STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

STATEWIDE NORTHWEST STP CULV(90): JERICHO VT15 BR #6A

VT ROUTE 15, BRIDGE 6A OVER UNNAMED BROOK

October 9, 2023

Table of Contents

I. Site Information

Bridge 6A is a State-owned bridge located on VT Route 15 in the Town of Jericho approximately 2.9 miles westbound of the VT Route 128 intersection with VT Route 15. 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	Principal Arterial
Bridge Type	Asphalt Coated Corrugated Galvanized Multi Plate Pipe (ACCGMPP)
Culvert Span	6 feet
Culvert Length	66 feet
Average Cover	5 feet
Year Built	Unknown
Ownership	State of Vermont

Need

Bridge 6-A carries VT Route 15 across an unnamed brook. The following is a list of deficiencies of Bridge 6-A and VT Route 15 in this location:

1. The culvert is in Poor condition:
    a. The heavy rust scaling and pitting has led to small perforations along the haunches in the first half of the barrel.
    b. Moderate distortion throughout the pipe has allowed for small gaps along connection joints leading to minor piping.
    c. The majority of the invert is covered with gravel, what can be seen is in poor condition.
2. VT Route 15 has substandard shoulder widths along the VT Route 15 corridor through the project area.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2027 and 2047.

TRAFFIC DATA	2027	2047
AADT	9,554	10,482
DHV	1,100	1,200
%T	6.2	8.7
%D	67	67
ADTT	788	1,213
Flexible ESALS:	**2027~2047**	**2027~2067**
	4,243,000	9,712,000

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 10,482, a DHV of 1,200, and a design speed of 35 mph for a Principal Arterial.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 3.3	11'/4' (30')	11'/8' (38')	Substandard shoulder width
Clear Zone Distance	VSS Table 3.4	No Issues Noted	16' fill / 14' cut	
Banking	VSS Section 3.13	Superelevated 0.8% - 4%	8% (max)	
Speed	VSS Section 3.3	35 mph (Posted)	35 mph (design)	
Horizontal Alignment	AASHTO Green book Table 3-10b	R = 14,692 ft	R_{min} = 1370' @ 4.0%	
Vertical Grade	VSS Table 3.5	-2.5%	6% (max) for level terrain	
K Values for Vertical Curves	AASHTO Table 3-37	K_{sag} = 157	29 crest / 49 sag	
Vertical Clearance	VSS Section 3.8	No Issues Noted	14'-3" (min)	
Stopping Sight Distance	AASHTO Table 3-37	1,731'	250'	
Bicycle/Pedestrian Criteria	VSS Table 3.8	4' shoulder	3' Shoulder	Meets Minimum Standards
Hydraulics	VTrans Hydraulics Section	HW/D @ 2% AEP = 0.19 HW/D @ 1% AEP = 0.21 Span: 6 feet	HW/D < 1.2 @ 2% AEP HW/D < 1.5 @ 1% AEP Minimum design span diameter: 2.5 feet	Meets Minimum Standards
Structural Capacity	SM, Ch. 3.4.1	Poor Rated Culvert	Design Live Load: HL-93	Substandard

Inspection Report Summary

Culvert Rating 4 Poor
Channel Rating 7 Good

11/28/2022 Asphalt Coated Corrugated Galvanized Multi Plate Pipe (ACCGMPP) is in poor condition having heavy corrosion with small perforations starting to form along the invert with small buildup of sediment / debris present. Heavy squashing / distortion is present below roadway. Pipe should be considered for replacement in the near future. Structure has heavy corrosion and should be considered for replacement. ~SP

11/27/2018 Heavy rust scaling and pitting has led to small perforations along the haunches in first half of barrel. Moderate distortion throughout has allowed for small gaps along connection joints leading to minor piping. Majority of invert is covered with gravel, what can be seen is in poor condition. ~ AC

Hydraulics

The existing structure meets the current hydraulic standards of the VTrans hydraulic manual. ANR agreed with VTrans Hydraulics that this appears to be an intermittent stream and Aquatic Organism Passage (AOP) is not required for this project. This structure results in a headwater depth of 1.2 feet at 2% AEP and 1.3 feet at 1% AEP. VTrans Hydraulics has made several recommendations for

rehabilitation of this structure; these options are outlined in the preliminary hydraulics report in Appendix D.

Utilities

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

Aerial:

- Comcast
- Consolidated Communications
- Green Mountain Power

Underground:

- Jericho Village Water System
- Vermont Gas Systems

The aerial lines and underground water and gas lines run parallel to VT Route 15 on the north side of the roadway. It is anticipated that aerial and underground utilities may need to be relocated or stabilized for select maintenance of traffic options or if a replacement alternative is chosen.

Right Of Way

The existing Right-of-Way is plotted on the Existing Conditions Layout Sheet. The existing culvert is located outside of the State-owned Right-of-Way. As such, any construction alternative will require additional Right-of-Way.

Environmental and Cultural Resources

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

Biological:

Wetlands/Floodplains

There are wetland complexes mapped on the outlet end (south side of VT Route 15) of the culvert within the study area. For additional information, see the Existing Conditions Layout Sheet and the Natural Resources Memo in Appendix G.

Rare, Threatened, and Endangered Species

There were no mapped cases or historic occurrences of rare, threatened, and endangered (RTE) plants or animal species in the vicinity of the project site.

Wildlife Habitat

The Vermont Conservation Design database on the Vermont Agency of Natural Resources BioFinder Mapping Tool was reviewed to assess landscape scale wildlife habitat. None of the wildlife habitat components were identified as priority or highest priority within the study area.

Archeological:

The VTrans Senior Archaeology conducted a resource identification field visit in the summer of 2022, and found one area of archeological sensitivity to the south located on an outwash plain above a floodplain of the Winooski River. This area seems as though it could be easily avoided during construction and has been added to project plans.

Historic:

Bridge 6A is not historic. This structure is a common corrugated metal pipe that is not historically significant. If work is confined to the existing ROW, there will likely be no other buildings, structures, or objects within a project APE.

Hazardous Materials:

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are no hazardous waste sites located in the project area.

Stormwater:

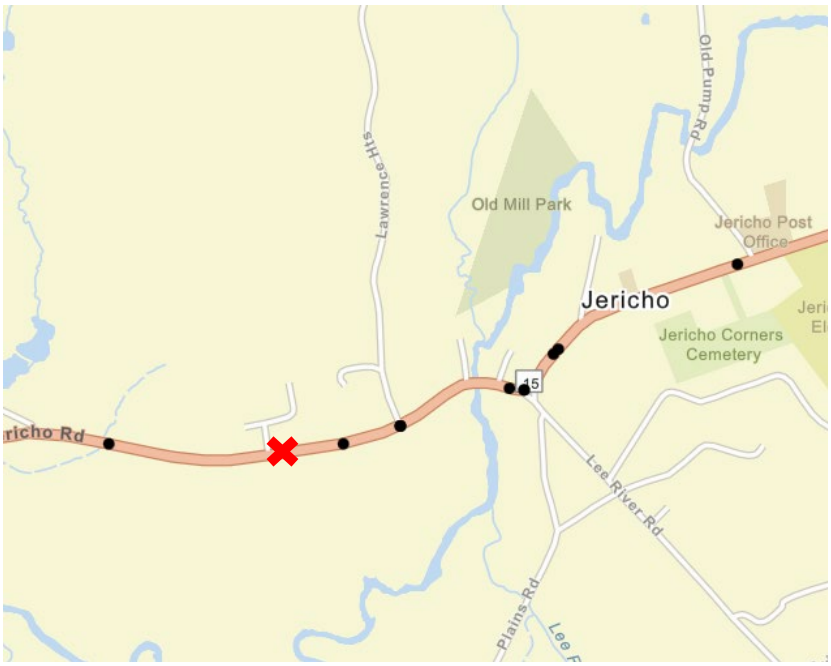
There do not appear to be any existing stormwater permits immediately adjacent to the project site and there are no noteworthy stormwater regulatory concerns. It is encouraged that drainage work associated with this project, particularly around any ditching and culvert work, be aligned with the VTrans Phosphorus Control Highway Drainage Management Standards, as this may allow future credit toward achieving phosphorus reduction goals required by the Agency's TS4 permit.

Landscape Clearance

The VTrans landscape architect conducted a resource identification study on April 18th, 2022, and determined that there are potentially minor buffer impacts occurring as a result of the proposed work. It is recommended that re-vegetating the area with native trees and shrubs for river buffers, willow fascines or live stakes (depending on soil conditions at the waters' edge), and a diverse pollinator seed mix.

II. Safety

There have been 34 crashes along VT Route 15 in Jericho in the last five-year period. 8 of those crashes were within approximately 0.5 mile the project area. The structure is not located within a designated high crash location section.



III. Local Concerns

A local concerns questionnaire was sent to the Town. No response has been received to date. There is a copy of the questionnaire in Appendix N.

IV. Operations Concerns

An Operations questionnaire was sent to the VTrans maintenance District 5. No response has been received to date. There is a copy of the questionnaire in Appendix O.

V. Maintenance of Traffic

The Vermont Agency of Transportation has created an 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 helps 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 early. 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 Construction should provide enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Option 1: Off-Site Detour

This option would close the bridge and reroute VT Route 15 traffic onto a signed detour route. The regional detour route would detour traffic from VT 15, to VT 104, to VT 128, back to VT 15. See detour distance information below:

- End-to-End Distance = 34.1 miles
- Through Route Distance = 16.1 miles
- Detour Route Distance = 18.0 miles
- Added Distance = 1.9 miles

There are multiple local bypass routes available that have shorter end-to-end distances compared to the State detour route. The local bypass routes available that local traffic will likely take if Bridge 6A is closed is as follows:

1. From VT 15, to Weed Road, to Sleepy Hollow Road, to Old Pump Road, back to VT 15 (4.6 miles end-to-end).

2. From VT 15, to Lee River Road, to Plains Road, to Skunk Hollow Road, to River Road/VT 117, to Sand Hill Road, Allen Martin Drive, to Jericho Road/VT 15 (8.6 miles end-to-end).

A map of the detour routes can be found in Appendix P.

Advantages: This option would not require the need to obtain rights from adjacent property owners for a temporary bridge. Also, this option would have minimal impacts to natural resources downstream of the bridge. This option reduces the time and cost of the project both at the development stage and construction. This is the safest traffic control option since the traveling public is removed from the construction site.

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

Option 2: Phased Construction

Phased construction is the maintenance of 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 must be performed multiple times. In addition to the increased design and 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. Another negative aspect of phased construction is the decreased safety of the workers and vehicular traffic, which is caused by increasing the proximity and extending the duration that workers and moving vehicles are operating in the same confined space. 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 AADT and DHV of 9,554 veh/day and 1,100 veh/hr respectfuly, 2-way traffic would need to be maintained at all times. In a high travel corridor like VT 15, maintaining traffic with phased construction will cause considerable delays and extend the duration of the project.

Advantages: Two-way traffic flow would be maintained through the project corridor during construction. Also, this option would have minimal impacts to adjacent properties and environmental resources. Right-of-Way would not be required for this maintenance of traffic option.

Disadvantages: Phased construction generally involves higher costs and complexity of construction. Costs are usually higher and construction duration is longer since many construction activities must be performed two times. Because this corridor has such high traffic volumes there would be increased traffic delays and backups around the project area. Additionally, since cars are traveling near construction activity, there is decreased safety.

Option 3: Temporary Bridge

From a constructability standpoint, a temporary bridge could be placed upstream or downstream of the existing structure. With the Mountain View Road intersection with VT Route 15 very close to the inlet of Bridge 6A, a temporary bridge on the upstream (northwestern) side of the road may be more challenging to construct. There are also aerial and underground utilities on the northbound side of the roadway that would need to be relocated for a temporary bridge on the upstream side. A temporary bridge on the downstream side of the culvert would require tree clearing and may have impacts to possible wetlands and cultural resources.

Additional costs would be incurred to construct a temporary bridge, including the cost of fill for the approaches and the bridge itself, installation and removal of the temporary bridges and approaches, restoration of the disturbed area, and the time and money associated with the temporary Right-of-Way.

If a temporary bridge is chosen as the preferred method of traffic control, based on the traffic volumes, it should be a two-lane bridge. See the Temporary Bridge Layout Sheets in Appendix Q.

Advantages: Traffic flow can be maintained along the VT Route 15 corridor.

Disadvantages: This option would have adverse impacts to surrounding wetlands and archaeologically sensitive areas. There would be decreased safety for 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 more costly, and time consuming, than an offsite detour. Additional Right-of-Way would need to be acquired for a temporary bridge either up or downstream.

VI. Alternatives Discussion

No Action

This alternative is not recommended. The culvert is in poor condition and will continue to deteriorate if no action is taken. The pipe has heavy corrosion with small perforations starting to form along the invert with small build up of sediment and debris present. The pipe is also beginning to become squashed/distorted below the roadway which can lead to settlement in the pavement. In

the interest of safety to the traveling public, the No Action alternative is not recommended. No cost estimate has been provided for this alternative since there are no immediate costs.

Alternative 1: Rehabilitation

This alternative involves the rehabilitation of the Asphalt Coated Corrugated Galvanized Multi Plate Pipe.

Rehabilitation options considered:

a. Pipe Liner
b. Spray on Liner

All rehabilitation options would employ the use of hydroblasting or hydrodemolition to appropriately clean the existing pipe interior prior to rehabilitation. In addition to cleaning, some grouting would be needed to plug holes in the pipe and fill all voids on the outside of the pipe.

a. Pipe Liner:

A pipe liner involves inserting a culvert liner into the existing culvert, and grouting between the two. Sliplining can be done using several different types of pipe material including corrugated steel, aluminum, reinforced concrete, and polyethylene, and can restore the structural integrity of the culvert. The outside diameter of the pipe used for sliplining is generally specified to be at least 4-inches smaller than the inside diameter of the host pipe to allow the grout to be injected into the annular space between the two pipes. The reduced waterway would likely still meet the minimum hydraulic standard. A liner option is anticipated to have the longest life expectancy of the rehabilitation alternatives, since the grout provides an increased structural capacity, prevents liner collapse, prevents fatigue failure, stabilizes the pipe, extends the design life from uncertainty to at least 50 years, and resists temperature changes.

For this project, a slip liner with a minimum inner diameter of 4-feet would provide a headwater to depth ratio (HW/D) of 0.31 and 0.35 during the design and check storm event, with headwater depths of 1.2-ft and 1.4-ft were determined during the design and check storm event, respectively.

b. Spray-On Liners

Spray-On liners provide a new rigid interior surface for the pipe and use either cementitious materials (polymer-enhanced cement mortar) or polyurea. These liners are spray applied either by hand or machine, although some users have had better quality control with hand-applied methods. Cementitious liners installed by these methods can provide full structural support, depending on thickness applied. Proper curing is essential to using spray-on liners to avoid bond failures. There could be water quality impacts associated with the application of these liners, their degree of impact related to selection of materials, and adherence to curing requirements. If a spray-on liner is selected, the polymer-enhanced cement mortar is recommended for environmental and safety reasons. Temporary Right-of-Way would need to be acquired to provide a staging area at each end to accomplish this alternative.

Advantages: A repair alternative would address the ongoing pipe distortion and deterioration issues with the invert of the existing culvert without affecting traffic flow, and with minimum upfront

costs. Additionally, it would have minimal impacts on resources and would meet the minimum hydraulic standards. A rehabilitation would avoid the need to relocate underground water and gas lines as well as aerial utilities.

Disadvantages: The rehabilitation alternative is only a repair and not a new structure. The life span of the repair work is estimated to be 30 to 50 years. It is assumed that for any rehabilitation alternative, temporary right-of-way will be necessary for the contractor's access to the ends of the culvert.

Maintenance of Traffic: The rehabilitation alternative has minimal effect on traffic. Traffic will remain open during the duration of the project, with the exception of intermittent lane closures for some construction activities.

Alternative 2: Structure Replacement Using Open Cut

This option involves removing the existing Asphalt Coated Corrugated Galvanized Metal Plate Pipe and replacing it with a corrugated polyethylene pipe with a minimum span of 3-ft. Since there is approximately 5 feet of fill above the existing culvert, there would not be a considerable amount of earthwork required to replace the structure. If this alternative is considered, the existing roadway width and alignment would be reconstructed to match existing conditions.

The existing 6-foot diameter structure exceeds the required hydraulic capacity for the intermittent stream it carries. For this reason, the Hydraulics team recommended replacement options that are smaller in size to the existing structure. The Hydraulics team recommended a new culvert with a minimum diameter of 3 feet to replace the existing structure.

Advantages: This alternative would address the structural deficiencies of the existing culvert, with a brand-new culvert with a 75-year design life. This option would meet the minimum hydraulic standards. This option would have minimal future maintenance costs.

Disadvantages: This option has higher upfront costs compared to the rehabilitation options. Open cutting this structure to replace it would significantly increase the construction duration of the project and would have impacts on traffic and natural resources.

Maintenance of Traffic: Either an off-site detour, phased construction, or a temporary bridge would be appropriate measures for traffic control at this site. This alternative has the most impact on traffic out of all options considered.

VII. Alternatives Summary

Based on the existing site conditions, culvert condition, and recommendations from hydraulics and others, the following alternatives are offered:

- Alternative 1a: Culvert Rehabilitation Using a Slip Liner with Traffic Maintained on Existing Culvert
- Alternative 1b: Culvert Rehabilitation Using a Spray-On Liner with Traffic Maintained on Existing Culvert
- Alternative 2a: Structure Replacement Using Open Cut with Traffic Maintained on Offsite Detour
- Alternative 2b: Structure Replacement Using Open Cut with Traffic Maintained with Phased Construction
- Alternative 2c: Structure Replacement Using Open Cut with Traffic Maintained on a Temporary Bridge

A cost evaluation for each of the alternatives is shown below.

VIII. Cost Matrix[1]

Jericho VT15 Br6A		Do Nothing	Alternative 1		Alternative 2		
			Culvert Rehabilitation		Culvert Replacement using Open Cut Method		
			On-Alignment		On-Alignment		
			a. Slip Liner	b. Spray-On Liner	a. Off-site Detour	b. Phased Construction	c. Temporary Bridge
COST	Structure Cost	$0	$94,942	$112,332	$264,289	$303,932	$264,289
	Removal of Structure	$0	$39,600	$39,600	$39,600	$45,540	$39,600
	Roadway	$0	$132,852	$139,808	$400,665	$575,955	$400,665
	Maintenance of Traffic	$0	$279,040	$279,040	$323,300	$734,100	$529,040
	Construction Costs	$0	$546,434	$570,780	$1,027,854	$1,659,528	$1,233,594
	Construction Engineering & Contingencies	$0	$191,252	$199,773	$256,963	$414,882	$308,398
	Accelerated Premium	$0	$0	$0	$0	$0	$0
	Total Construction Costs w CEC	$0	$737,686	$770,553	$1,284,817	$2,074,410	$1,541,992
	Preliminary Engineering	$0	$163,930	$171,234	$256,963	$414,882	$308,398
	Right of Way	$0	$10,000	$10,000	$10,000	$35,000	$60,000
	Total Project Costs	$0	$911,617	$951,787	$1,551,780	$2,524,292	$1,910,390
	Annualized Costs	$0	$18,300	$31,800	$20,700	$33,700	$25,500
TOWN SHARE	No Local Share						
TOWN %							
SCHEDULEING	Project Development Duration	N/A	2 years	2 years	4 years	4 years	4 years
	Construction Duration	N/A	4 months	4 months	6-8 months	8 months	8 months
	Closure Duration (If Applicable)	N/A	NA	NA	3 to 7 days	NA	NA
ENGINEERING	Typical Section - Roadway (feet)	No Change	32	32	32	32	32
	Geometric Design Criteria	No Change	Substandard shoulder widths		Substandard shoulder widths		
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No Change	No Change	No Change	No Change	No Change	No Change
	Bicycle Access	No Change	Meets Minimum Standards		Meets Minimum Standards		
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulics	No Change	Meets Minimum BFW and VTrans Hydraulic Standards		Meets Minimum BFW and VTrans Hydraulic Standards		
	Utilities	No Change	No Change	No Change	Requires aerial and underground relocation		
OTHER	ROW Acquisition	No Change	Yes	Yes	Yes	Yes	Yes
	Road Closure	No Change	No	No	Yes	No	No
	Design Life (years)	No Change	50	30	75	75	75

[1] Costs are estimates only, used for comparison purposes.

IX. Conclusion

Alternative 1a is recommended; to rehabilitate the existing culvert with a slip liner while traffic is maintained on the existing culvert during construction.

Structure:
The existing culvert is likely close to 90 years old and is rated in a poor condition having heavy corrosion with small perforations starting to form along the invert. The structure exceeds the required standards of the VTrans Hydraulic Manual and the requirements of bankfull width. The existing structure does not provide AOP which is not a requirement for future work done on this structure. Therefore, a rehabilitation of this structure is recommended as opposed to a replacement in order to reduce impacts to traffic.

Rehabilitation treatment options include culvert lining systems such as slip or spray-on liner systems. Considering the settlement occurring in the last third of the pipe length, we would likely not go with a spray on liner system since that method doesn't provide the additional strength we would need for this structure's future performance. A culvert slip liner system is the recommended rehabilitation option for this structure.

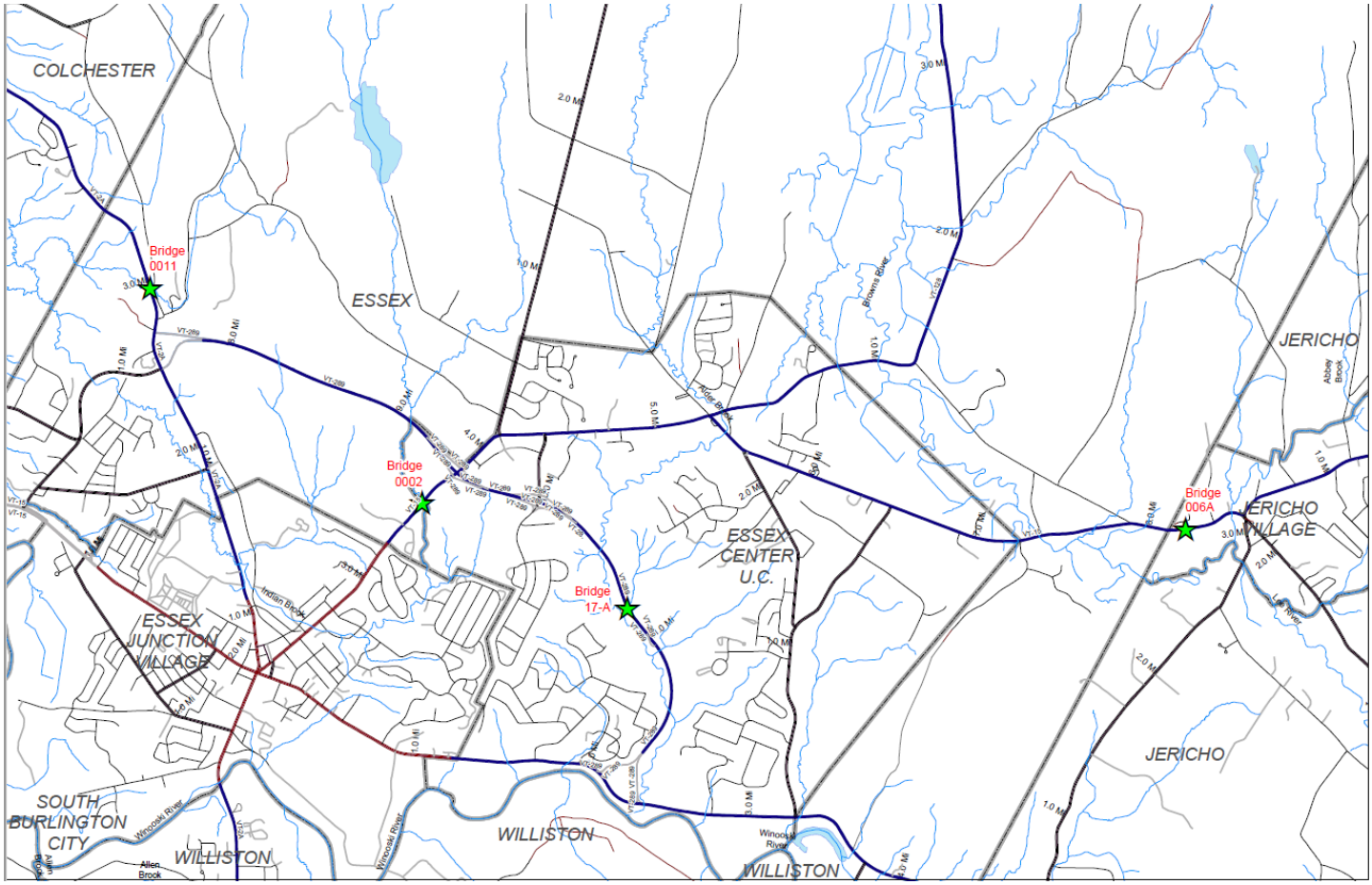
A slip liner with a minimum inner diameter of 4-feet would meet current hydraulic standards by providing a Headwater to Depth ratio (HW/D) of 0.31 and 0.35 during the design and check storm event, respectively.

