STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Woodstock BF 0241(44)

VT ROUTE 12, BRIDGE 19 OVER THE NORTH BRIDGEWATER BROOK

August 22, 2018

Table of Contents

I. Site Information

Bridge 19 is a State owned bridge located on VT Route 12 approximately 3.2 miles north of the junction with US Route 4 in Woodstock. There are several historic properties in the immediate vicinity of the project on VT 12, and an archaeologically sensitive area upstream, northwest of the bridge. The existing conditions were gathered from a combination of a site visit, the Inspection Report, the Route Log and the existing survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Major Collector
Bridge Type	Concrete T-Beam
Bridge Length	49 feet
Year Built	1938
Ownership	State of Vermont

Need

Bridge 19 carries VT Route 12 over the North Bridgewater Brook in Woodstock. The following is a list of deficiencies of Bridge 19 and Route 12 in this location:

1. The existing T-beams are in satisfactory condition following rehabilitation work in 2014. There is some cracking occurring on the underside of the T-beams and on the diaphragms with exposed reinforcing steel.

2. The substructure is rated as good. The bridge is categorized as scour critical following its most recent inspection. Abutment foundations do not meet current recommended standards for burial beneath the stream bed.

A rehabilitation project took place in 2014 and replaced the downstream fascia beam, re-poured the deck over this beam, and installed new curb and guardrail on the downstream side of the bridge.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2017 and 2037.

TRAFFIC DATA	2017	2037
AADT	1,900	2,000
DHV	230	250
ADTT	110	160
%T	4.3	6.1
%D	61	61

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on an ADT of 2,000, a DHV of 250, and a design speed of 50 mph for a Major Collector.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3, HSDEI 11-004	11'/4' (30')	11'/3' (28')[1]	
Bridge Lane and Shoulder Widths	VSS Section 5.3, HSDEI 11-004	11'/4.25' (30.5')	11'/3' (28')[1]	
Clear Zone Distance	VSS Table 5.5	No Issues Noted	20' fill / 12' cut (1:3 slopes) 14' cut (1:4 or flatter)	
Banking	VSS Section 5.13	Varies	8% (max)	
Speed		50 mph (Posted)	50 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-9	R = 1100'	R_{min} = 833' @ e = 6.0%	
Vertical Grade	VSS Table 5.6	3.3867% (max)	6% (max) for level terrain	
K Values for Vertical Curves	VSS Table 5.1	119 (sag)	110 crest / 90 sag	
Vertical Clearance	VSS Section 5.8	No Issues Noted	14' 3"	
Stopping Sight Distance	VSS Table 5.1	402'	400'	
Bicycle/Pedestrian Criteria	VSS Table 5.8	4' Shoulder	4' Shoulder	
Bridge Railing	Structures Design Manual Section 13	Curb mounted W-beam	TL-3	
Hydraulics	VTrans Hydraulics Manual	1. Passes Q_{50} storm event with 1.9' of freeboard 2. 25' Bank full width	1. Pass Q_{50} storm event with 1.0' of freeboard 2. 25'(min) Bank full width	
Structural Capacity	AASHTO LRFD Bridge Design Specifications // VSS Table 5.4	HS-15	Design Live Load: HL-93	Acceptable

Inspection Report Summary

Deck Rating	6 Satisfactory
Superstructure Rating	6 Satisfactory
Substructure Rating	7 Good
Channel Rating	7 Good

08/22/2017 – This structure is in good to satisfactory condition. JW/SP

08/05/2015 - This structure needs to have a deck rehabilitation project and then repaved with a membrane. ~JWW/JDM

[1]Table 5.3 in the Vermont State Design Standards specifies a minimum lane and shoulder width of 10'/3', respectively. As per HSDEI 11-004, a 14' minimum paved width shall be provided for State plow trucks.

Hydraulics

The clear span length is approximately 43' with a clear height of approximately 8', providing a waterway opening of 260 sq. ft. The bridge has concrete abutments and spread footings. The bridge is rated Scour Critical (3) in its most recent inspection report with observed undermining of the footings.

The upstream average low beam elevation is approximately 846.1'. With a Q_{50} water surface elevation of 844.2', there is 1.9' of freeboard at Q_{50}. The bridge also meets the minimum requirement for bank full width. The existing bridge is hydraulically adequate.

The VTrans hydraulic section has made recommendations for any replacement structure to have a minimum clear span of 43' measured perpendicular to channel and abutments with sufficient depth from the channel bottom to avoid undermining. These recommendations can be found in the preliminary hydraulics report in the appendix.

Utilities

The existing utilities are shown on the Existing Conditions Layout Sheet, and are as follows:

Municipal Utilities

- There are no municipal water or sewer mains in the project area.

Public Utilities

Underground:

- There are no known buried utilities in the vicinity of the project.

Aerial:

- The primary aerial electric transmission lines and communication cables are adjacent to VT 12, and the existing bridge, on the west side of VT 12. At a point just north of Bridge 19, these aerial facilities cross to the east side of VT 12; this aerial crossing is approximately 60' north of the existing bridge.

- There are aerial electric and telephone service lines, which cross VT 12 approximately 25' south of the existing bridge.

It is anticipated that overhead utilities will have to be relocated for any superstructure or full bridge replacement that utilizes a temporary bridge.

Right Of Way

There is an existing 60.5' Right-of-Way on VT 12 south of and across Bridge 19 that transitions to four rod ROW at approximately 40' north east of Bridge 19. The 60.5' Right-of-Way is centered on VT 12. The existing Right-of-Way is plotted on the Existing Conditions Layout Sheet. Depending on the alternative selected, additional Right-of-Way may need to be acquired.

Resources
The environmental resources present at this project are shown on the Existing Conditions Layout Sheet, and are as follows:

Biological:

Wetlands/Watercourses
Wetlands are not present in the project area.

Wildlife Habitat

No significant terrestrial wildlife habitat exists within the project area. A variety of aquatic species including wild brook trout may occur within the North Bridgewater Brook. There will likely be instream time-of-year restrictions due to fisheries.

Rare, Threatened and Endangered Species (R/T/E)

The VT Agency of Natural Resources Natural Resource Atlas indicates that no R/T/E species are present within the project area. The USFWS Information, Planning and Conservation System-(IPac) mapping indicates no occurrences of any federally listed species.

Agricultural

Statewide and prime agricultural soils are not present in the project area.

Hazardous Materials:

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are no hazardous waste sites in the immediate project area. It is anticipated that there will be no impacts to hazardous waste sites.

Historic:

Bridge 19 is not a historic resource. There are multiple historic properties to the north and south of the bridge on VT-12, however, Bridge 19 is outside of any existing or potential historic district, and therefore not subject to any aesthetic restrictions.

Archaeological:

One quadrant of archaeological sensitivity has been identified within the area of potential effect. The Northwest quadrant was identified as sensitive with visible artifact scatter and remnants of a stone retaining wall that was likely related to a mill dam. This area has been marked on the Existing Conditions plan sheet.

If a temporary off-alignment bridge is required upstream during construction, a Phase 1 sub-surface survey will be needed to assess site presence in the Northwest quadrant.

Stormwater:

There are no stormwater concerns for this project.

II. Maintenance of Traffic

The Vermont Agency of Transportation reviews each new project to determine suitability for the Accelerated Bridge Program, which focuses on faster delivery of construction plans, permitting, and Right of Way, as well as faster construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with faster construction techniques and incentives to contractors to complete projects sooner. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of prefabricated elements in new bridges will also expedite construction schedules. This can apply to decks, superstructures, and substructures. Accelerated Bridge Construction should provide enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Option 1: Temporary Bridge

From a constructability standpoint, a temporary bridge could be placed on the upstream or downstream side of the existing bridge. An upstream temporary bridge would have temporary impacts to archaeologically sensitive resources and would require a Phase 1 sub-surface archaeology survey be completed before construction. An upstream temporary bridge would also have temporary impacts to the residential drive and outbuilding located in the immediate project vicinity to the southwest of the existing bridge. A temporary bridge would require additional rights from adjacent property owners and would require a temporary relocation of overhead utilities. Wetland permitting would likely be required for construction of an upstream temporary bridge as well.

A temporary bridge downstream of the existing bridge would have significant ROW impacts to homes north and south of the bridge. Due to proximity of the proposed downstream temporary bridge to these homes, a downstream temporary bridge is not being considered further.

A one-lane temporary bridge would be adequate based on the daily traffic volumes. Due to the substandard sight distance, any one-lane temporary bridge should be signalized. It is recommended that if a temporary bridge is used to maintain traffic, that it is constructed upstream of the existing bridge. A layout of the potential temporary bridge alignment is provided on the Temporary Bridge Layout Sheet in the appendix.

Advantages: Traffic flow can be maintained through the project corridor during construction.

Disadvantages: This option would require additional Right-of-Way acquisition for placement of the temporary bridge. This option would have adverse impacts to adjacent properties and resources, including wetlands and archaeology. There would be decreased safety to the workers and to vehicular traffic, because of cars driving near the construction site, and construction vehicles entering and exiting the construction site. This traffic control option would be costly, and time consuming, as construction activities would take a second construction season, in order to set up the temporary bridge.

Option 2: Phased Construction

Phased construction is the maintenance of one way alternating traffic on the existing bridge while building one lane at a time of the proposed structure. This allows keeping the road open during construction, while having minimal impacts to adjacent property owners and environmental resources.

While the time required to develop a phased construction project would remain the same, the time required to complete a phased construction project increases because some of the construction tasks have to be performed multiple times. In addition to the increased construction costs mentioned above, the costs also increase for phased construction because of the inconvenience of working around traffic and the effort involved in coordinating the joints between the phases. Phased construction increases the proximity of workers and vehicular traffic and extends the duration that workers and moving vehicles are operating in the same confined space, thus phased construction decreases safety for workers and vehicular traffic. Phased construction is usually considered when the benefits include reduced impacts to resources and decreased costs and development time by not requiring the purchase of additional ROW.

Based on the current traffic volumes, it is acceptable to close one lane of traffic, and maintain one lane of traffic, serving both directions, with a traffic signal. In order to keep one lane open to traffic, approximately 12 feet of the existing bridge width needs to remain for Phase 1. The existing bridge roadway is 30.5 feet wide, making phased construction a workable option. This option would increase the design and construction costs.

Advantages: VT-12 would remain open to the traveling public throughout construction. The need for ROW acquisition would be reduced and impacts to archaeologically sensitive areas could be avoided.

Disadvantages: Increased design and construction costs. Increased construction duration. Decreased safety for workers and vehicular traffic.

Option 3: Off-Site Detour

This option would close the bridge and reroute traffic onto an offsite detour. Since the bridge is located on a State Highway, it would be the responsibility of the Vermont Agency of Transportation to choose the preferred detour route, and manage the sign selection and placement. The Town would be responsible for management of emergency services through the closure period.

There are limited routes that would be appropriate for a detour at this site. This route has an end-to-end distance of 33.6 miles and represents a general detour. Local bypass routes are also available in this area utilizing Town Highways, however, these routes will not be signed by VTrans as formal detour routes, though it is anticipated that local traffic will utilize these local bypass routes. Regardless of the route chosen, it is likely that surrounding roads will see increased traffic if VT 12 were closed during construction. The official detour route which would be considered is as follows:

1. VT Route 12, to VT Route 107, to Interstate 89, to US Route 4, back to VT Route 12 (33.6 mi end-to-end)

A map of this detour route can be found in the appendix.

Advantages: This option would eliminate the need for a temporary bridge, which would significantly decrease cost and time of construction. This option would not require the need to obtain rights from adjacent property owners for a temporary bridge and would not have impacts to archaeological resources adjacent to the bridge. This option reduces the time and cost of the project both at the development stage and construction.

Disadvantages: Traffic flow would not be maintained through the project site during construction.

III. Alternatives Discussion

No Action

The existing bridge is not structurally deficient and received a Federal Sufficiency Rating of 95 in its most recent inspection in August 2017. The overall bridge width is sufficient to meet travel lane and shoulder width standards. However, the substructure is rated as scour critical, and some undermining of the abutments is already occurring. Some cracking in the beams and exposed reinforcing steel has been observed. In the interest of safety to the traveling public, and longevity of the bridge, the No Action alternative is not recommended. No cost estimate has been provided for this alternative since there are no immediate costs.

Membrane Installation

The existing bridge is structurally sufficient, and the superstructure and deck are both rated as satisfactory (6). The beams beneath the deck have exposed reinforcing steel, and rust stains and efflorescence are present from water entering the bridge components and working its way through the concrete beams. In the 2015 inspection report for this bridge, a membrane installation and deck rehabilitation was recommended.

A membrane installation would entail removing the bituminous pavement overlay down to the concrete bridge deck, crack filling and patching the deck as needed with the appropriate concrete class, applying a sheet membrane waterproofing and repaving the deck with the appropriate pavement type. Cracking in the beams will be patched with the appropriate concrete class as part of this alternative. A Silane water repellent treatment would also be applied to the abutments to prevent further damage from draining water and road salts.

