

**DESCRIPTION OF PROJECT**

This project involves the reconstruction of a bridge over the Winooski River and New England Central Railroad. The project is on TH 4/TH 3, Lime Kiln Road, between the Town of Colchester and the City of South Burlington. A new two lane three span bridge consisting of a reinforced concrete arch with prestressed concrete box beam approach spans, will be constructed upstream of the existing bridge while traffic is maintained on the existing bridge during construction. Following completion of the new bridge, the existing bridge and substructure will be removed. Total roadway approach work, including both approaches, is approximately 479 meters. No Wetlands or Historic Resources have been identified in the project area, other than the existing bridge. The existing bridge structure has been cleared for removal, as it has been photo-documented for Historical purposes. A Cedar/Pine Bluff Community has been identified southeast of the bridge. The site is located, based upon NAD 83/92 at 221253.563 N, 447341.096 E (Sta. 10+308.00).

In addition to the bridge replacement, a concrete path and lookout and paved parking area will be constructed as requirements of the Memorandum of Agreement for mitigation of adverse effect of removal of the historic bridge.

It is anticipated that this project will last two and a half construction seasons.

Total disturbed area (excluding waste, borrow and staging areas): 2.03 ha (5.02 ac.).

**SITE INVENTORY & ANALYSIS**

**OFF SITE DRAINAGE CHARACTERISTICS:**

The property surrounding the project site consists of recently constructed condominium developments in the southeast and southwest quadrants. The gradient is relatively flat and there are lawns with the exception of the cedar/pine forest immediately adjacent to the southwest of the bridge. North of the bridge is steeply sloped (existing road has 12% maximum gradient). Above a fill retaining wall in the northwest quadrant are the lawn and buildings of St. Michael's College, and closer to the bridge is an inactive quarry. To the northeast is a newly filled fill section that serves as the subgrade for the proposed road. This fill was from an offsite project that filled an inactive quarry. At the northern extent of the project, grass lawns flank both sides of the road and TH 4/TH 3 intersects VT 15. The proposed roadway is curbed with a closed drainage system with proposed stormwater treatment units near each outlet to the Winooski River. The current roadway ditches are not well defined and are not lined with stone.

**DRAINAGE, WATERWAYS, BODIES OF WATER:**

The Winooski River is located in the project area. There are no other water bodies or wetlands within the project area. The Winooski River flows through a rock gorge upstream and downstream of the bridge.

**TOPOGRAPHY, EXISTING ROADS, BUILDINGS, UTILITIES:**

The topography of the project site is hilled to the north of the bridge up to a plateau at the intersection with VT 15, and relatively flat to the south of the bridge. Development along TH 4/3 road consists of condominium developments to the south of the bridge and college residences and administrative buildings to the north. Utility relocations will be required for the aerial lines east of the existing bridge, the gas line carried by the existing bridge, the sewer line under the north roadway approach, and the waterline to the south of the bridge. The waterline bridge to the east of the existing bridge will not be impacted.

**VEGETATION:**

A mix of cedar, pine, maple and elm trees exist southwest of the bridge. A Tree Protection Plan will be created and implemented during construction for the trees not designated for removal. The areas in front of the condominiums to the south of the bridge are grass lawns with newly planted trees. Impacts to vegetation will be limited to that which are effected by the construction of the new bridge along a new alignment, the parking area and lookout and the relocated aerial utility lines. Individual trees affected near the condominiums will be replanted or replaced in-kind. The lawns, trees and bushes at the north end of the project will not be affected except the lawn and bushes on the east side of the road in the area of the relocated roadway transition back to existing alignment.

Following construction of the new bridge, the existing bridge and roadway approaches will be removed and vegetation reestablished with standard seed & mulch practices.

**SOILS:**

The Soil Conservation Service has mapped the soils throughout Chittenden County. A very brief description of the soils from the USDA Soil Survey for Chittenden County follows, along with the Soil Erodibility Coefficient (K-value) for each soil type. Generally, K-values indicate the following: 0.0 - 0.23 = low erodibility; 0.24 - 0.36 = moderate erodibility; 0.37 and higher = higher erodibility. The soil types identified for this project site are:

CoA (Colton gravelly loamy sand, 0-5% slopes) at the top of the hill in Colchester. Colton series soils are deep, very friable, or loose, excessively gravelly throughout the profile. They are very rapidly permeable. Surface runoff is slow and the hazard of erosion is slight except on terrace breaks. Erosion factors range from 0.15 for 0-8" of soil depth up to a high of 0.24 for 8-9" and back down to 0.10 for 22-72" of soil depth.

CsD (Colton-Stetson soils, 20-30% slopes) midway down the hill in Colchester. Colton series soils are deep, very friable, or loose, excessively gravelly throughout the profile. They are very rapidly permeable. Surface runoff is rapid and the erosion hazard is severe in areas not vegetated. Erosion factors range from 0.15 for 0-8" of soil depth up to a high of 0.24 for 8-9" and back down to 0.10 for 22-72" of soil depth.