Traffic Control:
Traffic will be maintained on the existing culvert and will not be significantly affected by the construction activities with the rehabilitation of this culvert. There may be occasional lane or shoulder closures in order to mobilize or demobilize construction equipment and manage truck traffic. Intermittent lane closures should not occur during the peak hours of traffic.

Statewide Northwest STP CULV(90) Bridge Locations:
There are several structures within the Statewide Northwest STP CULV(90) project. The structures are as follows:

- ESSEX VT 2A Bridge 11 over unnamed brook.
- ESSEX VT 15 Bridge 2 over Indian brook.
- ESSEX VT 289 Bridge 17-A over unnamed brook.
- JERICHO VT 15 Bridge 6A over unnamed brook.

These bridges are being bundled together for scoping, design and/or construction.



X. Appendices

- Appendix A: Site Pictures
- Appendix B: Town Map
- Appendix C: Bridge Inspection Report
- Appendix D: Hydraulics Memo
- Appendix E: Preliminary Geotechnical Information
- Appendix F: Resource Identification Completion Memo
- Appendix G: Natural Resources Memo
- Appendix H: Archeology Memo
- Appendix I: Historic Memo
- Appendix J: Environmental Specialist Resource ID
- Appendix K: Hazardous Sites Map
- Appendix L: Stormwater Resource ID
- Appendix M: Landscape Clearance Resource ID
- Appendix N: Local Input
- Appendix O: Operations Input
- Appendix P: Detour Map
- Appendix Q: Plans

Appendix A: Site Pictures

Eastern Approach (Inspection photo 2021)


Downstream Approach Rail (Inspection photo 2021)

Upstream Channel (Inspection photo 2021)

Western Upstream Invert Corrosion (Inspection photo 2021)

Eastern Upstream Invert Corrosion (Inspection photo 2021)

Eastern Invert Distortion/Corrosion (Inspection photo 2021)

Western Upstream Invert Corrosion (Inspection photo 2021)

Western Invert Corrosion (Inspection photo 2021)

Eastern Invert Corrosion (Inspection photo 2021)

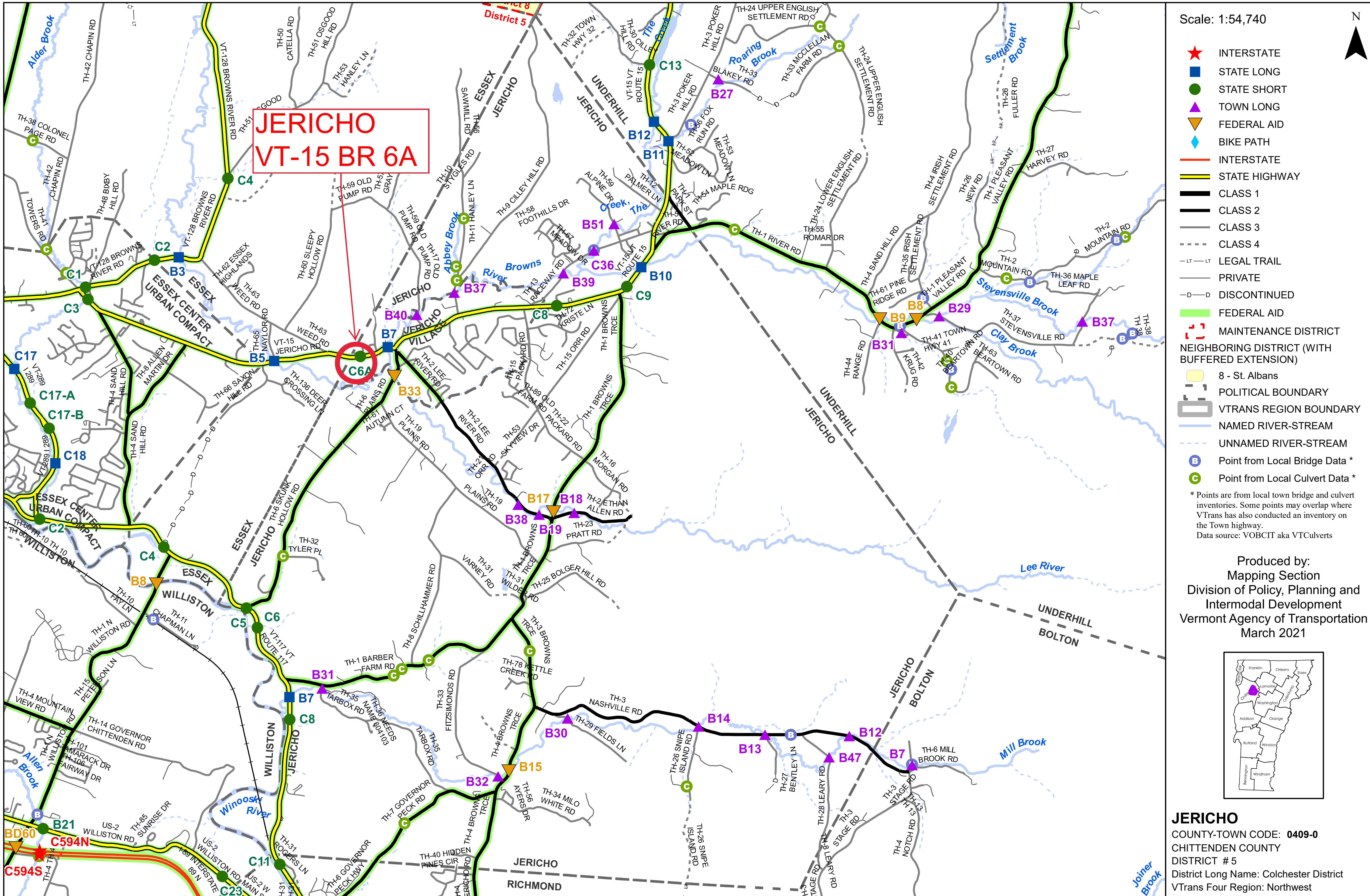
Eastern Wall (Inspection photo 2021)

Invert near Downstream (Inspection photo 2021)

Culvert looking Upstream (Inspection photo 2021)

Downstream Elevation (Inspection photo 2021)

Appendix B: Town Map



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

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Town: 109 - JERICHO

District 5, 7 - CHITTENDEN County

Owner:

Maintenance Responsibility: 1 - State Highway Agency

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
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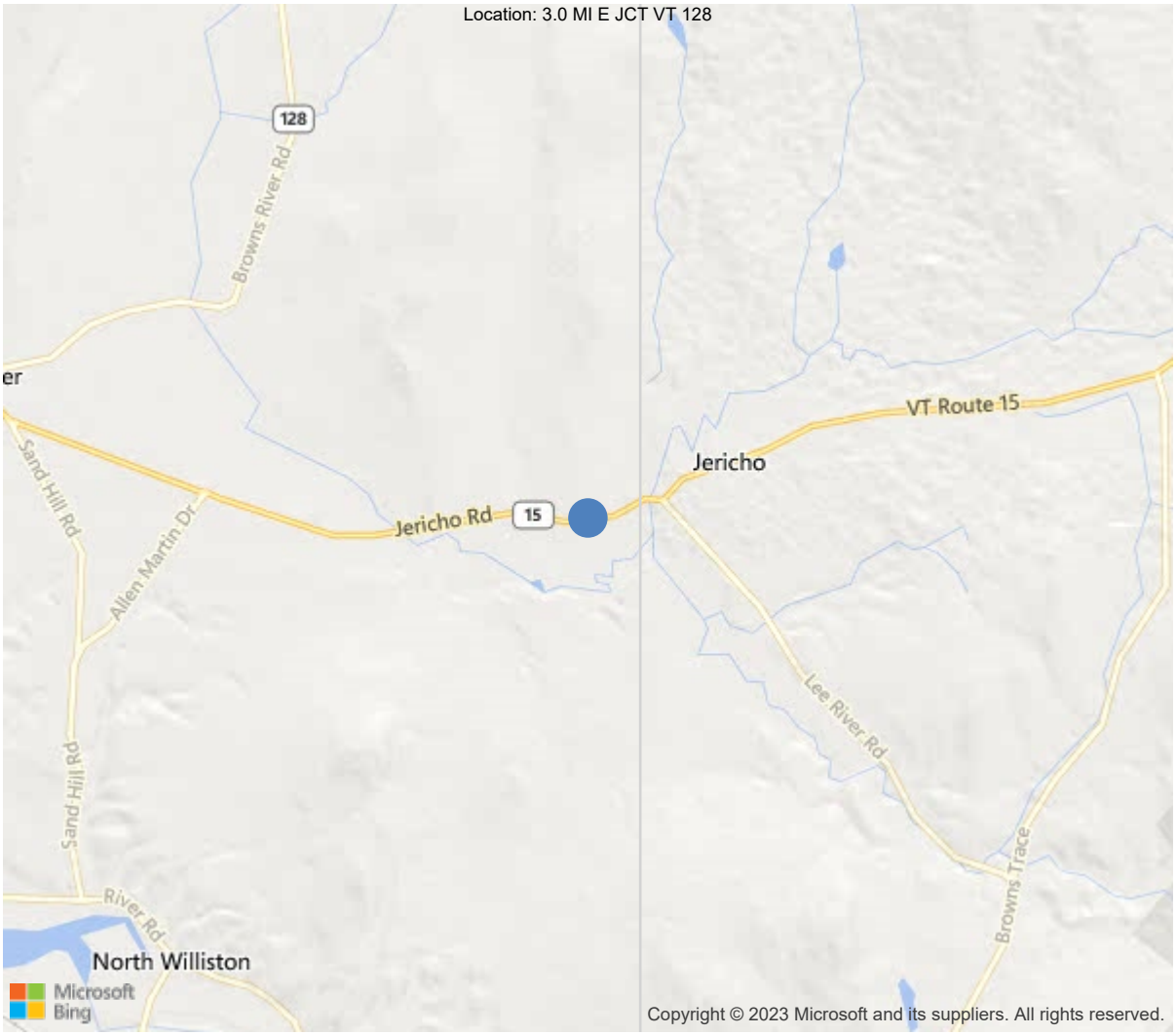

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VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK

Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

IDENTIFICATION	
(1) State Names	50 - Vermont
(8) Structure Number	300030006A04091
(5) Inventory Route	
(2) Highway Agency District	5 - District 5
(3) County Code	7 - CHITTENDEN
(4) Place Code	36700
(6) Features Intersected	BROOK
(7) Facility Carried	VT15
(9) Location	3.0 MI E JCT VT 128
(11) Mile Point	mi
(12) Base Highway Network	No
(13) LRS Inventory Rte & Subrte	
(16) Latitude	44.5028444444444
(17) Longitude	-73.0046138888889
(98) Border Bridge State Code	
(99) Border Bridge Structure No.	
STRUCTURE TYPE AND MATERIAL	
(43) Main Structure Type	319
Material	3 - Steel
Type	19 - Culvert
(44) Approach Structure Type	
Material	
Type	
(45) No. of Spans in Main Unit	1
(46) No. of Approach Spans	
(107) Deck Structure Type	N - Not applicable
(108) Wearing Surface/Protective System	
Type of Wearing Surface	N - Not applicable (applies only to stru
Type of Membrane	N - Not applicable (applies only to stru
Type of Deck Protection	N - Not applicable (applies only to stru
AGE AND SERVICE	
(27) Year Built	
(106) Year Reconstructed	
(42) Type of Service	15
On	1 - Highway
Under	5 - Waterway
(28) Lane	
On	2
Under	0
(29) Average Daily Traffic	12600
(30) Year of ADT	1996
(109) Truck ADT	%
(19) Bypass, Detour Length	3 mi
GEOMETRIC DATA	
(48) Length of Maximum Span	6 ft
(49) Structure Length	6 ft
(50) Curb or Sidewalk Width	
Left	0 ft
Right	0 ft
(51) Bridge Roadway Width Curb to Curb	0 ft
(52) Deck Width Out to Out	0 ft
(32) Approach Roadway Width (W/Shoulders)	29 ft
(33) Bridge Median	0 - No median
(34) Skew	0 Deg
(35) Structure Flared	
(10) Inventory Route Min Vert Clear	ft
(47) Inventory Route Total Horiz Clear	34 ft
(53) Min Vert Clear Over Bridge Rdwy	ft
(54) Min Vert Underclear	6 ft
Ref:	
(55) Min Lat Underclear RT	ft
Ref:	
(56) Min Lat Underclear LT	ft
NAVIGATION DATA	
(38) Navigation Control	
(111) Pier Protection	
(39) Navigation Vertical Clearance	ft
(116) Vert-Lift Bridge Nav Min Vert Clear	ft
(40) Navigation Horizontal Clearance	ft

CLASSIFICATION	
(112) NBIS Bridge Length	
(104) Highway System	
(26) Functional Class	6 - Rural Minor Arterial
(100) Defense Highway	
(101) Parallel Structure	
(102) Direction of Traffic	
(103) Temporary Structure	
(105) Federal Lands Highways	
(110) Designated National Network	
(20) Toll	
(21) Maintain	1 - State Highway Agency
(22) Owner	
(37) Historical Significance	
CONDITION	
(58) Deck	N
(59) Superstructure	N
(60) Substructure	N
(61) Channel & Channel Protection	7
(62) Culverts	4
LOAD RATING AND POSTING	
(31) Design Load	
(63) Operating Rating Method	
(64) Operating Rating	
Type	
Rating	
(65) Inventory Rating Method	
(66) Inventory Rating	
Type	
Rating	
(70) Bridge Posting	
(41) Structure Open/Posted/Closed	
APPRAISAL	
(67) Structural Evaluation	
(68) Deck Geometry	
(69) Clearances, Vertical/Horizontal	
(71) Waterway Adequacy	
(72) Approach Roadway Alignment	8
(36A) Bridge Railings	
(36B) Transitions	
(36C) Approach Guardrail	
(36D) Approach Guardrail Ends	
(113) Scour Critical Bridges	
PROPOSED IMPROVEMENTS	
(75) Type of Work	
(76) Length of Structure Improvement	ft
(94) Bridge Improvement Cost	$
(95) Roadway Improvement Cost	$
(96) Total Project Cost	$
(97) Year of Improvement Cost Estimate	
(114) Future ADT	
(115) Year of Future ADT	

INSPECTIONS *			
(90) Inspection Date			11/28/2022
(91) Frequency			12
(92) Critical Feature Inspection	Done	Freq. (Mon)	Date
A: Fracture Critical Detail	No		
B: Underwater Inspection	No		
C: Other Special Inspection			

* The inspection date and frequency information in this box contains the current NBI date and frequency information. Please refer to the report header for the date this inspection was conducted.

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Maintenance Needs

Date Reported:	11/28/2022
Priority:	5 - Cyclical Activity - Per Policy
Type of Work:	3 - General - Replacement project
Status:	Open
Component:	Culvert

Deficiency Description

Asphalt Coated Corrugated Galvanized Multi Plate Pipe (ACCGMPP) is in poor condition having heavy corrosion with small perforations starting to form along the invert with small build up of sediment / debris present. Heavy squashing / distortion is present below roadway. Pipe should be considered for replacement in near future.

Remarks

Structure has heavy corrosion and should be considered for replacement.

Through shot facing downstream

Through shot facing upstream

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Approach From East

Top of Culvert facing upstream

Approach From West

Upstream End of Culvert

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Upstream End of Culvert

Rock buildup near Upstream End of Culvert

Through shot facing downstream

Slight Separation between sections of culvert near Midspan

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Downstream shot from Midspan

Downstream End of Culvert

Through shot facing upstream

Downstream Channel

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Heavy Corrosion along Eastern Wall near Upstream

Pipe Squashing from Upstream

Western Wall Corrosion from Upstream

Eastern Wall Corrosion from Upstream

VERMONT
AGENCY OF TRANSPORTATION

Route VT15 /
Structure #006A / (Routine)
VT15 over BROOK
Team Lead: Stephen Piro, **Inspection Date:** 11/28/2022

Invert Corrosion from Upstream

Downstream End of Culvert

Downstream Channel

Western Wall

Appendix D: Hydraulics Memo

VERMONT

State of Vermont
Structures and Hydraulics Section
219 North Main Street
Barre, VT 05641
vtrans.vermont.gov

Agency of Transportation

TO: Laura Stone, Structures, Scoping Engineer

CC: Patrick Ross, Hydraulics Engineer

FROM: Jeff DeGraff, Hydraulics Project Engineer

DATE: February 17, 2023

SUBJECT: Statewide – Northwest STP CULV(90) pin #22B044
Jericho, VT 30 Br6-A, over Unnamed Brook
Coordinates: 44.502843, -73.004615

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

ANR agreed that this appears to be an intermittent stream and Aquatic Organism Passage is not required for this project.

Design Storm Flow is 2% AEP (Q50).

The following options were analyzed:

Existing Conditions: 6.0-ft Diameter Corrugated Metal Plate Pipe Culvert

- Provides a Headwater to Depth ratio (HW/D) of 0.19 and 0.21 during the design and check storm event, respectively. Headwater depths of 1.15-ft and 1.28-ft were determined during the design and check storm event, respectively.
- The existing culvert meets the current hydraulic standards.

Option 1: 2.5-ft Diameter Corrugated Metal Pipe Culvert (Rehab/Liner)

- Provides a Headwater to Depth ratio (HW/D) of 0.59 and 0.66 during the design and check storm event, respectively. Headwater depths of 1.47-ft and 1.66-ft were determined during the design and check storm event, respectively.
- The proposed culvert meets the current hydraulic standards.

For Option 1 Stone Fill Type II may be used for outlet protection or to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet.

Any other rehab/liner alternative that has a minimum 2.5' diameter could be considered for this site. If another alternative is considered, coordinate with the Hydraulics Unit to perform additionally analyses.

Please contact us with any questions, or to check substructure configuration scenarios.

VERMONT

Appendix E: Preliminary Geotechnical Information

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Laura Stone, P.E., Scoping Engineer

From: Stephen Madden, Geotechnical Engineer SPM

Date: July 22th, 2022

Subject: Statewide-Northwest STP CULV(90) – Jericho VT-15, Br. 6A, Preliminary Geotechnical Information

1.0 INTRODUCTION

As requested, we have completed our preliminary geotechnical investigation of Bridge 6A, located on VT-15 in the Town of Jericho, VT. The culvert is located at the intersection of VT 15 and Mountain View Rd. The project consists of rehabilitation or replacement of the existing 66 ft long, 6ft diameter, corrugated metal plate pipe (CGMPP) culvert. This review included the examination of as-built record plans, water well logs and hazardous site information on file at the Vermont Agency of Natural Resources (ANR), as well as published surficial and bedrock geologic maps, and information we gained from in-house bridge inspection reports and photos. This culvert is currently in the scoping phase and comprises one of the four culverts bundled into the Statewide-Northwest STP CULV(90) project.

2.0 SUBSURFACE INFORMATION

2.1 Published Geologic Data

Mapping conducted in 1970 for the Surficial Geologic Map of Vermont shows that the project site consists of a Glaciolacustrine deposit which consists predominantly of pebbly sand (Doll, 1970).

According to the 2011 Bedrock Map of Vermont, published by the State of Vermont and USGS, the site is underlain with schist and metawacke of the Pinnacle Formation, and is in close proximity to phyllite of the Fairfield Pond Formation (Ratcliffe, et. al, 2011).

The Geotechnical Engineering Section maintains a GIS database of historical boring logs throughout the state, which contains electronic records of the majority of investigations completed in the past 15 years. During the research into this project, the database did not reveal any borings or projects within 2 miles that could be referenced for information of value.

2.2 Water Well Logs

The Vermont ANR documents and publishes a database of all public and private wells that have been drilled in the state. Published online, these logs may provide general characteristics of the soil strata and depth to bedrock in the area. One private well was identified within 1000 feet of the culvert location. Well TAG# 122-88) is located approximately 800 ft northeast of the culvert and reported bedrock at a depth of 20 feet, noting clay from ground surface to top of bedrock.

2.3 Hazardous Materials and Underground Storage Tanks

The ANR Natural Resource Atlas also maintains records of any hazardous material sites and underground storage tanks. Their records show the location of the project is not on the Hazardous Site List. There is one hazardous waste generator and one underground storage tank within a 0.5-mile radius of the project, both located at 39 Route 15 (Chittenden Mills Beverage). This site is not anticipated to impact construction activities.

2.4 Record Plans

Historic record plans for the existing culvert were not found.

3.0 FIELD OBSERVATIONS

A site investigation was not conducted by Geotechnical Section staff; however, photos from bridge inspection reports and satellite imagery were reviewed to evaluate the feasibility of boring operations and assess general site conditions as they relate to the proposed project. Overhead utilities are present to the north of, and running parallel with, VT Route 15. These are not anticipated to impact boring operations. A boring could be located in close proximity to the inlet of the culvert from the shoulder of the westbound travel lane. The embankment slope at the outlet location is fairly steep and likely inaccessible for drilling equipment. A boring could be located within the shoulder of the eastbound travel lane.

4.0 RECOMMENDATIONS

Based on preliminary findings from nearby private wells, surficial soil mapping, and the apparent shallow depth of cover of the existing culvert, conditions appear to be favorable for an open cut approach to any culvert replacement operations.

4.1 Proposed Subsurface Investigation

A proposed investigation would include two borings, advanced adjacent to the inlet and outlet of the culvert. If bedrock is encountered during drilling operations in close proximity to the bottom of the proposed culvert elevation, additional borings will likely be required to profile the bedrock elevation across the footprint of the proposed structure.

5.0 CLOSING

If a culvert replacement is the preferred alternative, the Geotechnical Section can assist in developing a subsurface investigation plan that efficiently gathers adequate information for design of the replacement structure.

If you have any questions or would like to discuss this report, please contact the Geotechnical Section via email.

6.0 REFERENCES

Doll, C. G., 1970, Surficial Geologic Map of Vermont, Vermont Geological Survey, Montpelier, VT.

Ratcliffe, N. M., Stanley, R. S., Gale, M. H., Thompson, P. J., Walsh, G. J., 2011, Bedrock Geologic Map of Vermont, Vermont Geological Survey, Montpelier, VT.