This alternative will provide a waterproofing seal for the bridge deck and beams and extend the longevity of the structure by essentially "freezing" the rate of deterioration of the bridge components. As this alternative requires only minor cold planning, membrane installation, and repaving, its project costs are low and would cause minimal traffic disruption.

Advantages: A waterproofing membrane will extend the life of structure. Construction time and costs will be low and will have minimal effects on traffic.

Disadvantages: This alternative does not address the condition of the concrete T-beams.

Maintenance of Traffic: As construction time is minimal for this alternative, an off-site detour or phased construction could be used to maintain traffic during construction.

Partial Superstructure Replacement

A deck rehabilitation and membrane installation was recommended following the 2015 bridge inspection. Since the existing T-beams are integral with the deck, replacement of the deck only is not feasible. As the deck and superstructure are rated as Satisfactory, a rehabilitation project will target specific deficiencies that have been noted in recent inspections, as follows:

- There is some cracking on the underside of the concrete beams that were not replaced in the minor rehabilitation work in 2014 completed by the District. This work included replacing the downstream fascia beam and replacing the curb mounted guardrail. The total cost of this work was approximately $130,000. The remaining beams have longitudinal cracking with exposed reinforcing steel. This alternative proposes replacing these five beams to extend the life of the structure.

Above, the extent of the work completed in 2014. Replacement of the downstream fascia beam and guardrail.

- The deck will be re-poured in areas where beams have been replaced. The typical section of the bridge is proposed at 4.25'-11'-11'-4.25' which meets the minimum standard roadway widths and matches the overall corridor roadway width.

- A sheet membrane waterproofing will be applied to the deck prior to laying the wearing course of pavement.

- The abutments would be treated with a Silane water repellent to prevent further water damage from roadway drainage and road salts.

- Scour protection would be constructed at the bridge abutments. Scour countermeasures at the abutments would be designed by the VTrans Hydraulics section.

Advantages: A bridge rehabilitation will allow for necessary repairs of the beams and abutments at lower design and construction costs than a full replacement project. A sheet membrane waterproofing can be installed before repaving the bridge.

Disadvantages: Scour protection, if not properly constructed, may affect hydraulic conditions.

Maintenance of Traffic: Possible options for this alternative are an off-site detour, temporary bridge, or phased construction.

Full Superstructure Replacement

A superstructure replacement for this bridge would include a new precast superstructure and substructure repair, as follows:

- The existing concrete T-beam superstructure would be removed, and a new pre-cast superstructure would be constructed.

- The existing bridge seats would be cut down and new bridge seats would be poured to accommodate the new superstructure.

- Scour protection would be constructed at the bridge abutments. Scour countermeasures at the abutments would be design by the VTrans Hydraulics section.

The existing substructure is in good condition, and it is reasonable to assume that the existing substructure can safely carry anticipated traffic loads for an additional 15 years, if additional scour protection is constructed.

A full superstructure replacement will maintain all geometric, hydraulic, and loading standards. The new superstructure would have a recommended 30' deck cross section to match into the existing geometry of VT Route 12 and meet all minimum standards for roadway widths.

Advantages: A full superstructure replacement will provide an updated design providing for a longer service life and greater ease of maintenance compared to the current non-standard design.

Disadvantages: This alternative would replace relatively recent work (fascia beam c. 2014).

Maintenance of Traffic: Possible options for this alternative are an off-site detour, temporary bridge, or phased construction.

Full Bridge Replacement

The existing bridge meets all current loading, hydraulic, and geometric standards. Considering the ratings in the most recent bridge inspection in 2017, a full bridge replacement is not being considered.

IV. Alternatives Summary

Based on the existing site conditions, bridge condition, and recommendations from hydraulics, there are several viable alternatives:

Alternative 0: No Action
Alternative 1a: Membrane Installation with Traffic Maintained on the Existing Bridge
Alternative 1b: Membrane Installation with Traffic Maintained on an Off-Site Detour
Alternative 2a: Partial Superstructure Replacement with Traffic Maintained on the Existing Bridge
Alternative 2b: Partial Superstructure Replacement with Traffic Maintained on an Off-Site Detour
Alternative 2c: Partial Superstructure Replacement with Traffic Maintained on a Temporary Bridge
Alternative 3a: Full Superstructure Replacement with Traffic Maintained on Existing Bridge
Alternative 3b: Full Superstructure Replacement with Traffic Maintained on a Temporary Bridge
Alternative 3c: Full Superstructure Replacement with Traffic Maintained on an Off-Site Detour

V. Cost Matrix

Woodstock BF 0241(44)		Do Nothing	Alt 1a	Alt 1b	Alt 2a	Alt 2b	Alt 2c	Alt 3a	Alt 3b	Alt 3c
			Membrane Installation		Partial Superstructure Replacement			Full Superstructure Replacement		
			Phased Construction	Offsite Detour	Phased Construction	Offsite Detour	Temporary Bridge	Phased Construction	Offsite Detour	Temporary Bridge
COST	Bridge Cost	$0	$12,600	$10,100	$326,200	$274,500	$274,500	$551,900	$465,500	$475,400
	Removal of Structure	$0	$0	$0	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
	Roadway	$0	$30,000	$28,000	$145,000	$134,000	$134,000	$162,000	$172,000	$174,000
	Maintenance of Traffic	$0	$115,000	$39,000	$140,000	$49,000	$132,520	$165,000	$59,000	$164,860
	Construction Costs	$0	$157,600	$77,100	$641,200	$487,500	$571,020	$908,900	$726,500	$844,260
	Construction Engineering + Contingencies	$0	$47,280	$23,130	$256,480	$146,250	$199,857	$181,780	$145,300	$168,852
	Total Construction Costs w CEC	**$0**	**$204,880**	**$100,230**	**$897,680**	**$633,750**	**$770,877**	**$1,090,680**	**$871,800**	**$1,013,112**
	Preliminary Engineering[1]	**$0**	**$47,300**	**$23,200**	**$96,200**	**$73,200**	**$85,700**	**$136,400**	**$109,000**	**$126,700**
	Right of Way	**$0**	**$0**	**$0**	**$0**	**$0**	**$60,000**	**$0**	**$0**	**$60,000**
	Total Project Costs	**$0**	**$252,180**	**$123,430**	**$993,880**	**$706,950**	**$916,577**	**$1,227,080**	**$980,800**	**$1,199,812**
	Annualized Costs	$0	$16,812	$8,229	$24,847	$17,674	$22,914.43	$24,541.60	$19,616	$23,996
TOWN SHARE		$0	$0	$0	$0	$0	$0	$0	$0	$0
TOWN %		0%	0%	0%	0%	0%	0%	0%	0%	0%
SCHEDULING	Project Development Duration[2]	N/A	12 months	12 months	2 years	2 years	2 years	3 years	2 years	4 years
	Construction Duration	N/A	3 months	2 weeks	12 months	6 months	12 months	18 months	12 months	24 months
	Closure Duration (If Applicable)	N/A	N/A	2 days	N/A	6 weeks	N/A	N/A	3 weeks	N/A
ENGINEERING	Typical Section - Roadway (feet)	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'
	Typical Section - Bridge (feet)	4.25'-11'-11'-4.25'	4.25'-11'-11'-4.25'	4.25'-11'-11'-4.25'	4.25'-11'-11'-4.25'	4.25'-11'-11'-4.25'	4.25'-11'-11'-4.25'	4'-11'-11'-4'	4'-11'-11'-4'	4'-11'-11'-4'
	Geometric Design Criteria	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard	Meets Standard
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No	No	No	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulics	Meets Standard								
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	No Change	No Change	No Change	No Change	Relocation	No Change	No Change	Relocation
OTHER	ROW Acquisition	No	No	No	No	No	Yes- Major Impacts	Yes - Minor Impacts	Yes – Minor Impacts	Yes – Major Impacts
	Road Closure	No	No	Yes	No	Yes	No	No	Yes	No
	Design Life (Years)	<10 years	15	15	40	40	40	50	50	50

[1] Preliminary Engineering costs are estimated starting from the end of the Project Definition Phase
[2] Project Development Durations are starting from the end of the Project Definition Phase

VI. Conclusion

We recommend **Alternative 1a**; to patch the concrete deck and install a waterproofing membrane utilizing phased construction. This alternative will also include applying a Silane treatment to the concrete abutments.

Structure:
Considering the current load rating of the bridge and condition of the superstructure, a membrane installation is the most economical alternative considered. While a superstructure replacement, partial or full, would be a more comprehensive bridge rehabilitation, the current condition of the bridge does not justify the extent of work or cost at this time. A membrane will help to prevent water and salt from draining off the roadway and into the bridge superstructure, thereby decreasing the rate of deterioration and extending the life of the structure.

The structure will continue to provide two 11 foot travel lanes with 4.25 foot shoulders, matching the typical section of Route 12 within this corridor and satisfying current bridge width standards.

Traffic Control:
It is recommended that the project be completed utilizing phased construction. This option will not have permanent impacts to surrounding historic and archaeological resources and will not require Right-of-Way acquisition. The design ADT on VT Route 12 is 2,000 at this location, which is considered relatively low. The current bridge is wide enough to accommodate phased construction and is anticipated to have only minor impacts to traffic during construction.

Design Criteria:
Bridge 19 will maintain its current geometry, meeting geometric standards. The low beam elevation will not be changed.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archeology Memo
- Historic Memo
- Local Input
- Detour and Local Bypass Maps
- Plans
    - Existing Conditions
    - Existing Profile
    - Proposed Typical Sections
    - Temporary Bridge Layout Sheets
    - Phasing Typical Sections and Layouts
    - Proposed Layout

Appendix A: Site Photos

Looking north over the bridge.

Looking south over the bridge.

Beam cracking and efflorescence on soffit.

Recurring efflorescence on a beam that was patched in a rehabilitation project in 2014.

Southern abutment condition.

Appendix B: Town Map

Woodstock Br 19
BF 0241(44)

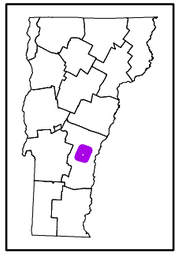
Scale: 1:57,750

N

- INTERSTATE
- STATE LONG
- STATE SHORT
- TOWN LONG
- FAS/FAU
- BIKE PATH
- INTERSTATE
- STATE HIGHWAY
- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4
- LEGAL TRAIL
- PRIVATE
- DISCONTINUED
- FAS/FAU HWY
- MAINTENANCE DISTRICT
- POLITICAL BOUNDARY
- VTRANS REGION BOUNDARY
- NAMED RIVER-STREAM
- UNNAMED RIVER-STREAM
- Point from Local Bridge Data *
- Point from Local Culvert Data *

* Points are from local town bridge and culvert inventories. Some points may overlap where VTrans has also conducted an inventory on the Town highway.
Data source: VOBCIT aka VTCulverts

Produced by:
Mapping Section
Division of Policy, Planning and Intermodal Development
Vermont Agency of Transportation
May 2017



WOODSTOCK

COUNTY-TOWN CODE: **1424-0**
WINDSOR COUNTY
DISTRICT # 4
District Long Name: White River Junction District
VTrans Four Region: Southeast

This map was funded in part through grants from the Federal Highway Administration, U.S. Department of Transportation. The representation of the authors expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

Appendix C: Bridge Inspection Report

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

Vermont Agency of Transportation ~ Structures Section ~ Bridge Management and Inspection Unit

Inspection Report for WOODSTOCK **bridge no.:** 00019 **District:** 4

Located on: VT 00012 ML **over** NO. BRIDGEWATER B **approximately** 3.2 MI N JCT. U.S.4 **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 6 SATISFACTORY

Superstructure Rating: 6 SATISFACTORY

Substructure Rating: 7 GOOD

Channel Rating: 7 GOOD

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200241001914242

Federal Sufficiency Rating: 095

Deficiency Status of Structure: ND

AGE and SERVICE

Year Built: 1938 **Year Reconstructed:** 0000

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 18

ADT: 002000 **% Truck ADT:** 06

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0047

Structure Length (ft): 000049

Lt Curb/Sidewalk Width (ft): 0.8

Rt Curb/Sidewalk Width (ft): 0.8

Bridge Rdwy Width Curb-to-Curb (ft): 31.5

Deck Width Out-to-Out (ft): 34.3

Appr. Roadway Width (ft): 032

Skew: 00

Bridge Median: 0 NO MEDIAN

Min Vertical Clr Over (ft): 99 FT 99 IN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: CONCRETE T-BEAM

Number of Approach Spans 0000 **Number of Main Spans:** 001

Kind of Material and/or Design: 1 CONCRETE

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 6 BITUMINOUS

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 1 MEETS CURRENT STANDARD

Transitions: 1 MEETS CURRENT STANDARD

Approach Guardrail 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 6 EQUAL TO MINIMUM CRITERIA

Deck Geometry: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 7 SLIGHT CHANCE OF OVERTOPPING BRIDGE & ROADWAY

Approach Roadway Alignment: 8 EQUAL TO DESIRABLE CRITERIA

Scour Critical Bridges: 3 SCOUR CRITICAL

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 1 LOAD FACTOR (LF)

Posting Status: A OPEN, NO RESTRICTION

Bridge Posting: 5 NO POSTING REQUIRED

Load Posting: 10 NO LOAD POSTING SIGNS ARE NEEDED

Posted Vehicle: POSTING NOT REQUIRED

Posted Weight (tons):

Design Load: 3 HS 15

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 082017 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

8/22/2017 This structure is in good to satisfactory condition. JW/SP

8/5/2015 This structure needs to have a deck rehabilitation project and then repaved w/ a membrane. JWW/JDM

Appendix D: Hydraulics Memo

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Leslie Russell, P.E., Hydraulics Project Supervisor

DATE: 24 April 2014

SUBJECT: Woodstock BR 0241(44) VT 12 BR 19 over North Bridgewater Brook

---

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

Existing Conditions

The existing structure was built in 1938. It is a concrete t-beam bridge with a concrete deck. The bridge measures about 49' along the roadway. It has a clear span length of approximately 43', with a clear height of about 8', providing a waterway opening of 260 sq. ft. The bridge has concrete abutments on spread footings.

