



# VERMONT

## AGENCY OF TRANSPORTATION

### FY 2016 Municipal Highway Grant Application

APPLYING FOR:  Structures  Class 2 Roadway  Emergency

MUNICIPALITY: East Montpelier ADDRESS: 40 Kelton Road, PO Box 157 East Montpelier, VT 05651

MUNICIPAL CONTACT (name): C. Bruce Johnson

Phone: (802) 223-3313

E-Mail: eastmontadmin@comcast.net

ACCOUNTING SYSTEM:  Automated  Manual  Combination

DUNS #: 10 887 3704

Grantee FY End Month (mm format): 06

DISTRICT CONTACT (name): Tom Anderson -- D6 Project Manager

Phone: (802) 828-2687

E-Mail: tom.anderson@state.vt.us

#### SCOPE OF WORK TO BE PERFORMED BY GRANTEE

**Location of Work.** The work described below involves the following town highway structure:

TH# 25, (Name) Quaker Road which is a class 3 town highway.

Bridge # \_\_\_\_\_, which crosses \_\_\_\_\_

Culvert # 6, p. 6, for which the original size was 24" and the replacement size is 5'6" x 5'

Causeway: \_\_\_\_\_

Retaining Wall: \_\_\_\_\_

**Estimated Completion Date:** 11/01/2016

#### Work to Be Done:

Replace existing undersized 24" culvert with a 66" x 60" aluminized steel culvert exceeding the minimum VTrans hydraulic study recommendations

#### Detailed Cost Estimate (below or attached):

Per proposal dated December 18, 2011 by Newton Technical Services; cost updated March 27, 2015 by Newton Technical Services

Estimated cost of project: \$69,899.11

Proposal included

Estimated Project Amount: \$ 69,899.11

Municipality has adopted Codes & Standards that meet or exceed the State approved template?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
Municipality has a current Network Inventory? (less than 3 years old)	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
<b>Municipality <u>MUST</u> complete the following environmental resource checklist:</b>		
<b>EXISTING STRUCTURES: (check all that apply)</b>		
<input checked="" type="checkbox"/> Steel Tube Culvert	<input type="checkbox"/> Concrete Box Culvert	
<input type="checkbox"/> Stone Culvert	<input type="checkbox"/> Concrete Bridge	
<input type="checkbox"/> Ditch	<input type="checkbox"/> Rolled Beam/Plate Girder Bridge	
<input type="checkbox"/> Metal Truss Bridge	<input type="checkbox"/> Wooden Covered Bridge	
<input type="checkbox"/> There are foundation remains, mill ruins, stone walls or other.	<input type="checkbox"/>	
<input type="checkbox"/> Stone Abutments or Piers	<input type="checkbox"/> Buildings (over 50 yrs old) within 300 feet of work	
<b>PROJECT DESCRIPTION: (check all that apply)</b>		
<input type="checkbox"/> The Project involves engineering/ planning only.	<input type="checkbox"/> The project consists of repaving existing paved surfaces only.	
<input type="checkbox"/> The project consists of reestablishing existing ditches only.	<input type="checkbox"/> All work will be done from the existing road or shoulder.	
<input type="checkbox"/> The structure is being replaced on existing location/alignment.	<input checked="" type="checkbox"/> There will be excavation within 300 feet of a river or stream.	
<input type="checkbox"/> There will be excavation within a flood plain.	<input type="checkbox"/> Road reclaiming, reconstruction, or widening	
<input type="checkbox"/> Tree cutting / clearing.	<input type="checkbox"/> Temporary off-road access is required.	
<input checked="" type="checkbox"/> New ditches will be established.	<input type="checkbox"/> The roadway will be realigned.	
The municipality has included photos of the Project. Must show infrastructure and surrounding features, as much as possible. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
The municipality has included a detailed Scope of Work. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		

**Below this line to be filled in by VTrans staff:**

Recommended Award Amount:

District Staff Approval: (name) \_\_\_\_\_ Date: \_\_\_\_\_

Archaeology Approval: J. Russell  B. Gauthier  Date: \_\_\_\_\_

Historic Preservation Approval: J. Ehrlich  K. O'Shea  Date: \_\_\_\_\_

Archology/Historic Preservation Conditions/Comments:

Note:

Projects may involve impacts to protected historic or archaeological resources. For more information, responsible parties are encouraged to contact the individuals listed below :

Jen Russell, VTrans Archaeology Officer,  
802-828-3981, [jeannine.russell@state.vt.us](mailto:jeannine.russell@state.vt.us)

OR

Brennan Gauthier, VTrans Assistant Archaeologist,  
802-828-3965, [brennan.gauthier@state.vt.us](mailto:brennan.gauthier@state.vt.us)

Judith Ehrlich, VTrans Historic Preservation Officer,  
802-828-1708, [judith.ehrlich@state.vt.us](mailto:judith.ehrlich@state.vt.us)

OR

Kaitlin O'Shea, VTrans Historic Preservation Specialist,  
802-828-3962, [kaitlin.OShea@state.vt.us](mailto:kaitlin.OShea@state.vt.us)



## Town Administrator

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**From:** Doug Newton [newtontechnicalservices@charter.net]  
**Sent:** Sunday, December 18, 2011 7:43 PM  
**To:** Town Administrator  
**Subject:** Estimate for Quaker Road  
**Attachments:** East Montpelier, Quaker Road Site.xls

Hi Bruce,  
 "Things" didn't work out as planned for me to complete the estimate on Friday; I spent a lot of the day either talking with someone at the BCA helpdesk, and/or trying to follow the steps shown in an email they sent me, neither of which worked. Hopefully, things progress better tomorrow.

