STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Dorset
STATEWIDE - SOUTHWEST STP CULV(91)

VT ROUTE 30, BRIDGE 58A OVER DRAINAGE CULVERT

March 9, 2023

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I. Site Information

Bridge 58A is a State-owned Culvert located on VT Route 30 in the Town of Dorset approximately 7.1 miles north of the junction with VT Route 7A. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Minor Arterial
Bridge Type	Asphalt Coated Corrugated Galvanized Metal Plate Pipe (ACCGMPP)
Culvert Span	6 feet
Culvert Length	56 feet
Fill Over Culvert	4 feet
Year Built	1949
Ownership	State of Vermont

Need

Bridge 58A carries VT Route 30 across a closed drainage system. The following is a list of deficiencies of Bridge 58A and VT Route 30 in this location:

1. The culvert is in poor condition. There are holes scattered throughout the pipe measuring 1 to 2-feet in diameter causing material loss.

2. The existing shoulder widths along VT Route 30 are substandard.

3. VT Route 30 has a substandard vertical crest curve 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	3,700	4,059
DHV	440	480
ADTT	404	643
%T	9.4	13.6
%D	69	69

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 4,060, a DHV of 480, and a design speed of 40 mph for a Minor Arterial.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Lane and Shoulder Widths	VSS Table 4.3	11'/3' (28')	11'/5' (32')	Substandard
Clear Zone Distance	VSS Table 4.4	No Issues Noted	14' fill 12' cut	
Banking	VSS Section 4.13	Normal Crown	8% (max)	
Speed	VT Route Log	40 mph (Posted)	40 mph (design)	
Horizontal Alignment	AASHTO Green Book Table 3-10b	$R = \infty$	R_{min} = 5,410' @ NC	
Vertical Grade	VSS Table 4.5	2.67% (max)	5% (max) for level terrain	
K Values for Vertical Curves	VSS Table 4.1	K_{crest} = 74	60 crest / 60 sag	
Vertical Clearance	VSS Section 4.8	No Issues Noted	14'3" (min)	
Stopping Sight Distance	VSS Table 4.1	415'	275'-325'	
Bicycle/Pedestrian Criteria	VSS Table 4.7	3' shoulder	4' Shoulder	Substandard
Hydraulics	VTrans Hydraulics Section	HW/D = 0.52 Clear span: 6'	HW/D < 1.2 Bank Full Width: 4'	AOP not required
Structural Capacity	SM, Ch. 3.4.1	Structurally Sufficient	Design Live Load: HL-93	

Inspection Report Summary

Culvert Rating 4 Poor
Channel Rating NOT APPLICABLE

12/1/2023 – Culvert comments: Areas of freckled rust and minor rust staining throughout. The splice connections and sides of the pipe near the center have scattered small areas of heavy rust scale with deep pitting and minor to moderate section loss. The north side has scattered large perforations as well measuring 1'- 2' in diameter allowing some loose fill to fall through. The grated drop inlet and surrounding retaining concrete blocks are undermined 6"- 1' vertically and penetrating 3'+/-.

11/30/2016 – This pipe supplements only a small drainpipe and should be removed and a smaller HDPE (or equivalent) pipe installed in its place ~ MJ/SP/AC

11/28/2012 – This is a 24-month inspection with no changes seen since last inspection of 2011 ~ PLB

07/20/2011 – Sinkholes may develop in the roadway in the not too distant future due to holes along the North wall of the pipe ~ PLB

07/07/2009 – Culvert is in fair to poor condition with holes in the north side of the pipe in places. This structure is now used for a drainage ditch. Culvert will need replacing in the near future ~ DCP

Hydraulics

The existing structure meets the current hydraulic standards of the VTrans hydraulic manual and minimum bankfull width standards. The existing 6-foot diameter culvert provides a Headwater to Depth ratio (HW/D) of 0.52 during the design storm event. Per the current standards, a culvert with a diameter greater than 60-inches should provide a maximum HW/D of 1.2 during the design storm event. Hydraulics has made several recommendations for a rehabilitation or replacement structure; these options are outlined in the preliminary hydraulics report in Appendix C. Aquatic Organism Passage is not required for this location.

Utilities

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

Municipal Utilities

- There are no municipal utilities within the project area.

Public Utilities

Underground:

- There are no underground utilities within the project area.

Aerial:

- Aerial infrastructure is located on the inlet end of the pipe (eastern side of the road) and is owned by Green Mountain Power (Single Phase and Three Phase), Consolidated Communications, Comcast, FirstLight Fiber, and the Vermont Telephone Company.

It is anticipated that overhead utilities may need to be relocated depending on the project scope.

Right-Of-Way

The existing Right-of-Way (ROW) is plotted on the Existing Conditions Layout sheet. The existing inlet and outlet of the culvert are located outside of the State-owned ROW. As such, any construction alternative will require additional rights to be acquired.

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 no wetlands located in the project area.

Rare, Threatened, and Endangered Species

There are no occurrences of R/T/E species within the project vicinity.

The USFWS IPaC mapping indicates that the project area is within the Northern Long Eared Bat's (NLEB's) habitat range. The NLEB is a federally listed threatened species. Suitable habitats for NLEB's per guidance from USFWS are: trees ≥ 3 inches in diameter that have holes, crevices,

cracks or peeling bark. As the project moves forward, additional investigation is warranted to avoid impacts to potential roosting habitat.

Wildlife Habitat

Resource identification has found that there is little or no need for extra provisions for wildlife passage.

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.

Historic:

- A potentially National-register eligible farmstead was identified within a likely project APE at 4299 and 4343 Vermont Route 30. Further research, including better images of the farmhouse, is necessary to make a more definitive determination; however, this complex should be considered historically significant during project design. Section 4(f) review might be necessary if easements are required from the parcel associated with the farm complex.

- Although over 50 years of age, Bridge 58A is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Archeological:

There are no archaeologically sensitive areas within the project limits.

Stormwater:

There are no stormwater concerns for this project.