Vermont Agency of Natural Resources Department of Environmental Conservation, Natural Resources Atlas, www.anr.vermont.gov/maps/nr-atlas%20, accessed 7/14/2022.

cc: Electronic Read File/MG
Project File/SPM

Appendix F: Resource ID Completion Memo

OFFICE MEMORANDUM

AOT - PDB - ENVIRONMENTAL SECTION

RESOURCE IDENTIFICATION COMPLETION MEMO

TO: Daniel Beard, Project Manager
FROM: Julie Ann Held, Environmental Specialist (802)917-4319
DATE: December 14, 2022
Project: **Statewide – Northwest STP CULV(90)**

ENVIRONMENTAL RESOURCES:

Archaeological Site:	X	Yes	See Archaeological Resource ID Memo Issued: 12/14/2022
Historic/Historic District:	X	Yes	See Historic Resource ID Memo Issued: 05/26/2022
4(f) Property:		Yes X No	
Wetlands:	X	Yes	See Natural Resource ID Memo Issued: 08/08/2022
Agricultural Land:	X	Yes	See Natural Resource ID Memo Issued: 08/08/2022
Fish & Wildlife Habitat:	X	Yes	See Natural Resource ID Memo Issued: 08/08/2022
Wildlife Habitat Connectivity:		Yes X No	
Endangered Species:	X	Yes	
Stormwater:		Yes X No	
6(f) Property:		Yes X No	
Hazardous Waste:		Yes X No	
VTrans Limited Reuse Soils:	X	Yes	See ES Resource ID
USDA-Forest Service Lands:		Yes X No	
Scenic Highway/Byway:		Yes X No	
Act 250 Permits:	X	Yes	See ES Resource ID
FEMA Floodplains:	X	Yes	Flood Hazard Area/River Corridor Permit may be required
Flood Hazard Area/ River Corridor**:**	X	Yes	Potential Flood Hazard area, may need permits depending on the scope of work.
US Coast Guard:		Yes X No	
Lakes and Ponds:		Yes X No	
Environmental Justice:		Yes X No	
303D List/ Class A Water/ Outstanding Resource Water:		Yes X No	
Source Protection Area:		Yes X No	
Public Water Sources/ Private Wells:		Yes X No	
Other:		Yes X No	

cc:
Project File

Appendix G: Natural Resources Memo

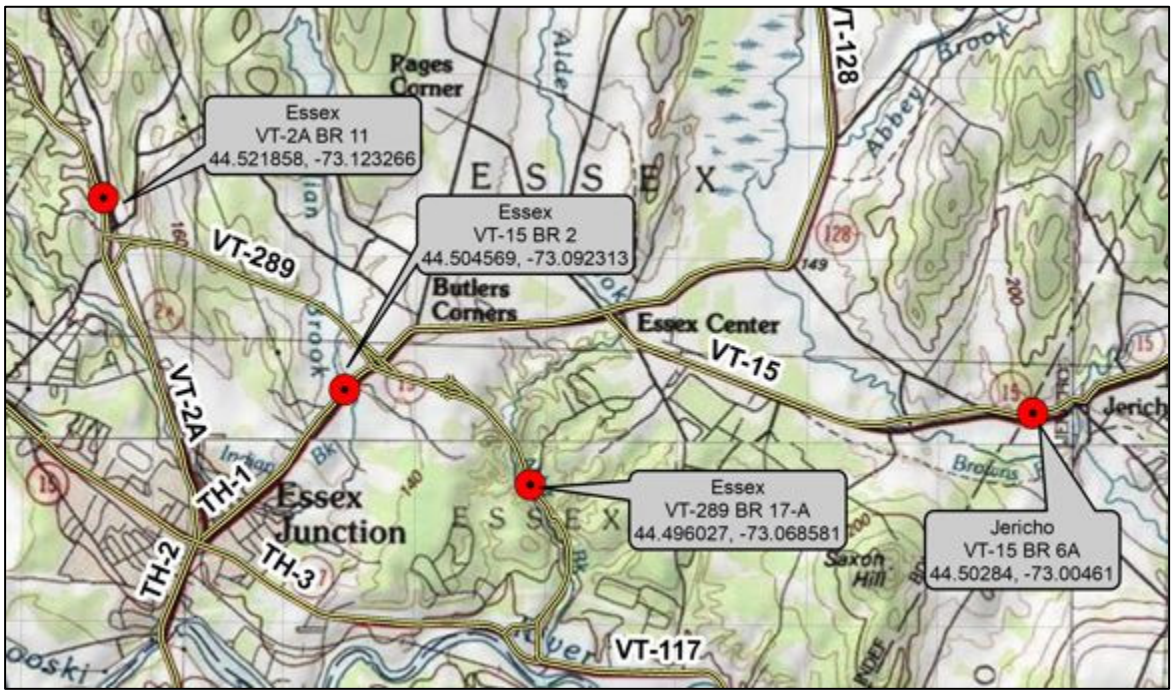
Natural Resource Evaluation

Vermont Agency of Transportation

Northwest STP CULV (90)

- **Essex VT-2A BR 11**
- **Essex VT-15 BR 2**
- **Essex VT-289 BR 17-A**
- **Jericho VT-15 BR 6A**

September 6, 2022
Revised February 8, 2023



Prepared for:
Vermont Agency of Transportation
219 North Main Street
Barre, VT 05641

Prepared by:
Bear Creek Environmental, LLC
Natural Resource Services Team
131 Elm Street, Suite 1
Montpelier, VT 05602

Table of Contents

1.0 EXECUTIVE SUMMARY

- During summer 2022, the Bear Creek Environmental (BCE) Natural Resource Services Team conducted a scoping level natural resource assessment of four stream crossing sites included under the project Northwest CULV (90). Three of the stream crossing sites are located in Essex, and the fourth is in Jericho. This Natural Resource evaluation was revised in February 2023 to correct the location of the Jericho structure, which was originally evaluated as a bridge on the Browns River, rather than a 6-foot diameter structure near Mountain View Road.

- The study area included 75 feet upstream and downstream of the structure and 100 feet on both approaches to the culvert.

- The BCE team conducted mapping exercises to identify pertinent natural resources within and surrounding the study area at each site. In addition to these desktop analyses, the team also conducted field surveys to evaluate wetlands and botanical resources.

- Rare, threatened, and endangered species occurrence reports were reviewed for the project sites. There are several RTE plants that have reported occurrences near the Essex VT-2A BR 11 site. Many of these RTE plants are associated with the Dry Pine-Oak-Heath Sandplain Forest. A botanical survey was performed of the Essex VT-2A BR 11 and the Essex VT-15 BR 2 sites. No RTE plant species were observed.

- The Creek Heelsplitter, a Species of Greatest Conservation Need (SGCN) with a State protection status of S2, has an element occurrence report for locations in Indian Brook below the Essex VT-15 BR 2 study area. Mark Ferguson, a biologist with the VT Department of Fish and Wildlife Department was consulted for guidance regarding this rare mussel. Mr. Ferguson requested that he be contacted four weeks prior to commencement of construction activities to allow time for him to search for and relocate any Creek Heelsplitters from the project area.

- The Bear Creek Environmental team delineated wetlands within the study areas of Essex VT-2A BR 11, Essex VT-15 BR 2, Essex VT-289 BR 17-A sites. A site visit with District Wetland Ecologist, Elijah Schumacher, was completed on July 28, 2022 to confirm the wetland boundaries at the three Essex sites.

- Remote sensing was utilized to identify potential wetlands with the Jericho VT 15 BR 6A study area during winter 2022/2023. Based on imagery, Streetview, Hillshade, and LiDAR contours, the extent of a Class 2 wetland within the study area downstream of the culvert was determined based on best professional judgment. A wetland delineation within the growing season is recommended to verify the extent and class.

- The Vermont Fish and Wildlife Department (VDFW) was consulted regarding requirements of aquatic organism passage (AOP) for the three Essex structures that are culvert crossings during summer 2022. Based on email correspondence from September 1, 2022, full aquatic organism passage will be required for replacement of structures at all three sites. In the event the VT-2A BR 11 and VT-15 BR 2 structures were modified, retrofits of the structures would be required to allow full AOP. Given the close proximity of the structure outlet to Alder Brook, and the long

culvert length, AOP would not be required for modifications to the Essex VT-289 BR 17-A structure.

- During February 2023, the VDFW was contacted regarding AOP recommendations for the Jericho VT-15 BR 6A culvert. Given the small watershed size, the Department has opted to wait until electrofishing can be conducted during the spring or summer to make a determination regarding AOP.

- The project area was not evaluated for RTE bat presence nor was potential habitat quantified; however, it is possible that the Little Brown Bat (state-endangered) and/or Northern Long-eared Bat (state-endangered, federally threatened) could be found in the vicinity of the project sites.

2.0 BACKGROUND

The Bear Creek Environmental Natural Resource Services Team was retained by the Vermont Agency of Transportation (VTrans) to evaluate wetland and wildlife resources in the vicinity of four VTrans stream crossing sites that are included in the Northwest CULV (90) project. The project, which currently is at a scoping level, includes sites:

- VT-2A BR 11 in Essex
- VT-15 BR 2 in Essex
- VT-289 BR 17-A in Essex, and
- VT-15 BR 6A in Jericho.

The sites are located in Essex and Jericho, as shown on the map on page 1 of Appendix A.

Assessment work included remote sensing analysis to evaluate resources at and in the vicinity of the project site. A desktop analysis of wildlife connectivity was also performed.

3.0 REMOTE SENSING

A remote sensing review of natural resources was performed by Bear Creek Environmental for the four study sites. The study involved a review of historic occurrences of rare, threatened, and endangered (RTE) plant and animal species in the vicinity of the project site, as well as an assessment of wildlife connectivity. Ecological Resource maps of the four project sites are provided on pages 2 through 5 of Appendix A.

RTE Plants

The Essex 2A BR 11 was the only site with rare, threatened, and endangered (RTE) plants documented within the vicinity of the project site, based on the Vermont Natural Heritage database. The ecological map on page 2 of the Appendix A includes six RTE plant species, most of which are associated with the Dry Pine-Oak-Heath Sandplain Forest natural community. The RTE plant species documented within the vicinity of Essex 2A BR 11 are:

- *Crocanthemum canadense* (Canada Frostweed) – S2S3
- *Lactuca hirsuta* (Hairy Lettuce) – S1S2 (SGCN)
- *Helianthus strumosus* (Harsh Sunflower) – S2S3 (SGCN)
- *Carex muehlenbergii* var. muehlenbergii (Muehlenberg's Sedge) – S2 (SGCN)
- *Cyperus houghtonii* (Houghton's Flatsedge) – S2 (SGCN)
- *Solidago squarrosa* (Squarrose Goldenrod) – S2S3 (SGCN)

RTE Animals

Lasmigona compressa (Creek Heelsplitter), a rare (S2 state rank) freshwater mussel, is the only rare animal species that has been documented within the vicinity of the four project sites according to the Vermont Natural Heritage database. Occurrences of Creek Heelsplitter from 2002 and 2006 were recorded several tenths of a mile downstream of the VT-15 BR 2 study area in Indian Brook, as shown on the map on page 3 of the Appendix A.

Mark Ferguson of the Vermont Fish and Wildlife Department was contacted for a determination of whether a mussel survey of Indian Brook would be required if instream work for a culvert project were needed. In an email response dated Thursday, August 11, 2022 (Appendix A, page 6), Mr. Ferguson stated the following:

"Since there is little chance of any threatened or endangered mussel species occurring in this stream section, I don't see a need for a formal mussel survey. Since there is some potential for Creek Heelsplitter bring there, I request that I be contacted within four weeks prior to commencement of construction/prep activities so that I can search for and relocate any Creek Heelsplitters from within the project area."

Wildlife Habitat

The Vermont Conservation Design database on the Vermont Agency of Natural Resources BioFinder Mapping Tool was reviewed to assess landscape scale wildlife habitat. A narrative and maps of the results are provided by Alexandra Marcucci of SLR on pages 1 through 6 of Appendix B. A brief summary of the landscape scale wildlife habitat in the vicinity of each study area is provided below:

- VT Route 2A BR 11 – Within the study area, Surface Water and Riparian Areas and Physical Landscape Diversity are rated as highest priority. Residential development along Gentes Road and commercial development on Colchester Road contribute to fragmentation of Riparian and Wildlife Connectivity.

- VT Route 15 BR 2 – Surface Water and Riparian Areas and Physical Landscape Diversity are rated as highest priority adjacent to Indian Brook within the study area.

- VT Route 289 BR 17A – Riparian and Wildlife Connectivity are rated as highest priority both upstream of the culvert under Route 289 and upstream and downstream on the culvert outlet within the Alder Brook corridor.

- VT Route 15 BR 6A – None of the wildlife habitat components were identified as priority or highest priority within the study area.

4.0 FIELD OBSERVATION OF RTE SPECIES

Plants

A site visit was conducted by botanist Elizabeth McLane on July 4, 2022 to investigate the presence of rare plant species within the VT Route 2A BR 11 and the VT Route 15 BR 2 study areas. These two sites were recommended for an RTE plant survey for the following reasons:

- Area dominated by sand and sea-bed soils that can lead to unusual natural community types and associated RTE species;
- Located in vicinity of remnant Dry Pine-Oak-Heath Sandplain Forest Natural Community;
- Not uncommon for rare plant species to be associated with road and stream edges;
- Rare plant species occurrences have been reported within the vicinity of the VT Route 2A BR 11 study area.

No rare or significant Natural Communities were noted at either site during the plant survey. A memorandum summarizing the botanical findings is provided in Appendix C.

Bats

The project area was not evaluated for RTE bat presence nor was potential habitat quantified; however, it is possible that the Little Brown Bat (state-endangered) and/or Northern Long-eared Bat (state-endangered, federally threatened) could be found in the vicinity of the project sites.

5.0 WETLANDS AND STREAMS

Methods

Mary Nealon of Bear Creek Environmental and Alex Marcucci of SLR visited the three Northwest CULV (90) study areas in Essex during July 2022 to delineate jurisdictional wetlands and to perform a functional evaluation of the wetlands. The delineation was performed in accordance with the methods described in the manual prepared by the US Army Corps of Engineers dated 2012 and titled "Regional Supplement to the Corps of Engineers Wetland

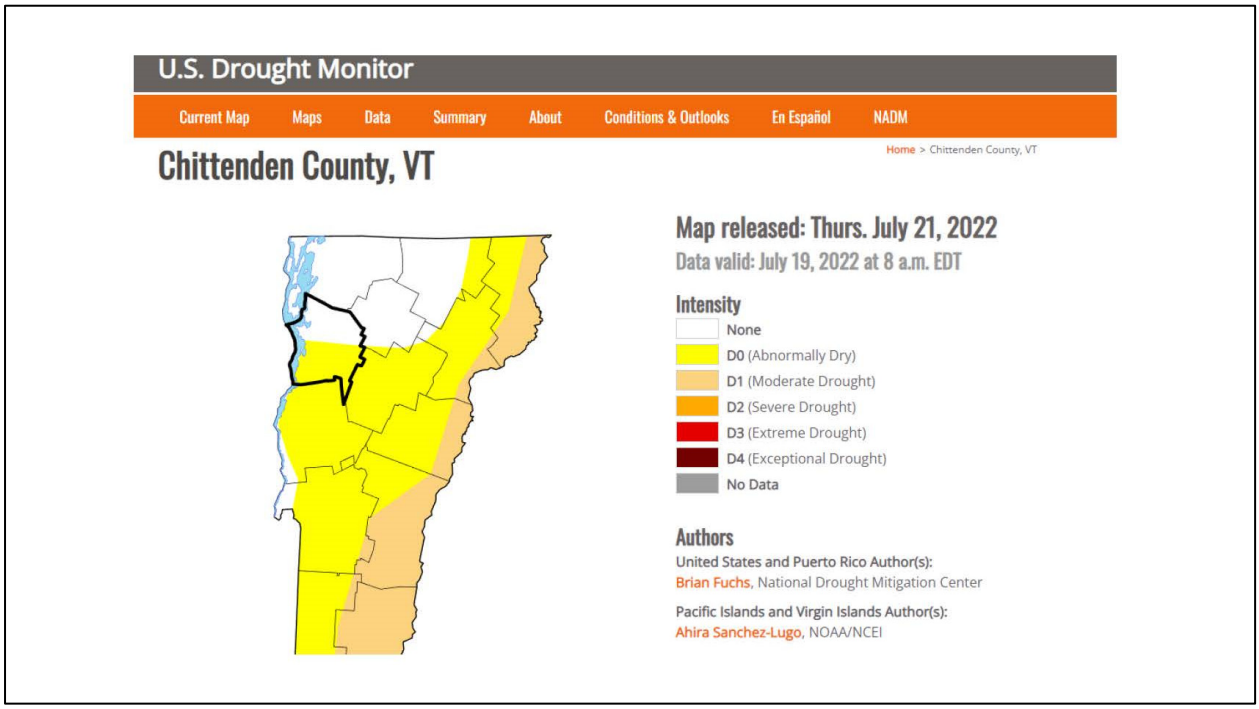
Delineation Manual: Northcentral and Northeast Region". The locations of wetlands were documented in the field using a submeter GPS unit, and functional evaluations were performed. Wetlands were delineated through field observations of soils, vegetation, and hydrology.

The wetlands were identified using the codes of wetland cover types in the United States Fish and Wildlife Service document titled Classification of Wetlands and Deepwater Habitats of the United States 2nd Edition (1.4MB PDF), 2013, by Cowardin, Lewis M. et al. (FGDC, 2013). In the Cowardin system, wetlands are categorized first by landscape position (tidal, riverine, lacustrine, and palustrine), followed by cover type (cover types described below), and then by hydrologic regime (ranging from saturated or temporarily-flooded to permanently flooded).

Class II wetlands are protected under the Vermont Wetland Rules. As such, impacts to Class II wetlands and their 50-foot buffer zones should be avoided whenever possible, in accordance with the rules. If impacts cannot be avoided, they should be minimized. Mitigation may be required for unavoidable wetland impacts to replace impacted functions and values (VANR, 2018).

Results

Maps showing the wetland delineations that were verified by Elijah Schumacher, Vermont Wetland Ecologist on July 28, 2022, are provided on pages 1 through 4 of Appendix D. Climatic / hydrologic conditions at the time of the wetland delineation field work was normal to Abnormally Dry, based on the U.S. Drought Monitor data for Chittenden County.



The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC.

The Wetland Determination Forms are provided on pages 5 through 25 of Appendix D, with the Functions and Values following on pages 26 through 58. All the wetlands at the three Essex project sites are palustrine. Palustrine wetlands are defined as nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens. No wetlands were found at the Jericho site (VT Route 15 BR 6A).

Available stream crossing inventory data was acquired from the Vermont Fish and Wildlife Department link on the Vermont Natural Resources Atlas. Methods for data collection and analysis of the stream crossing data followed the Vermont Agency of Natural Resources (VANR 2009, Milone & MacBrook 2008 and 2009). The stream crossing reports are provided on pages 59 and 60 of Appendix D and are summarized below in Table 1. No report is available for the Route 289 BR17A or the Route 15 BR 6A structure.

The Vermont Fish and Wildlife Department was contacted by Bear Creek Environmental regarding requirements for aquatic organism passage (AOP), should the structure be replaced or retrofitted. Recommendations from the VFWD are included in Appendix D on pages 61 through 67.

Table 1. Stream Crossing Inventory Data from Vermont Agency of Natural Resources

Type and Structure No.	Stream	Road	AOP Coarse Screen	AOP Geomorphic Compatibility	Percent Bankfull Width	Assessment Date
Culvert 2A BR 11 SgaID 400024000004061	Unnamed Tributary to Indian Brook	VT Route 2A, Railroad, Gentes Road	No AOP including Adult Salmonids	Partially Compatible	54%	11/23/2015
Culvert 15 BR 2 SgaID 300015000004062	Indian Brook	VT Route 15 (Upper Main St.)	Reduced AOP	Mostly Compatible	48%	11/23/2015

NA – not applicable
AOP – aquatic organism passage

Figure 7. Unnamed Tributary to Alder Brook downstream of VT 289 Culvert

VT Route 15 BR 6A

Wetlands

The resource evaluation of the Route 15 BR 6A site occurred outside of the growing season. Therefore, a wetland delineation could not be performed. Based on remote sensing, possible wetland habitat within the study area was identified. Google Streetview, Bing Streetview, imagery, hillshade, and LiDAR contours were used in combination to identify "possible wetlands". Google Streetview was particularly useful for seeing the vegetated drainage, where the farmer had fenced off. Based on imagery and Streetview, it seems likely the wetland extends outside of this fenced area and is greater than 0.5 acres. A wetland greater than 0.5 acres is assigned a Class 2 wetland designation in Vermont. A map showing the possible extent of the wetland within the Route 15 BR 6A study area boundary is provided in a page 4 of Appendix D. The size of the possible wetland within the study area is approximately 0.05 acres. An open wetland boundary is included to indicate the wetland likely continues to the south.

Figure 7. Google Streetview showing a possible wetland downstream of the Route 15 6A culvert

Stream Crossing

An inspection report for VT-15 BR 6A (VT Agency of Transportation, 2021, indicates the structure is a 6-foot diameter steel culvert that intersects a brook. No photos of the upstream or downstream channel without snow cover are available in the inspection report. Photos of the structure and narrative in the inspection report provide evidence of heavy rust and small holes in the barrel. The size of the channel upstream and downstream of the structure is not reported.

Bear Creek Environmental used a hydrology model in ArcGIS to calculate a rough drainage area at the culvert inlet. The hydrology model uses a Digital Elevation Model (DEM) and flow direction and accumulation. Based on the hydrology model, the drainage area at the culvert inlet is approximately 0.009 sq. miles (Appendix D, page 4). This drainage area seems low relative to the size of the culvert diameter, and may possibly underrepresent the drainage due to manmade alterations in drainage patterns. Field verification of the drainage area could not be completed due to snow cover.

The VFWD was contacted on February 1, 2023 regarding recommendations for AOP at this structure. The Department has deferred a recommendation until this spring or summer, when electrofishing can be conducted to determine if fish are present (refer to email correspondence included in Appendix D, pages 68 and 69).

REFERENCES

Federal Geographic Data Committee (FGDC). 2013. Classification of Wetlands and Deepwater Habitats of the United States. Second Edition. Available at: https://www.fws.gov/wetlands/documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States-2013.pdf

Milone & MacBroom, Inc. 2008. The Vermont Culvert Geomorphic Compatibility Screening Tool. South Burlington, VT. 43 pp.

Milone & MacBroom, Inc. 2009. The Vermont Culvert Aquatic Organism Passage Screening Tool. South Burlington, VT 120 pp.

U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. Available at: https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7640

Vermont Agency of Natural Resources (VANR). 2018. Department of Environmental Conservation, Watershed Management Division – Wetlands Program. Guidance for Determining Wetland Jurisdiction. Available at: http://dec.vermont.gov/sites/dec/files/wsm/wetlands/docs/wl_ClassificationGuidance.pdf

Vermont Agency of Natural Resources (VANR). 2009. Bridge and Culvert Assessment, Appendix B, Stream Geomorphic Assessment Handbooks. 22 pp.

Vermont Agency of Transportation. 2021. Route VT15, Bridge #006A (Routine), VT15 over Brook, Inspection Date: November 29, 2021. 9 pp.

