and equipment

Requested Grant Amount (\$20,000 max Category B, \$40,000 max Categories C & D): 16,880.00

Estimated Total Project Cost (including 20% local match): 4,800.00

Estimated Completion Date: 10/01/2016

REQUIRED ATTACHMENTS:

- Itemized Cost Estimate (labor, equipment, materials)
(For assistance, call Better Backroads at 802-828-4585)
- Project Location Map
(Please show location of affected water; 1:12,000 USGS 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.

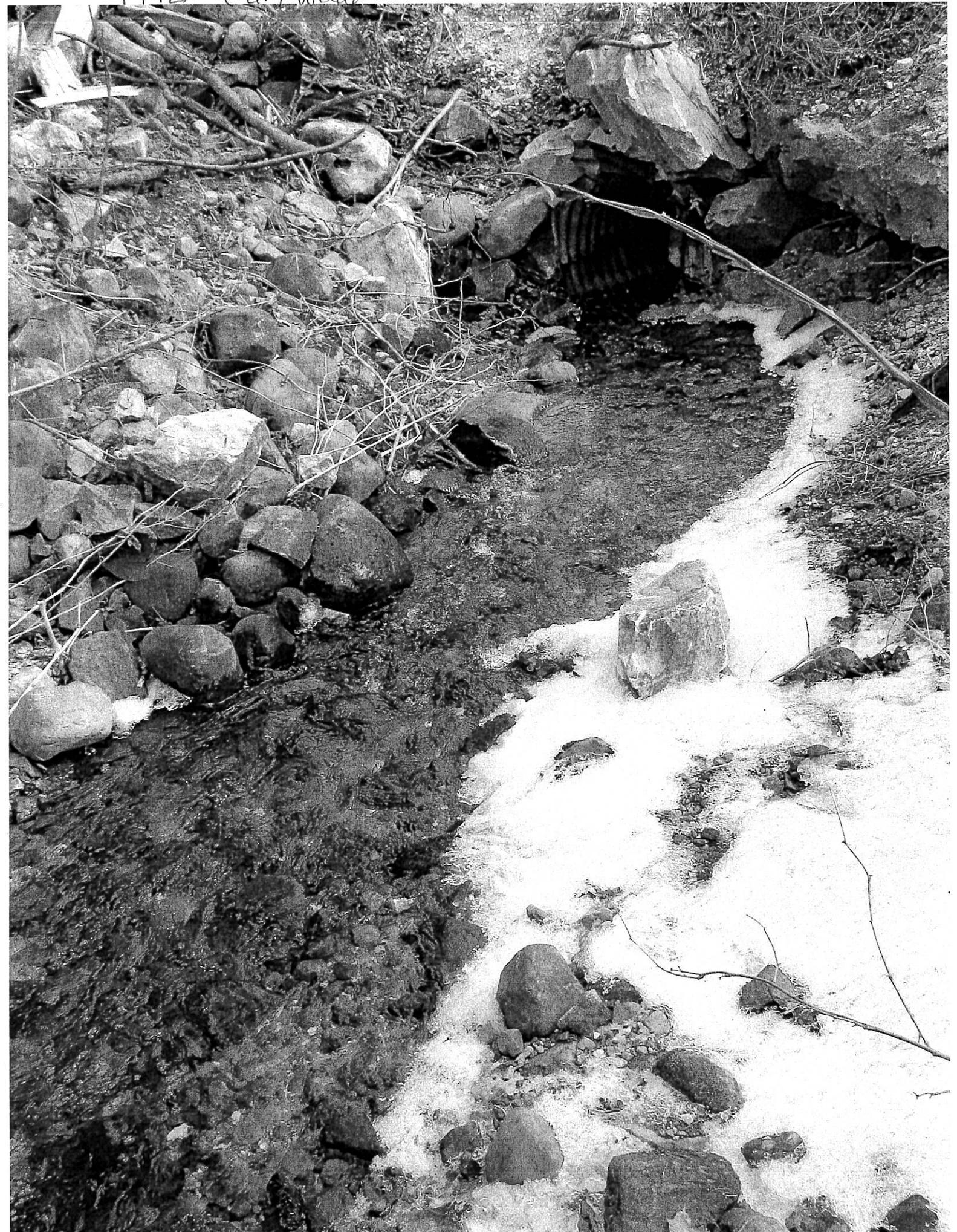
By signing this application I certify that all the information provided is accurate to the best of my knowledge. We will comply with all the requirements of the grant including making our books available for audit if required.