II. 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. There are holes up to 2-feet throughout the culvert invert which will continue to grow if no action is taken. Additionally, roadway undermining is starting to occur due to these large voids. Something will have to be done to improve this culvert in the near future. 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.

Structure Rehabilitation

This alternative involves the rehabilitation of the existing corrugated metal plate pipe. The culvert is rated in poor condition, however, there is no visible settlement or displacement, and the culvert maintains its shape making rehabilitation feasible at this location. Since the minimum hydraulic opening is a 4-foot diameter, any of the rehabilitation options will meet the minimum hydraulic standards.

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. Curing in dry conditions would be required in most cases, necessitating a re-routing of the stream flow during the work and for a prescribed curing period (usually 24 hours).

a. Pipe Liner:
   A pipe liner involves inserting a culvert liner into the existing culvert, and grouting between the two. The outside diameter of the pipe used for slip lining 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 existing pipe has deformed at the last 10-feet on the outlet end. As such, a slightly smaller liner may be needed and should be installed from the inlet end. A liner would have an approximate 5-foot diameter, but could be as small as a 4-foot diameter to meet the 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 fatigue failure, stabilizes the pipe, and extends the design life by approximately 50 years.

b. Spray-On Liner

   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 may need to be acquired to provide a staging area at each end to accomplish this alternative.

Advantages: The rehabilitation alternatives would be the most cost-efficient option. It would have minimal impacts to resources and would not interrupt traffic.

Disadvantages: The rehabilitation alternative is only a repair and not a new structure. The life span of the repair work is estimated to be 20 to 50 years. The existing substandard roadway width would remain unchanged for any culvert rehabilitation option.

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

Structure Replacement

The preliminary hydraulics report specifies that a minimum 4-foot diameter culvert would meet the minimum requirements at this location. By replacing the existing culvert with a smaller structure, the pipe can be removed from the large culvert structures inventory. Additionally, there has been material loss in the roadway due to large voids in the existing culvert. This alternative would replace all of the roadway fill material, mitigating any risks of voids in the roadway around the culvert.

Structure Replacement Using Open Cut

Culvert replacement using an open cut is considered a more cost-effective solution then trenchless methods when there is a shallow amount of fill over the culvert. There is approximately 4-feet of fill over the culvert, making this the most cost effective replacement option.

This option involves removing the existing Corrugated Galvanized Metal Plate Pipe and replacing it with a new culvert having a minimum span of 4-feet. The various considerations under this option include: the roadway width, structure type, culvert length and skew, and roadway alignment.

a. Roadway Width

The existing roadway currently has 11-foot-wide lanes and 3-foot-wide shoulders, which does not meet the minimum standard of 32-feet as set forth in the Vermont State Standards. Since a new 75+ year structure is being proposed, the roadway geometry should meet the minimum standards. A 32-foot width roadway with 11-foot-wide lanes and 5-foot-wide shoulders will be proposed through the project area to meet minimum requirements.

b. Structure Type

The most common structure type for the recommended hydraulic opening is a round corrugated metal plate pipe or High Density Poly Ethylene (HDPE) pipe. Either option would be an acceptable material for this site, however, the HDPE option is expected to have a longer service life as compared to the metal option.

c. Culvert Size, Length and Skew

The existing culvert has a span of 6 feet, which is larger than what is needed at this site. If a new structure is chosen Hydraulics has recommended a minimum 4-foot diameter pipe, which would get the structure off the large culvert inventory. In order to accommodate a 32-foot-wide roadway, the proposed barrel length will be approximately 60 feet long. The culvert would have an approximate skew of 70 degrees to the roadway to match the existing skew of the channel.

d. Roadway Alignment

Horizontal: The existing horizontal alignment meets the minimum standards as set forth by the AASHTO Green Book. As such it is recommended that the horizontal alignment remains unchanged.

Vertical: The existing vertical alignment has a substandard crest curve. However, the culvert is not located within a high crash location segment. In order to keep project limits as well as adjacent property impacts to a minimum, it is recommended that the vertical alignment remains unchanged.

e. Maintenance of Traffic

Either an off-site detour, phased construction, or a temporary bridge would be appropriate measures for traffic control at this site.

Advantages: This alternative would address the structural deficiencies of the existing bridge, with a brand-new culvert with a 75-year design life. This option would meet the minimum hydraulic standards and minimum roadway width standards.

Disadvantages: This option has the higher upfront costs compared to the rehabilitation options.

III. 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 traffic onto an official, signed State detour. There are two detours that could be used if the bridge is closed during construction. The shortest potential State-signed detour is as follow:

> Regional Detour Route. VT Route 30, to US Route 7, US Route 4, and VT Route 133, back to VT Route 30 (72.1 miles end-to-end)

There is a local bypass route that may see an increase in traffic from local passenger cars if VT Route 30 is closed during construction. Local bypass routes are not signed detours but may experience higher traffic volumes during a road closure. The most likely local bypass route is as follows:

> Local Bypass 1. VT Route 30, to Church Street, Dorset West Road, Rupert Mountain Road, back to VT Route 30 (4.3 miles end-to-end)

A map of the detour routes and possible local bypass route, which could see an increase in traffic, can be found in Appendix M.

Advantages: Utilizing an off-site detour would eliminate the need to use a temporary bridge or phase construction to maintain traffic. This would decrease the cost and amount of time required to construct a project in this location. The impacts and amount of temporary rights required to construct a project in this location would also be reduced for this option. The safety of both construction workers and the travelling public will be improved by removing traffic from the construction site. Impacts to cultural resources and the need for additional Right-of-Way would be avoided.

Disadvantages: Traffic flow would not be maintained through the project corridor during construction. A hyper-accelerated closure duration would require night work and lighting.

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 traffic volumes, it is acceptable to close one lane of traffic, and maintain one lane of alternating traffic, both ways, with a traffic signal. Due to the narrow shoulders, the road would have to be temporarily widened for construction and safe vehicle traffic for phased construction. Impacts to cultural resources and the need for additional Right-of-Way would be avoided.