FaE (Farmington extremely rocky loam, 20-60% slopes) just south of the bridge in South Burlington. Farmington series consists of soils that are shallow to bedrock, rocky or extremely rocky, somewhat excessively drained, and loamy throughout their profile. Water moves through the soil and flows down slope on the top of the bedrock if the bedrock is not fractured or jointed. Surface runoff is rapid, but is reduced by small hummocks or mounds resulting from the tree windthrow. Erosion factors range from 0.32 for 0-8" of soil depth up to 0.37 for 8-18" of soil depth.

Qd (quarries) on the northwest and northeast sides of the bridge as well as one southeast of the bridge (behind the condominiums). Quarries are areas where limestone was close to the surface and after the overlying soil was removed, the rocks were mined. All the quarries in this area are inactive.

FaC (Farmington extremely rocky loam, 5-20% slopes) most of the south roadway approach. Farmington series consists of soils that are shallow to bedrock, rocky or extremely rocky, somewhat excessively drained, and loamy throughout their profile. Water moves through the soil and flows down slope on the top of the bedrock if the bedrock is not fractured or jointed. The hazard of erosion is only slight in protected areas, but in unvegetated areas it is moderate to severe. Erosion factors range from 0.32 for 0-8" of soil depth up to 0.37 for 8-18" of soil depth.

AgA (Agewam fine sandy loam, 0-5% slopes) at the very beginning of the project and to the south in the area of the existing houses in South Burlington. Agewam soils are deep, friable, well-drained and consist of fine sandy loam over sandy material. They have moderately rapid permeability in the moderately coarse upper part of the profile and rapid permeability in the coarse-textured lower part. Surface runoff is slow. The hazard of erosion is slight in cultivated areas or where soil is not vegetated. Erosion factors range from 0.28 for 0-11" of soil depth to a high of 0.37 for 11-16" back down to 0.10 for 55-65" of soil depth.

**SENSITIVE RESOURCE AREAS:**

No 'Threatened & Endangered Species' have been identified within the project limits. A Cedar/Pine Bluff Community southeast of the bridge has been identified. The existing bridge is an historic resource and its removal is an adverse effect of that resource. The existing bridge structure has been cleared for removal as it has been photo-documented for Historical purposes and the other requirements of the Memorandum of Agreement are being addressed. The Winooski River is an identified resource. There are no wetlands within the vicinity of the project.

**PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES:**

The pier arch foundations will be constructed above the 100-year recurrence interval flood elevation and will not affect the Winooski River. All removals of existing substructures are above the 100-year recurrence interval flood elevation and will not affect the Winooski River.

**TEMPORARY EROSION PREVENTION & SEDIMENT CONTROL**

**Temporary erosion prevention measures to be utilized include:**

"Project Demarcation Fencing," denoted -PDF- on the plans, to delineate the limits the contractor can access with construction equipment. This measure limits the area that can be disturbed and exposed to erosion.

Seeding, mulching and biodegradable erosion control matting, or an equivalent product, will be utilized on all slopes steeper than 3:1 that are not lined with stone fill. These slopes shall be stabilized within 48 hours of reaching final grade or during intermittent phases of construction activity.

Tracking of all exposed slopes, combined with temporary mulching, will also be utilized on a regular basis. Any slopes to be exposed for several days prior to final grading shall be tracked and mulched. The forecast of rainfall events shall also trigger protection of exposed slopes.

Temporary stone check dams will be placed in ditches to reduce flow velocities and thus reduce the potential for erosion. Check dams will be placed along the ditches such that the elevation of the top of each check dam corresponds with the elevation of the toe of the preceding upslope check dam. See 'Erosion Controls Details' sheets. The check dams may be removed once the stone lining of the ditches is complete and the surrounding area stabilized.

When trees are removed within areas that existing ground is not being covered, (example: overhead utilities easement areas), then the trees are to be cut off at 6 inches (150 mm) above existing ground and the trees chipped and spread back over said area.

**Temporary measures to control sediment transport include:**

Silt fence will be installed a distance of 1800 mm (5.9') from the toe of slopes to prevent sediment transport to down gradient areas. Each line of silt fence will be placed along the contour with ends turned slightly uphill to create a ponding effect should water try to run along the fencing and around the ends. The maximum slope length between separate runs of silt fence is 30 000 mm (100'). Silt fence shall be installed prior to any upslope earthwork.

Sand bags filled with clean, small diameter stone, or an equivalent barrier, will be utilized around the drop inlets to create a temporary ponding area for particles to settle out as water drains through the barrier. Inlet protection shall be installed as soon as there is the possibility of water flowing to the structure. The height of the barrier shall be limited such that the ponding area does not present a hazard to the traveling public. Alternative inlet control measures shall be approved by the Engineer and on site coordinator prior to implementation.

Measures such as temporary stone check dams, silt fence, and sand bags shall be checked regularly for accumulation of sediment. Sediment build-up shall be removed when the level of sediment reaches one-half the height of the control measure. Sediments shall be disposed of in an approved area such that they will not be subject to erosion.