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

Name: *Jodi St*

Title: *Town Administrator*

447Z Earl Wadd



4473 Fall Woody



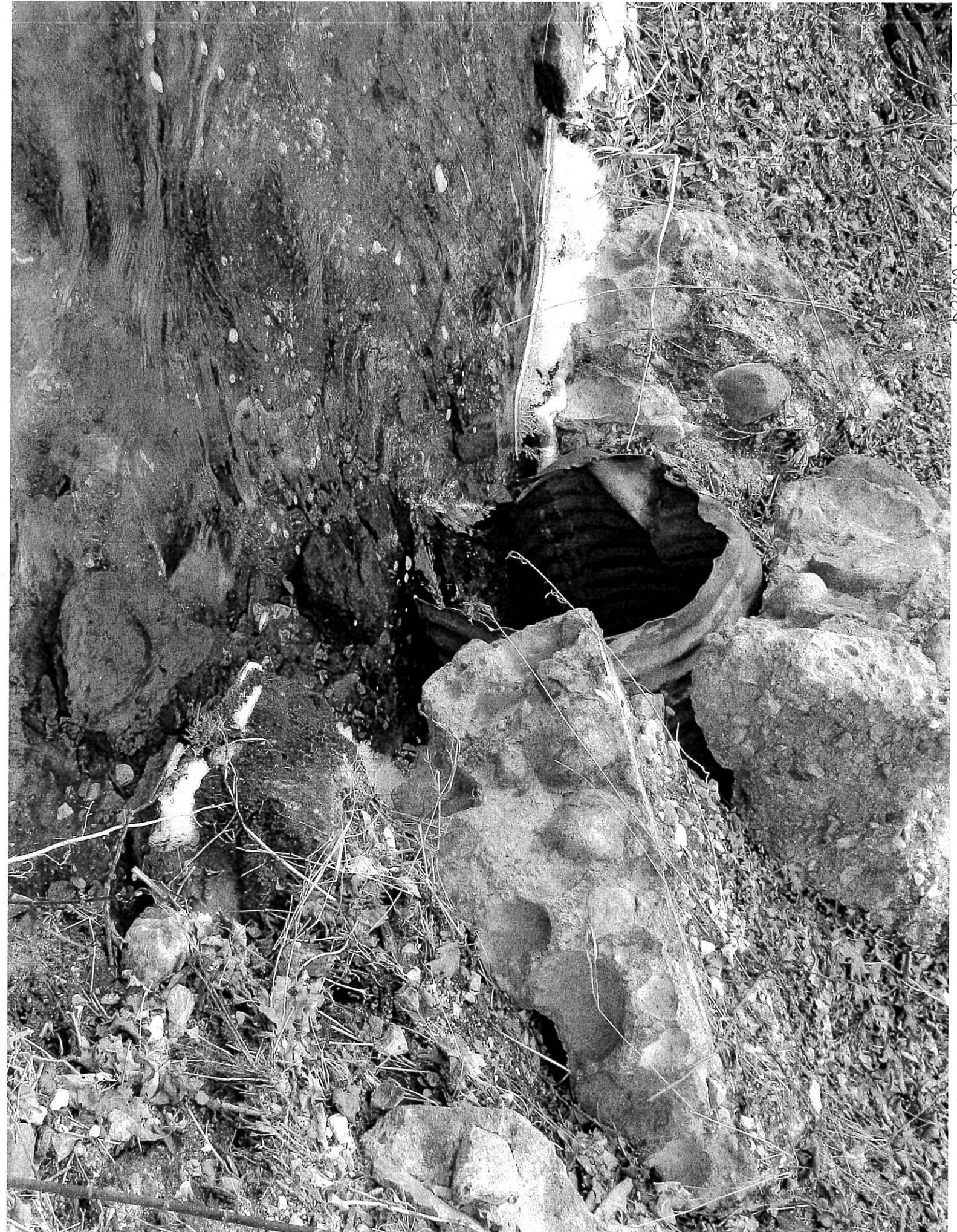
4479 Earl Wall



4475 Earl Wadell



4970 Car 1 road



4478 241 Wady



W79 Soil Made



Town Admin

From: Carvajal, Joshua <Joshua.Carvajal@vermont.gov>
Sent: Tuesday, March 29, 2016 10:40 PM
To: Sandi Switzer
Subject: Wallingford_Earl Wade Road
Attachments: VT_SRMPP_Type E_Stone Fill.pdf; Wallingford_Earl Wade Road Atlas Map.pdf

Sandi,

As we discussed at the site visit, a corrugated metal arch pipe may be used at this location instead of a box culvert. Either structure type will need to satisfy the sizing requirements noted in the Vtrans Hydraulics Report dated June 25, 2014. The new structure will need ANR streambed material as will the downstream scour hole. Attached is the spec sheet for this type of stone and a site map.