Option 3: Temporary Bridge

From a constructability standpoint, a temporary bridge would need to be placed on the upstream side of the existing culvert. There are several structures located on the downstream side that would make placement of a downstream temporary bridge difficult. A temporary bridge on the upstream side would have limits outside the existing Right-of-Way and would require an aerial utility relocation.

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, it should be a one-way alternating bridge with traffic signals to accommodate the traffic volumes along VT Route 30. A two-way bridge would be acceptable as well.

Advantages: Traffic flow can be maintained along the VT Route 30 corridor.

Disadvantages: This option would have adverse impacts to surrounding resources including aerial utilities. There would be decreased safety to the workers and to vehicular traffic, because of cars driving near the construction site, and construction vehicles entering and exiting the construction site. This traffic control option would be more costly, and time consuming than an offsite detour. The bridge is surrounded by wooded areas, both upstream and downstream. Several trees would need to be cut down for this temporary condition.

IV. Alternatives Summary

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

- Alternative 1: Culvert Rehabilitation with Traffic Maintained on Existing Roadway
    a. Pipe Liner
    b. Spray-On Culvert Liner

- Alternative 2a: New 4-foot Pipe with Traffic Maintained on an Offsite Detour
- Alternative 2b: New 4-foot Pipe with Traffic Maintained with Phased Construction
- Alternative 2c: New 4-foot Pipe with Traffic Maintained on a Temporary Roadway

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

V. Cost Matrix[1]

Dorset Bridge 58A: STATEWIDE - SOUTHWEST STP CULV(91) 22B045		Do Nothing	Alternative 1		Alternative 2		
			Culvert Rehabilitation		New 4-foot Diameter Pipe		
			a. Pipe Liner	b. Spray-on	a. Offsite Detour	b. Phased Construction	c. Temporary Roadway
COST	Bridge Cost	$0	63,954	72,800	42,458	48,826	42,458
	Removal of Structure	$0	46,020	43,680	45,240	52,026	45,240
	Roadway	$0	88,082	91,620	174,907	251,428	174,907
	Maintenance of Traffic	$0	79,040	79,040	99,300	234,100	154,040
	Construction Costs	$0	277,096	287,140	361,904	586,381	416,644
	Construction Engineering & Contingencies	$0	96,984	100,499	108,571	175,914	124,993
	Accelerated Premium	$0	0	0	14,476	0	0
	Total Construction Costs w CEC	$0	374,080	387,639	484,952	762,295	541,638
	Preliminary Engineering	$0	150,000	150,000	150,000	150,000	150,000
	Right of Way	$0	10,000	10,000	10,000	10,000	50,000
	Total Project Costs	$0	534,080	547,639	644,952	922,295	741,638
	Annualized Costs	$0	17,803	36,509	8,599	12,297	9,889
SCHEDULEING	Project Development Duration	N/A	2 Years	2 Years	2 Years	2 Years	2 Years
	Construction Duration	N/A	3 Months	3 Months	4 Months	9 Months	9 Months
	Closure Duration (If Applicable)	N/A	N/A	N/A	2 Days	N/A	N/A
ENGINEERING	Typical Section - Roadway (Feet)	3'-11'-11'-3'	3'-11'-11'-3'	3'-11'-11'-3'	5'-11'-11'-5'	5'-11'-11'-5'	5'-11'-11'-5'
	Geometric Design Criteria	No Change	Substandard Roadway Width	Substandard Roadway Width	Meets Minimum Standards	Meets Minimum Standards	Meets Minimum Standards
	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	No Change	No Change	Improved	Improved	Improved
	Pedestrian Access	No Change	No Change	No Change	Improved	Improved	Improved
	Hydraulics	Meets Minimum Standards	Meets Minimum Standards	Meets Minimum Standards	Meets Minimum Standards	Meets Minimum Standards	Meets Minimum Standards
	Utilities	No Change	No Change	No Change	No Change	No Change	Aerial Relocation
OTHER	ROW Acquisition	No	Yes	Yes	Yes	Yes	Yes
	Road Closure	No	No	No	Yes	No	No
	Design Life (Years)	5-10	30	15	75	75	75

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

VI. Conclusion

Alternative 2a is recommended; to replace the existing culvert with a new 4-foot diameter pipe while maintaining traffic on an offsite detour.

Structure:
Since the culvert is rated as being in poor condition, it is reasonable to assume that a replacement structure is needed. The preliminary hydraulics report specifies that a minimum 4-foot diameter culvert would meet the minimum requirements at this location. By replacing the existing culvert with a smaller structure, the pipe can be removed from the large culvert structures inventory. Additionally, there has been material loss in the roadway due to large voids in the existing culvert. This alternative will replace all of the roadway fill material, mitigating any risks of voids in the roadway around the culvert. By choosing to replace the culvert, the width of the roadway through the project area can be widened by two feet on each side to accommodate bicycle traffic, with 5-foot shoulders as per the Vermont State Standards.

The new culvert will be a 4-foot diameter corrugated metal plate pipe or high-density polyethylene (HDPE) pipe. Either option would be an acceptable material for this site, however, the HDPE option is expected to have a longer service life as compared to the metal option. AOP is not required here.

Traffic Control:
The recommended method of traffic control is to close the bridge for 2 days and maintain traffic on an offsite detour. The official state detour route has an end-to-end distance of 72 miles, which is long for the amount of traffic that would be detoured at this site. The Average Daily Traffic volume is 3,700 vehicles per day. However, the Local Bypass Routes, as described in Appendix M could be appropriate for a signed detour route for passage cars, if the Town gives their permission to do so.