The upstream average low beam elevation is approximately 846.1'. With a Q50 water surface elevation of 844.2', there is 1.9' of freeboard at Q50. Therefore, the bridge is hydraulically adequate.

The inspection report states that the channel is stable for scour. However, we noted that in the pictures, the bottom of footings is showing. There may even be some undermining going on. The record plans show the bottom of the spread footings well above the channel bottom. This is not acceptable.

Recommendations

In sizing a new structure we attempt to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. There is not enough reach length to determine actual bankfull width in the reach. However, the Agency of Natural Resources VT Regional Hydraulic Geometry calculates a bank full width of 25' for a drainage area this size in equilibrium. With a 43' clear span, the bridge does not constrict the channel. Based on our calculations and the information available, we recommend any of the following structures as a replacement at this site:

1) As a minimum, a new bridge can be built with a 43' clear span measured perpendicularly to the channel and an average low beam elevation of 845.3' and still be hydraulically adequate. This bridge will provide a waterway opening of about 225 sq. ft. and will provide 1.0' of freeboard at Q50. While this low beam is acceptable, it is lower than existing. We recommend keeping low beam as high as possible to help pass the higher flows.

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.

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.

Stone Fill, Type III 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. Bottom width of stone fill should reamin the same – approximately 15’ wide from toe of slope to toe of slope – through the bridge.

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

LGR

Enclosure: Sketch of bridge

cc: Hydraulics Project File via NJW
Hydraulics Chrono File

Appendix E: Preliminary Geotechnical Memo

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, P.E., Structures Project Manager

END

From: Eric Denardo, Geotechnical Engineer via Callie Ewald, P.E., Senior Geotechnical Engineer

CEE

Date: June 10, 2014

Subject: Woodstock BF 0241(44) – Preliminary Subsurface Investigation

1.0 INTRODUCTION

We have completed our preliminary geological and geotechnical subsurface investigation for the proposed replacement of Bridge No. 19 located on VT Route 12 over the North Bridgewater Brook in Woodstock, Vermont. The proposed project includes the replacement of the existing bridge with a new structure. This report contains the results of field sampling and testing, laboratory analyses of soil and rock samples, as well as boring logs.

2.0 FIELD INVESTIGATION

The field investigation was conducted between May 28, 2014 and May 30, 2014. Two standard penetration borings were drilled to determine the existing subsurface stratum. A summary of the location of each boring and corresponding ground surface elevation can be found in Table 1 as well as in the attached Boring Location plan. The values for the Northings and Eastings are based on the Vermont State Plane Grid Coordinate System NAD 83, and were located by a handheld Trimble GPS Unit.

Table 1: Boring Locations and Elevations

Boring Number	Easting (ft)	Northing (ft)	Ground Surface Elevation (ft)	Top of Bedrock Elevation (ft)
B – 101	1624741.19	418652.32	851.7	793.3
B – 102	1624773.75	418590.42	852.2	810.5

During the boring operations, split spoon samples and standard penetration tests (SPT) were taken continuously to twenty feet and every five feet thereafter until bedrock. When bedrock was encountered, NX rock cores were taken 10 feet into bedrock to collect five foot core sample runs. The notation 'NXDC' found on the boring logs signifies that the NX barrel was used to clean out the hole of the very dense material. For each boring, soil samples were visually identified and SPT blow counts were recorded on the boring logs.

3.0 FIELD AND LABORATORY TESTING

The standard penetration resistance of the in-situ soil is determined by the number of blows required to drive a 2 inch OD split barrel sampler into the soil with a 140 pound hammer dropped from a height of 30 inches, in accordance with procedures specified in AASHTO T206. During the standard penetration test, the sampler is driven for a total length of 2 feet, while counting the blows for each 6 inch increment. The

SPT N-value, which is defined as the sum of the number of blows required to drive the sampler through the second and third increments, is commonly used with established correlations to estimate a number of soil parameters, particularly the shear strength and density of cohesionless soils. The N values provided on the boring logs are raw values and have not been corrected for energy, borehole diameter, rod length, or overburden pressure. The VT Agency of Transportation has determined a hammer correction value, C_E, to account for the efficiency of the SPT hammer on the drill rig. For this project, a CME 55 Track Rig was used, with a hammer energy correction factor of 1.46. This value, included on the boring logs, should be used in calculations to determine soil parameters. Laboratory tests were conducted on all samples to evaluate grain size, moisture content, and percent finer than No. 200 sieve. Results from this testing can be found on the attached boring logs.

A detailed description of the rock cores is presented on the logs in addition to Recovery and Rock Quality Designation (RQD). The percent recovery is defined as the length of core obtained expressed as a percentage of the total length cored. RQD is the total length of core pieces, 4 inches or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams, jointing and bedding planes.

4.0 FOUNDATION RECOMMENDATIONS

Based on a preliminary review of the subsurface investigation results and the presence of bedrock at depths between 40 feet and 60 feet below the pavement surface, abutments supported on piles appear to be feasible. The refusal conditions encountered from 10 feet below the ground surface to bedrock appear to be from a very dense glacial till with no evidence of cobbles or boulders during drilling. Based on these observations, driving of H-piles for pile supported abutments is considered feasible. If the alignment for Bridge No. 19 doesn't change significantly, we do not foresee the need to perform additional borings during the design phase of the project to aid in foundation design.

5.0 CONCLUSION

Once further information becomes available, we would be happy to assist in the analysis and design of components of the substructure. If you have any questions, or you would like to discuss this report, please contact us at (802) 828-2561. The boring logs are attached as available in the M:Projects\13C272\MaterialsResearch folder.

Enclosures: Boring Logs – 4 pages
Boring Location Plan – 1 page

cc: Electronic Read File/WEA
Project File/CEE
END

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

WOODSTOCK
BF 0241(44)
VT-12 BR-19

Boring No.: **B-101**
Page No.: 1 of 2
Pin No.: 13C272
Checked By: END

Boring Crew: JUDKINS, NIETO, HOOK
Date Started: 5/29/14 Date Finished: 5/30/14
VTSPG NAD83: N 418652.32 ft E 1624741.19 ft
Station: Offset:
Ground Elevation: 851.68 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 55 TRACK	C_F = 1.46

Groundwater Observations

Date	Depth (ft)	Notes
05/30/14	12.1	AM
05/30/14	12.9	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.52 ft								
		A-1-a, SaGr, Lt/brn, Moist, Rec. = 0.9 ft				6-6-5-8 (11)	6.2	56.4	29.9	13.7
		A-1-a, SaGr, Lt/brn, Moist, Rec. = 1.0 ft				8-8-10-9 (18)	3.3	55.9	30.2	13.9
5		Field Note:, No Recovery				6-2-2-3 (4)				
		A-2-4, GrSa, Lt/brn, Moist, Rec. = 1.0 ft				2-2-2-3 (4)	12.2	32.4	49.1	18.5
		A-1-b, GrSa, brn, Moist, Rec. = 1.3 ft, Roller coned ahead.				3-4-6-5 (10)	10.7	36.3	48.9	14.8
10		A-2-4, GrSa, Dk/brn, Moist, Rec. = 1.0 ft, Roller coned ahead.				3-3-6-13 (9)	18.5	21.2	63.4	15.4
		A-2-4, SiSaGr, Dk/gry, MTW, Rec. = 0.5 ft, Lab Note: Broken Rock was within sample.				32-25-32-R@2.5" (57) R@0.0" (R)	13.8	38.5	31.7	29.8
15		Field Note:, Roller coned ahead.								
		Field Note:, No Recovery								
		Field Note:, NXDC								
		A-4, SaSi, gry, Moist, Rec. = 1.1 ft				25-37-R@5.0" (R)	11.8	9.8	41.4	48.8
		Field Note:, NXDC								
20		A-4, SaSi, gry, Moist, Rec. = 0.9 ft				39-R@5.0" (R)	11.8	10.8	35.7	53.5
		Field Note:, NXDC								
25		A-4, SaSi, gry, Moist, Rec. = 1.0 ft				30-44-R@2.5" (R)	14.3	13.5	28.5	58.0
		Field Note:, NXDC								
30		A-4, GrSaSi, gry, Moist, Rec. = 0.9 ft				39-R@5.0" (R)	9.0	26.2	30.8	43.0
		Field Note:, NXDC								
35		A-4, SaSi, gry, Moist, Rec. = 0.5 ft				R@6.0" (R)	10.9	10.6	31.4	58.0
		Field Note:, NXDC								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WOODSTOCK BF 0241(44).GPJ VERMONT AOT.GDT 6/5/14

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

WOODSTOCK
BF 0241(44)
VT-12 BR-19

Boring No.: **B-101**
Page No.: 2 of 2
Pin No.: 13C272
Checked By: END

Boring Crew: JUDKINS, NIETO, HOOK
Date Started: 5/29/14 Date Finished: 5/30/14
VTSPG NAD83: N 418652.32 ft E 1624741.19 ft
Station: Offset:
Ground Elevation: 851.68 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 55 TRACK	C_F = 1.46

Groundwater Observations

Date	Depth (ft)	Notes
05/30/14	12.1	AM
05/30/14	12.9	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-4, GrSaSi, gry, Moist, Rec. = 1.1 ft				20-36-42-R@6.0" (78)	11.9	24.9	31.4	43.7
		Field Note:, NXDC								
45		Field Note:, No Recovery				R@5.0" (R)				
		Field Note:, NXDC								
50		Field Note:, No Recovery				28-43-R@3.5" (R)				
		Field Note:, NXDC								
55		A-4, SaSi, gry, Moist, Rec. = 1.4 ft				14-28-32-R@3.5" (60)	11.6	15.5	33.0	51.5
		58.4 ft - 63.4 ft, Silver-gray, Micaceous quartz-rich meta- Limestone, with interbedded phyllite. Hard to moderately hard, Slightly weathered, Fair rock, NXMDC, RMR = 54	1 (?)	42 (24)	6 6 9 18 13	Top of Bedrock @ 58.4 ft				
60										
		63.4 ft - 68.4 ft, Silver-gray, Micaceous quartz-rich meta- Limestone, with interbedded phyllite. Hard to moderately hard, Moderately weathered, Fair rock, NXMDC, RMR = 54	2 (?)	76 (22)	6 7 14 5 8					
65										
		Hole stopped @ 68.4 ft								
70		Remarks: Hole collapsed at 28.7 ft.								
75										

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WOODSTOCK BF 0241(44).GPJ VERMONT AOT.GDT 6/5/14

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

WOODSTOCK
BF 0241(44)
VT-12 BR-19

Boring No.: **B-102**
Page No.: 1 of 2
Pin No.: 13C272
Checked By: END

Boring Crew: JUDKINS, NIETO, HOOK
Date Started: 5/28/14 Date Finished: 5/29/14
VTSPG NAD83: N 418590.42 ft E 1624773.75 ft
Station: Offset:
Ground Elevation: 852.24 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 55 TRACK	C_F = 1.46

Groundwater Observations

Date	Depth (ft)	Notes
05/29/14	10.6	AM

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-1-b, SaGr, Lt/brn, Moist, Rec. = 1.2 ft				12-16-12-11 (28)	8.1	43.1	39.9	17.0
		A-1-b, SaGr, brn, Moist, Rec. = 0.4 ft				18-R@2.5" (R)	13.5	47.5	43.7	8.8
5		A-2-4, SiSa, brn, Moist, Rec. = 1.0 ft				6-5-4-2 (9)	18.4	8.4	66.5	25.1
		Visual Description:, Broken Rock with silty sand, brn, Moist, Rec. = 0.3 ft				3-4-7-7 (11)	9.1			
10		A-2-4, Sa, brn, MTW, Rec. = 0.4 ft, Roller coned.				4-4-4-R@5.0" (8)	20.3	14.1	66.7	19.2
		Field Note:, No Recovery				R@0.0" (R)				
		Field Note:, NXDC								
		A-2-4, SiGrSa, gry, Moist, Rec. = 0.4 ft				R@5.0" (R)	11.4	29.5	42.6	27.9
		Field Note:, NXDC								
15		A-4, GrSaSi, gry, Moist, Rec. = 0.7 ft				40-R@5.0" (R)	12.1	22.7	26.1	51.2
		Field Note:, NXDC								
		A-4, SaSi, gry, Moist, Rec. = 1.2 ft				20-38-R@3.5" (R)	12.7	9.7	34.2	56.1
		Field Note:, NXDC								
20		A-4, SaSi, gry, Moist, Rec. = 1.0 ft				32-49-R@2.5" (R)	12.9	10.6	33.4	56.0
		Field Note:, NXDC								
25		A-4, SaSi, gry, Moist, Rec. = 1.1 ft				13-46-R@1.0" (R)	11.3	18.0	29.5	52.5
		Field Note:, NXDC								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WOODSTOCK BF 0241(44).GPJ VERMONT AOT.GDT 6/5/14