Stabilized construction entrances to the project site, staging areas, as well as to waste and borrow areas shall be established. The minimum size of a stabilized construction entrance is 3700 mm x 15 000 mm (12' x 50'). All surface water flowing to or diverted towards a construction entrance shall be piped under the stone. Pipes shall be appropriately sized for the contributing area; however, no pipes smaller than 150 mm diameter shall be used. See detail on 'Erosion & Sediment Control Detail' sheet for materials and construction method to be utilized when constructing a stabilized entrance.

Not used: [Temporary sediment settling basins may or may not be utilized on this project. If a settling basin is to be used for dewatering a cofferdam, it should be sized based upon the pumping rate and target particle size to be settled out for the project site. The follow sizing criteria is based upon a target particle size of 0.01 mm and is provided as general guidance. (See Sediment Settling Basin Sizing Criteria.)]

**PERMANENT EROSION CONTROL MEASURES**

**Several permanent erosion control measures will be utilized:**

Stone lining of roadway ditches with clean, angular Stone Fill, Type I will be used to prevent erosion during storm events. See 'Erosion Control Details' sheet for typical ditch section.

Not used: [Stone lining of the stream banks with Stone Fill, Type II as specified by VTrans Hydraulics personnel is specified. This stone will protect from stream bank erosion during design storm events.]

Closed drainage runoff will be treated by a stormwater treatment unit on each side of the river prior to discharge into the Winooski River.

Stone Fill, Type II will be utilized at culvert outlets to dissipate water velocities and reduce erosion potential.

Grass, or other suitable ground cover will be established outside of the roadway limits where stone lining has not been specified.

**GENERAL EROSION & SEDIMENT CONTROL GUIDELINES**

The Erosion Control Plans are meant as a guideline for preventing erosion and controlling sediment transport. The work outlined in this narrative consists of applying measures throughout the life of the project to control erosion and minimize the sedimentation of receiving waters. The measures include stabilization and structural practices, stormwater controls and other pollution prevention controls.

Coordinate the installation, use, and removal of erosion and sediment control measures with construction activities to ensure economical, effective and continuous erosion and sediment control. Employ temporary stabilization practices in incremental stages as construction proceeds. The contractor will use additional erosion control measures as necessitated by the sequence of construction and as directed by the Engineer and on site coordinator. See section 105.23 of the Vermont AOT Standard Specifications for Construction, dated 2001.

Install all erosion and sediment control measures as shown in the Erosion Control Plans or as directed by the Engineer and on site coordinator. Do not modify the type, size or location of any control or practice without approval of the Engineer and on site coordinator. Any changes shall be noted on the plans, in the weekly inspection report, and reported to the appropriate authority in a timely manner. Inspect all control measures after each storm event that potentially can discharge settlement and after each rainfall event. Repair measures promptly once damage is discovered.

Preventing initial soil erosion is much more effective than treating eroded sediment. Therefore, stabilize all disturbed areas generally within 48 hours after construction activity has temporarily or permanently ceased. Temporary vegetation shall be established if the area is to be without construction activity for a period of 14 days. Perimeter control measures shall be installed following clearing, but prior to the start of any grubbing or grading activity, install other temporary controls in incremental stages as construction proceeds.

There is no vegetation buffers along the stream banks due to vertical ledge.

Control only sediment-laden runoff generated by the project site. Collect and route all offsite runoff around or through the project site using diversion berms, diversion channels, culverts and/or temporary pipes.

Do not allow construction equipment to operate on the down slope side of perimeter control measures.

**SEDIMENT SETTLING BASIN SIZING CRITERIA**

PUMP FLOW RATE	REQUIRED SURFACE AREA	LENGTH / WIDTH = 2:1			
		L (ft)	W (ft)	L (m)	W (m)
Q (gpm)	Q (m <sup>3</sup> /s)	(ft <sup>2</sup> )	(m <sup>2</sup> )		
50	0.0032	595	55	35.0	17.0
100	0.0063	1200	111	49.0	24.5
150	0.0095	1776	165	59.6	29.8
200	0.0126	2368	220	68.8	34.4
250	0.0158	2970	276	77.0	38.5
300	0.0189	3560	330	84.4	42.2
350	0.0221	4155	386	91.2	45.6

**STATE OF VERMONT  
AGENCY OF TRANSPORTATION**

Town Of COLCHESTER-SOUTH BURLINGTON	Bridge No. 6
Highway No. TH 4/3	Log Sta. Surv. Sta.
TH 4/3 OVER WINOOSKI RIVER & N. E. C. R.	
<b>EROSION CONTROL NARRATIVE</b>	
Designed By VTRANS/SMG	Drawn By VTRANS/BJM
Checked By VTRANS/SMG	Date 4/05
Bridge Design Supervisor S. M. GUNN Date 4/05	
PROJECT COLCHESTER-SOUTH BURLINGTON	PROJECT NO. BRM 5600 (6) S C/2
I.G.C. Info.	
Bridge Sheet No. ZD139econar	Sheet 47 of 124