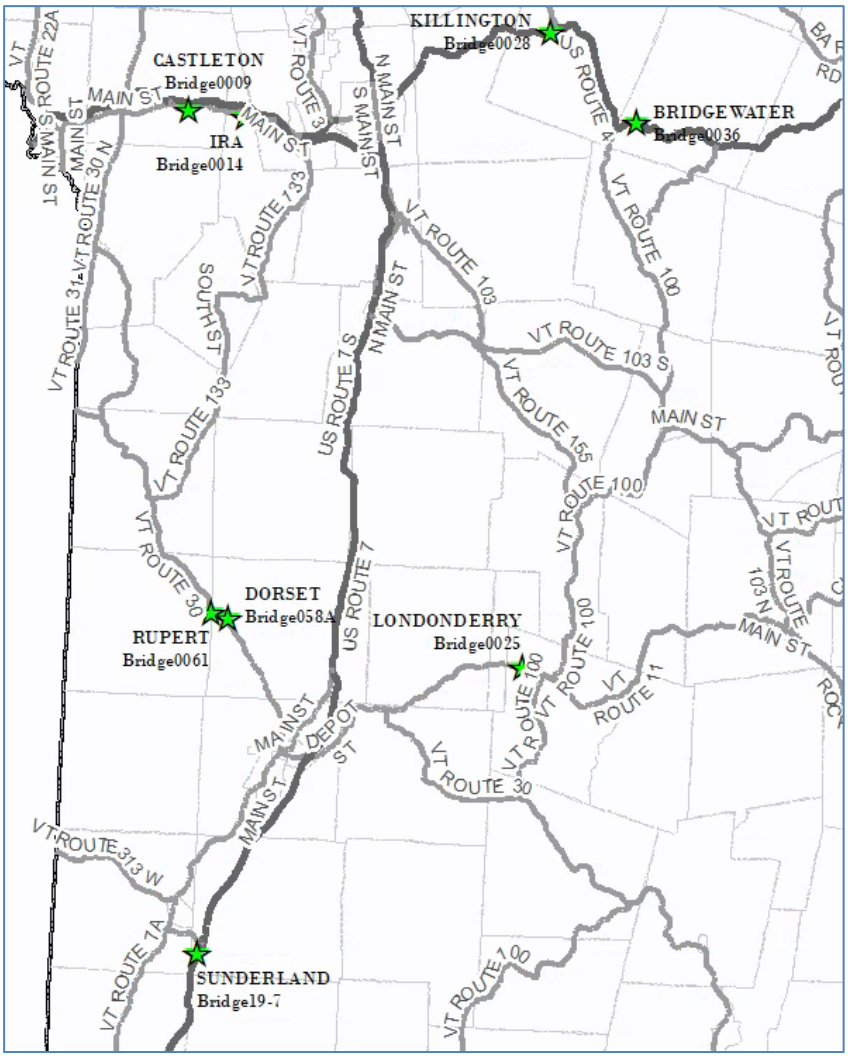
The shortest local bypass route is as follows: VT Route 30, to Church Street, Dorset West Road, Rupert Mountain Road, back to VT Route 30. This local bypass route has an end-to-end distance of 4.3 miles and is located entirely on paved class 2 roads.

If an accelerated closure is found to be unacceptable, then phased construction will be recommended. Since there is an average of four feet of fill above the culvert, which is relatively low, it will not be extremely costly to retain the soil between phases, making this site a good candidate for phased construction. The temporary bridge option would have greater impacts to adjacent historic properties and aerial utilities, and as such is not the preferred maintenance of traffic option.

Coordination with other projects:
There are several culverts/bridges in the STATEWIDE - SOUTHWEST STP CULV(91) project that are currently in the scoping phase of project development. The projects are as follows:

- Rupert, VT Route 30, Bridge 61 over unnamed brook.
- Ira, VT Route 4A, Bridge 14 over Ira Brook.
- Sunderland, US Route 7, Bridge 19-7 over unnamed brook.
- Dorset, VT Route 30, Bridge 58A (drainage culvert).
- Londonderry, VT Route 11, Bridge 25 (cattle pass).
- Killington, US Route 4, Bridge 28 over unnamed brook.
- Castleton, VT Route 4A, Bridge 9 over unnamed brook.
- Bridgewater, US Route 4, Bridge 36 over unnamed brook.

Consideration should be given to bundling these projects for design and/or construction.



VII. Appendices

- Appendix A: Town Map
- Appendix B: Bridge Inspection Report and Site Pictures
- Appendix C: Hydraulics Memo
- Appendix D: Preliminary Geotechnical Information
- Appendix E: Landscape (LA) Clearance for Resource ID
- Appendix F: Natural Resources Memo
- Appendix G: Archeology Memo
- Appendix H: Historic Memo
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- Appendix J: Crash Data
- Appendix K: Detour Map
- Appendix L: Scoping Plans

Appendix A: Town Map

DORSET
VT-30 BR 58A

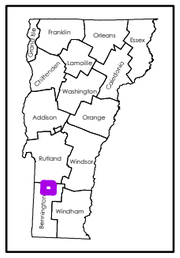
Scale: 1:44,940

N

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

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

Produced by:
Mapping Section
Division of Policy, Planning and Intermodal Development
Vermont Agency of Transportation
March 2021



DORSET

COUNTY-TOWN CODE: **0203-0**
BENNINGTON COUNTY
DISTRICT # 1
District Long Name: Bennington District
VTrans Four Region: Southwest

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 B: Bridge Inspection Report and Site Pictures

VERMONT
AGENCY OF TRANSPORTATION

Route VT30
Bridge #058A (Routine)
VT30 over Drainage culvert
Team Lead: Justin White **Inspection Date:** December 01, 2021