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH SECTION
SUBSURFACE INFORMATION

BORING LOG

WOODSTOCK
BF 0241(44)
VT-12 BR-19

Boring No.: **B-102**
Page No.: 2 of 2
Pin No.: 13C272
Checked By: END

Boring Crew: JUDKINS, NIETO, HOOK
Date Started: 5/28/14 Date Finished: 5/29/14
VTSPG NAD83: N 418590.42 ft E 1624773.75 ft
Station: Offset:
Ground Elevation: 852.24 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 55 TRACK	C_F = 1.46

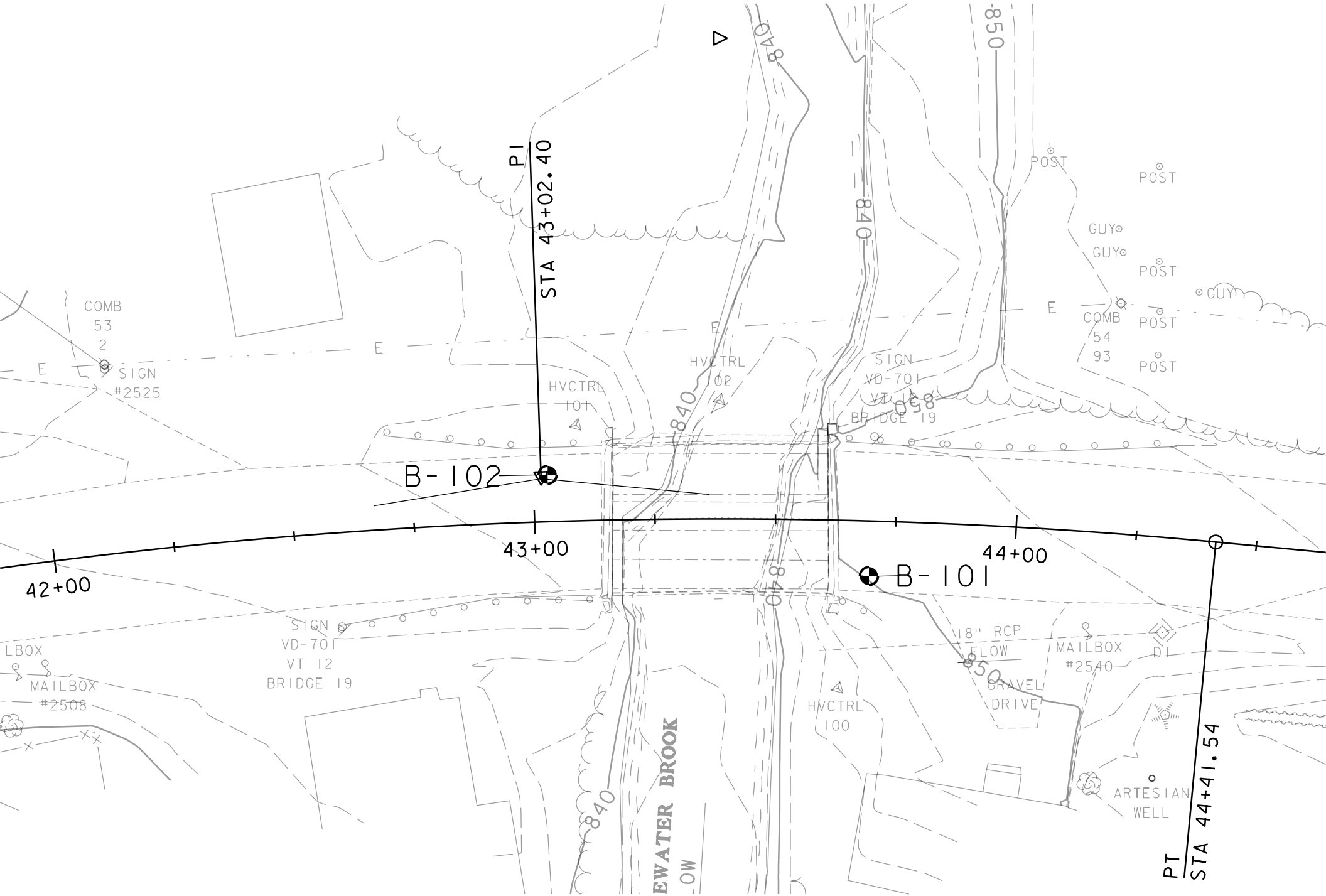
Groundwater Observations

Date	Depth (ft)	Notes
05/29/14	10.6	AM

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-4, SaSi, gry, Moist, Rec. = 1.2 ft				10-28-38-R@5.0" (66)	13.4	8.0	32.5	59.5
		Field Note:, NXDC								
35		A-4, GrSaSi, gry, Moist, Rec. = 1.2 ft				15-48-R@5.0" (R)	11.8	23.1	29.3	47.6
		Field Note:, NXDC				18-24-30-R@2.5" (54)				
40		A-4, SaSi, gry, Moist, Rec. = 1.2 ft					11.1	16.1	28.7	55.2
		41.7 ft - 46.7 ft, Silver-gray, Micaceous quartz-rich meta- Limestone, Hard, Unweathered, Very good rock, NXMDC, RMR = 86	1 (?)	92 (86)	7 9 6 5 4	Top of Bedrock @ 41.7 ft				
45										
		46.7 ft - 51.7 ft, Silver-gray, Micaceous quartz-rich meta- Limestone, Hard, Unweathered, Very good rock, NXMDC, RMR = 89	2 (?)	100 (96)	4 3 4 4 4					
50										
		Hole stopped @ 51.7 ft								
		Remarks: Hole collapsed at 1.9 ft.								
55										

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WOODSTOCK BF 0241(44).GPJ VERMONT AOT.GDT 6/5/14


PI
STA 43+02.40
B-102
B-101
42+00
43+00
44+00
PT
STA 44+41.54
840
850
HVCTRL
101
HVCTRL
102
HVCTRL
100
SIGN
VD-701
VT 12
BRIDGE 19
SIGN
#2525
COMB
53
2
COMB
54
93
POST
GUY
E
MAILBOX
#2508
MAILBOX
#2540
18" RCP
FLOW
GRAVEL
DRIVE
DI
ARTESIAN
WELL
EWATER BROOK

Appendix F: Natural Resource Completion Memo

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

TO: Lee Goldstein, Environmental Specialist

FROM: John Lepore, Transportation Biologist

DATE: April 22, 2014

SUBJECT: Woodstock B_F 0241 (44)
VT 12, Bridge 19 over North Bridgewater Brook

The purpose of this memorandum is to let you know that I have completed my resource identification for this project and have concluded that the only regulated natural resource in the immediate vicinity of this stream crossing is tht brook itself.

Wetlands - Wetlands are not present in project area.

Fisheries – North Bridgewater Brook is a cold-water trout stream and aquatic organism passage should be a provision of the project.

Floodplains – North Bridgewater Brook is confined within steeped, sided, somewhat channelized banks in the vicinity of the project.

Agricultural Soils & Species of Special Concern - Neither of these resources are in the vicinity of the project.

If you have any questions about this, call me at 828-396.!

Yelinek, Kara

From: Brady, James
Sent: Monday, March 19, 2018 2:38 PM
To: Yelinek, Kara
Subject: RE: question on bat habitat

Hi Kara,

Based on the photos of the bridge and the approximate height of 8' (found in scoping report) above the stream, this bridge is not considered to have suitable habitat for the federally threatened northern long-eared bat. This site is also outside of the known range of the federally endangered Indiana bat.

This project will not be subject to time-of-year restrictions due to bats. There will likely be instream time-of-year restrictions due to fisheries.

Please let me know if you have any questions.

-James

P.S. – unrelated to bats, it looks like there might be a class II wetland upstream of the structure. The Woodstock Conservation Commission did a study in 2004 and hired a consultant to map wetlands. I'll need to verify, but no wetlands were indicated on the original scoping report.

James Brady
VTrans Biologist
james.brady@vermont.gov
Mobile: (802) 279-2562

From: Yelinek, Kara
Sent: Monday, March 05, 2018 2:13 PM
To: Brady, James <James.Brady@vermont.gov>
Subject: question on bat habitat

Hey James,

I'm currently scoping a bridge down in Woodstock. The resource ID I have for it is a little old and it was recommended in the first round of reviews that I double check on bat habitat, as it is not mentioned in the 2014 natural resource ID I have in the project file. I checked the ANR resource atlas and nothing pops up as sensitive for bats, but figured I would reach out to be safe in case we've had other projects in the area that have run into bat habitat. If not, I can include a section in the report about the ANR atlas showing no sensitive bat habitat.

It's bridge 19 on VT 12, over the North Bridgewater Brook. Woodstock(44) pin 13c272

Thanks!
Kara

Kara Yelinek
Vermont Agency of Transportation
Project Delivery – Structures & Hydraulics
kara.yelinek@vermont.gov :: (802)595-4655

Appendix G: Archaeology Memo

VERMONT

Jeannine Russell
VTrans Archaeology Officer
State of Vermont
Environmental Section
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

Agency of Transportation

[phone] 802-828-3981
[fax] 802-828-2334
[ttd] 800-253-0191

To: Lee Goldstein, VTrans Environmental Specialist

From: Jeannine Russell, VTrans Archaeology Officer
via Brennan Gauthier, VTrans Archaeologist

Date: 5/16/2014

Subject: Woodstock BF 0241(44) – Archaeological Resource ID

Lee,

A field visit was completed on 5/14/2014 in order to assess archaeological resources in a 200 foot radius around Bridge 19 over North Bridgewater Brook in Woodstock, Windsor County, Vermont. The APE is situated in a rural area that was historically developed with saw and grist mills, a school house and numerous residential structures. The SOW is yet to be defined, so a generalized radius of 200 feet was assumed for a maximum APE. One quadrant of sensitivity was identified with a visible artifact scatter and remnants of a stone retaining wall that was likely related to a mill dam. The NW quadrant has been mapped and should be avoided during construction if possible.

Please feel free to contact me with questions or concerns. I've added the quadrant of arch sensitivity into the archaeology geodatabase for inclusion in future plans.

Sincerely,

Brennan

Brennan Gauthier
VTrans Archaeologist
Vermont Agency of Transportation
Project Delivery Bureau
Environmental Section
1 National Life Drive
Montpelier, VT 05633
tel. 802-828-3965
fax. 802-828-2334
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation

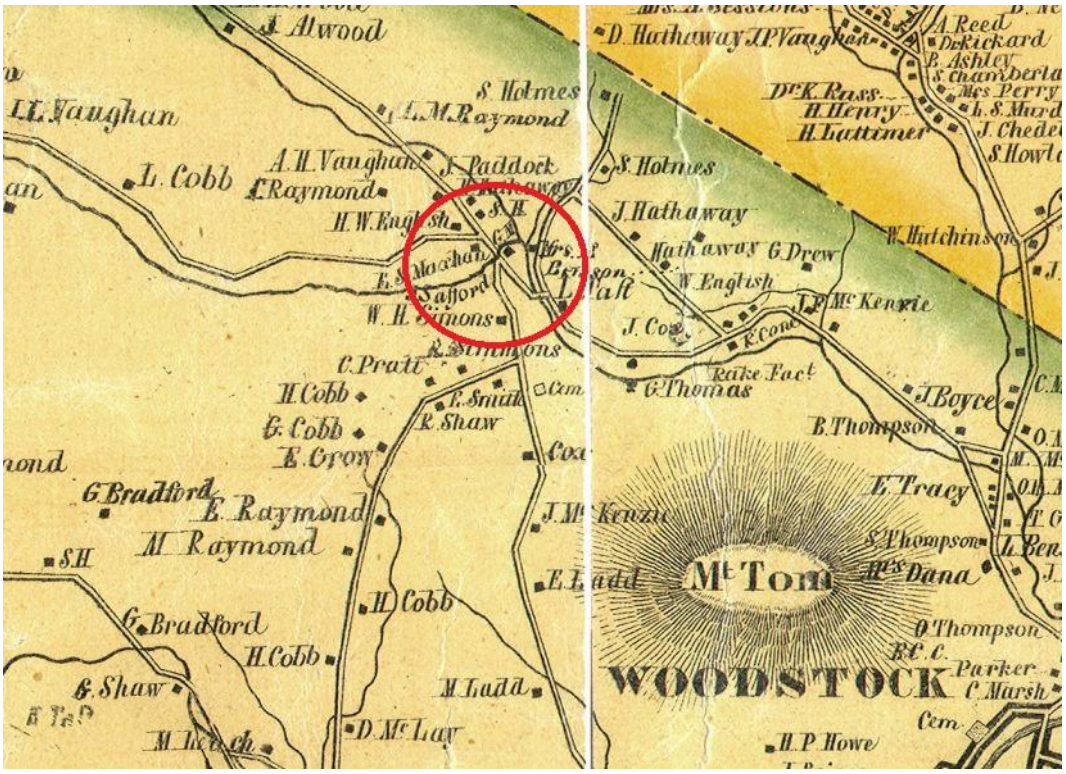


Figure 1: 1850s Map

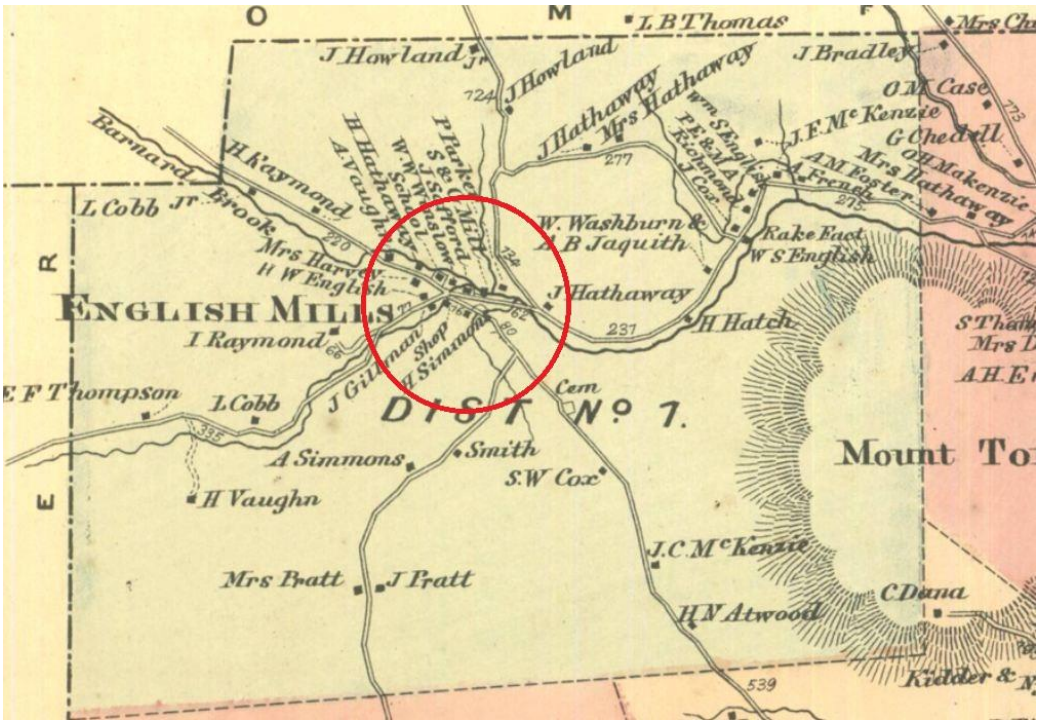


Figure 2: 1860s Map


Woodstock Bridge 19
1:829
0 4.5 9 18 27 36
Meters
N
Map created by BCG
PDD-Environmental Section
on 5/16/2014

Appendix H: Historic Memo

Goldstein, Lee

From: O'Shea, Kaitlin
Sent: Friday, January 24, 2014 12:21 PM
To: Goldstein, Lee
Cc: Newman, Scott; Williams, Chris
Subject: Woodstock BF 0241(44) Historic Resource ID

Hi Lee,

I have completed the historic resource ID for this project. Bridge 19 is not a historic bridge. There are historic properties located north of the bridge on Route 12. These properties have been identified on Arcmap, and bookmarked under the project name.

Let me know if you need additional information.

Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

802-828-3962
Kaitlin.O'Shea@state.vt.us

Appendix I: Local Input

Local & Regional Input Questionnaire

Project Name: VT 12, Bridge 19 over North Bridgewater Brook **Project Number:** WOODSTOCK BF 0241(44)

Community Considerations

1. Are there any scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), or may be difficult to stage if the bridge is closed during construction? Examples include: a bike race, festivals, cultural events, farmers market, concerts, etc. that could be impacted? If yes, please provide date, location and event organizers' contact info.

   WO – Killington Stage Race (Stage 2 course affects VT12) around Labor Day
   Woodstock Farmers Market (1st Wed in June until mid-Oct) on the Green
   VT Symphony Orchestra at SS6 (July 4th weekend)
   Covered Bridge Half Marathon (June 1, 2014)

2. Is there a "slow season" or period of time from May through October where traffic is less?

   WO - Between Dartmouth graduation (mid-May) to July 1
   2-3 weeks in Sept (after Labor Day to Sept 20) before foliage season in October* preferred option

3. Please describe the location of emergency responders (fire, police, ambulance) and emergency response routes.

   Please see attached facility map. 454 Woodstock Rd (fire/police/ambulance)

4. Where are the schools in your community and what are their schedules?

   Please see attached facility map.

   WO – schools finish around end of June.

5. In the vicinity of the bridge, is there a land use pattern, existing generators of pedestrian and/or bicycle traffic, or zoning that will support development that is likely to lead to significant levels of walking and bicycling? Please explain.

   No.

6. Are there any businesses (including agricultural operations) that would be adversely impacted either by a detour or due to work zone proximity?

   BA – Riverbend Home and Garden Supply

7. Are there any important public buildings (town hall or community center) or community facilities (recreational fields or library) in close proximity to the proposed project?

   WO – Prosper Community House
   Bike Vermont – local bike shop in Woodstock – familiar with bike tours in the area.

8. Are there any town highways that might be adversely impacted by traffic bypassing the construction on another local road?

   Cox District Rd / N Bridgewater Rd as the local detours would take extra traffic.

9. Are there any other municipal operations that could be adversely impacted if the bridge is closed during construction? If yes, please explain.

   WO - No. Mutual aid fire protection for Barnard.

10. Please identify any local communication channels that are available—e.g. weekly or daily newspapers, blogs, radio, public access TV, Front Porch Forum, etc. Also include any unconventional means such as local low-power FM.

    Vermont Standard (local paper) - http://www.thevermontstandard.com/
    Valley News
    Public Access TV - http://wctv8.com/
    Front Porch Forum
    Public radio – 89.5FM

11. Is there a local business association, chamber of commerce or other downtown group that we should be working with?

    Woodstock Area Chamber of Commerce – Beth Finlayson bfinlayson@woodstockvt.com
    Billings Farm – Peggy McLean - pmclean@billingsfarm.org
    Marsh Billings Rockefeller National Park – christina_marts@nps.gov
    Thompson Senior Center – Paula Audsley paudsley@comcast.net
    Sustainable Woodstock – Sally Miller sally@sustainablewoodstock.org

Design Considerations

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?

   Alignment is good.

2. Are there any concerns with the width of the existing bridge?

WO - Would prefer wider shoulders to accommodate popular bike route users.

3. What is the current level of bicycle and pedestrian use on the bridge?

   Occasional pedestrians that walk for exercise but mostly cyclists using VT12 (moderate traffic for cyclists).

4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one? Are there existing bicycle and/or pedestrian facilities on the approaches to the bridge?

   No existing sidewalk and current 3ft shoulder but would like wider shoulders to accommodate cyclists. No current facilities on bridge approaches.

5. Does the Town have plans to construct either bicycle or pedestrian facilities leading up to the bridge? Please provide a copy of the planning document that demonstrates this (e.g. scoping study, master plan, corridor study) Please explain and provide documentation.

   No – it's a State bridge.

6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that you feel that bicycle and pedestrian traffic should be accommodated during construction?

   No.

7. Are there any special aesthetic considerations we should be aware of?

   Same guardrail design (W beams or brown paint impregnated galvanized steel).

8. Are there any traffic, pedestrian or bicycle safety concerns associated with the current bridge? If yes, please explain.

   No.

9. Does the location have a history of flooding? If yes, please explain.

   Town is unaware – check VTrans files.

10. Are you aware of any nearby Hazardous Material Sites?

    No.

11. Are you aware of any historic, archeological and/or other environmental resource issues?

    No.

12. Are there any other comments you feel are important for us to consider that we have not mentioned yet?

    No.

Land Use & Public Transit Considerations – to be filled out by the municipality or RPC.

1. Does your municipal land use plan reference the bridge in question? If so please provide a copy of the applicable section or sections of the plan.

   Please see attached map (of both Town of Woodstock and Pomfret).

2. Please provide a copy of your existing and future land use map, if applicable.

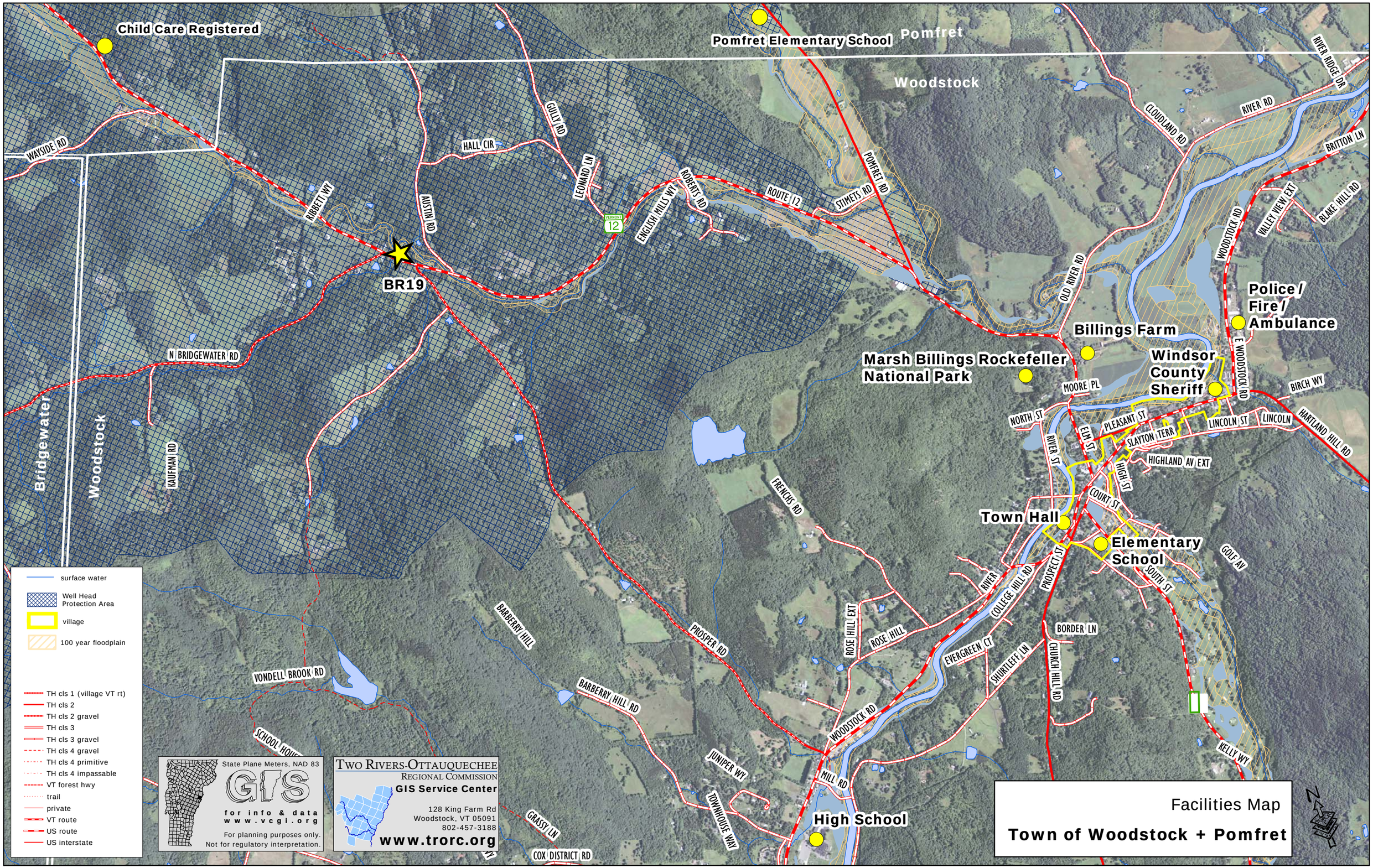
   Please see attached map (of both Town of Woodstock and Pomfret).

3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain.

   No.