Geospatial and remote sensing data sources include:

Vermont Agency of Natural Resources (VANR). 2022. BioFinder Mapping Tool. Available at: https://anrmaps.vermont.gov/websites/BioFinder/

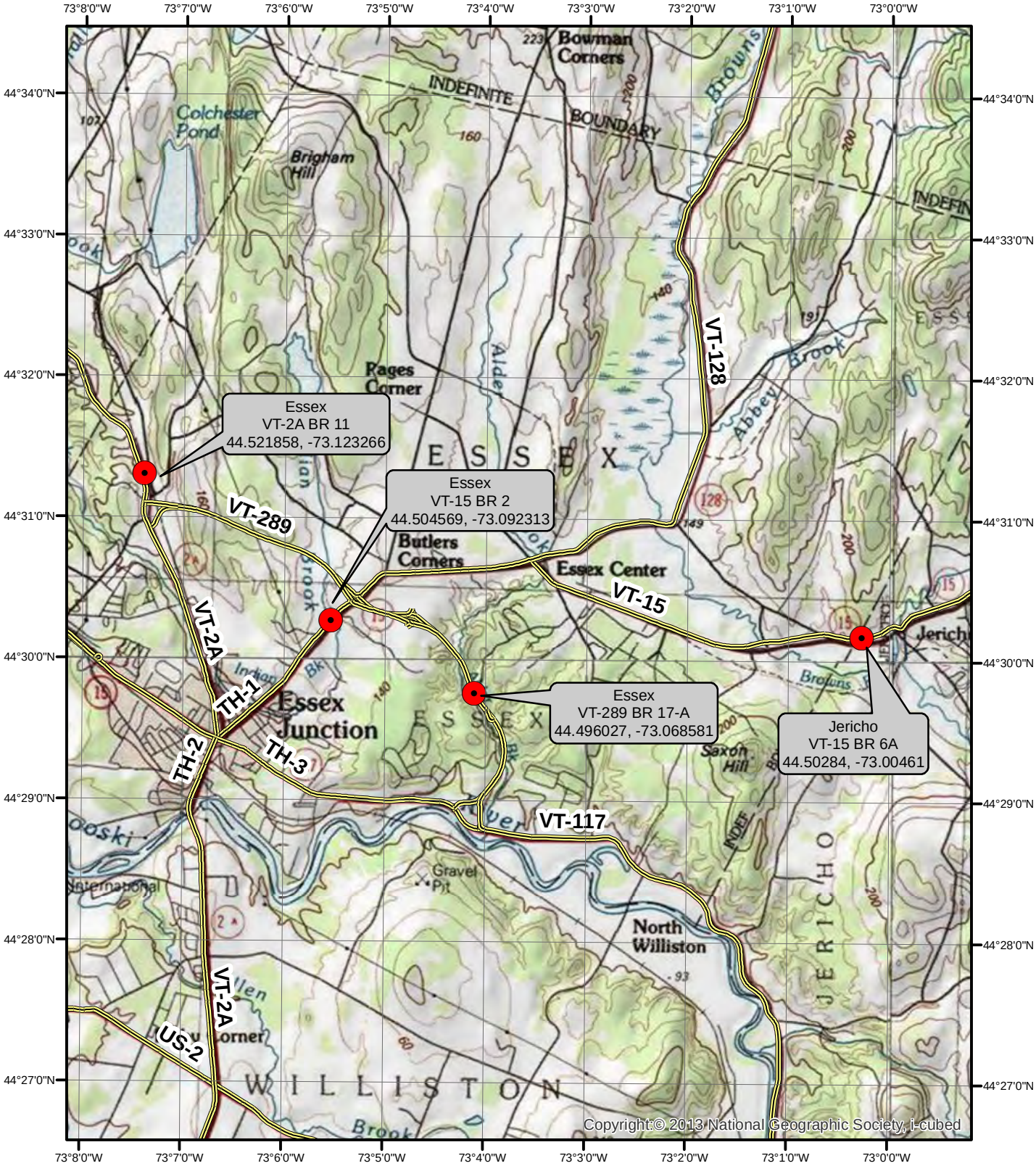
Vermont Agency of Natural Resources (VANR). 2022. Natural Resources Atlas. Available at: http://anrmaps.vermont.gov/websites/anra5/

Vermont Center for Geographic Information (VCGI). Data available at: http://gis.vtanr.opendata.arcgis.com/

Appendix A

Site Location, Ecological Resource Maps and Correspondence

Project Location Map for Northwest STP CULV (90)
Vermont Routes 2A, 15, and 289
Essex and Jericho, Vermont



Legend

- Culvert
- Major Road

Data sources include:
Vermont Center for Geographic Information (VCGI)

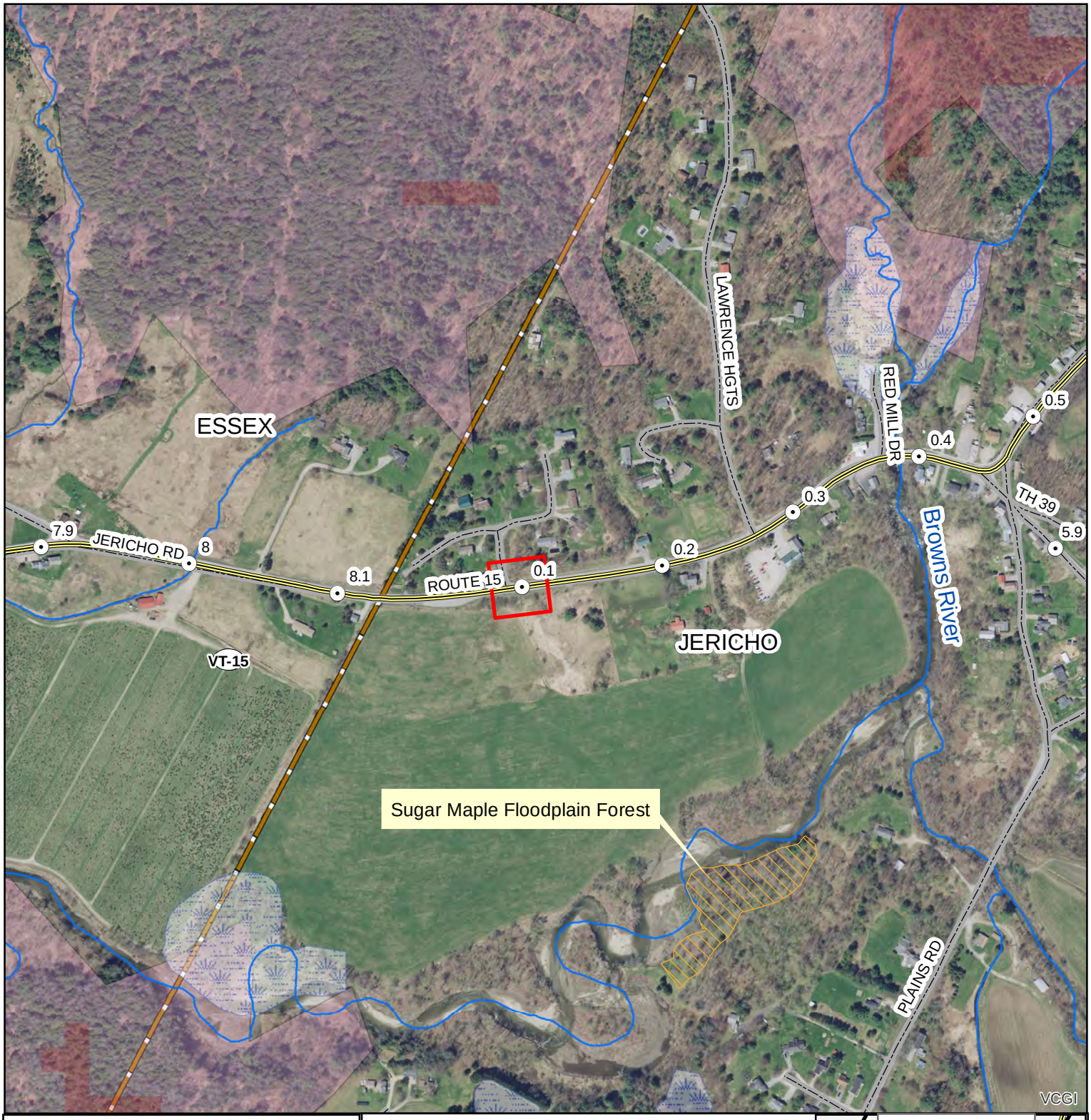
Map composed on June 27, 2022, Revised on January 5, 2023.

Bear Creek Environmental

0 3,000 6,000 Feet

1 inch = 6,000 feet

N



Resource Map - Ecological

Vermont Agency of Transportation
Northwest STP CULV (90)
Vermont Route 15 BR 6A
Jericho, VT
Chittenden County

Bear Creek Environmental

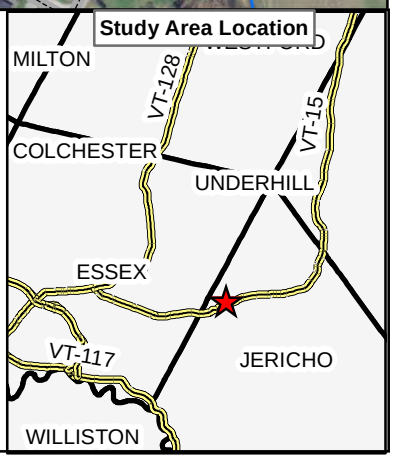
Legend

- Study Area VT15 BR-6A
- Mile Marker - Tenths
- Major Road
- Road
- VHD Stream
- Significant Natural Community
- VSWI Class Layer
- RTE Plant Species
- RTE Animal Species
- Deer Wintering Area
- Core Habitat
- Habitat Block
- Town Boundary

N

0 125 250 500 Feet

Data sources include Vermont Agency of Natural Resources and Bear Creek Environmental. Map composed on January 5, 2023



Appendix B

Wildlife Habitat

Vermont Agency of Transportation
Northwest CULV (90)
Essex and Jericho, Vermont

Wildlife Habitat

A desktop analysis was performed to review wildlife habitat in the vicinity of the four project sites. The BioFinder tool published by the Vermont Fish and Wildlife Department and available at https://anrmaps.vermont.gov/websites/BioFinder/ was used to evaluate landscape-scale wildlife habitat. The mapping tool contains two primary datasets – a Landscape Scale layer and a Community and Species Scale layer. The Landscape Scale layer is a composite of six components – Interior Forest Blocks, Connectivity Blocks, Riparian Wildlife Connectivity, Surface Water and Riparian Areas, Physical Landscape Blocks, and Physical Landscape Diversity. The components are ranked as highest priority, priority, or not a priority by geographic area. BioFinder also displays Communities and Species Scale data, which contains the following components: Natural Communities, Aquatic Habitats, Wetlands, Terrestrial Wildlife Crossings, Riparian Wildlife Crossings, and Rare and Uncommon Species.

Essex VT-2A BR 11

The Essex Vermont Route 2A BR 11 site was reviewed using the BioFinder tool. Wildlife habitat data are portrayed on a map on page 3 of Appendix B. The site is the location of a culvert underneath Gentes Road, the railroad, and Vermont Route 2A. The culvert conveys flow from an unnamed tributary to Indian Brook, which is a direct tributary to Lake Champlain. Lands surrounding the project study area are primarily residential, with small areas of forest interspersed. There are numerous houses along Gentes Road and several businesses on Route 2A. Class II wetlands were found at the site during the wetland delineation performed by BCE and SLR on the floodplain of the unnamed tributary both upstream and downstream of the culvert. The riparian area of the brook has received a ranking of highest priority for the following landscape habitat components: Surface Water and Riparian Areas, Riparian and Wildlife Connectivity, and Physical Landscape Diversity. Lands to the west of Route 2A (downstream of the culvert) have been identified as highest priority for the following landscape scale components: Interior Forest Blocks, Connectivity Blocks, and Physical Landscape Diversity. Forested lands to the east of Gentes Road (upstream side of the culvert) have been identified as highest priority for the following components: Connectivity Blocks and Physical Landscape Diversity. There is also a forest block present east of Lamore Road that is noted as highest priority for Connectivity Blocks and Physical Landscape Diversity.

Essex VT-15 BR 2

The Essex Vermont Route 15 BR 2 site was also evaluated for wildlife habitat. The project site centers around a culvert under Route 15 that conveys flow from Indian Brook beneath the road. Lands surrounding the project site are a mix of residential and commercial, with a large meadow and a small amount of forested land present. Lands to the west of Route 15 (upstream side of the culvert) are noted in the BioFinder tool as highest priority for Surface Water and Riparian Areas and Physical Landscape Diversity. Lands to the east of the road (downstream of the culvert) are also highest priority for the same components. Open lands to the northeast of the culvert on the Lang Farm property are designated as priority for Surface Water and Riparian Areas. Sections of the corridor along Indian Brook are also

designated as highest priority for Riparian and Wildlife Connectivity. Landscape scale habitat features for the Essex Route 15 site are shown on a map on page 4 of Appendix B.

Essex VT-289 BR 17A

The Interstate 289 BR 17A site is a culvert that conveys flow from an unnamed tributary to Alder Brook beneath Interstate 289. The site is surrounded primarily by forested land and has Class II wetlands both east and west of the road. Forested lands to the east of the road (upstream of the culvert) have been identified as highest priority for the following landscape scale components: Physical Landscape Diversity and Physical Landscape Blocks. They are also priority for Interior Forest Blocks. Alder Brook flows parallel to Interstate 289 to the west of the road through forested land and shrub-sapling wetlands. Beyond the forested land to the west is a residential development. The swath of land along Alder Brook has been identified as highest priority for the following components: Surface Water and Riparian Areas, Riparian and Wildlife Connectivity, and Physical Habitat Diversity, as well as priority for Interior Forest Blocks. Lands to the west in the vicinity of the residential development are priority for Interior Forest Blocks. There is also a narrow band of priority Surface Water and Riparian Areas identified between Alder Brook and I-289, as shown on the map on page 5 of Appendix B.

Jericho VT-15 BR 6A (Revised February 7, 2023)

The Vermont Route 15 BR 6A site is located at a culvert under Route 15 near the intersection with Mountain View Road. Lands within the study area boundary are not identified as priority or highest priority for any of the BioFinder wildlife habitat components. Lands immediately along Route 15 are residential and agricultural. Forested lands are present north of the project site at the edge of a residential development. These forested lands have been identified as priority for the BioFinder landscape component Connectivity Blocks. The Browns River flows through agricultural lands south of the project site. A large area encompassing the corridor of the Browns River has been identified as highest priority for Surface Water and Riparian Areas and Physical Landscape Diversity. A narrower band of land immediately adjacent to the river is also identified as highest priority for Riparian and Wildlife Connectivity.

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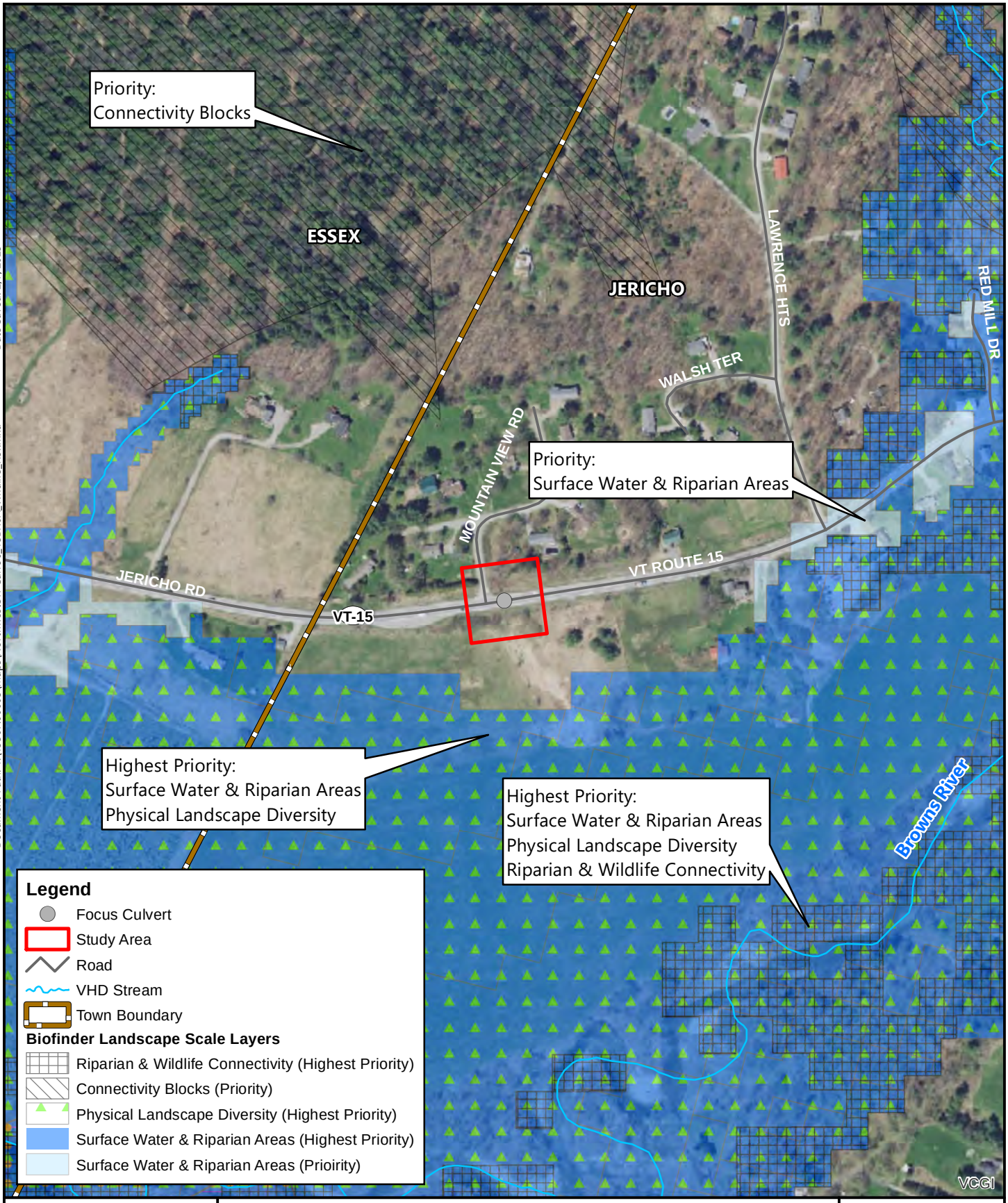
Date Saved: 2/7/2023

Document Path: Y:\15507.00003\Maps\NorthwestSTPCulv90_15BR6A_Wildlife_Rev.mxd



Legend

- Focus Culvert
- Study Area
- Road
- VHD Stream
- Town Boundary

Biofinder Landscape Scale Layers

- Riparian & Wildlife Connectivity (Highest Priority)
- Connectivity Blocks (Priority)
- Physical Landscape Diversity (Highest Priority)
- Surface Water & Riparian Areas (Highest Priority)
- Surface Water & Riparian Areas (Prioirity)

SLR
1 SOUTH MAIN ST
WATERBURY, VT 05676
802.882.8335

Wildlife Landscape Habitat Map

Vermont Agency of Transportation
Northwest STP CULV (90)
Vermont Route 15 BR 6A
Jericho, VT
Chittenden County

N

0 500
Feet

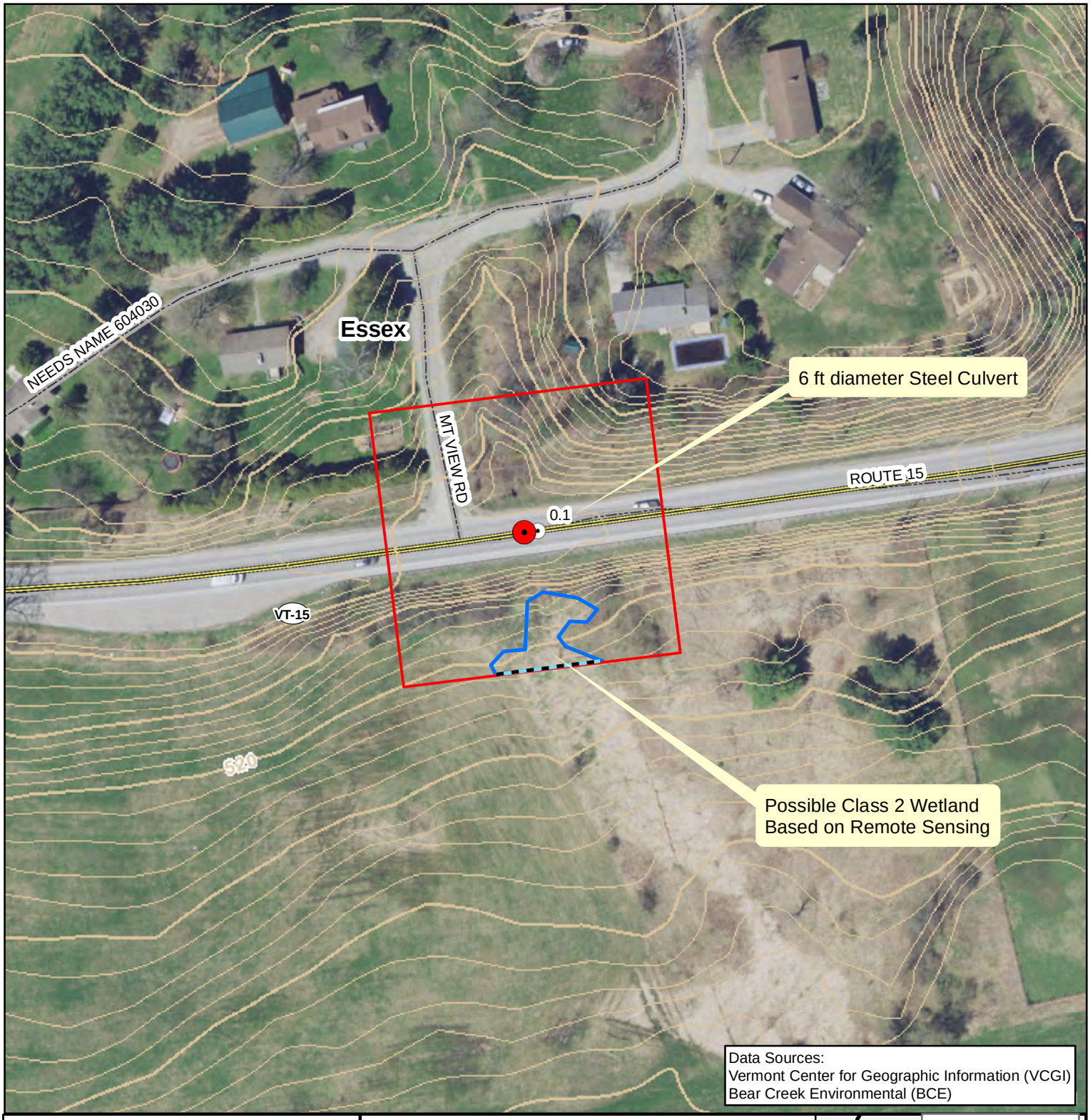
Biofinder data from Vermont Conservation Design Landscape Scale Components layer published by the Vermont Agency of Natural Resources (last updated March 24, 2022). Revised map prepared on February 7, 2023.

SCALE 1 " = 500 '
DATE 2/7/2023
146.15507.00003
PROJ. NO.

WILDLIFE MAP

Appendix D

Wetland and Stream Resources



Possible Wetlands

Vermont Agency of Transportation
Northwest STP CULV (90)
Vermont Route 15 BR 6A
Jericho, VT
Chittenden County

Bear Creek Environmental

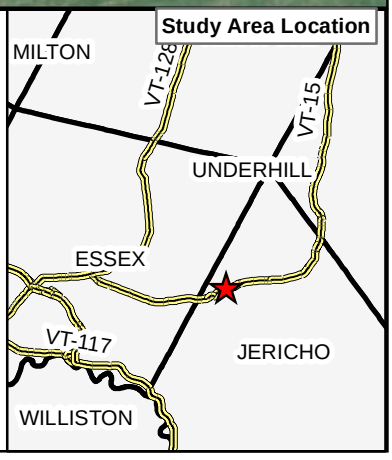
Legend

- Culvert
- Study Area
- Possible Class 2 Wetland
- Wetland Open Boundary
- VHD Stream
- VSWI Class Layer
- Mile Marker - Tenths
- Major Road
- Road

N

0 25 50 100 Feet

Possible Class 2 wetlands were identified within the study area using remote sensing. Map composed on February 8, 2023.



From:	Eldridge, William
To:	mary@bearcreekenvironmental.com; Simard, Lee
Cc:	Pientka, Bernie
Subject:	RE: VTrans Northwest CULV (90) - stream crossings
Date:	Thursday, September 1, 2022 8:50:06 AM

Lee and Mary,

Lee, thanks for visiting the site and reporting your observations to Mary.

Mary, thanks for sharing your concerns and making sure everything is adequately addressed.

Thanks,
Will

VERMONT
Will Eldridge | Aquatic Habitat Biologist
Vermont Fish and Wildlife Department | Fish Division
802-585-4499 cell | william.eldridge@vermont.gov

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Thursday, September 1, 2022 7:16 AM
To: Simard, Lee <Lee.Simard@vermont.gov>; Eldridge, William <William.Eldridge@vermont.gov>
Cc: Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.
Hi Lee,

Thanks for getting back to me. I will add your recommendations to the VTrans report.

Mary

From: Simard, Lee <Lee.Simard@vermont.gov>
Sent: Thursday, September 1, 2022 6:49 AM
To: mary@bearcreekenvironmental.com; Eldridge, William <William.Eldridge@vermont.gov>
Cc: Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

Hi Mary,

I was able to stop by this site, although unfortunately with time constraints without bringing a backpack shocker with me. That said, I walked some distance upstream of the culvert and immediately adjacent wetland area and found a well-defined channel with clear flowing water that could serve as suitable habitat for a number of fish species.

I do not believe this changes our recommendations but instead reconfirms that AOP would be required if the structure were to be replaced. If the project does move in this direction, I'd be happy to review the site further if necessary.

I'll be in the field most of today but let me know if you have any questions.
Thanks,
Lee

VERMONT

Lee Simard | Fisheries Biologist
Vermont Fish and Wildlife Department
Fisheries Division
111 West Street | Essex Junction, VT 05452
802-879-5697 office | 802-622-4017 cell | 802-879-5649 fax
www.vtfishandwildlife.com

The Agency of Natural Resources supports telework, and there are times when I may be working from another office location. I am available to connect by phone and email. I am also available to connect in-person upon request.

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Sunday, August 28, 2022 1:15 PM
To: Simard, Lee <Lee.Simard@vermont.gov>; Eldridge, William <William.Eldridge@vermont.gov>
Cc: Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.
Hi Lee,

Thanks for your offer to swing by the RT 289 site on your way home from work. I'm tied up with field work this week, and won't be able to join you.

Please let me know your thoughts after your site visit. I plan to finalize my VTrans report no later than Thursday of this week.

Best regards,

Mary

From: Simard, Lee <Lee.Simard@vermont.gov>
Sent: Thursday, August 25, 2022 2:42 PM
To: Eldridge, William <William.Eldridge@vermont.gov>; mary@bearcreekenvironmental.com
Cc: Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

Hi Mary,

Those recommendations were solely based on a desktop review of watershed size at each structure and the corresponding requirements through the SAGP. If the watershed size is greater than 0.25 mi^2 at a location or fish are known to be present, our recommendation will consistently be that AOP be provided unless the applicant flags specific issues that would negate the need for AOP at a site (e.g., an impassable natural barrier near the structure) or can justify a replacement. Thanks for providing that additional context for this crossing.

I agree with Will's statement that the request for AOP would be based on this structure being replaced. Our preference will usually be for a structure to be replaced rather than repaired to achieve AOP, but do understand the cost constraints, especially in instances such as this where there may be limited habitat upstream of the structure. Ultimately that decision will be made in consultation with the RME.

In this instance, LIDAR imagery does suggest there is some amount of stream channel further upstream, so I'd be interested in conducting a site visit to take a closer look to do my due diligence. I'd be willing to stop by sometime next week on my way home from work but could also coordinate a time with you if you'd like to be present.