Once the Town has funding to construct the project, we will work on permitting for this perennial stream crossing. This project has a \$200 fee and classified as a 'Reporting Activity', the permit form is available at -

www.anr.state.vt.us/dec/waterq/rivers/docs/SA/Stream%20Alt%20Application_11052015.pdf.

Please let me know if you have any questions.

Josh Carvajal, P.E. CFM

Rivers Program

Agency of Natural Resources

Department of Environmental Conservation

cell: (802) 490-6163

www.watershedmanagement.vt.gov/rivers.htm

floodready.vermont.gov

Our email addresses have changed (@vermont.gov)

NEW: joshua.carvajal@vermont.gov

Streambed Stone Fill Design Guidance

Type	Velocity Range (fps)*	Embeddedness (in)
E1	$V < 9$	18
E2	$9 < V \leq 11$	24
E3	$11 < V \leq 13$	36
E4	$13 < V \leq 15$	48

*Maximum velocity should be based on a minimum 50-year design flow rate and calculated at the structure outlet.

Item xxx.xxx CY Streambed Stone Fill Specification

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

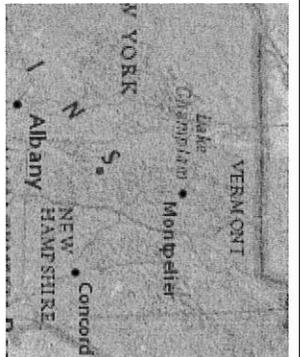
Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E4. The longest dimension of the stone shall be at least 48 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 36 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.



LEGEND

- DFIRM Floodways
- DFIRM Preliminary Floodways
- Special Flood Hazard Areas (A Counties)**
- AE (1-percent annual chance flood)
- A (1-percent annual chance floodpl)
- AO (1-percent annual chance zone (feet))
- 0.2-percent annual chance flood ha
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- AE (1-percent annual chance flood)
- A (1-percent annual chance floodpl)
- AO (1-percent annual chance zone (feet))
- 0.2-percent annual chance flood ha
- VTRANS State and Town Long
- VTRANS State Short Structure
- Town Bridge
- Town Culvert
- Waterbody
- Stream
- Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

1: 2,188
March 29, 2016

111.0 Meters
0 56.00 111.0 Meters
WGS_1984_Web_Mercator_Auxiliary_Sphere
© Vermont Agency of Natural Resources
1" = 182 Ft. 1cm = 22 Meters
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Town Admin

From: Carvajal, Joshua <Joshua.Carvajal@vermont.gov>
Sent: Monday, April 04, 2016 9:53 PM
To: Town Admin
Subject: Re: Wallingford_Earl Wade Road

Hi Sandi,

The minimum arch pipe size will need to be 117" x 79" to satisfy the bankfull width requirements (ANR) and the passage of the Q25 design flow rate (Vtrans). I've only seen smaller arch pipes installed but I'm guessing this might cost about \$12K - \$15K. Let me know if you need any contacts for local vendors.

Josh

From: Town Admin <townadmin@wallingfordvt.com>
Sent: Monday, April 4, 2016 11:07 AM
To: Carvajal, Joshua
Subject: RE: Wallingford_Earl Wade Road

Hi Josh,
Road Commissioner Phil Baker priced a 95"X67" squash culvert for Earl Wade Road and wanted to know if the state would deem that sufficient? Thanks.

Sincerely,

Sandi Switzer

Wallingford Town Administrator

75 School Street

Wallingford, VT 05773

(802)446-2872

Open Mic Nights at Town Hall the second Tuesday of each month from 7 p.m. to 9 p.m.

From: Carvajal, Joshua [mailto:Joshua.Carvajal@vermont.gov]
Sent: Tuesday, March 29, 2016 10:40 PM
To: Sandi Switzer <townadmin@wallingfordvt.com>
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As we discussed at the site visit, a corrugated metal arch pipe may be used at this location instead of a box culvert. Either structure type will need to satisfy the sizing requirements noted in the Vtrans Hydraulics Report dated June 25, 2014. The new structure will need ANR streambed material as will the downstream scour hole. Attached is the spec sheet for this type of stone and a site map.