Town: DORSET

District 1, BENNINGTON County

Owner: -

Maintenance Responsibility: 1-State Highway Agency

VERMONT
AGENCY OF TRANSPORTATION

Route VT30
Bridge #058A (Routine)
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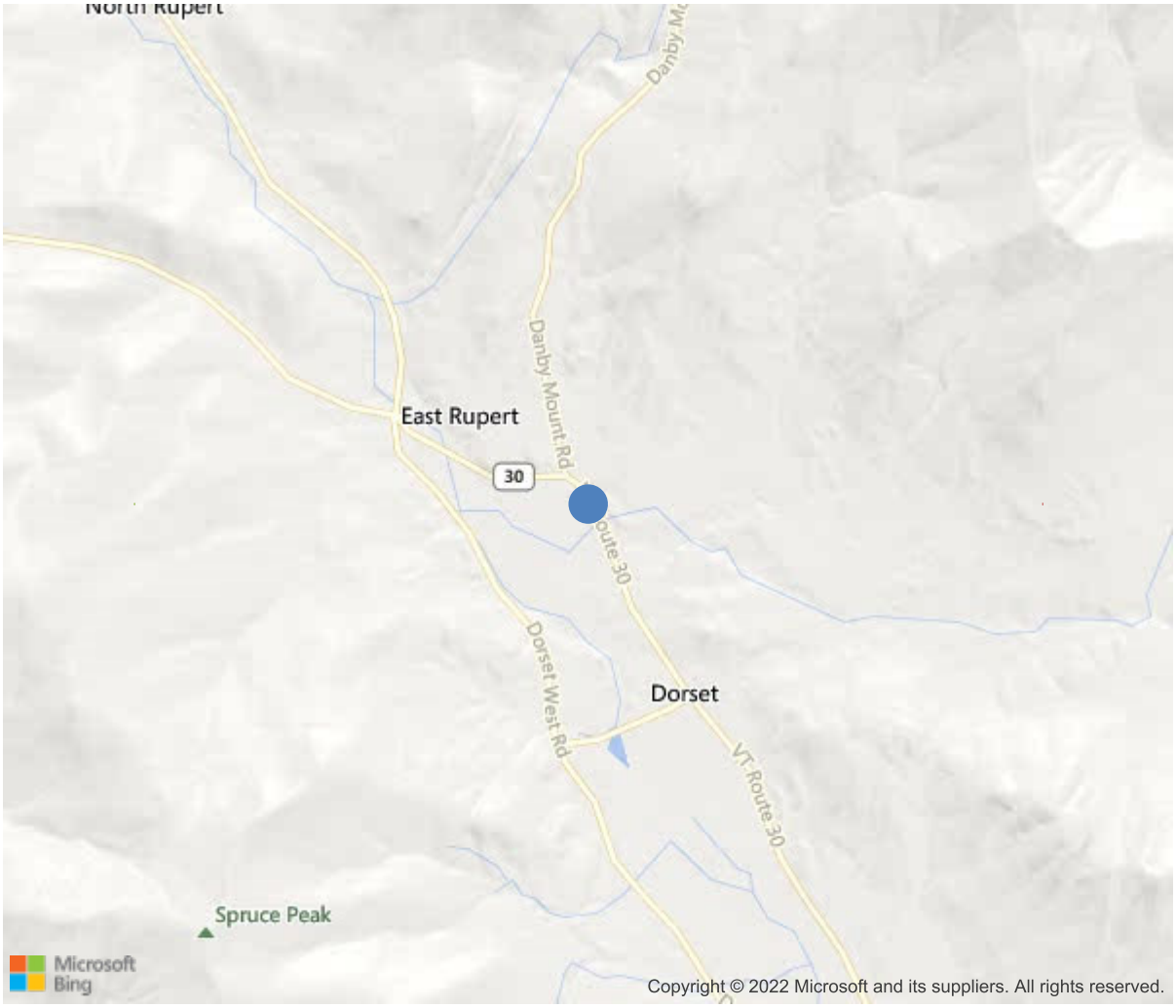
Team Lead: Justin White, **Inspection Date:** December 01, 2021

7.1 MI N JCT VT 7A



43.26708, -73.10771

VERMONT
AGENCY OF TRANSPORTATION

Route VT30
Bridge #058A (Routine)
VT30 over Drainage culvert
Team Lead: Justin White, **Inspection Date:** December 01, 2021

IDENTIFICATION	
(1) State Names	Vermont
(8) Structure Number	300150058A02031
(5) Inventory Route	
(2) Highway Agency District	1
(3) County Code	3-003 - BENNINGTON
(4) Place Code	17725
(6) Features Intersected	Drainage culvert
(7) Facility Carried	VT30
(9) Location	7.1 MI N JCT VT 7A
(11) Mile Point	mi
(12) Base Highway Network	No
(13) LRS Inventory Rte & Subrte	
(16) Latitude	43.2670833333333
(17) Longitude	-73.1077083333333
(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 structur
Type of Membrane	N-Not applicable (applies only to structur
Type of Deck Protection	N-Not applicable (applies only to structur
AGE AND SERVICE	
(27) Year Built	1949
(106) Year Reconstructed	
(42) Type of Service	19
On	1-Highway
Under	9-Relief for waterway
(28) Lane	
On	2
Under	0
(29) Average Daily Traffic	3400
(30) Year of ADT	1996
(109) Truck ADT	%
(19) Bypass, Detour Length	39 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)	28 ft
(33) Bridge Median	0-No median
(34) Skew	15 Deg
(35) Structure Flared	
(10) Inventory Route Min Vert Clear	ft
(47) Inventory Route Total Horiz Clear	28 ft
(53) Min Vert Clear Over Bridge Rdwy	ft
(54) Min Vert Underclear	0 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	N
(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	1
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			12/2021
(91) Frequency			60 Months
(92) Critical Feature Inspection	Req.	Freq. (Mon)	Date
A: Fracture Critical Detail	Yes		
B: Underwater Inspection	Yes		
C: Other Special Inspection	Yes		

* 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 VT30
Bridge #058A (Routine)
VT30 over Drainage culvert
Team Lead: Justin White, **Inspection Date:** December 01, 2021

Culvert

ELEM #	DESCRIPTION	UNITS	TOTAL	CS1	CS2	CS3	CS4
240	Steel Culvert	LF	72	0	62	0	10
1000	Corrosion	LF	72	0	62	0	10

APPROACH / DECK

72-Approach Roadway Alighment (8)

58-Deck Condition (N)

CULVERT

(62) Culvert (4)

Comment: Areas of freckled rust and minor rust staining throughout. The the splice connections and sides of the pipe near the center have scattered small areas of heavy rust scale with deep pitting and minor to moderate section loss. The north side has scattered large perforations as well measuring 1'- 2' in diameter allowing some loose fill to fall through. The grated drop inlet and surrounding retaining concrete blocks are undermined 6"- 1' vertically and penetrating 3'+/-.