Thanks,
Lee

VERMONT

Lee Simard | Fisheries Biologist
Vermont Fish and Wildlife Department
Fisheries Division
111 West Street | Essex Junction, VT 05452
802-879-5697 office | 802-622-4017 cell | 802-879-5649 fax
www.vtfishandwildlife.com

The Agency of Natural Resources supports telework, and there are times when I may be working from another office location. I am available to connect by phone and email. I am also available to connect in-person upon request.

From: Eldridge, William <William.Eldridge@vermont.gov>
Sent: Tuesday, August 23, 2022 4:36 PM
To: mary@bearcreekenvironmental.com
Cc: Simard, Lee <Lee.Simard@vermont.gov>; Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

Hi Mary,

I don't know the site and will defer to Lee or Bernie on the habitat quality upstream.

Your points about the constraints to achieving AOP through a retrofit are well taken. I think we would ask that AOP be provided if the structure is replaced.

Thanks,
Will

VERMONT
Will Eldridge | Aquatic Habitat Biologist
Vermont Fish and Wildlife Department
3902 Roxbury Road | Roxbury, VT 05669
802-585-4499 cell
https://vtfishandwildlife.com/vthabitatstamp

Due to the coronavirus (COVID-19), the Agency of Natural Resources is taking additional safety measures to protect our employees, partners and customers. We are now working remotely and focused on keeping our normal business processes fully functional. We encourage you to communicate electronically or via phone to the greatest extent possible. Thank you for your patience and understanding that responses may occasionally be delayed.

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Tuesday, August 23, 2022 2:58 PM
To: Eldridge, William <William.Eldridge@vermont.gov>
Cc: Simard, Lee <Lee.Simard@vermont.gov>; Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Lee, Bernie and Will,

I thought I would follow up on your request for AOP at the VT 289 site. I wondered if you had seen this site in the field, and what your thoughts were regarding a new structure or the possibility of retrofitting the existing one.

I've attached a map of the site. The culvert is more than 500 feet in length. There was flow coming out of the culvert when I was there in July, but the channel above the inlet had very little water (photo 5431) and offered minimal habitat. The outlet drop is substantial (Photo 5438), and the distance the trib flows to Alder Brook under low flow conditions is only 15 to 20 feet (Photo 5432).

Without doing any sort of modeling, it would seem that a AOP retrofit would not work. Because Alder Brook is so close to the mouth of the trib, it would be impossible to address the outlet drop without raising Alder Brook. It also seems like baffles would be needed throughout the 500 foot structure to address the velocity barrier.

Although a new structure could potentially provide AOP, it seems like it would be an expensive project due to distance and the highway.

I would be interested in your thoughts and suggestions.

Thanks,

Mary

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Monday, August 22, 2022 1:41 PM
To: 'Eldridge, William' <William.Eldridge@vermont.gov>
Cc: 'Simard, Lee' <Lee.Simard@vermont.gov>; 'Pientka, Bernie' <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

Thanks Will

Yes, the VT-15 BR 6A site is a bridge in a gorge. The four stream crossings were part of the same project. I'm sorry if my request for AOP requirements was confusing. I should have noted it was a bridge when I sent you my request.

Thanks for the input from the District Biologists.

Mary

From: Eldridge, William <William.Eldridge@vermont.gov>
Sent: Monday, August 22, 2022 1:26 PM
To: mary@bearcreekenvironmental.com
Cc: Simard, Lee <Lee.Simard@vermont.gov>; Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

Hi Mary,

Here's the feedback I got from the District Biologists.

VT-15 BR 6A: A little confused by the AOP request here as it's a bridge. It's a cascade/gorge area, that I'd assume is impassable (Bernie would you agree? I haven't spent a lot of time staring at it), so maybe that is part of it. But it's a bridge??

VT-289 BR 17-A: This a trib to Alder Brook which has many fish species present (DEC sampling station just downstream). Watershed size = 0.2835 square miles. AOP required.

VT-15 BR 2 (Bernie's area): Indian Brook, 3.63 square miles. AOP required

VT-2A BR 11 (Bernie's area): watershed = 0.786 square miles. AOP required

Let me know if you need more information.

Thanks,

Will

Will Eldridge | Aquatic Habitat Biologist
Vermont Fish and Wildlife Department
3902 Roxbury Road | Roxbury, VT 05669
802-585-4499 cell
https://vtfishandwildlife.com/vthabitatstamp

Due to the coronavirus (COVID-19), the Agency of Natural Resources is taking additional safety measures to protect our employees, partners and customers. We are now working remotely and focused on keeping our normal business processes fully functional. We encourage you to communicate electronically or via phone to the greatest extent possible. Thank you for your patience and understanding that responses may occasionally be delayed.

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Thursday, August 18, 2022 9:31 AM
To: Eldridge, William <William.Eldridge@vermont.gov>
Subject: RE: VTrans Northwest CULV (90) - stream crossings

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Will,

I'm writing to check in with you regarding the email I sent last week. Please let me know if you would like me to provide additional information for you to make a determination regarding AOP requirements for the three stream crossing locations in Essex.

Feel free to give me a call if you have questions (802-223-5140).

Thanks,

Mary

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Tuesday, August 9, 2022 5:00 PM
To: 'Eldridge, William' <William.Eldridge@vermont.gov>
Subject: VTrans Northwest CULV (90) - stream crossings

Good Afternoon Will,

The Bear Creek Environmental Natural Resources Services Team has been retained by VTrans to conduct a scoping level study of four stream crossing projects. I have attached a topo map showing the four locations.

Glenn Gingras has asked me to reach out to you and inquire if AOP will be required for these sites. I'm happy to send along Ecological maps of each site, if that would be helpful. I also have some photographs of the structures and the channels in the vicinity of the structures, if you would like that information.

I appreciate any input you may have.

Best regards,

Mary

Mary Nealon
Principal / River Scientist
Professional in Erosion and Sediment Control
Certified Floodplain Manager

Bear Creek Environmental

131 Elm Street, Suite 1
Montpelier, Vermont 05602
Phone: (802) 223-5140
Email: Mary@BearCreekEnvironmental.com
Website: http://www.bearcreekenvironmental.com

From: Simard, Lee
To: Mary Nealon
Cc: Eldridge, William; Pientka, Bernie
Subject: RE: Recommendations for Culvert on Route 15 in Jericho near Essex town line
Date: Wednesday, February 1, 2023 2:03:57 PM

Hi Mary,

Thanks for reaching out about AOP requirements for this structure in Jericho.

Given the small watershed size on this structure, requiring AOP would be dependent on observing fish within this stream either upstream of the culvert or in the proximity of the structure downstream. While the watershed size and your pictures suggest fish are less likely to be present, we have observed fish in very small or even intermittent streams so it is possible. However, with the deep snow and cold temperatures, now is not the time of year to confidently make that determination as electrosampling is not practical. Ideally, I would wait to get out this spring or early summer to sample.

If you have evidence (i.e., pictures with a rough measurement) of large impassable drops at or near this structure though, I could use that as justification as well for not requiring AOP.

Let me know if you have any questions or would like to discuss further.
Thanks,
Lee

VERMONT

Lee Simard | Fisheries Biologist
Vermont Fish and Wildlife Department
Fisheries Division
111 West Street | Essex Junction, VT 05452
802-879-5697 office | 802-622-4017 cell | 802-879-5649 fax
www.vtfishandwildlife.com

The Agency of Natural Resources supports telework, and there are times when I may be working from another office location. I am available to connect by phone and email. I am also available to connect in-person upon request.

From: mary@bearcreekenvironmental.com <mary@bearcreekenvironmental.com>
Sent: Wednesday, February 1, 2023 9:15 AM
To: Simard, Lee <Lee.Simard@vermont.gov>
Cc: Eldridge, William <William.Eldridge@vermont.gov>; Pientka, Bernie <Bernie.Pientka@vermont.gov>
Subject: Recommendations for Culvert on Route 15 in Jericho near Essex town line

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.

Good Morning Lee,

I hope your winter has been going well.

I am doing some remote sensing for a culvert in Jericho on Route 15 (44.50284,-73.00461). The site is located near Mountain View Drive in Jericho near the Jericho/Essex town line. Please see the attached site location maps.

I'm attaching a couple of photos that VTrans has provided and a report that provides some additional photos and information.

The drainage is quite small and is not included in the Vermont Hydrography Dataset (VHD). I used a hydrology model in ArcGIS to determine the drainage area. The hydrology model uses a Digital Elevation Model (DEM) and flow direction and accumulation. Based on the hydrology model, the drainage area at the inlet of the culvert is 0.009 sq. mi. The drainage area is shown on the site location map "VTrans_Jericho VT-15 BR 6A_StudyArea_Rev1".

Would you be willing to provide recommendations regarding AOP? I am hoping to get all my remote sensing information and your recommendations to VTrans by early next week. Would you have availability to get back to me by Monday or Tuesday?

Thanks,

Mary

Mary Nealon
Principal / River Scientist
Professional in Erosion and Sediment Control
Certified Floodplain Manager

Bear Creek Environmental

131 Elm Street, Suite 1
Montpelier, Vermont 05602
Phone: (802) 223-5140
Email: Mary@BearCreekEnvironmental.com
Website: http://www.bearcreekenvironmental.com

Appendix H: Archeology Memo

VERMONT

Brennan Gauthier
VTrans Senior Archaeologist
Vermont Agency of Transportation
Project Delivery Bureau
Environmental Section
tel. 802-279-1460
Brennan.Gauthier@Vermont.gov

To: Julie Ann Held, VTrans Environmental Specialist

From: Brennan Gauthier, VTrans Senior Archaeologist

Date: 12/14/2022

Subject: Statewide Northwest STP CULV(90) Archaeological Resource Identification

Dear Julie Ann,

I have completed my background research and field inspection of the four separate locations requested as part of this resource ID request in the northwest part of the state. I will explain each in an individual section below and add any areas of archaeological sensitivity into the archaeology geodatabase for inclusion in future plan sets.

Bridge No.11, VT-2A, Essex, Chittenden County, Vermont

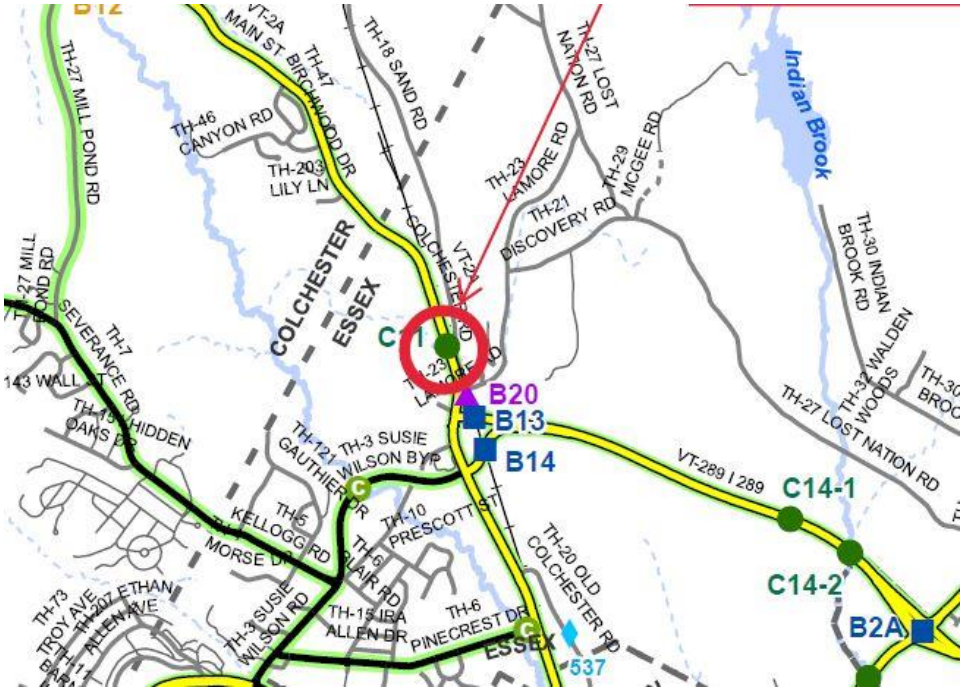


Figure 1: Bridge Location.

A review of known archaeological sites in the VAI database shows several known VAI archaeological sites within a half kilometer of the project site. These sites are Native American in origin and were discovered during the 1990s Circumferential Highway archaeological survey. Both sites, VT-CH-0613 and VT-CH-0622, are located on a sandy outwash plain directly to the south of Bridge No. 11. Due to the close proximity and being situated near/on the same geologic feature, any undisturbed areas outside of the culvert, roadway and railroad prism are considered sensitive for precontact archaeological site presence. Additionally, the median between the rail and the roadway appears to be disturbed.

Figure 2: Project Location.

A review of the Beers and Walling map series show no industrial activity at the bridge location, but there may be older sites not represented. However, the archaeological sensitivity mapped for precontact sites covers the potential for historics. See ***Figure 4*** below for a view of the sensitive areas as mapped using LiDAR hillshade.

Figure 3: Project LiDAR View and VAI Site Location.

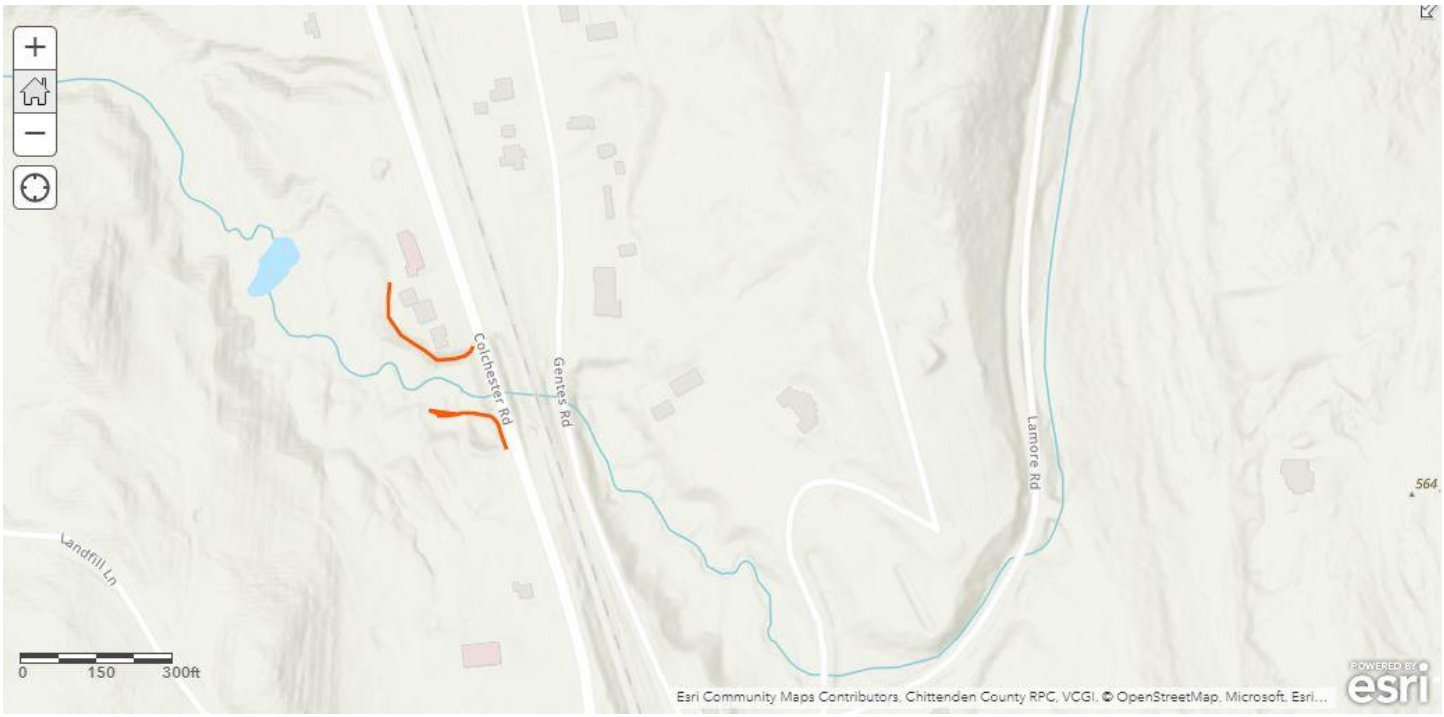


Figure 4: Arch Sensitive Areas.

In conclusion, there are two mappable archaeologically sensitive areas related to rehabilitation of Bridge No. 11 that have been added to the archaeology geodatabase for inclusion in future plans.

Bridge No. 2, VT-15, Essex, Chittenden County, Vermont

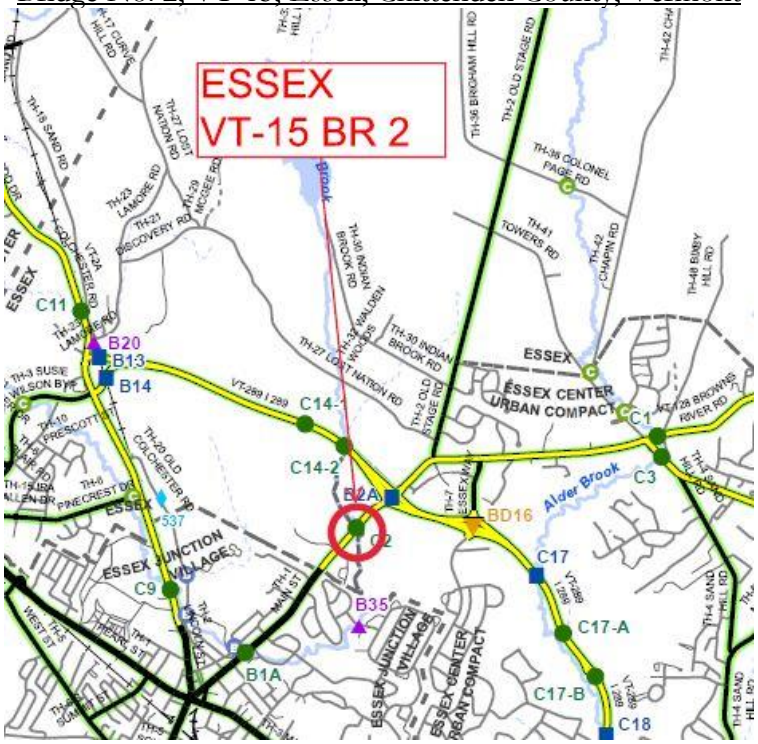


Figure 5: Bridge Location.

A review of known archaeological sites in the VAI database shows one known VAI archaeological site (VT-CH-9191) within a half kilometer of Bridge No. 2 over Indian Brook on Vermont Route 15 in Essex. This site is Native American in origin and were discovered during a field walkover of the farm to the east of the project location. Due to the close proximity of the site to the bridge, it is advisable to mark all undisturbed areas as archaeologically sensitive. Roadway prism disturbance is obvious at this location, so any area outside of the prism and/or utilities is deemed archaeologically sensitive. A field review was conducted during the 2022 field season and the areas of sensitivity were drawn using LiDAR hillshade. Please refer to ***Figure 7*** for a visual representation of the archaeologically sensitive areas.

Figure 6: Bridge Location.

Figure 7: Archaeologically Sensitive Areas.

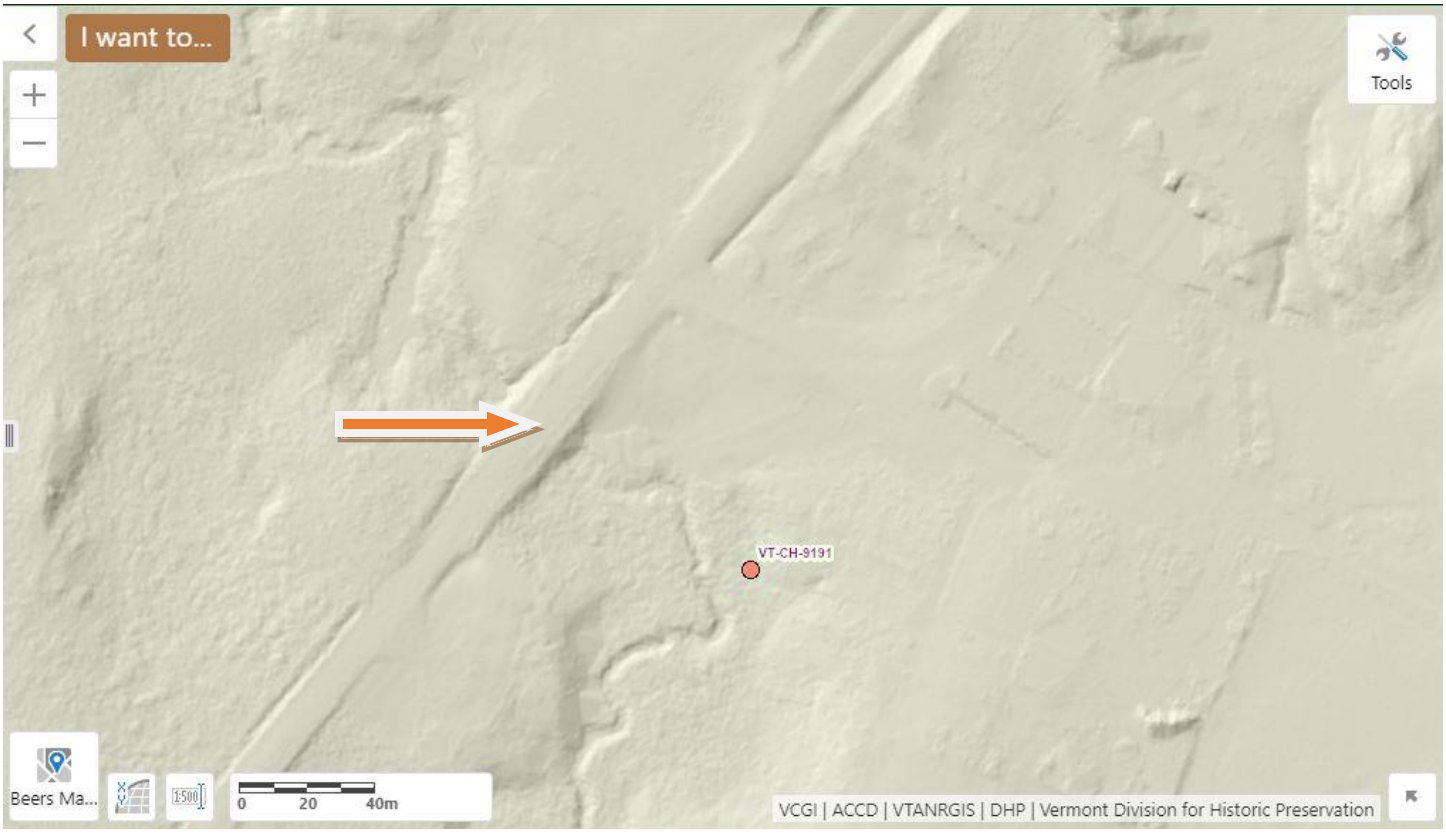


Figure 8: LiDAR View of Project Location.

Bridge No.17A, Vermont Route 289, Essex, Chittenden County, Vermont

Figure 9: Project Location.

A review of known archaeological sites in the VAI database shows one known VAI archaeological site (VT-CH-0207) within a half kilometer of Bridge No.17A on Vermont Route 289 in Essex. This site is Native American in origin and were discovered during review work for the Circumferential Highway in the 1980s. Although located in a general location to Bridge No. 17A, the site is located well outside any work likely to take place during project construction. Additionally, the bridge (really a small culvert) is located completely within the previously disturbed roadway prism of Vermont Route 289. There are no archaeologically sensitive areas to map as part of this project.