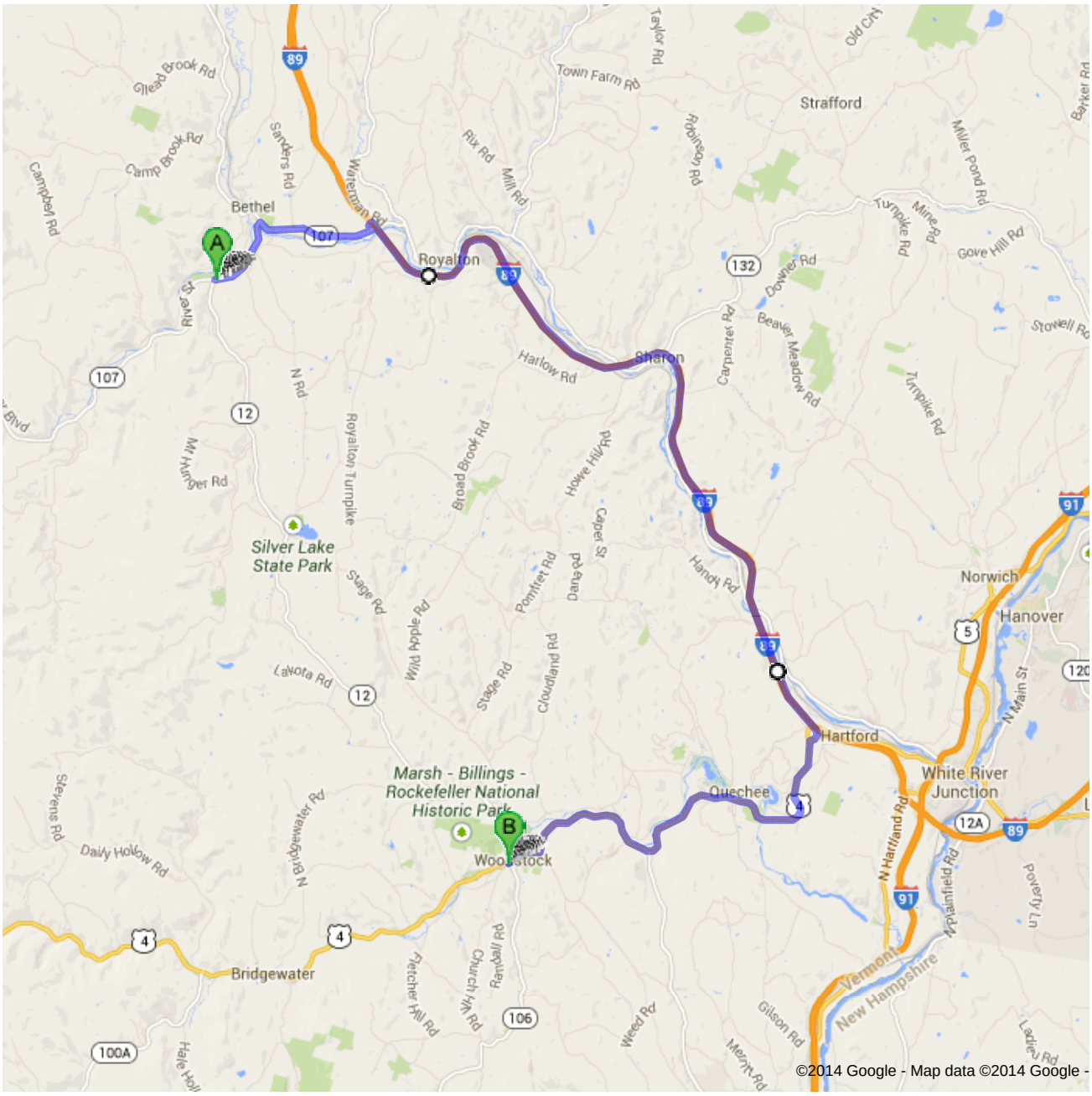
4. Is there any planned expansion of public transit service in the project area? If not known please contact your Regional Public Transit Provider.

   No there is not public transit service in the area.


Child Care Registered
Pomfret Elementary School
Pomfret
Woodstock
WAYSIDE RD
HALL CIR
GULLY RD
LEONARD LN
RIBBETT WY
AUSTIN RD
VERMONT 12
ENGLISH MILLS WY
ROBERTS RD
ROUTE 12
STIMETS RD
POMFRET RD
RIVER RIDGE DR
CLOUDLAND RD
RIVER RD
BRITTON LN
VALLEY VIEW EXT
BLAKE HILL RD
WOODSTOCK RD
OLD RIVER RD
BR19
N BRIDGEWATER RD
Bridgewater
Woodstock
KAUFMAN RD
Police / Fire / Ambulance
Billings Farm
Marsh Billings Rockefeller National Park
Windsor County Sheriff
E WOODSTOCK RD
MOORE PL
BIRCH WY
NORTH ST
PLEASANT ST
SLAYTON TERR
LINCOLN ST
LINCOLN
HARTLAND HILL RD
RIVER ST
ELM ST
HIGH ST
HIGHLAND AV EXT
COURT ST
Town Hall
Elementary School
GOLF AV
SOUTH ST
PROSPECT ST
RIVER
COLLEGE HILL RD
FRENCHS RD
BARBERRY HILL
PROSPER RD
ROSE HILL EXT
ROSE HILL
EVERGREEN CT
SHURTLEFF LN
BORDER LN
CHURCH HILL RD
VONDELL BROOK RD
BARBERRY HILL RD
WOODSTOCK RD
JUNIPER WY
MILL RD
TOWNHOUSE WAY
KELLY WY
GRASSY LN
COX DISTRICT RD
High School
surface water
Well Head Protection Area
village
100 year floodplain
TH cls 1 (village VT rt)
TH cls 2
TH cls 2 gravel
TH cls 3
TH cls 3 gravel
TH cls 4 gravel
TH cls 4 primitive
TH cls 4 impassable
VT forest hwy
trail
private
VT route
US route
US interstate
State Plane Meters, NAD 83
GIS
for info & data
www.vcgi.org
For planning purposes only.
Not for regulatory interpretation.
TWO RIVERS-OTTAUQUECHEE
REGIONAL COMMISSION
GIS Service Center
128 King Farm Rd
Woodstock, VT 05091
802-457-3188
www.trorc.org
Facilities Map
Town of Woodstock + Pomfret
N

Appendix J: Detour and Local Bypass Maps

Directions to US-4 W/N Park St
33.6 mi – about **40 mins**
Woodstock Detour Route



A VT-12 S/Creek Rd

1.	Head **north** on **VT-12 N/□Creek Rd** toward **VT-107 W/□River St**	go 30 ft total 30 ft
2.	Turn right onto **VT-107 E/□VT-12 N/□River St** Continue to follow VT-107 E About 7 mins	go 4.5 mi total 4.5 mi
3.	Turn left to merge onto **I-89 S** About 16 mins	go 18.6 mi total 23.1 mi
4.	Take exit **1** toward **US-4/□Woodstock/□Quechee**	go 0.3 mi total 23.3 mi
5.	Continue straight	go 0.1 mi total 23.4 mi
6.	Turn left onto **US-4 W/□Woodstock Rd** About 14 mins	go 9.4 mi total 32.9 mi
7.	Turn right onto **US-4 W/□VT-12 N/□Pleasant St** Continue to follow US-4 W About 2 mins	go 0.8 mi total 33.6 mi

B US-4 W/N Park St

Appendix K: Plans

EXISTING CURVE DATA
DELTA = 14°34′26″
D = 5°12′31″
R = 1100.00′
T = 140.66′
L = 279.80′
E = 8.96′

PI
STA 50+00.00

POB
STA 50+00.00

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. = 848.56

BANGO, LUIS & JOAN H.

WESCHLER, THOMAS R.

YOUKNOT, NORMAN & ERLA

HOOGHE, MICHELLE

PROSPER COMMUNITY CLUB HOUSE

VT STATE PLANE GRID

N

PI STA 43+02.40

PC STA 41+61.74

PT STA 44+41.54

POE STA 46+16.29

PI STA 52+00.00

POE STA 52+00.00

N 54°27′34″ W

N 39°53′08″ W

VT ROUTE 12
TO WOODSTOCK VILLAGE

VT ROUTE 12
TO POMFRET

TH-6
NORTH BRIDGEWATER ROAD

NORTH BRIDGEWATER BROOK

BRIDGE 19

41+00 42+00 43+00 44+00 45+00 46+00 46+16

50+00 51+00 52+00

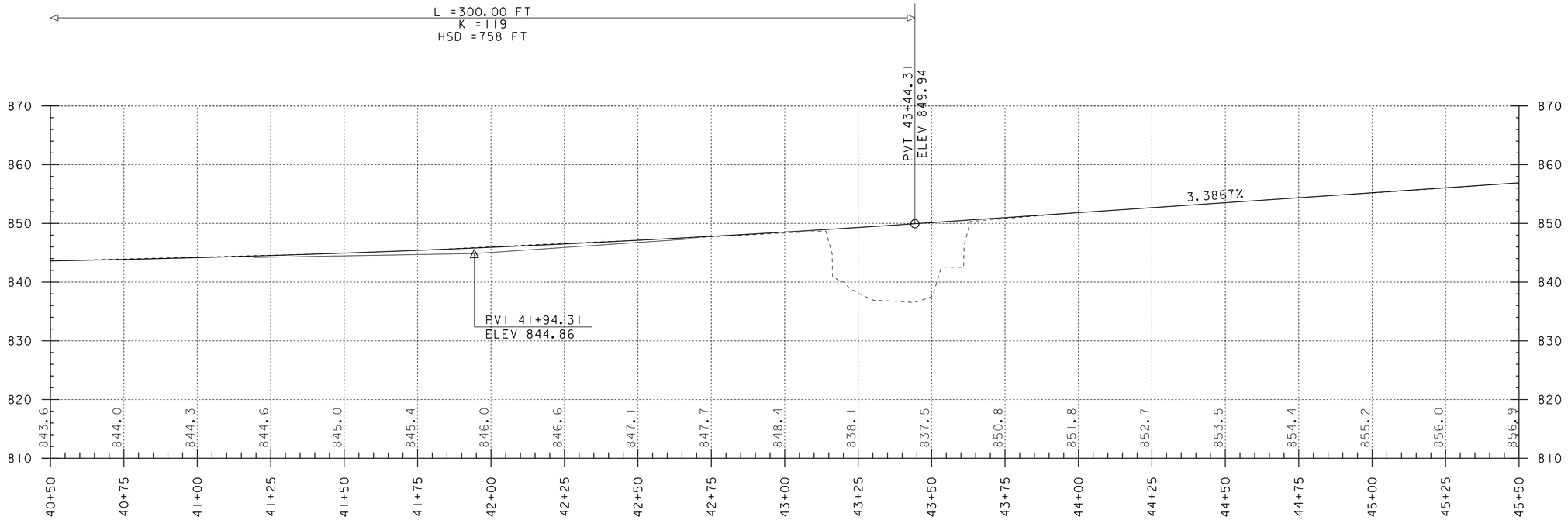
COMB 52 91
COMB 53 2
COMB 54 93
COMB 62 94
SIGN #2525
SIGN #6936
SIGN VR107 (24K)
SIGN VD-701 VT 12
SIGN D3-1 (BARNARD RD/VT12)
SIGN D3-1 (N BRIDGEWATER RD)
SIGN D1-1
SIGN #2508
MAILBOX #2508
MAILBOX #2540
MAILBOX #2558
RAIL FENCE
PAVED DRIVE
GRAVEL DRIVE
FIELD DRIVE
ARTESIAN WELL
POST
GUY
ARCH
HVCTRL 101
HVCTRL 102
HVCTRL 100
HVCTRL 110
D1
18" RCP FLOW
12" CMP FLOW
18" CMP FLOW
PIPE FLOW
HISTORIC

EXISTING BRIDGE INFORMATION
SINGLE SPAN CONCRETE T-BEAM
BUILT 1938
49′-0″ LONG X 33′-6″ WIDE

EXISTING CONDITIONS

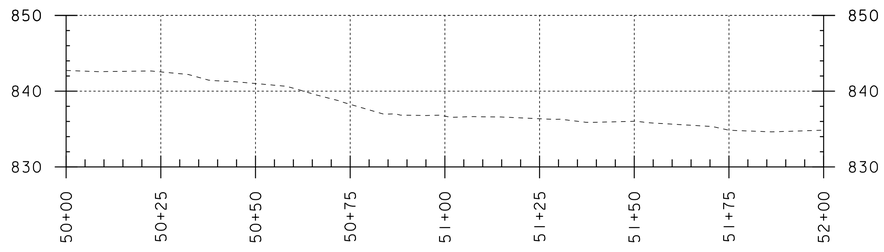
SCALE 1″ = 20′-0″
20 0 20

PROJECT NAME:	WOODSTOCK
PROJECT NUMBER:	BF024I(44)
FILE NAME: I3c272/sI3c272border.dgn	PLOT DATE: 26-MAR-2018
PROJECT LEADER:	DRAWN BY: K.B.YELINEK
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS	SHEET 1 OF 10



VT ROUTE 12 EXISTING PROFILE

SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"