HYDRAULICS UNIT

TO: James Caulin, District 3 Technician
Tom Roberts, District 3 Project Manager

FROM: Justin Hadley, Hydraulics Project Engineer

DATE: June 25, 2014

SUBJECT: Wallingford, TH 72 Earl Wade Rd, 324' from VT 140
GPS coordinates: N 43.44881° W 72.87531°

Recommended Structure dimensions to meet state standards:

<u>10</u>	(Span Length)
<u>4</u>	(Opening Height)

We have completed our hydraulic study for the above referenced site, and offer the following information for your use:

Hydrology

This site has a hilly to mountainous drainage basin that is mostly forested with about 20 percent fields. The total contributing drainage area is about 0.49 sq. mi. There is an overall length of 8,200 feet from the divide to the site, with a 640-foot drop in elevation, giving an average overall channel slope of more than 7 %. The stream slope at the site was estimated to be about 3%. Using several hydrologic methods, we selected the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	30
Q10	70
Q25	90 - Town Highway Design Flow
Q50	110
Q100	130 - Check flow

Channel Morphology

The channel upstream of the structure is fairly steep with defined step pool morphology. The channel transitions at the site to a flatter gradient downstream of the structure. There is evidence of high sediment transport at the site. There is a large sediment pile downstream of the structure and both ends of the current pipe are damaged from removing material with an excavator. The request also states that the roadway overtops at ordinary high water events. Field measurements of bankfull width varied from 10 to 12 ft. The Vermont Hydraulic Geometry Relationships anticipate a bankfull width of 10 ft. for stream channels in equilibrium at this watershed size. Due to ponding water during high water it seems that material is aggrading and building up a sediment wedge at the inlet. A large scour hole exists at the existing structure outlet indicating that the structure causes a significant hydraulic constriction.

Existing Conditions

The existing structure is a 30" corrugated metal pipe, providing a waterway opening of about 4.9 sq. ft. The inlet and outlet have large type III stones laid up as a headwall of a sort. Our calculations, field observations and measurements indicate the existing structure does not meet the current standards of the VTrans Hydraulic Manual nor does the existing structure meet state stream equilibrium standards for bankfull width (span length). The existing structure constricts the channel width, resulting in scour at the outlet and increased

potential for debris blockage. Headwater to depth ratios exceed allowable values established in the current VTrans Hydraulics Manual and water overtops the roadway below the design Q25 discharge.

Recommendations

In sizing a new structure we attempt to select structures that meet both the current VTrans hydraulic standards, state environmental standards with regard to span length and opening height, and allow for roadway grade and other site constraints.

Based on the above considerations and the information available, we recommend any of the following structures as a replacement at this site:

1. A bridge with a 10' wide by 4' high minimum waterway opening, providing 40 sq. ft. of waterway area. This structure will result in a headwater depth at Q25 = 2.3' and at Q100 = 2.9'.
2. A concrete box with a 10' wide by 6' high inside opening, with 6" high bed retention sills (baffles) in the bottom. The box invert should be buried 24", so the top of the sills will be buried 6" and not be visible. That will result in a 10' wide by 4' high waterway opening above streambed, providing 40-sq. ft. of waterway area. Sills should be spaced no more than 8'-0" apart throughout the structure with one sill placed at the inlet and one at the outlet. Sills can be cast flat. This structure will result in a headwater depth at Q25 = 2.3' and at Q100 = 2.9', with no roadway overtopping up to Q100.
3. A 117" wide by 79" high corrugated metal pipe arch, buried 30" similar to the box above. This structure will provide approximately 33.3 -sq. ft. of waterway area. This structure will result in a headwater depth at Q25 = 2.6' and at Q100 = 3.3'.
4. Any similar structure with a minimum clear span of 10' and at least 33.3 -sq. ft. of waterway area, that fits the site conditions, could be considered. Any closed bottom structure should have bed retention sills and a buried invert as described above.

Prior to any further action toward implementation of any of the above recommendations, structure size and type must be confirmed, and may be modified, by the VT ANR River Management Engineer to ensure compliance with state environmental standards for stream crossing structures, and achieve the best, least cost alternative for the design life of the structure.

General comments

If a new bridge is installed, the bottom of abutment footings should be at least six feet below the channel bottom, or to ledge, to prevent undermining. Abutments on piles should be designed to be free standing for a scour depth at least 6' below channel bottom.

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

If the pipe arch option is installed, concrete headwalls should be constructed at the inlet and outlet. The headwalls may be either half height or full height. The headwalls should extend at least four feet below the channel bottom or to ledge, to prevent undermining of the structure. We recommend a minimum cover of 3' over all pipe structures. Therefore the roadway grade would have to be raised about 1.5' to provide the required cover over the pipe arch. Pipe manufacturers can provide specific recommendations for minimum and maximum fill heights and required pipe thickness.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel. A new structure should span the

natural channel width.

Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

Other regulatory authorities including the US Army Corps of Engineers may have additional concerns or requirements regarding replacement of this structure.

Please note that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding replacement of this structure must comply with state regulatory standards, and should take into consideration matching natural channel conditions, roadway grade, environmental concerns, safety, and other requirements.

Please contact us if you have any questions or if we may be of further assistance.

JFH

cc: Jaron Borg, A.N.R. River Management Engineer
Hydraulics Project File via NJW
Hydraulics Chrono File

Town Admin

From: Carvajal, Joshua <Joshua.Carvajal@vermont.gov>
Sent: Tuesday, April 05, 2016 9:57 AM
To: Town Admin
Subject: Re: Wallingford_Earl Wade Road

No worries. My measurements of bankfull width were about 11ft upstream and 12 ft downstream. Vtrans report stated 10ft so that works too

Josh

On Apr 5, 2016, at 8:48 AM, Town Admin <townadmin@wallingfordvt.com> wrote:

Sorry to keep bothering you, but the grant application is asking for sketches with river widths. I did not take those measurements. Do you have the measurements of the streams related to the projects on Earl Wade Road and Sugar Hill Road?

*Sincerely,
Sandi Switzer
Wallingford Town Administrator
75 School Street
Wallingford, VT 05773
(802)446-2872*

Open Mic Nights at Town Hall the second Tuesday of each month from 7 p.m. to 9 p.m.

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Sent: Monday, April 04, 2016 9:53 PM
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Josh

From: Town Admin <townadmin@wallingfordvt.com>
Sent: Monday, April 4, 2016 11:07 AM

Town Admin

From: Mike Zakrzewski - 592 COLCHESTER_WATERWORKS <mike.zakrzewski@ferguson.com>
Sent: Thursday, April 07, 2016 12:41 PM
To: townadmin@wallingfordvt.com
Subject: Email Bid# B196933

Price Quotation # B196933

FERGUSON WATERWORKS #592

134 PARK ST.
RUTLAND, VT 05701

Phone : 802-747-7555
Fax : 802-747-7129

Bid No.....: B196933
Bid Date...: 04/06/16
Quoted By: FXG
Customer.: TOWN OF WALLINGFORD
HWY DEPT
75 SCHOOL STREET
WALLINGFORD, VT 05773

Cust Phone: 802-446-2336
Terms.....: NET 10TH PROX
Ship To.....: TOWN OF WALLINGFORD
HWY DEPT
75 SCHOOL STREET
WALLINGFORD, VT 05773

Cust PO#..:

Job Name.: 117X79 CULVERT

Item	Description	Quantity	Net Price	UM	Total
SP-CMP1177910GA51	177X79 GALV CMP 5X1 10GA	40	197.500	FT	7900.00
SP-CMPBND117791051	117X79 BAND 10GA 5X1 CMP	1	395.000	EA	395.00
FFREIGHT	FRT CHARGE FEE	1	400.000	EA	400.00
	- LEAD TIME 2 WEEKS APROX				

Subtotal: \$8695.00
Inbound Freight: \$0.00
Tax: \$0.00
Order Total: \$8695.00

Quoted prices are based upon receipt of the total quantity for immediate shipment (48 hours). SHIPMENTS BEYOND 48 HOURS SHALL BE AT THE PRICE IN EFFECT AT TIME OF SHIPMENT UNLESS NOTED OTHERWISE. Seller not responsible for delays, lack of product or increase of pricing due to causes beyond our control, and/or based upon Local, State and Federal laws governing type of products that can be sold or put into commerce. This Quote is offered contingent upon the Buyer's acceptance of Seller's terms and conditions, which are incorporated by reference and found either following this document, or on the web at http://wolseley.com/terms_conditionsSale.html. Govt Buyers: All items quoted are open market unless noted otherwise. LEAD LAW WARNING: It is illegal to install products that are not "lead free" in accordance with US Federal or other applicable law in potable water systems anticipated for human consumption. Products with *NP in the description are NOT lead free and can only be installed in non-potable applications. Buyer is solely responsible for product selection.

JH 72
Structure 370

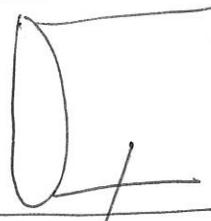
Mill River

Earl Made Rd

← 10' →

restore
disturbed
stem

↑ 11' ↓
Stream



culvert
117" x 79"
40' Long

↑ 12' ↓
Stream



rip rap
bank
as needed

← 10' →