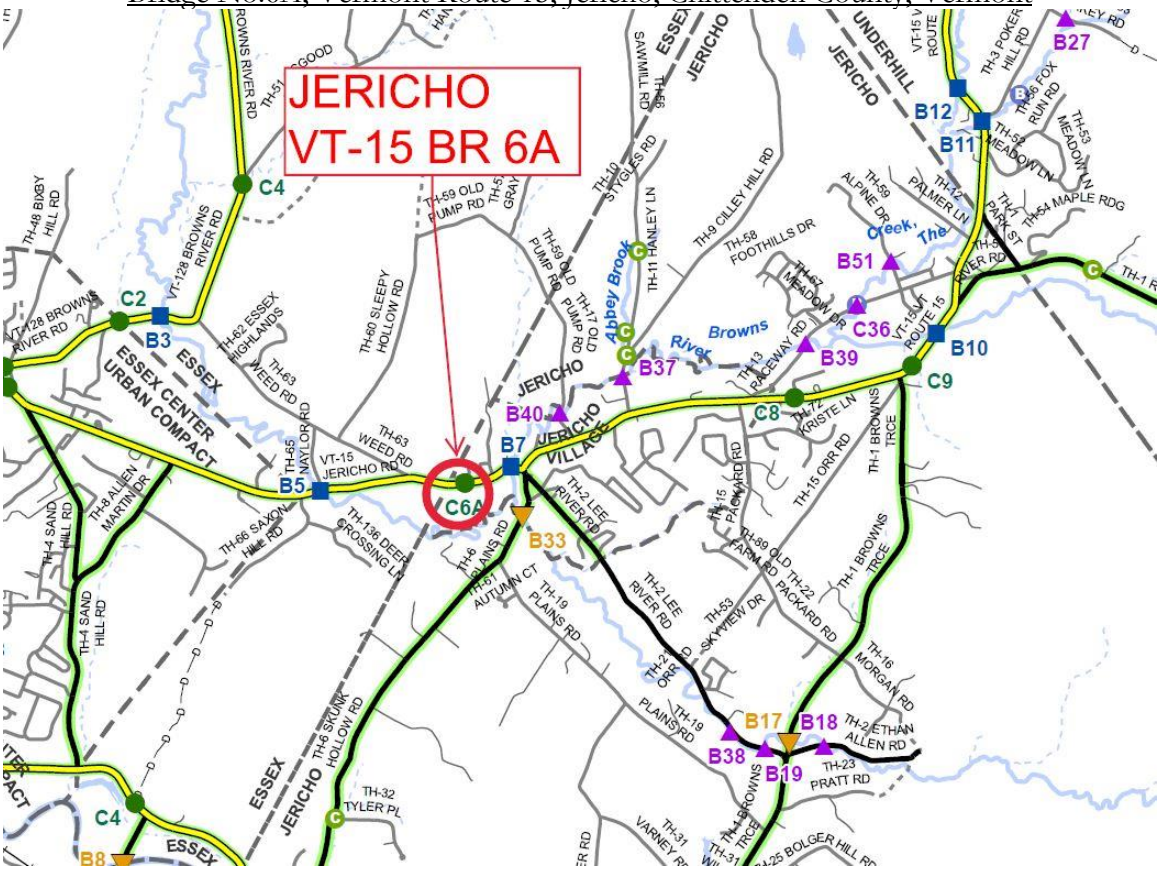


Figure 10: Project Location.

A review of known archaeological sites in the VAI database shows no known archaeological sites within a half kilometer of Bridge No.6A on Vermont Route 15 in Jericho. A site visit conducted in the summer of 2022 was adequate to identify the area to the south as archaeologically sensitive based on its location on an outwash plain above a floodplain of the Winooski River. This area seems as though it could be easily avoided during construction and has been added to the archaeological geodatabase (***Figure 13***) for inclusion in project plans.

Figure 11: Project View.

Figure 12: LiDAR View.

Figure 13: Archaeological Sensitivity.

Appendix I: Historic Memo

Kyle Obenauer
Senior Architectural Historian

Vermont Agency of Transportation

Project Delivery Bureau - Environmental Section
219 N. Main Street
Barre, VT 05641

kyle.obenauer@vermont.gov
(802) 279-7040
www.vtrans.vermont.gov

Re: Statewide STP CULV(90) – Above Ground Resource ID

Date: 05/26/2022

This Resource Identification effort is being undertaken to identify cultural resources within broad preliminary survey areas that could be potentially impacted by future culvert projects at the locations below in Essex and Jericho, Chittenden County, Vermont. Once a project has been defined at the conceptual design phase, VTrans Cultural Resources staff will be able to determine a formal Area of Potential Effect (APE) for purposes of Section 106 and 22 VSA § 14, as well as more conclusively determine potential impacts to protected property types, including Section 4(f) properties.

Culvert locations:

Essex

- Bridge No. 11, Vermont Route 2A
    - Although an early concrete culvert (c. 1930s), this structure does not appear to possess the historic significance necessary for inclusion in the National Register of Historic Places (NRHP). If work is confined to the existing ROW, there will likely be no other buildings, structures, or objects within a project APE.

- Bridge No. 2, Vermont Route 15/Upper Main Street
    - **Historic property - see below**

- Bridge No. 17A, Vermont Route 289
    - This structure is a common CMP from the 1990s that is not historically significant. No other buildings, structures, or objects within a likely APE.

Jericho

- Bridge No. 6A, Vermont Route 15A
    - This structure is also a common CMP that is not historically significant. If work is confined to the existing ROW, there will likely be no other buildings, structures, or objects within a project APE.

Historic Property Identified

Of the four culvert locations above, a potentially NRHP-eligible property within a likely APE was identified at 38 Upper Main Street in Essex, at the northeastern quadrant of Bridge No. 2 (*Figures 1;3*). This vernacular Greek Revival-style two story eaves front brick house is listed in the Vermont State Register of Historic Places (Survey 0405-123; listed 1980; *Figure 2*). Although it's fenestration has been altered and associated outbuildings modified and/or removed, the NRHP-eligibility of the former Abbott House should be considered further since this building and the former Lang Farmhouse directly across the road (to the south) are two increasingly rare examples of mid-19th century brick architecture on the fringes of Essex.

The building at 38 Upper Main Street in Essex should also be considered a Section 4(f) property type.

Impacts to the former Abbott House at 38 Upper Main Street will most likely be avoided if work associated with replacing Bridge No. 2 is confined to the existing right of way.

Please, let me know if there are any questions.

Images and Illustrations

Figure 1. 38 Upper Main Street at northeastern corner of Bridge No. 2 in Essex.

Figure 2. 38 Upper Main Street, photographed in 1980s.

Figure 3. 38 Upper Main Street at northeastern quadrant showing adjacent parcel boundaries, with Bridge No. 2 at arrow.

Figure 4. Bridge No. 11, Essex

Figure 5. Bridge No. 17A, Essex

Figure 6. Bridge No. 6A, Jericho

Appendix J: Environmental Specialist Resource ID

VERMONT

State of Vermont
Highways-PDB-Environmental
219 N. Main Street
www.aot.state.vt.us

Agency of Transportation

Date: September 12, 2022
Project: **Statewide – Northwest STP CULV(90)**

6(f) Properties:
There aren't any 6(f) Properties within the project area.

Hazardous Waste:
There aren't any Hazardous Wastes Sites identified within the project area.

Contaminated Soils:
There aren't any Contaminated Soils within the project area.

Contaminated Soils/ Urban Background Soils general language
-Sections of the proposed project are located within Urban Background Soils areas as mapped on the ANR Atlas. Proposed project limits will determine if impacts are anticipated, and if coordination with the Hazard Waste Coordinator is required. Disturbed soils within this project should be expected to be kept on site, or follow Notice to bidders guidance.

Wild Scenic Rivers:
There aren't any designated Wild Scenic Rivers within the project area.

Act 250 Permits:
There are adjacent parcels that have Act 250 Permits and may need to be amended if impacted.

FEMA Floodplains:
There are FEMA Floodplains mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.

River Corridor:
There are River Corridors mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.

Protected Lands:
There aren't any Protected Lands within the project area.

US Coast Guard:
There aren't any US Coast Guard navigable waterways within the project area.

Lakes and Ponds:
There aren't any lakes or ponds within the project area.

Scenic Highway/ Byway:
There aren't any Scenic Highway/ Byways within the project area.

Environmental Justice:
There are no EJ populations present within the study area, therefore there is no potential to have a disproportionately high and adverse effect.

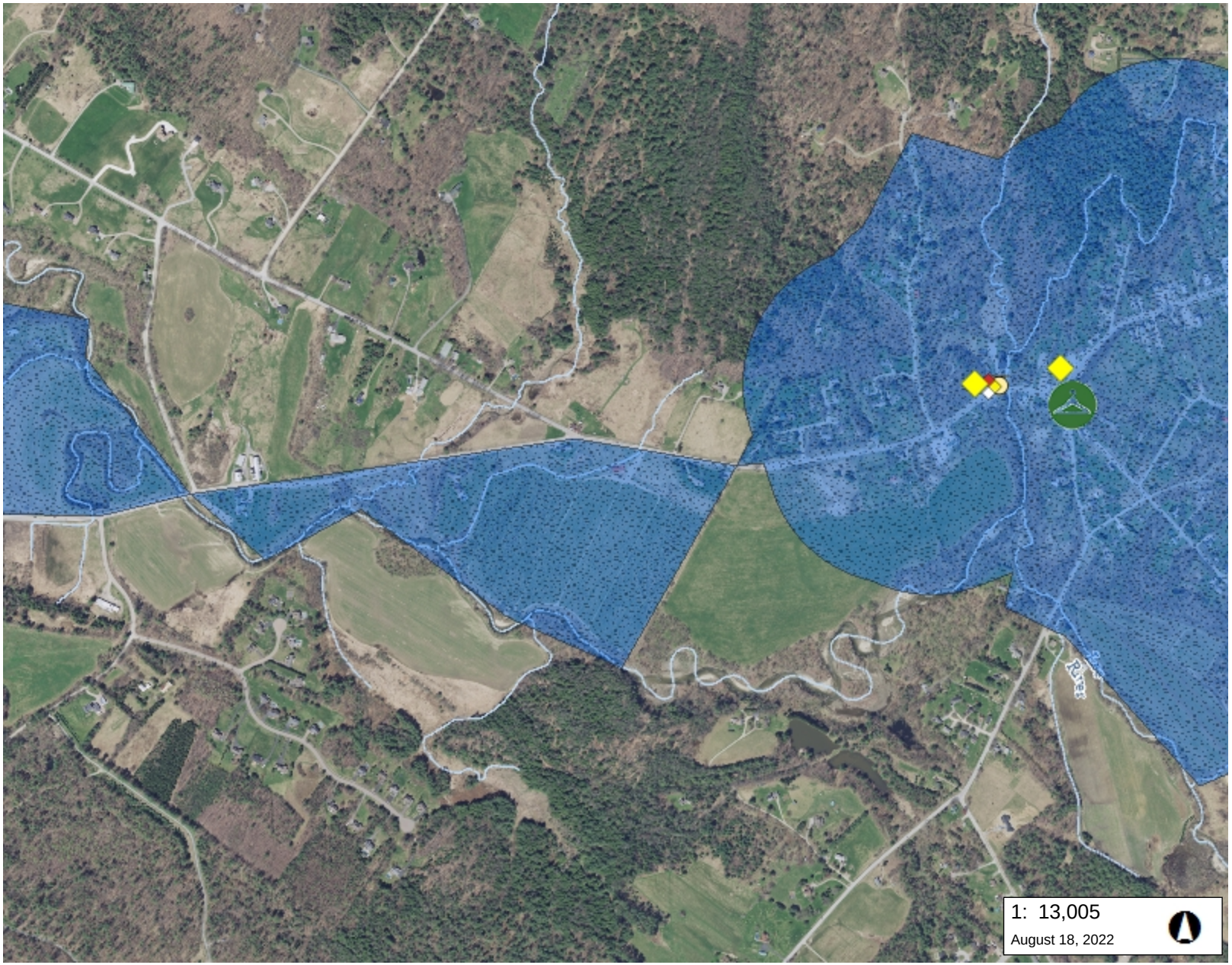
Other:
There aren't any other resources within the project area.

Appendix K: Hazardous Sites Map

Natural Resources Atlas

Vermont Agency of Natural Resources

vermont.gov



LEGEND

- Landfills
  - OPERATING
  - CLOSED
- Land Use Restrictions
  - Class IV GW Reclass
  - Class VI GW Reclass
  - Deed Restriction
  - Easement
  - Land Record Notice
  - Other
- Hazardous Site
- Hazardous Waste Generators
- Brownfields
- Salvage Yard
- Aboveground Storage Tank
- Underground Storage Tank (w
- Dry Cleaner
- Urban Soil Background Areas
- Stream/River
  - Stream
  - Intermittent Stream

NOTES

Map created using ANR's Natural Resources Atlas

661.0 0 330.00 661.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 1084 Ft. 1cm = 130 Meters

© Vermont Agency of Natural Resources

THIS MAP IS NOT TO BE USED FOR NAVIGATION

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

Appendix L: Stormwater Resource ID

VERMONT

State of Vermont
Environmental Section
219 North Main Street
Barre, Vermont 05641
Vtrans.vermont.gov

Agency of Transportation

[phone] 802-498-5787

To: Julie Ann Held, VTrans Environmental Specialist
From: Heather Voisin, VTrans Green Infrastructure Engineer
Date: August 18, 2022
Subject: Statewide – Northwest STP CULV(90) - Stormwater Resource ID Review

Project Description: I have reviewed the project area for Statewide – Northwest STP CULV(90) for stormwater related regulatory and water quality concerns. The project will involve repair or replacement to 4 different culverts in locations as follows:

- Essex VT-15 Br2
- Essex VT-2A Br 11
- Essex VT-289 Br 17
- Jericho VT-15 Br 6
-

My evaluation has included the review of existing imagery and mapping (ANR Natural Resource Atlas, VTrans Operational Stormwater Permits) to capture existing stormwater features and existing drainage.

Regulatory Considerations
Depending on how much impervious surface area is associated with repairing these culverts, an Operational Stormwater may be required, and, if any of the project work areas require greater than 1 acre of earth disturbance, the culverts would need to follow the GAP procedure considering opportunities for post-construction stormwater treatment.

For the Essex VT Route 15 culvert, several of the adjacent properties have existing operational stormwater permits, however it is not anticipated that repair or replacement of the culverts would impact those permits. This culvert conveys Indian Brook and is located within the Indian Brook watershed, which is considered impaired due to stormwater-related issues and is listed on EPA's 303(d) list. This designation is unlikely to affect the culvert projects, but it does elevate the need for a design that is sensitive to this context, as noted in the design considerations below.

The Essex VT Route 2A culvert carries an unnamed tributary of Indian Brook under the roadway and is located just outside of the stormwater-impaired portion of the Indian Brook watershed.

The culvert under VT Route 289 in Essex conveys an unnamed tributary of Alder Brook and is not located within a stormwater-impaired watershed. This location is within the limits of the historical stormwater permit that was obtained for VT Route 289. That permit is no longer in existence; however, the treatment features remain, including a grass swale running along the eastern side of the road at the culvert location.

For the Jericho culvert on VT Route 15, there do not appear to be any existing stormwater permits immediately adjacent to the project site and there are no noteworthy stormwater regulatory concerns at this time.

Design Considerations
It is strongly encouraged that drainage work associated with this project, particularly around any ditching and culvert work, be aligned with the VTrans Phosphorus Control Highway Drainage Management Standards, as this may allow future credit toward achieving phosphorus reduction goals required by the Agency's TS4 permit.

VERMONT

Appendix M: Landscape Clearence Resource ID

State of Vermont | Agency of Transportation
Environmental Section
219 North Main
Barre, VT 05641
Vtrans.vermont.gov

To: Project File
From: Bonnie Kirn Donahue, *VTrans Landscape Architect*
Date: July 21, 2022
Project: **STATEWIDE – NORTHWEST IM CULV(90) 22B044**
Subject: Landscape (LA) Clearance for Resource ID

SUMMARY

I have reviewed the locations for **STATEWIDE – NORTHWEST IM CULV(90) 22B044** dated 4/18/2022, and have determined that there are potentially minor riparian buffer impacts occurring as a result of the proposed work:

- This project includes 4 culverts:
  - Essex VT-2A Br 11
  - Essex VT-15 Br 2
  - Essex VT-289 Br 17-A
  - Jericho VT-15 Br 6A

DESCRIPTION OF IMPACT

The repair or replacement of culverts may require construction impacts to the riparian buffer and/or tree clearing.

Riparian Buffer:

Riparian and wetland buffers serve an important purpose for the health of Vermont's water quality and wildlife. They prevent erosion on steep embankments, provide shade, food sources and woody debris for healthy aquatic habitat, and provide wildlife corridors along wetlands and streams. With a vegetated riparian buffer, sediment and pollutants like phosphorus are prevented from entering water bodies, keeping our rivers, ponds and lakes clear from algae and cool for fish and other aquatic species to thrive. Revegetating areas where riparian and wetland buffers are impacted establishes a connection between the newly completed project with the existing conditions. Selecting native plants that complement the character of the area will make projects more visually appealing and merge the transportation asset with its surroundings.

Using native trees and shrubs in addition to a seed mix speeds up natural succession, establishing an effective riparian buffer more quickly than using seed alone. Selecting plants that have already started to grow will also have a better chance of establishing before invasive plants have a chance to fill in.

Tree Clearing

Trees and forests play a critical role in maintaining a healthy planet. Trees convert carbon dioxide to oxygen, filtering pollutants from the air and providing clean air to breathe. Roots and leaves work together to prevent soil erosion and control movement of sediment. Roots hold soil in place and soak up water, while leaves catch and slow down rainwater. Providing shade and performing evapotranspiration, trees also cool air and surface temperatures. Additionally, trees provide habitat, food and shelter for countless species, including insects, birds, and mammals.

Clearing of trees and forested areas can result in a loss of these benefits. Minimizing tree clearing, and replanting after construction are excellent ways to maintaining these benefits and support a healthy ecosystem.

RECOMMENDATIONS

1. I recommend re-vegetating the area with native trees and shrubs for river buffers, willow fascines or live stakes (depending on soil conditions at the waters' edge) and a diverse pollinator seed mix.
    a. See the *2022 VTrans Riparian Planting Toolkit* for design guidelines and species (link).

NOTES

1. I would be glad to assist with a plant list and plan (bonnie.donahue@vermont.gov).

Appendix N: Local Input

Project Summary

This project, PROJ #, focuses on Bridge BR-6A on Route 15 in Jericho, Vermont. The culvert is deteriorating and is in need of either a major maintenance action or replacement. Potential options being considered for this project include a new liner applied to the interior of the existing culvert pipe, removal of the existing pipe and replacement with a new culvert placed in the same location, or removal of the existing pipe and replacement in a new location. It is possible that VTrans will recommend a road closure and detour traffic away from the project site for the duration of the work. Efforts will be made to limit the detour to State roads.

Community Considerations

1. Are there regularly 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 culvert is closed during construction? Examples include annual bike races, festivals, parades, cultural events, weekly farmers market, concerts, etc. that could be impacted? If yes, please provide approximate date, location and event organizers' contact info.

2. Is there a "slow season" or period of time from May through October where traffic is less or no events are scheduled?

3. Please describe the location of the Town garage, emergency responders (fire, police, ambulance) and emergency response routes that might be affected by the closure of the culvert, one-way traffic, or lane closures and provide contact information (names, address, email addresses, and phone numbers.

4. Are there businesses (including agricultural operations and industrial parks) or delivery services (fuel or goods) that would be adversely impacted either by a detour or due to work zone proximity?

5. Are there important public buildings (town hall, community center, senior center, library) or community facilities (recreational fields, town green, etc.) close to the project?

6. What other municipal operations could be adversely affected by a road/culvert closure or detour?

7. Are there any town highways that might be adversely impacted by traffic bypassing the construction on other local roads? Please indicate which roads may be affected and their condition (paved/unpaved, narrow, weight-limited culverts, etc), including those that may be or go into other towns.

8. Is there a local business association, chamber of commerce, regional development corporation, or other downtown group that we should be working with? If known, please provide name, organization, email, and phone number.

9. Are there any public transit services or stops that use the culvert or transit routes in the vicinity that may be affected if they become the detour route?

Schools

1. Where are the schools in your community and what are their yearly schedules (example: first week in September to third week in June)?

2. Is this project on specific routes that school buses or students use to walk to and from school?

3. Are there recreational facilities associated with the schools nearby (other than at the school)?

Pedestrians and Bicyclists

1. What is the current level of bicycle and pedestrian use on the culvert?

2. Are the current lane and shoulder widths adequate for pedestrian and bicycle use?

3. Does the community feel there is a need for a sidewalk or bike lane over the culvert?

4. Is pedestrian and bicycle traffic heavy enough that it should be accommodated during construction?

5. Does the Town have plans to construct either pedestrian or bicycle facilities leading up to the culvert? Please provide any planning documents demonstrating this (scoping study, master plan, corridor study, town or regional plan).

6. In the vicinity of the culvert, 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?

Design Considerations

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

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

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

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

5. Are there any known Hazardous Material Sites near the project site?

6. Are there any known historic, archeological and/or other environmental resource issues near the project site?

7. Are there any existing, pending, or planned municipal utility projects (communications, lighting, drainage, water, wastewater, etc.) near the project that should be considered?

8. Are there any other issues that are important for us to understand and consider?

Land Use & Zoning

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

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

3. Is there any planned expansion of public transit or intercity transit service in the project area? Please provide the name and contact information for the relevant public transit provider.

Communications

1. Please identify any local communication outlets that are available for us to use in communicating with the local population. Include weekly or daily newspapers, blogs, radio, public access TV, Facebook, Front Page Forum, etc. Also include any unconventional means such as local low-power FM.

2. Other than people/organizations already referenced in this questionnaire, are there any others who should be kept in the loop as the project moves forward?
   Town of Essex Community Development Department

Appendix O: Operations Input

Bridge Scoping Project PROJ#(##)
Operations Input Questionnaire

The Structures Section has begun the scoping process for PROJ#(##), ROUTE ##, Bridge ##, over the FEATURE. This is a BRIDGE TYPE bridge constructed in YEAR. The Structure Inspection, Inventory, and Appraisal Sheet (attached) rates the deck as # (RATING), the superstructure as # (RATING), and the substructure as # (RATING). We are interested in hearing your thoughts regarding the items listed below. Leave it blank if you don't wish to comment on a particular item.

1. What are your thoughts on the general condition of this culvert and the general maintenance effort required to keep it in service?

2. What are your comments on the current geometry and alignment of the road overt the culvert (curve, sag, banking, sight distance)?

3. Do you feel that the posted speed limit is appropriate?

4. Is the current roadway width adequate for winter maintenance including snow plowing?

5. Are the railings constantly in need of repair or replacement? What type of railing works best for your district?

6. Are you aware of any unpermitted driveways within close proximity to the culvert? We frequently encounter driveways that prevent us from meeting railing and safety standards.

7. Are you aware of abutting property owners that are likely to need special attention during the planning and construction phases? These could be people with disabilities, elderly, or simply folks who feel they have been unfairly treated in the past.

8. Do you find that extra effort is required to keep the slopes and river banks around the culvert in a stable condition? Is there frequent flood damage that requires repair?

9. Does this culvert seem to catch an unusual amount of debris from the waterway?

10. Are you familiar with traffic volumes in the area of this project?

11. Do you think a closure with off-site detour and accelerated construction would be appropriate? Do you have any opinion about a possible detour route, assuming that we use State route for State projects and any route for Town projects? Are there locations on a potential detour that are already congested that we should consider avoiding?

12. Please describe any larger projects that you have completed that may not be reflected on the attached Appraisal sheet, such as deck patches, paving patches, railing replacement with new type, steel coating, etc.