In any event, attached is the estimate for the proposed project on Quaker Road. The unit prices shown in the estimate were taken from the VT Agency of Transportation's 5-year average bid price list.

The estimate is based on these parameters:

- Close Quaker Road to all thru traffic, allowing access only to local residents; contractor to sign adjacent local roads accordingly
- Install a new 66" x 60' aluminized steel culvert; culvert to have 5" x 1" corrugations and be buried one foot below grade
- New culvert to be installed slightly southwesterly (back towards VT 14) from the original culvert; this is ok with Pat Ross and does 2 things: (1) allows the existing culvert to continue to function while the new one is being installed, and (2) moves the outlet end of the new structure away from the house and away from the leach field in their front yard
- The limits of the excavation for the new structure will be approximately 6' outside the edge of the new pipe; this will allow the use of a vibratory roller to ensure good compaction around the pipe
- From a point that is 5' above the flowline of the pipe, the excavation should be laid back on a 1 on 1.5 slope; this will do 2 things: (1) allow the excavation area to be in compliance with VOSHA requirements with regards to safety and (2) ensure a smoother transition over the pipe when the project is completed
- Backfill with granular material for a distance of 3' on either side of the pipe as well as 3' over the top of the pipe
- Place and compact 18" of Subbase of Gravel
- Pave in affected area using a depth of 4" of asphalt (2 1/2" base course and 1 1/2" wearing surface)
- Construct a new reinforced concrete headwall at each end of the culvert; a full headwall (1' over the top of the pipe) at the inlet end and a cradle headwall (up to the midpoint of the pipe) at the outlet end; headwalls to be constructed per AOT Std. Dwgs. D-33 and D-34
- Apply water repellent to all exposed concrete
- Realign a small portion of both the inlet and outlet channels, place geotextile fabric on the excavated slope, and then armor the banks with Stone Fill, Type II
- Place Stone Fill, Type II around the 2 headwalls
- Construct the necessary "bubbles" and install an estimated length of 125 lf of Steel Beam Guard Rail on each side of the road
- Install 4 Anchors for Steel Beam Guard Rail
- Provide all necessary Erosion Control, Turf Establishment and Line Striping

I hope this helps; please let me know if you have any questions or need anything else re: this site.

Doug

Newton Technical Services  
 728 South Barre Road  
 Barre, VT 05641  
 Office: (802) 476-6900  
 Cell: (802) 793-0499  
 Email: [newtontechnicalservices@charter.net](mailto:newtontechnicalservices@charter.net)

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION  
**HYDRAULICS UNIT**

TO: Ted Domey, District 6  
FROM: Mike Tuttle, P.E., Hydraulics Project Engineer  
DATE: September 9, 2011  
SUBJECT: ~~At Montpelier, TH-25, Quaker Rd~~ - 0.48 miles from US2

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We have completed our preliminary 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. It is mixed forest and farmland. The total contributing drainage area is about 0.61 sq. mi. There is an overall length of about 10,000 feet from the divide to the site, with a 355-foot drop in elevation, giving an average overall channel slope of 3.6 %. The stream slope at the site was estimated to be about 3%. Using several hydrologic methods, we came up with the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	35
Q10	85
Q25	110 - Town Highway Design Flow
Q50	130
Q100	155 - Check flow

**Existing Conditions**

The existing structure is a 2 ft diameter CMP providing a waterway opening of 3.14 sq. ft.

Our calculations show the existing structure is not adequate hydraulically. This structure results in headwater depths that would be over the road.

**Recommendations**

In sizing a new structure we attempted to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. We recommend any of the following structures as a replacement at this site:

1. A 60 inch CMP provides 19.63 sq. ft. of waterway area, and will pass the design Q25 storm at a depth of 4.9 ft (HW/D = 1.0), and the Q100 at a depth of 6.6 ft (HW/D = 1.3).

2. A concrete box with a 5ft wide by 5ft high inside opening, with 3in high bed retention sills (baffles) in the bottom. These sills will act as roughness elements and slow the water down. The result will be a ~~6ft~~<sup>5'</sup> wide by 4.75ft high waterway opening above streambed, providing 23.75sq. ft. of waterway area. Sills should be horizontal across the width of the box and spaced no more than 8ft apart throughout the structure with one sill placed at the inlet and one at the outlet. This structure will result in a headwater depth at Q25 = 4.2ft (HW/D = 0.9) and at Q100 = 5.3ft (HW/D = 1.1), with no roadway overtopping.
3. Any similar structure with a minimum clear span of 5ft and at least ~~25~~<sup>19.6</sup> sq. ft. of waterway area, that fits the site conditions, could be considered. Any smooth bottom structure should have bed roughness elements as described above.

### General comments

We recommend a minimum cover of 3' over all metal arch structures. Pipe manufactures can provide specific recommendations for minimum and maximum fill heights and required pipe thickness. All structures are required to handle HS-25 loading.

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 round pipe 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. Obtaining the minimum cover of 3' should be no problem at this site. Pipe manufactures 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.

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.

The Agency of Natural Resources (ANR), Corps of Engineers, or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The River Management Engineer should be contacted with respect to those concerns, before a replacement structure is ordered. If ANR requires the invert of the pipe or box to be buried to provide a natural bottom, the size of the structure will have to be larger to provide the required waterway area.

Please keep in mind 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 the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

\* Corrections per phone call & follow up email from Mike Tuttle  
on 8 Dec 2011

D. J. H. H. H.

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

MIT

cc: Patrick Ross,  
Hydraulics Project File via NJW  
Hydraulics Chrono File