Invert ()

Comment: Not visible

SUBSTRUCTURE

60-Substructure Condition (N)

CHANNEL

61-Channel Condition (N)

GENERAL OBSERVATION

VERMONT
AGENCY OF TRANSPORTATION

Route VT30
Bridge #058A (Routine)
Location: 7.1 MI N JCT VT 7A
Inspection Date: December 01, 2021

Outlet

Drop inlet

Drop inlet

VERMONT
AGENCY OF TRANSPORTATION

Route VT30
Bridge #058A (Routine)
Location: 7.1 MI N JCT VT 7A
Inspection Date: December 01, 2021

North side

North side

Outlet drainage

Outlet drainage

Appendix C: 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 3, 2023

SUBJECT: Statewide – Southwest STP CULV(91) pin #22B045
Dorset, VT 30 Br58, over Unnamed Brook
Coordinates: 43.267109, -73.107693

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

In an email on 8/2/22 ANR agreed that this appears to be an intermittent and that the active channel width of 4.0 ft. should be used to size the new crossing. 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 0.52 and 0.56 during the design and check storm event, respectively. Headwater depths of 3.14-ft and 3.33-ft were determined during the design and check storm event, respectively.
- The existing culvert meets the current hydraulic standards.

Option 1: 4.0-ft Diameter Corrugated Metal Plate Pipe Culvert

- Provides a Headwater to Depth ratio (HW/D) of 1.09 and 1.15 during the design and check storm event, respectively. Headwater depths of 4.34 -ft and 4.6-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 4.0' diameter could be considered for this site. If another alternative is considered, coordinate with the Hydraulics Unit to perform additionally analyses.

Additional Comments

The proposed crossing was sized to convey the flow if the drop inlet was removed. This decision was made because based on preliminary modeling, there appears to be potential for bypassing and overtopping as shown in Figure 1.

Based on available floodplain maps, the 100-year floodplain (Zone A) is overtopping TH-38 as shown in Figure 2. The Hydraulic Unit's preliminary model was developed with up-to-date topographic data and more precise hydraulic modeling methods. Regardless, the FEMA Flood map supports the Hydraulics Unit's preliminary findings.

Figure 1 – 50yr Flood Flow Path

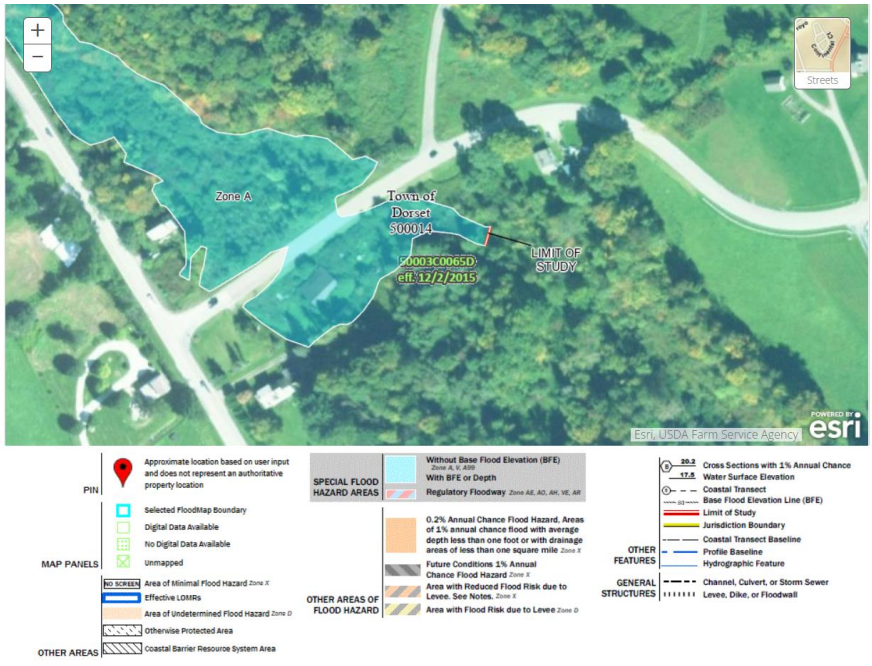


Figure 2 – FEMA Flood Zone A

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

VERMONT

Appendix D: Preliminary Geotechnical Information

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Laura Stone, PE, Scoping Engineer

END

From: Eric Denardo, PE, Geotechnical Engineer

Date: August 24, 2022

Subject: Statewide Southwest STP CULV(91) – Dorset Bridge 58A - Preliminary Geotechnical Information

1.0 INTRODUCTION

As requested, we have completed our preliminary geotechnical investigation of Bridge 58A, a drainage culvert, which runs under VT 30 in the Town of Dorset, VT. The 6 foot (ft) aluminum coated corrugated galvanized metal plate pipe is located approximately 7.1 miles north of the junction of VT 30 and VT 7A. The project consists of rehabilitation or replacement of the current culvert which is approximately 56 ft long and buried under an average of 4 ft of fill. 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 project is currently in the scoping phase.

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 glaciofluvial kame terrace. (Doll, 1970).

According to the 2011 Bedrock Map of Vermont, published by the State of Vermont and USGS, the site is underlain by Dolostone and dolomitic Limestone of the Vermont Valley Sequence and Middlebury Synclinorium belt of the Bascom Formation (Ratliffe, 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. No previous projects were found in a one-mile radius of the culvert.

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. Three private wells were noted within approximately 500 ft of the culvert. The private well located approximately 285 ft north of the culvert (WRN#: 197) noted 15 ft of fill underlain by bedrock described as limestone. The well located approximately 210 ft to the west of the culvert (TAG#: 25715) noted 25 ft of clay underlain by bedrock described as green shale. The well located

approximately 450 ft south of the culvert (WRN#: 57) noted 37 ft of gravel underlain by bedrock described as hard marble.