CHANNEL PROFILE

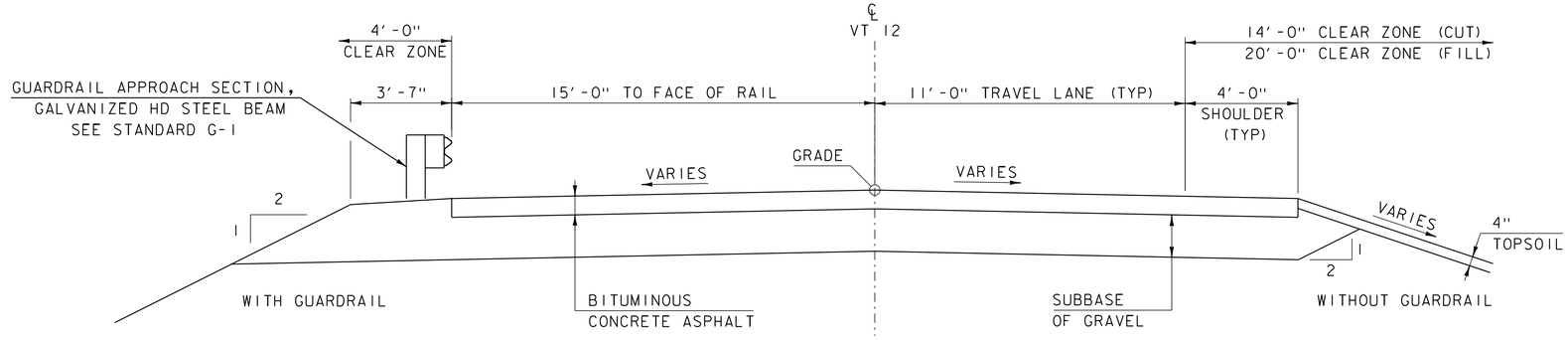
SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

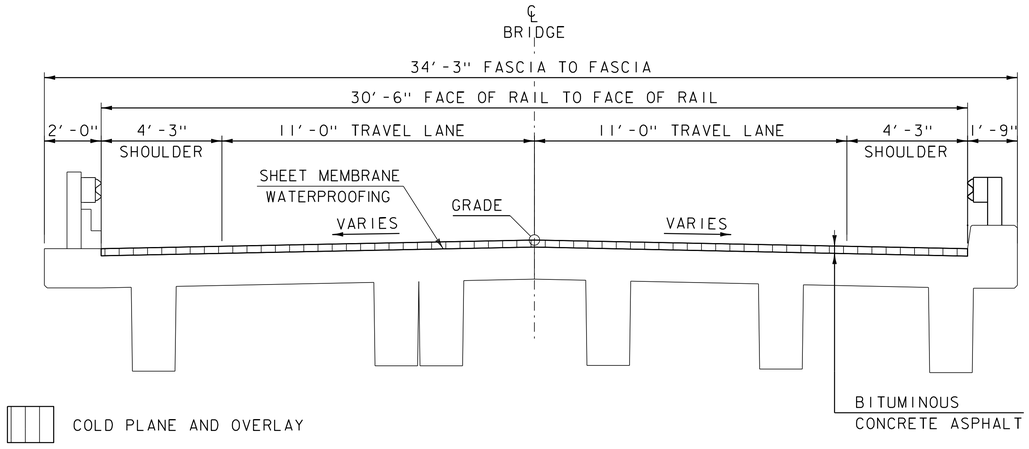
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME:	WOODSTOCK
PROJECT NUMBER:	BF 0241(44)
FILE NAME: l3c272/sl3c272profile.dgn	PLOT DATE: 26-MAR-2018
PROJECT LEADER:	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PROFILE SHEET	SHEET 2 OF 10



PROPOSED VT 12 TYPICAL SECTION

SCALE 3/8" = 1'-0"



FLOW

ALTERNATIVE 1 PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

MATERIAL TOLERANCES

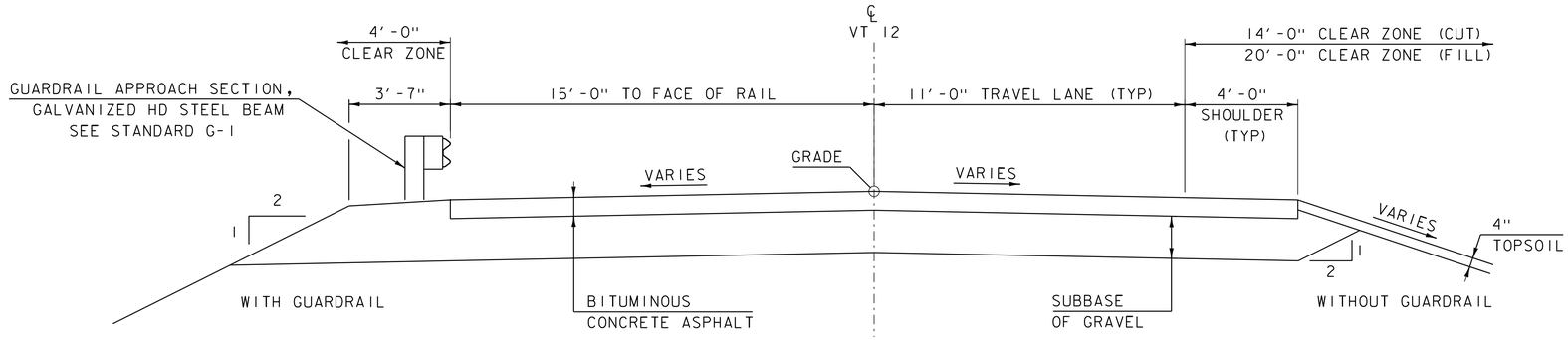
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: WOODSTOCK
PROJECT NUMBER: BF 0241(44)

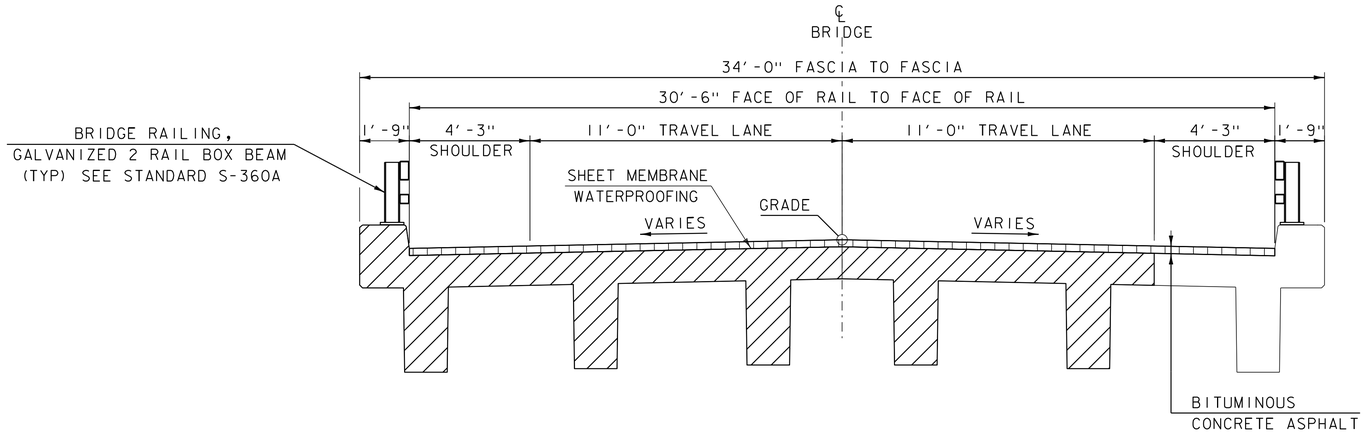
FILE NAME: 13c272\sl3c272typical.dgn
PROJECT LEADER:
DESIGNED BY: ----------
ALTERNATIVE 1 PROPOSED TYPICALS

PLOT DATE: 26-MAR-2018
DRAWN BY: K.B.YELINEK
CHECKED BY: ------



PROPOSED VT 12 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATIVE 2 PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

MATERIAL TOLERANCES

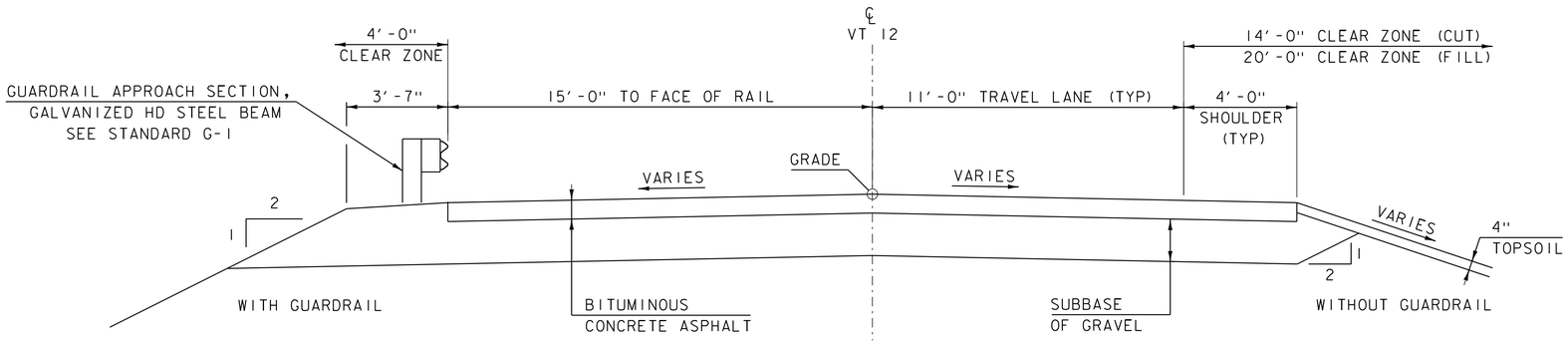
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: WOODSTOCK
PROJECT NUMBER: BF 0241(44)

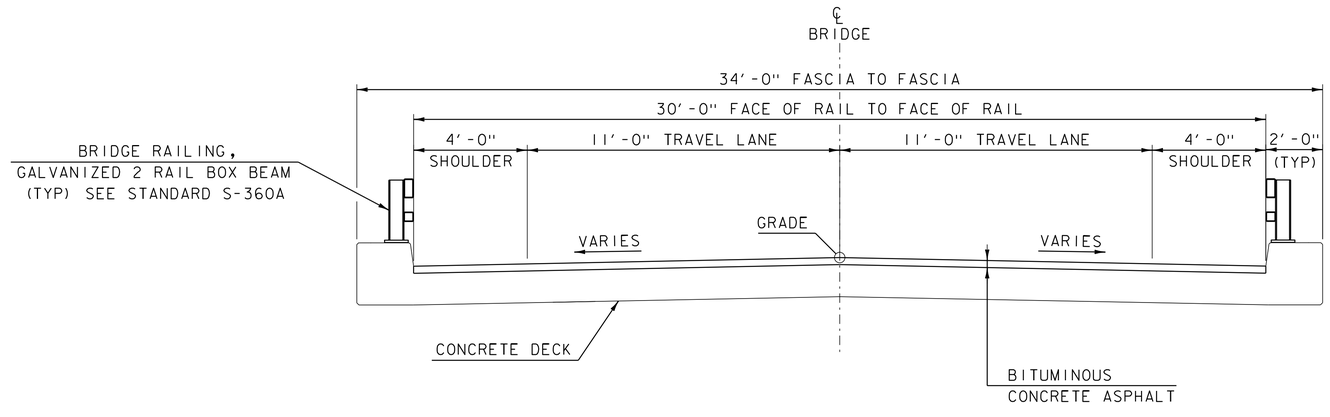
FILE NAME: 13c272\sl3c272typical.dgn
PROJECT LEADER:
DESIGNED BY: ----------
ALTERNATIVE 2 PROPOSED TYPICALS

PLOT DATE: 26-MAR-2018
DRAWN BY: K.B.YELINEK
CHECKED BY: ------



PROPOSED VT 12 TYPICAL SECTION

SCALE 3/8" = 1'-0"