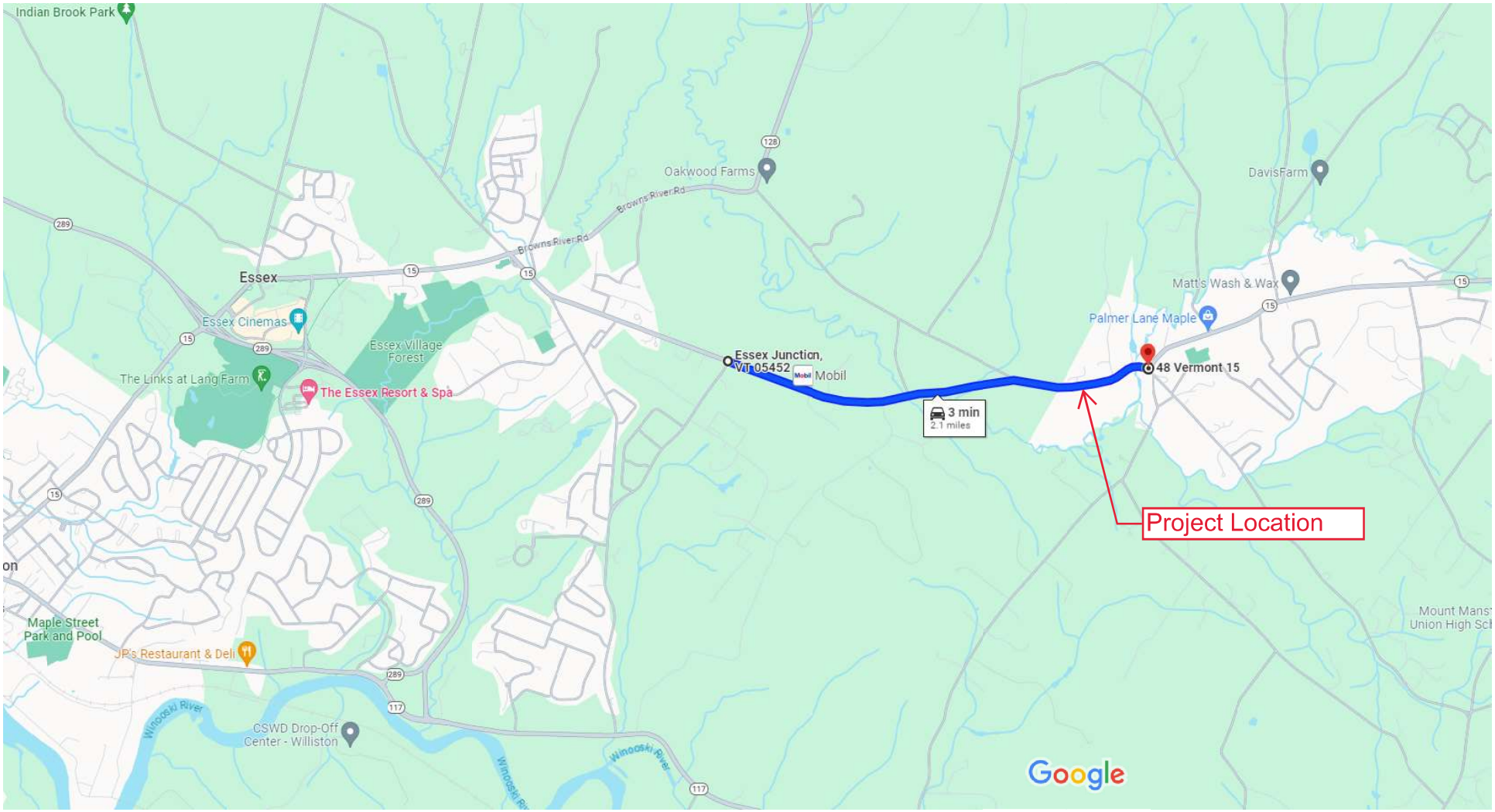
13. Are there any drainage issues that we should address on this project?

14. Are you aware of any complaints that the public has about issues that we can address on this project?

15. Is there anything else we should be aware of?

Appendix P: Detour Maps

Google Maps Jericho VT15 BR6A Through Distance Through Distance = 2.1 miles, Travel Time = 3 min



Map data ©2023 Google 2000 ft

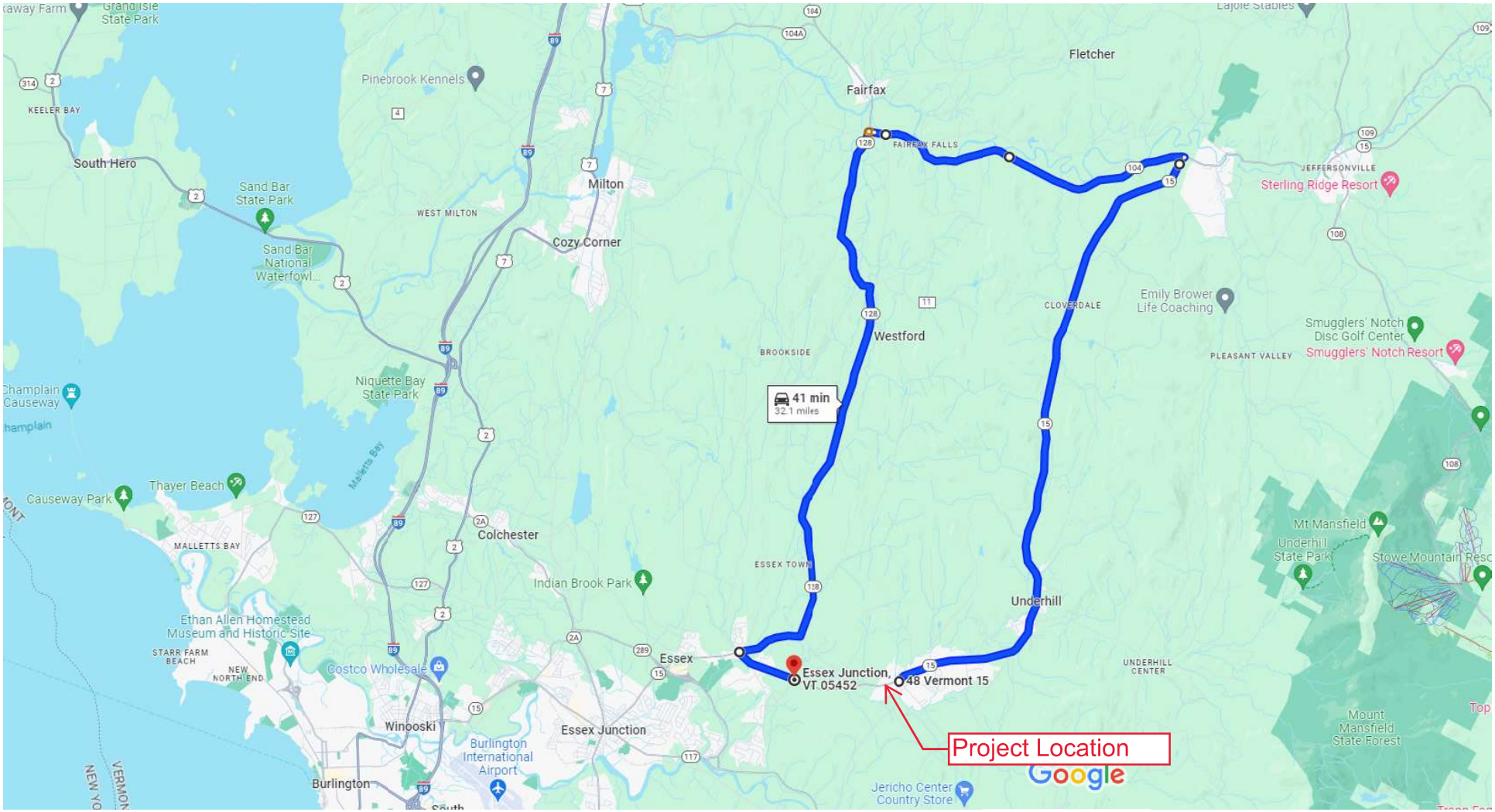
Essex Town

Essex Junction, VT 05452

1. Head east on VT-15 E toward Leo Dr

48 VT-15 2.1 mi

Google Maps Jericho VT15 BR6A Regional Detour Distance Detour Distance = 32.1 miles, Total Travel Time = 41 min



Map data ©2023 Google 1 mi

48 VT-15
Jericho, VT 05465

Regional Detour Route:
- Through distance = 2.1 miles
- Detour distance = 32.1 miles
- Added distance = 30 miles
- End-to-end distance = 34.2 miles

1. Head northeast on VT-15 E toward Skunk Hollow Rd

12.9 mi

2. Turn left onto VT-104 N

6.4 mi

3. Slight left onto McNall Rd/Ramsey Rd

0.1 mi

4. Turn left at the 1st cross street onto VT-128 S

11.5 mi

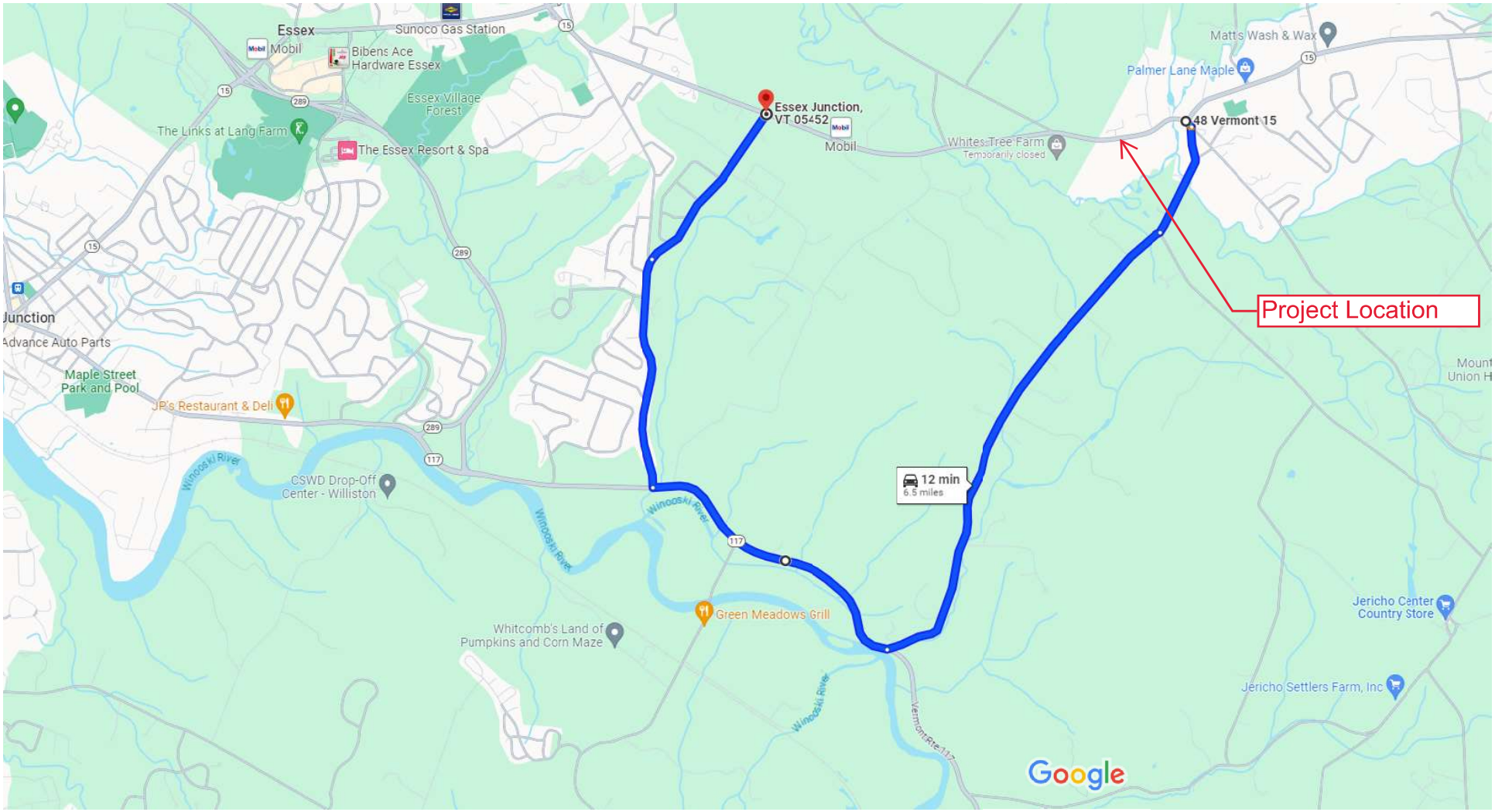
5. Turn left onto VT-15 E/Jericho Rd

1.2 mi

Essex Town

Google Maps Jericho VT15 BR6A Local Bypass Distance

Detour Distance = 6.5 miles, Total Travel Time = 12 min



Map data ©2023 Google 2000 ft

48 VT-15
Jericho, VT 05465

Local Bypass Route:
- Through distance = 2.1 miles
- Detour distance = 6.5 miles
- Added distance = 4.4 miles
- End-to-end distance = 8.6 miles

1. Head southeast on Lee River Rd toward Skunk Hollow Rd

197 ft

2. Turn right onto Plains Rd

0.5 mi

3. Continue onto Skunk Hollow Rd

2.5 mi

4. Slight right onto Vermont Rte 117 W

1.5 mi

5. Turn right onto Sand Hill Rd

1.1 mi

6. Continue straight onto Allen Martin Dr

0.9 mi

Essex Town

Appendix Q: Plans

APPROX. EXISTING TOWN R.O.W.

N/F
MERCER, KIMBERLY NORMAN

N/F
HAZELTON, PETER D. & MOLLY D.

N/F
MCCARTHY, PATRICK A. & YONG SUK

N

VT STATE PLANE GRID

(TH-47 MOUNTAIN VIEW ROAD)

N07°35'12"W 417.00'

POB 50+00.00

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV.= 540.90

SR(P)

PT 3+00.96

STA 4+64.75=
CHAN 40+00.00
Δ=85°00'00"LT

N/F
FORSYTH, TODD & CHERYL

N/F
FORSYTH, TODD & CHERYL

PC 6+04.44

APPROX. EXISTING R.O.W.

N82°24'47.72"E 404.00'

S11°50'08.24"E 121.00'

STA 5+13.40=
CHAN 50+99.85
Δ=85°45'04"RT

N/F
STRANG, ROBERT R. & ELIZABETH

POE 52+00.00

CURVE (x)
DELTA = 02°
D = 00°38'2
R = 8960.00
T = 179.39'
L = 358.73'
e = 1.80'

PI 7+83.83

VT ROUTE 15
TO ESSEX

VT ROUTE 15
TO UNDERHILL

2+00 3+00 4+00 5+00 51+00 52+00 6+00 7+00 8+00

540' 530' 520' 510'

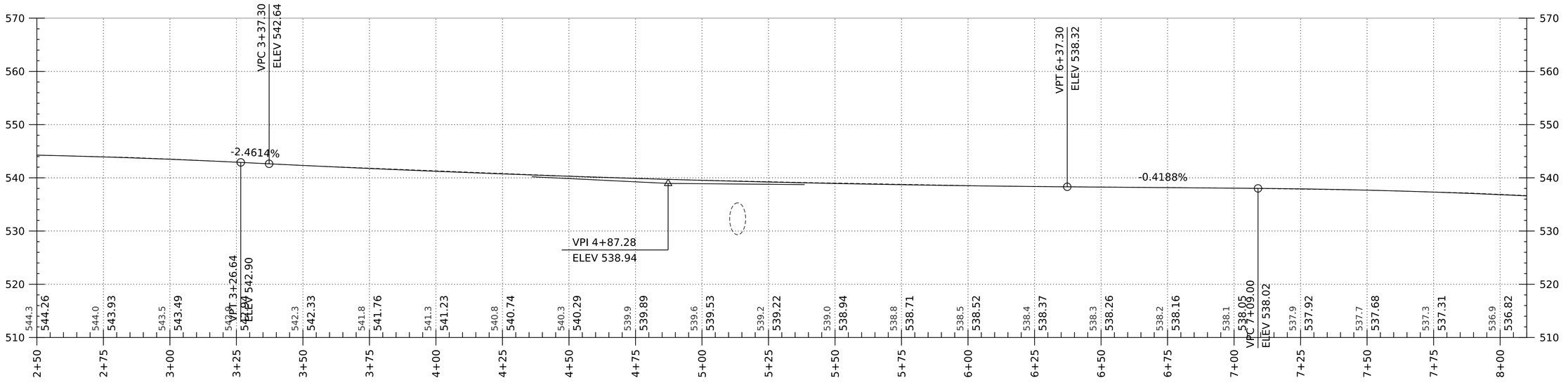
TELEPHONE POLE
COMB 186
GUY WIRE
SIGN UNDERGROUND GAS
SIGN UNDERGROUND WATER
SIGN VW-133R
SIGN VR-023
SIGN VR-014 (BRIDGE 6A VT 15)
SIGN VR-014 (GERICHO UNDERHILL FLATS 4)
SIGN VR-014 (ETHAN ALLEN TRAINING SITE)
MILEMARKER 0050
MILEMARKER 0009
GATE VALVE
HVCTRL 101
HVCTRL 100
HVCTRL 2
18" CPEP FLOW
72" CGMP FLOW
WOODEN FENCE
PAVED SHOULDER
ARCH
DIST=34.95
DIST=41.14
DIST=20.02

EXISTING BRIDGE INFORMATION
72" CGMP, 66' LONG
BUILT ?
6' AVERAGE COVER
28 SQ FT WATERWAY AREA

EXISTING CONDITIONS

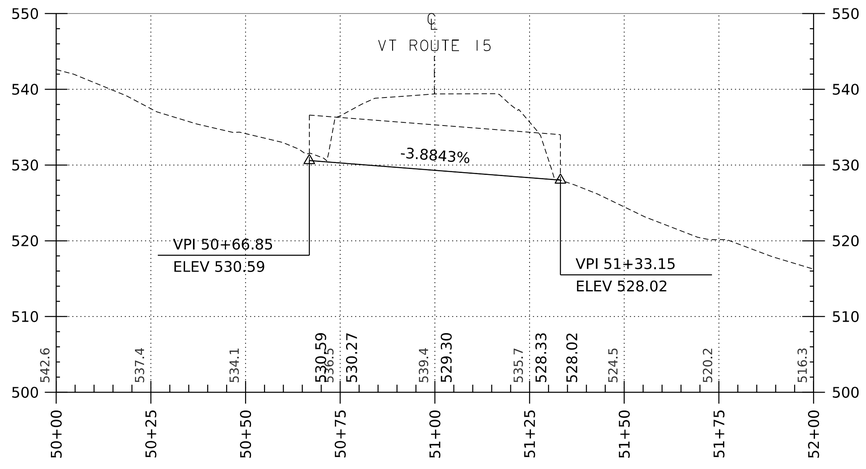
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_Existing Condidions.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS LAYOUT	SHEET 1 OF 2



VT ROUTE 15 EXISTING PROFILE

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

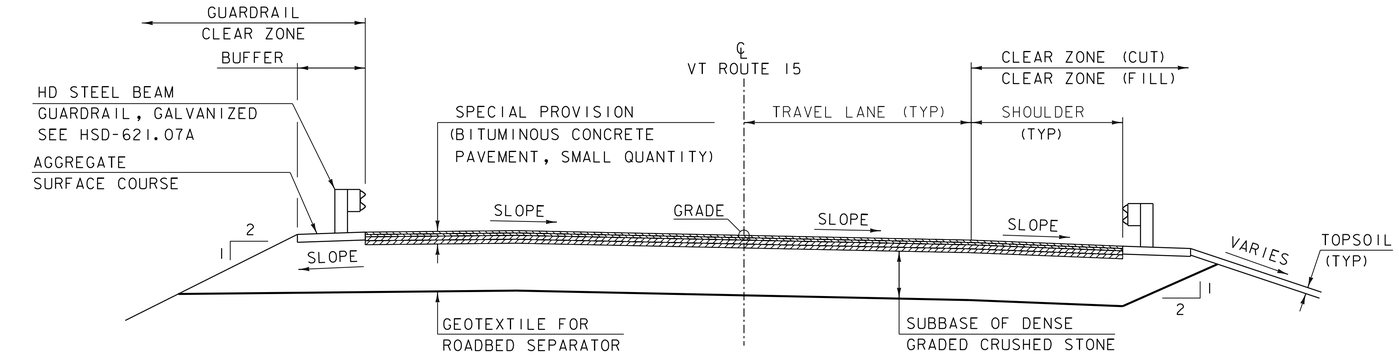


CULVERT 6A EXISTING CHANNEL PROFILE

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

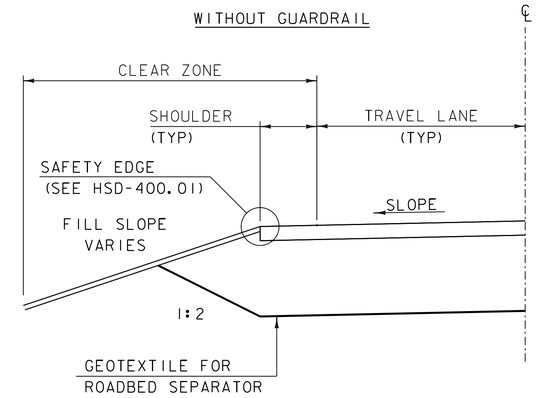
NOTE:
GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_profile.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING PROFILE SHEET	SHEET 2 OF 12



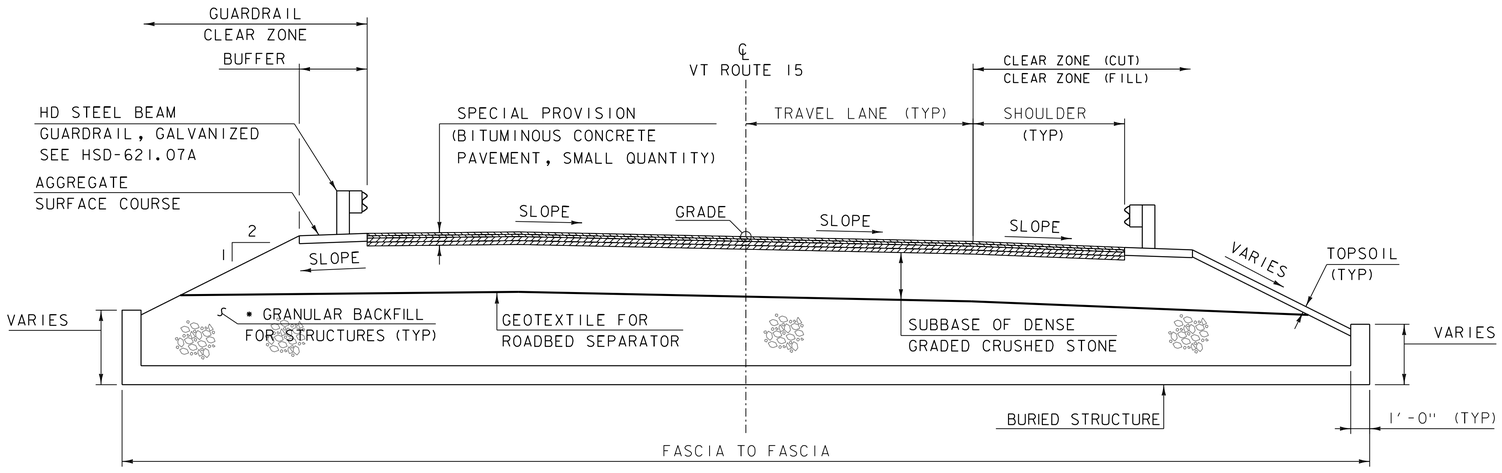
VT ROUTE 15 TYPICAL SECTION

SCALE: 1/4" = 1'-0"



ROADWAY TYPICAL SECTION

NOT TO SCALE



VT ROUTE 15 BURIED STRUCTURE TYPICAL SECTION

SCALE: 1/4" = 1'-0"

ROAD TYPICAL INFORMATION

	LEFT		RIGHT	
	WIDTH	SLOPE	WIDTH	SLOPE
TRAVEL LANE	11'-0"	VARIES	11'-0"	VARIES
SHOULDER	5'-0"	VARIES	5'-0"	VARIES
BUFFER	3'-7"	-0.060	3'-7"	-0.060
FILL SLOPE	---	VARIES	---	VARIES
CLEAR ZONE (CUT)	14'-0"	---	14'-0"	---
CLEAR ZONE (FILL)	16'-0"	---	16'-0"	---
CLEAR ZONE (GUARDRAIL)	4'-9"	---	4'-9"	---

MATERIAL INFORMATION

	THICKNESS	TYPE
WEARING COURSE	1½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BINDER COURSE	1½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BASE COURSE #2	2½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IIS)
BASE COURSE #1	2½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IIS)
BUFFER	8"	AGGREGATE SURFACE COURSE
SUBBASE	XX"	SUBBASE OF DENSE GRADED CRUSHED STONE
TOPSOIL	4"	TOPSOIL

TACK COAT: EMULSIFIED ASPHALT IS TO BE APPLIED AT A RATE OF 0.025 GAL/SY BETWEEN SUCCESSIVE COURSES OF PAVEMENT AND 0.080 GAL/SY ON COLD PLANED SURFACES AS DIRECTED BY THE ENGINEER.