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 were no hazardous sites or underground storage tanks within a 0.5-mile radius of the project.

2.4 Record Plans

Historic record plans were found from the 1949 of the existing culvert construction as part of the paving project from Dorset to Pawlet. The plans did not include any boring information from the culvert.

3.0 FIELD OBSERVATIONS

A site investigation was not conducted by Geotechnical Section staff however photos from inspections 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 run along the north/east side of VT 30 in the location of the culvert and cross the road just south of the culvert. The subsurface investigation can be adjusted to avoid the overhead utilities and still evaluate the subsurface conditions in this location. If additional information is needed, additional drilling techniques could be utilized or the use of geophysical methods can be implemented here. The overhead utilities can be seen in Figure 1 with the approximate location of the culvert marked.

Figure 1: *Overhead Utilities over the North End of the Culvert and Crossing VT-30*

4.0 RECOMMENDATIONS

Based on preliminary findings of nearby private wells and boring logs, bedrock may be near the elevation where the proposed wingwall footings would be. The native material, based on geologic mapping, is likely glaciofluvial kame terrace and consistent across the project. This material typically consists of sand, gravel, and till and would likely be suitable to support shallow foundations. If replacement is the chosen alternative the culvert could be replaced with another metal plate pipe culvert, a precast reinforced box culvert, or metal plate arch with new headwalls and wingwalls. Based on preliminary findings from the available information, as previously described, conditions at the site should be assessed in more detail for either an open cut or trenchless approach to the culvert replacement operations. The material described could likely be supported with sheet piling if an open cut or staged construction are the chosen alternative.

4.1 Proposed Subsurface Investigation

The proposed investigation would likely include, at a minimum, borings at opposite corners of the culvert but should also include borings along the alignment of the proposed structure if shallow rock is encountered. Borings can be advanced in the roadway of VT 30 avoiding the overhead utilities. If additional profiling is required in the area restricted by the overhead utilities, hollow stem augers can be advanced using the Drill Unit's truck mounted auger rig. Additionally, geophysical techniques such as seismic refraction or ground penetrating radar can be utilized if additional bedrock profiling is necessary. Sampling frequency of the borings should be increased at and below the proposed bearing elevation to determine if any obstructions or problematic soils exist.

5.0 CLOSING

The Geotechnical Section can assist in developing a subsurface investigation plan that appropriately aligns with information needed for either design or development of RFP documents, considers the risk involved in the project, and the contracting mechanism chosen to move forward with.

If you have any questions or would like to discuss this report, please contact me at Eric.Denardo@vermont.gov.

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 8/22/2022.

Review by: Stephen Madden, Acting Geotechnical Engineering Manager SPM

cc: Electronic Read File/MG
Project File/END

Z:\Highways\CMB\GeotechEngineering\Projects\Statewide-Southwest STP CULV(91)\REPORTS\Statewide-Southwest STP CULV(91) Dorset Bridge 58A - Preliminary Geotechnical Information .docx

Appendix E: Landscape (LA) Clearance for 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 8, 2022
Project: **STATEWIDE – SOUTHWEST IM CULV(91) 22B045**
Subject: Landscape (LA) Clearance for Resource ID

SUMMARY

I have reviewed the locations for **STATEWIDE – SOUTHWEST IM CULV(91) 22B045** 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 8 culverts:
  - Bridgewater US-4 Br 36
  - Castleton VT-4A Br 9
  - Dorset VT-30 Br 58A
  - Ira VT-4A Br 14
  - Killington US-4 Br 28
  - Londonderry VT-11 Br 25
  - Rupert VT-30 Br 61
  - Sunderland US-7 Br 19-7

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 F: Natural Resources Memo

VTrans Statewide – Southwest STP CULV(91) – Wetland and Watercourse Delineation and Rare Species Assessment Report

Bennington and Rutland Counties, Vermont

August 25, 2022

Prepared for:

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

Prepared by:

Stantec Consulting Services Inc.
193 Tilley Drive
South Burlington, VT 05403

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1.0 INTRODUCTION

The Vermont Agency of Transportation (VTrans) proposes to replace or rehabilitate eight road crossing structures located along Vermont state route roadways (US Route 7, US Route 4, Vermont Route 11, Vermont Route 4A, Vermont Route 30) in Bennington and Rutland counties, Vermont, herein referred to as the Statewide- Southwest STP CULV(91) Project (Project). VTrans requested that Stantec Consulting Services Inc. (Stantec) conduct wetland and watercourse delineations and preliminary assessment for rare, threatened, and endangered (RTE) species in the vicinity of the existing eight crossing locations. The field investigations were conducted in July 2022 and are summarized in this report. The crossing locations and structure identifiers assessed in this study are listed in Table 1 and shown in Appendix A.

Table 1. Site Locations, VTrans Statewide- Southwest STP CULV(91)

Structure ID	Road	Town	County
BR 19	US Route 7	Sunderland	Bennington
BR 25	Vermont Route 11	Londonderry	Bennington
BR 58A	Vermont Route 30	Dorset	Bennington
BR 61	Vermont Route 30	Rupert	Bennington
BR 36	US Route 4	Bridgewater	Rutland
BR 28	US Route 4	Killington	Rutland
BR 9	Vermont Route 4A	Castleton	Rutland
BR 14	Vermont Route 4A	Ira	Rutland

2.0 METHODOLGY

2.1 RTE SPECIES AND NATURAL RESOURCE DESKTOP ASSESSMENT

Prior to the field assessment, Stantec conducted a desktop review using information available through the Vermont Agency of Natural Resources (ANR) Natural Resources Atlas and other publicly available and privileged-access database sources to identify potential occurrences of RTE species, special wildlife habitats, or other natural resources of concern within or in the vicinity and with similar habitat(s) to those at a Project site. The information obtained during the desktop assessment was used to support the field investigations. Specific to the potential occurrence of RTE species, particularly those that are federally or

Vermont-listed threatened or endangered[1], and quantify available onsite habitat condition relative to each, Stantec researched the Vermont Natural Heritage Inventory (NHI) database for the presence of known Element Occurrences (EOs) of RTE species within the delineation area and within the vicinity (approximate 1-mile radius) for each Project site.