ALTERNATIVE 3 PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

MATERIAL TOLERANCES

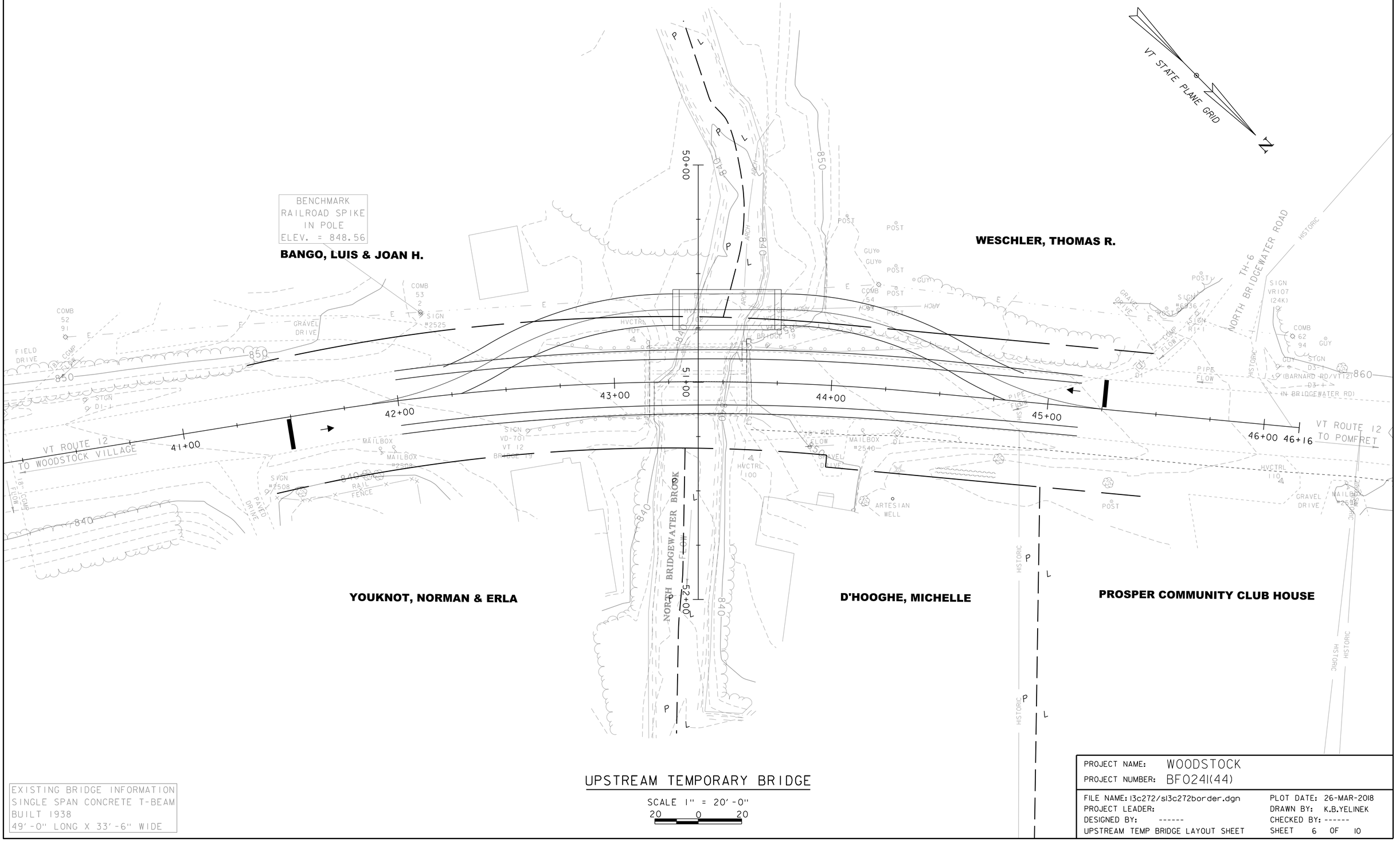
(IF USED ON PROJECT)

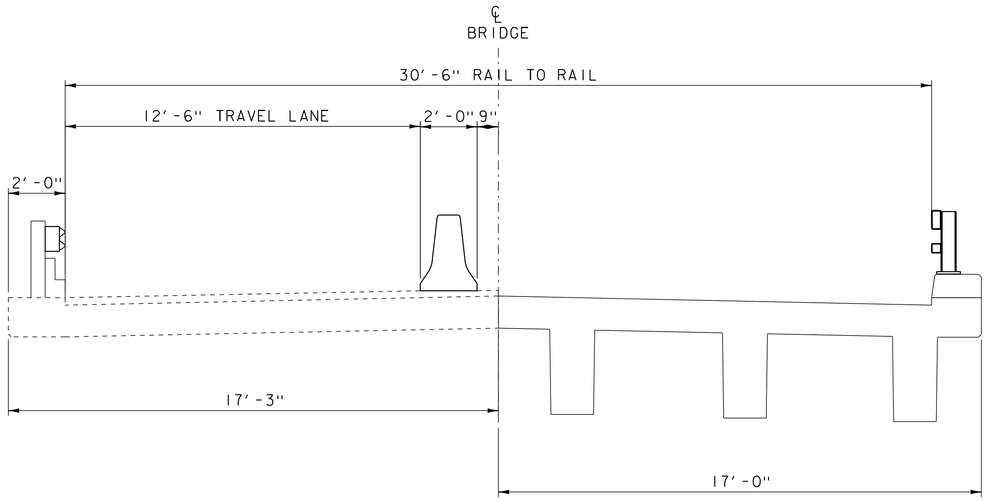
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: WOODSTOCK
PROJECT NUMBER: BF 0241(44)

FILE NAME: 13c272\sl3c272typical.dgn
PROJECT LEADER:
DESIGNED BY: ----------
ALTERNATIVE 3 PROPOSED TYPICALS

PLOT DATE: 26-MAR-2018
DRAWN BY: K.B.YELINEK
CHECKED BY: ------

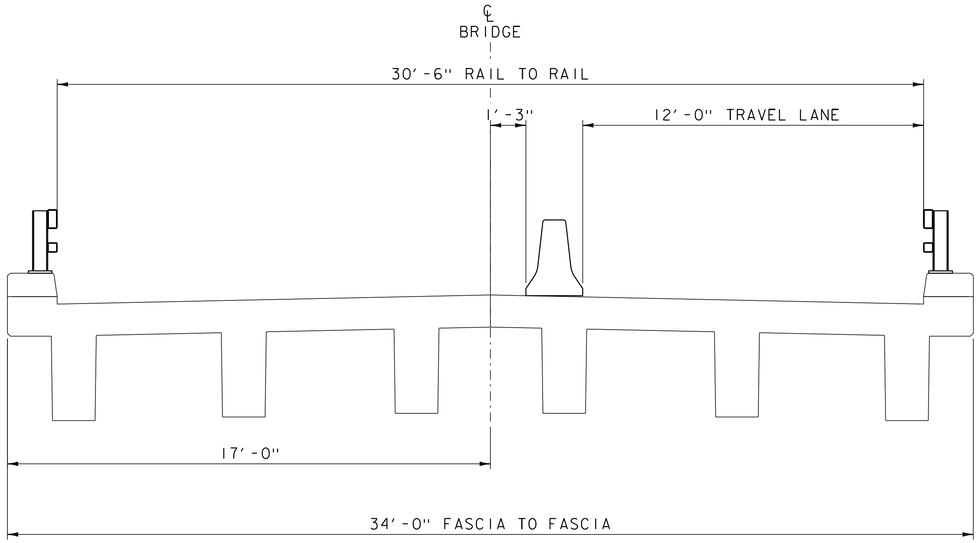

VT STATE PLANE GRID
N
BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. = 848.56
BANGO, LUIS & JOAN H.
WESCHLER, THOMAS R.
YOUKNOT, NORMAN & ERLA
D'HOOGHE, MICHELLE
PROSPER COMMUNITY CLUB HOUSE
VT ROUTE 12
TO WOODSTOCK VILLAGE
VT ROUTE 12
TO POMFRET
TH-6
NORTH BRIDGEWATER ROAD
(BARNARD RD/VT12)
(N BRIDGEWATER RD)
NORTH BRIDGEWATER BROOK
BRIDGE 19
41+00
42+00
43+00
44+00
45+00
46+00
46+16
50+00
51+00
52+00
840
850
860
HISTORIC
GRAVEL DRIVE
PAVED DRIVE
FIELD DRIVE
MAILBOX #2508
MAILBOX #2509
MAILBOX #2540
SIGN #2525
SIGN #2508
SIGN #2536
SIGN VD-701 VT 12 BRIDGE 19
SIGN VR107 (24K)
RAIL FENCE
ARTESIAN WELL
PIPE FLOW
HVCTRL 100
HVCTRL 110
COMB 52 91
COMB 53 2
COMB 54
COMB 62 94
POST
GUY
STGN D1-1
STGN D3-1
STGN R1-1
D1
D3
EXISTING BRIDGE INFORMATION
SINGLE SPAN CONCRETE T-BEAM
BUILT 1938
49'-0" LONG X 33'-6" WIDE
UPSTREAM TEMPORARY BRIDGE
SCALE 1" = 20'-0"
20 0 20
PROJECT NAME: WOODSTOCK
PROJECT NUMBER: BF024I(44)
FILE NAME: I3c272/sI3c272border.dgn
PROJECT LEADER:
DESIGNED BY: ------
UPSTREAM TEMP BRIDGE LAYOUT SHEET
PLOT DATE: 26-MAR-2018
DRAWN BY: K.B.YELINEK
CHECKED BY: ------
SHEET 6 OF 10



FLOW

PHASE 1

SCALE 3/8" = 1'-0"



FLOW

PHASE 2

SCALE 3/8" = 1'-0"

PROJECT NAME: WOODSTOCK
PROJECT NUMBER: BF 0241(44)

FILE NAME: 13c272\sl3c272typical.dgn
PROJECT LEADER:
DESIGNED BY: ----------
PHASING TYPICALS

PLOT DATE: 26-MAR-2018
DRAWN BY: K.B.YELINEK
CHECKED BY: ------
SHEET 7 OF 10

EXISTING CURVE DATA
DELTA = 14°34′26″
D = 5°12′31″
R = 1100.00′
T = 140.66′
L = 279.80′
E = 8.96′

VT STATE PLANE GRID

PI
STA 50+00.00

POB
STA 50+00.00

PI
STA 43+02.40

PC
STA 41+61.74

PT
STA 44+41.54

POE
STA 46+16.29

PI
STA 52+00.00

POE
STA 52+00.00

N 54°27′34″ W

N 39°53′08″ W

VT ROUTE 12
TO WOODSTOCK VILLAGE

VT ROUTE 12
TO POMFRET

NORTH BRIDGEWATER BROOK

TH-6
NORTH BRIDGEWATER ROAD

BRIDGE 19

ALTERNATIVE 3 LAYOUT - PHASE I

SCALE 1" = 20′-0"
20 0 20

PROJECT NAME:	WOODSTOCK
PROJECT NUMBER:	BF0241(44)
FILE NAME: l3c272/sl3c272border.dgn	PLOT DATE: 26-MAR-2018
PROJECT LEADER:	DRAWN BY: K.B.YELINEK
DESIGNED BY: ------	CHECKED BY: ------
PHASE I LAYOUT SHEET	SHEET 8 OF 10

EXISTING CURVE DATA
DELTA = 14°34'26"
D = 5°12'31"
R = 1100.00'
T = 140.66'
L = 279.80'
E = 8.96'

VT STATE PLANE GRID

PI
STA 50+00.00

POB
STA 50+00.00

PI
STA 43+02.40

PC
STA 41+61.74

PT
STA 44+41.54

POE
STA 46+16.29

PI
STA 52+00.00

POE
STA 52+00.00

N 54°27'34" W

N 39°53'08" W

VT ROUTE 12
TO WOODSTOCK VILLAGE

VT ROUTE 12
TO POMFRET

NORTH BRIDGEWATER ROAD

NORTH BRIDGEWATER BROOK

BRIDGE 19

ALTERNATIVE 3 LAYOUT - PHASE 2

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	WOODSTOCK
PROJECT NUMBER:	BF0241(44)
FILE NAME: l3c272/sl3c272border.dgn	PLOT DATE: 26-MAR-2018
PROJECT LEADER:	DRAWN BY: K.B.YELINEK
DESIGNED BY: ------	CHECKED BY: ------
PHASE 2 LAYOUT SHEET	SHEET 9 OF 10

EXISTING CURVE DATA
DELTA = 14°34′26″
D = 5°12′31″
R = 1100.00′
T = 140.66′
L = 279.80′
E = 8.96′

PI
STA 50+00.00

POB
STA 50+00.00

PI
STA 43+02.40

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. = 848.56

BANGO, LUIS & JOAN H.

WESCHLER, THOMAS R.

VT STATE PLANE GRID

N

COMB 52 91
COMB 53 2
COMB 54 93
COMB 62 94
SIGN #2525
SIGN VD-701 VT 12 BRIDGE 19
SIGN VR107 (24K)
SIGN #6936
SIGN D3-1 (BARNARD RD/VT12)
SIGN D3-1 (N BRIDGEWATER RD)
SIGN D1-1
SIGN #2508
HVCTRL 101
HVCTRL 102
HVCTRL 100
HVCTRL 110
BRIDGE 19
GUY
POST
ARCH
GRAVEL DRIVE
FIELD DRIVE
PAVED DRIVE
MAILBOX #2508
MAILBOX #2540
MAILBOX #2558
RAIL FENCE
ARTESIAN WELL
18" RCP FLOW
12" CMP FLOW
PIPE FLOW
D1
TH-6 NORTH BRIDGEWATER ROAD
HISTORIC

43+00
42+00
44+00
45+00
41+00
46+00
46+16
50+00
51+00
52+00

N 54°27′34″ W
N 39°53′08″ W

VT ROUTE 12
TO WOODSTOCK VILLAGE

VT ROUTE 12
TO POMFRET

PC
STA 41+61.74

PT
STA 44+41.54

POE
STA 46+16.29

NORTH BRIDGEWATER BROOK
FLOW

YOUKNOT, NORMAN & ERLA

PI
STA 52+00.00

POE
STA 52+00.00

VHOOGHE, MICHELLE

PROSPER COMMUNITY CLUB HOUSE

PROPOSED LAYOUT

SCALE 1" = 20′-0"
20 0 20

PROJECT NAME:	WOODSTOCK
PROJECT NUMBER:	BF024I(44)
FILE NAME: I3c272/sI3c272border.dgn	PLOT DATE: 26-MAR-2018
PROJECT LEADER:	DRAWN BY: K.B.YELINEK
DESIGNED BY: ------	CHECKED BY: ------
PROPOSED LAYOUT SHEET	SHEET 10 OF 10