MATERIAL TOLERANCES

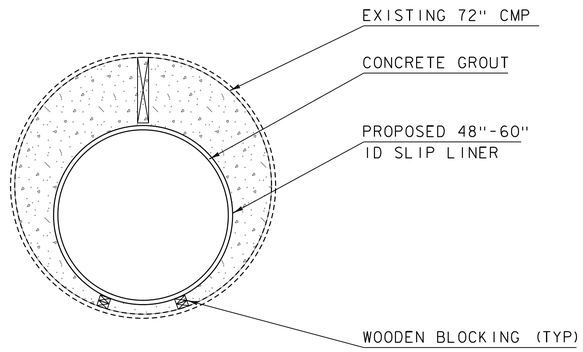
(IF USED ON PROJECT)

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

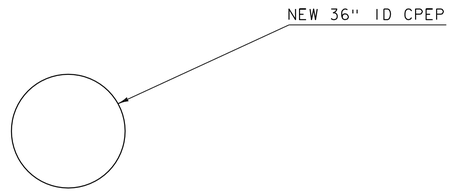
PROJECT NAME: STATEWIDE - NORTHWEST
PROJECT NUMBER: STP CULV(90)

FILE NAME: Jericho VT 15 Br 6A_typ.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
ROADWAY TYPICAL SECTION SHEET

PLOT DATE: 28-SEP-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------



SLIP LINER TYPICAL SECTION



NEW CULVERT TYPICAL SECTION

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)

FILE NAME: Jericho VT 15 Br 6A_typ.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ----------	CHECKED BY: ----------
REHABILITATION & REPLACEMENT TYP SECTIONS	SHEET 4 OF 12

N

VT STATE PLANE GRID

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. =540.90

STA 4+64.75=
CHAN 40+00.00
Δ=90° 00' 00"LT

STA 5+13.40=
CHAN 50+99.85
Δ=85° 45' 04"RT

PT 3+00.96

PC 6+04.44

PI 7+83.83

CURVE (x)
DELTA = 02°
D = 00°38'2
R = 8960.00
T = 179.39'
L = 358.73'
e = 1.80'

N07°35'12"W

N82°24'47.72"E

S11°50'08.24"E

TH-47
(MOUNTAIN VIEW ROAD)

VT ROUTE 15
TO ESSEX

VT ROUTE 15
TO UNDERHILL

2+00
3+00
4+00
40+00
41+00
5+00
50+00
51+00
52+00
6+00
7+00
8+00

TELEPHONE POLE
COMB 3 173
GUY WIRE
SIGN UNDERGROUND GAS
SIGN UNDERGROUND WATER
SIGN VW-133R
COMB 197 172
GUY WIRE
SIGN UNDERGROUND GAS
SIGN R1-1 (0150 0409 0008)
MILEMARKER
GATE VALVE
HVCTRL 101
18" CPEP FLOW
GUY WIRE
COMB 198 171
SIGN 2X03-1 (VT Route 15 Mountain View Rd)
SIGN VR-017 (BRIDGE 6A VT 15)
SIGN UNDERGROUND GAS
COMB 199 170
SIGN UNDERGROUND WATER
HVCTRL 3
PAVED SHOULDER
HVCTRL 2
SIGN VR-023b
SIGN VD-018A (JERICHO UNDERHILL FLATS 4)
SIGN VR-017 (BRIDGE VT 15)
SIGN (ETHAN ALLEN TRAINING SITE)
HVCTRL 100
WOODEN FENCE
WOODEN FENCE
ARCH

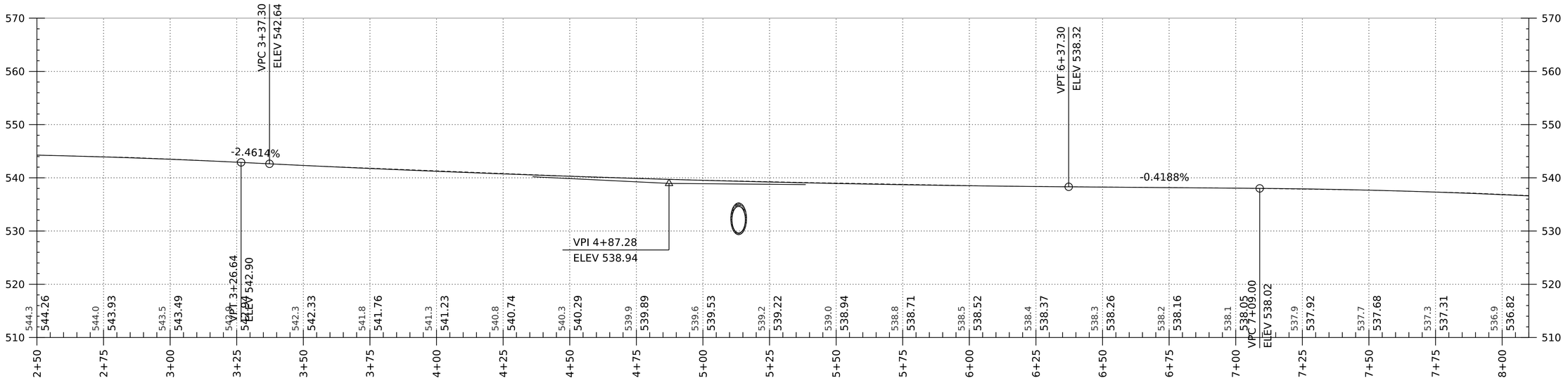
38'14"
2"

EXISTING BRIDGE INFORMATION
72" CGMP, 66' LONG
BUILT ?
6' AVERAGE COVER
28 SQ FT WATERWAY AREA

CULVERT LINER

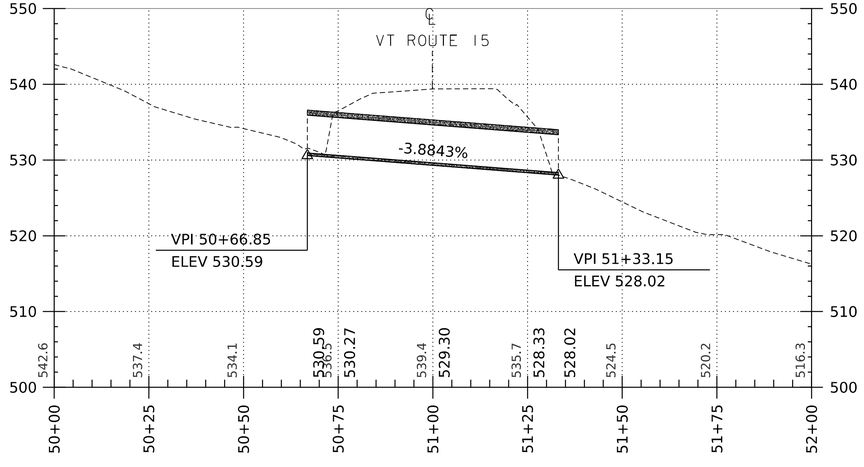
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_BDR_Liner.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
CULVERT LINER LAYOUT	SHEET 5 OF 12



VT ROUTE 15 CULVERT LINER PROFILE

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

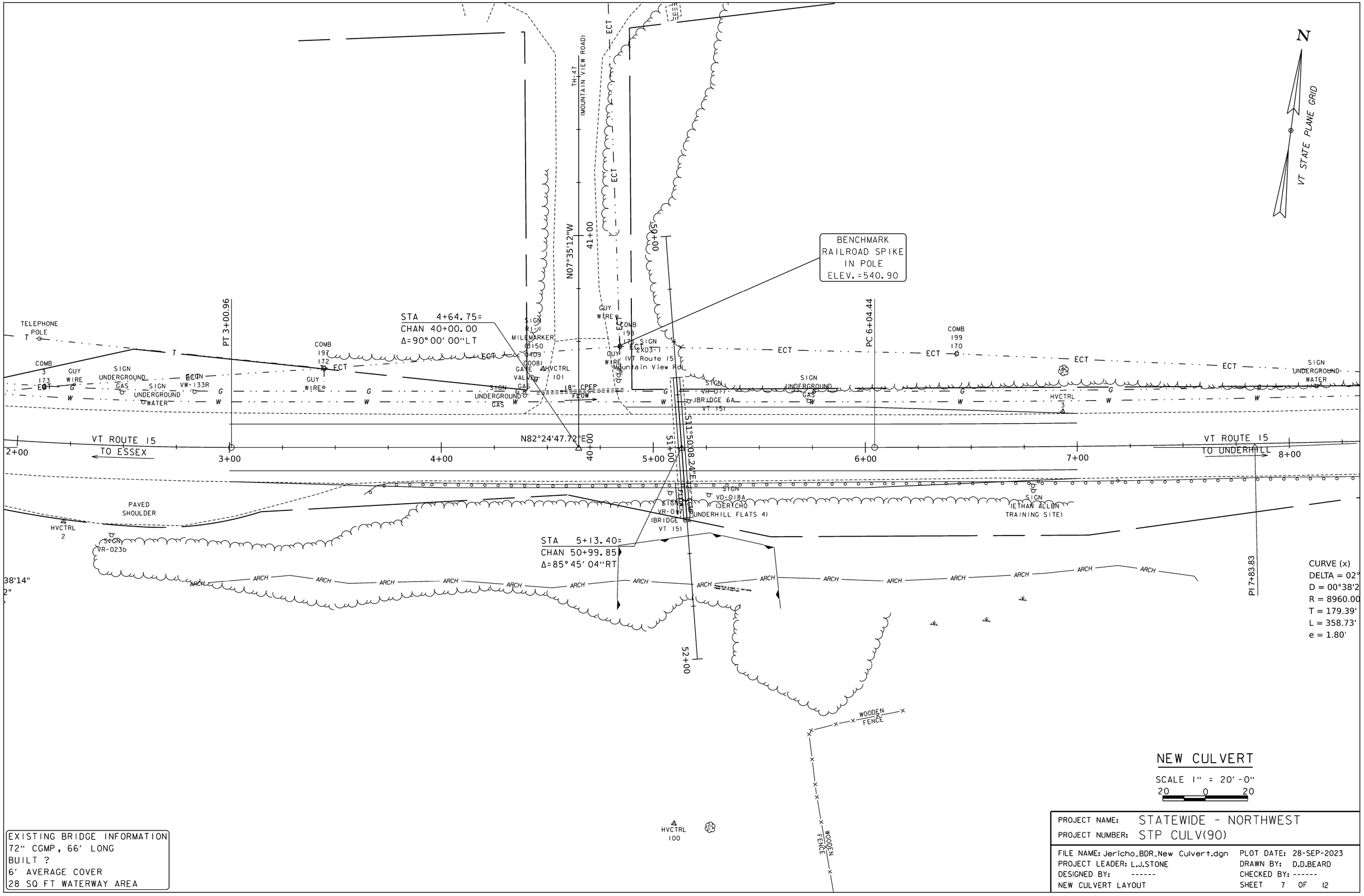


CULVERT 6A CULVERT LINER CHANNEL PROFILE

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:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_profile.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
CULVERT LINER PROFILE SHEET	SHEET 6 OF 12



STA 5+13.40=
CHAN 50+99.85
Δ=85° 45' 04"RT

EXISTING BRIDGE INFORMATION
72" CGMP, 66' LONG
BUILT ?
6' AVERAGE COVER
28 SQ FT WATERWAY AREA

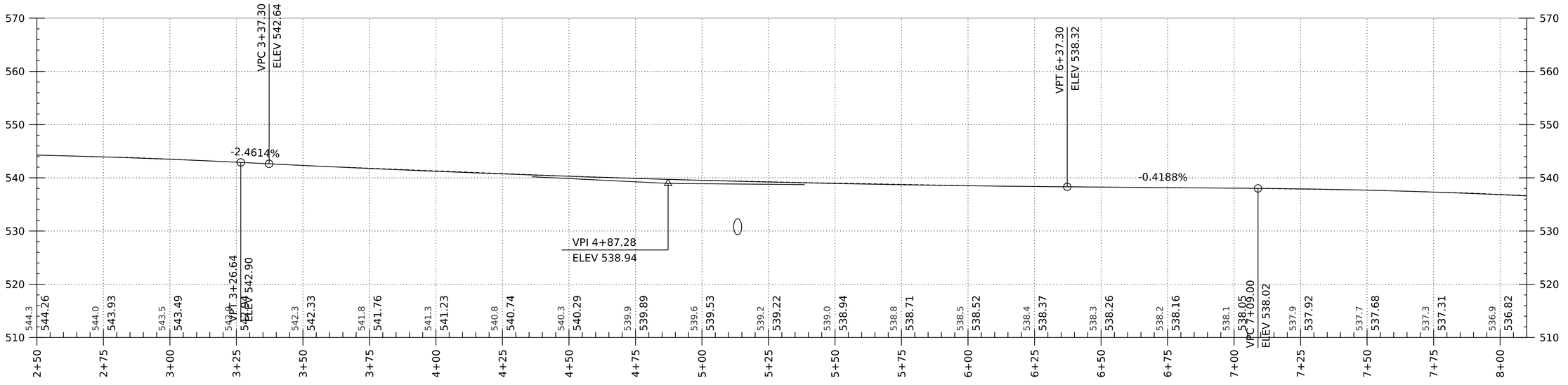
NEW CULVERT

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

PROJECT NAME: STATEWIDE - NORTHWEST
PROJECT NUMBER: STP CULV(90)

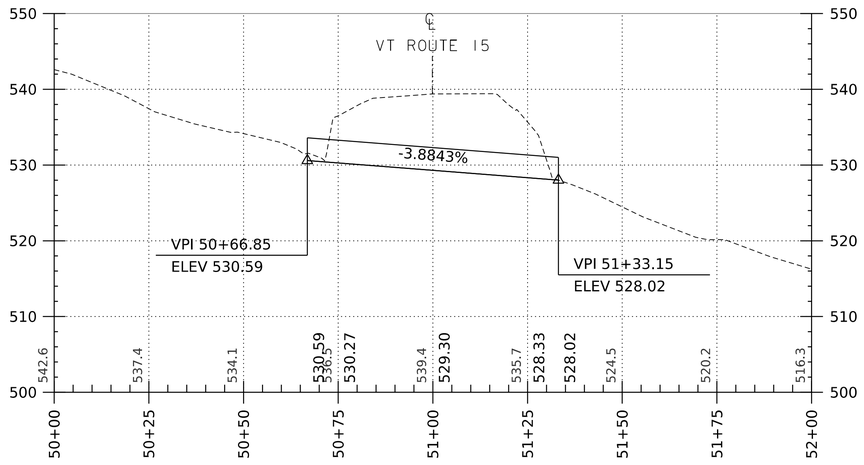
FILE NAME: Jericho_BDR_New Culvert.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
NEW CULVERT LAYOUT

PLOT DATE: 28-SEP-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 7 OF 12



VT ROUTE 15 NEW CULVERT PROFILE

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

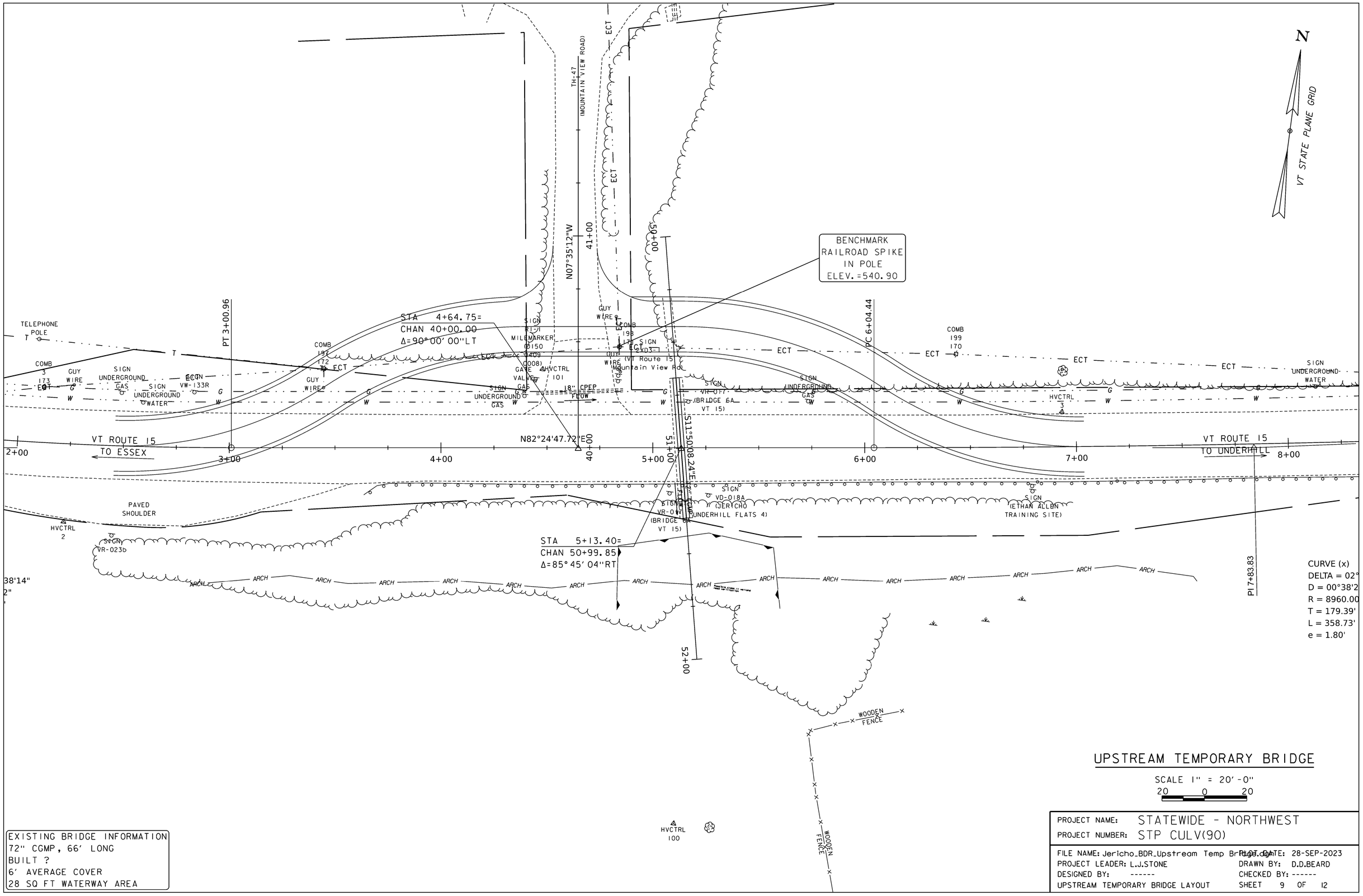


CULVERT 6A NEW CULVERT CHANNEL PROFILE

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:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_profile.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
NEW CULVERT PROFILE SHEET	SHEET 8 OF 12



UPSTREAM TEMPORARY BRIDGE

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

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_BDR_Upstream Temp Bridge.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
UPSTREAM TEMPORARY BRIDGE LAYOUT	SHEET 9 OF 12

N

VT STATE PLANE GRID

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. =540.90

STA 4+64.75=
CHAN 40+00.00
Δ=90° 00' 00"LT

PT 3+00.96

PC 6+04.44

TH-47
(MOUNTAIN VIEW ROAD)

N07°35'12"W
41+00

50+00

N82°24'47.72"E
40+00

51+00

N11°35'08.24"W
52+00

STA 5+13.40=
CHAN 50+99.85
Δ=85° 45' 04"RT

PI 7+83.83

CURVE (x)
DELTA = 02°
D = 00°38'2
R = 8960.00
T = 179.39'
L = 358.73'
e = 1.80'

38'14"
2"
'

VT ROUTE 15
TO ESSEX

VT ROUTE 15
TO UNDERHILL

2+00
3+00
4+00
5+00
6+00
7+00
8+00

TELEPHONE POLE
COMB 3 173
GUY WIRE
SIGN UNDERGROUND GAS
SIGN VW-133R
UNDERGROUND WATER
COMB 197 172
GUY WIRE
SIGN R1-1 MILEMARKER 0150 0409 0008)
GATE VALVE
HVCTRL 101
SIGN UNDERGROUND GAS
18" CPEP FLOW
GUY WIRE
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SIGN 2X03-1 (VT Route 15 Mountain View Rd)
SIGN VR-017 (BRIDGE 6A VT 15)
COMB 199 170
SIGN UNDERGROUND GAS
SIGN UNDERGROUND WATER
HVCTRL 3
PAVED SHOULDER
HVCTRL 2
SIGN VR-023b
SIGN VR-018 (BRIDGE VT 15)
72" CGMP
SIGN VD-018A (JERICHO UNDERHILL FLATS 4)
SIGN (ETHAN ALLEN TRAINING SITE)
ARCH
HVCTRL 100
WOODEN FENCE
WOODEN FENCE

EXISTING BRIDGE INFORMATION
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BUILT ?
6' AVERAGE COVER
28 SQ FT WATERWAY AREA

PHASE I LAYOUT

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

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)

FILE NAME: Jericho_BDR_Phase I.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASE I LAYOUT	SHEET 10 OF 12

N

VT STATE PLANE GRID

BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV. =540.90

TH-47
(MOUNTAIN VIEW ROAD)

N07°35'12"W

41+00

50+00

STA 4+64.75=
CHAN 40+00.00
Δ=90° 00' 00"LT

PT 3+00.96

PC 6+04.44

TELEPHONE POLE

COMB 3 173 ECT

COMB 197 172 ECT

COMB 198 ECT

COMB 199 170 ECT

GUY WIRE

SIGN UNDERGROUND GAS

SIGN UNDERGROUND WATER

SIGN VW-133R

SIGN UNDERGROUND GAS

MILEMARKER 0150 (409 0008)

GATE VALVE

HVCTRL 101

18" CPEP FLOW

SIGN VR-017 (VT Route 15 Mountain View Rd)

SIGN 2XD3-1

SIGN VR-017 (BRIDGE 6A VT 15)

HVCTRL 3

VT ROUTE 15
TO ESSEX

VT ROUTE 15
TO UNDERHILL

2+00

3+00

4+00

40+00

5+00

51+00

6+00

7+00

8+00

N82°24'47.72"E

S11°50'24"E

PAVED SHOULDER

HVCTRL 2

SIGN VR-023b

SIGN VD-018A (JERICHO UNDERHILL FLATS 4)

SIGN VR-017 (BRIDGE VT 15)

SIGN (ETHAN ALLEN TRAINING SITE)

STA 5+13.40=
CHAN 50+99.85
Δ=85° 45' 04"RT

52+00

ARCH

PI 7+83.83

CURVE (x)
DELTA = 02° 38'14"
D = 00°38'2
R = 8960.00
T = 179.39'
L = 358.73'
e = 1.80'

WOODEN FENCE

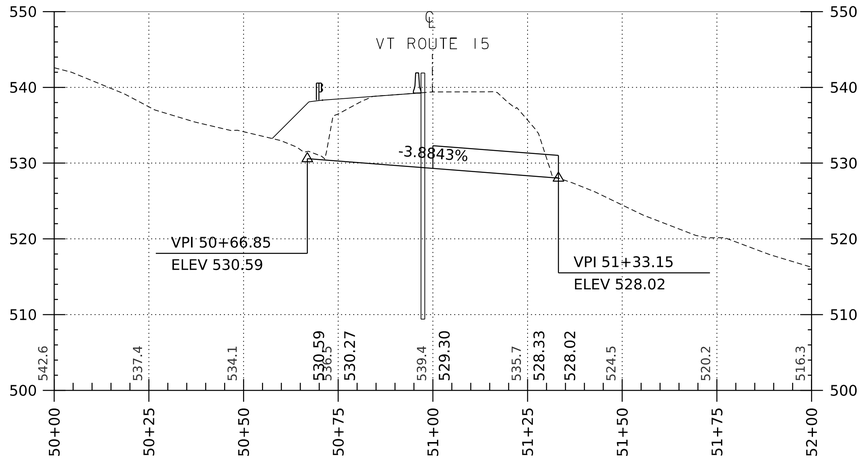
HVCTRL 100

EXISTING BRIDGE INFORMATION
72" CGMP, 66' LONG
BUILT ?
6' AVERAGE COVER
28 SQ FT WATERWAY AREA

PHASE 2 LAYOUT

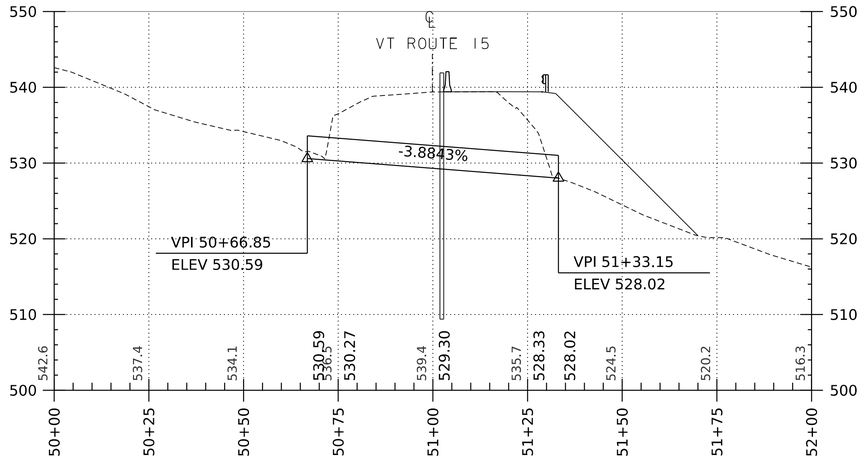
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_BDR_Phase 2.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASE 2 LAYOUT	SHEET 11 OF 12



PHASE 1 PROFILE

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



PHASE 2 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:	STATEWIDE - NORTHWEST
PROJECT NUMBER:	STP CULV(90)
FILE NAME: Jericho_profile.dgn	PLOT DATE: 28-SEP-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASING PROFILE SHEET	SHEET 12 OF 12