2.2 WETLAND AND WATERCOURSE DELINEATION

For the purposes of the field delineation, the delineation area consisted of an area within 100 feet along the roadway, centered on the existing crossing structure and approximately 50 feet laterally beyond the edge of the road shoulder. Wetland boundaries were delineated using the technical criteria provided in the U.S. Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual*[2] and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*[3]. Wetland communities were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States*[4]. Hydric soil determinations were made in accordance with the USACE manuals and the *Field Indicators for Identifying Hydric Soils in New England, Version 4*[5]*.* Anticipated wetland regulatory classifications were assigned based on ANR's Vermont Wetland Rules (VT Code R. 12 004 056). Where appropriate, wetland resources were flagged with pink flagging pre-labeled with "WETLAND DELINEATION" and each flag was labeled with a unique alpha-numeric code. Wetland Determination Data Forms and Vermont Wetland Evaluation Forms were completed for each wetland delineated and representative photographs were taken, as appropriate, to document existing conditions. Wetland flags were located using a Global Positioning System (GPS) receiver with a stated submeter accuracy of 1 meter or better.

Watercourses (e.g., perennial streams) and intermittent streams observed during the delineations were identified based on the definitions in ANR's Environmental Protection Rule Chapter 27 Vermont Stream Alteration Rule as well as the technical guidance available from the USACE on the identification of an Ordinary High Water Mark (OHWM)[6] and definition of a tributary as described in the Clean Water Rule[7]. Data was collected on flow regime, bankfull and OHWM widths, dominant substrates, and observations

[1] Federally listed species are protected under the U.S. Endangered Species Act and Vermont-listed species are protected under 10 V.S.A. §123.
[2] Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
[3] U.S. Army Corps of Engineers. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble, and J.F. Berkowitz, ERDC/EL TR-12, Vicksburg, MS: U.S. Army Engineer Research and Development Center.
[4] Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
[5] New England Hydric Soils Technical Committee. 2017. *Field Indicators for Identifying Hydric Soils in New England (Version 4)*.
[6] U.S. Army Corps of Engineers. 2005. *Regulatory Guidance Letter: Ordinary High Water Mark Identification. December 8, 2005. No. 05-05*.
[7] U.S. Army Corps of Engineers. 2015. *33 Code of Federal Regulations, Part 328, "Waters of the United States". June 29, 2015*.

on evidence of biological use. The stream flags were located with the GPS receiver and representative photographs were taken to document existing conditions.

2.3 RTE SPECIES ASSESSMENT

Concurrent with the delineation, meander surveys were conducted within the delineation area to characterize on site vegetative assemblages. Incidental observations were made of occurrences of RTE plant and/or wildlife species as well as of habitats that may be potentially suitable for RTE species known from the vicinity of the site based on the desktop assessment. If RTE species were observed, appropriate data were collected on population size, condition, vigor, associated habitat, and other pertinent landscape features. Representative photographs were taken of key identifying features and the associated habitat. If observed, populations were located using a combination of GPS and aerial photo interpretation, where appropriate.

In addition, observations were made in the field regarding the presence of trees with evidently peeling or exfoliating bark, cavities, and/or crevices, as such trees are identified as potential RTE bat roost habitat. Representative photographs were taken of potential bat roost trees as appropriate. Observations of the bark and trunk features were limited to those readily observable from ground level.

2.4 WILDLIFE HABITAT AND AQUATIC ORGANISM PASSAGE

Data from previous assessments regarding wildlife habitat connectivity and aquatic organism passage (AOP) was reviewed to assess the potential for wildlife connectivity and crossing at the eight Project sites. The primary data source reviewed was the 2017 Stantec report *Hot 200 Culvert Study*[8] (Hot 200). The Hot 200 study assessed many structural and fluvial geomorphic parameters of culverts across the state of Vermont. Three of the assessment criteria were queried:

- AOP: The Hot 200 study ranked each culvert as one of five individual categorizations for its AOP condition and potential use of a liner for restoration/rehabilitation of the existing culvert. Five ranking categories were used:

    1. Prime fish habitat, liner should not be considered
    2. High slope, large outlet drop, hydraulically undersized. Poor liner candidate
    3. Low slope, no outlet drop, hydraulically adequate. Good liner candidate
    4. Over 1 foot of standing water in the culvert. Liner will not limit AOP
    5. Natural barrier within 100 feet of culvert (upstream or downstream) preventing natural AOP

[8] Hot 200 Culvert Study: Stantec, 2017 (project 195311430 under contract for VTrans)

- Wildlife: The Hot 200 study included consideration of the range of wildlife that may utilize the culvert for accessing habitat(s) on one or both sides of the crossing. Wildlife species considered included small amphibians up to large mammals and field observations as well as habitat block mapping conducted by the ANR were utilized in the analysis. Wildlife conditions were ranked on a scale of one to three:

    1. Top priority for wildlife passage
    2. Moderate need for wildlife passage
    3. Little to no need for extra provisions for wildlife passage

- Bankfull width to Culvert Span Ratio: In the hot 200 study, bankfull width measurements were taken at multiple locations upstream and downstream from each culvert site assessed. The culvert span was also measured in the field, and a ratio was established to determine which culverts were relatively more appropriately sized for the natural channel conditions and which culverts were relatively undersized (i.e., a greater difference between the span of the culvert and the larger bankfull width of the channel). The higher the ratio number, the greater the difference between the (wider) bankfull width and the (narrower) culvert span, indicating that the culvert width dimension is undersized in consideration of providing wildlife passage and/or AOP.

3.0 RESULTS

The field surveys were conducted between July 18 and July 20, 2022. Table 1 summarizes the eight crossing locations and features observed and identified in the field. Appendix A includes figures of each bridge location that was surveyed and the associated delineated resources.

Table 2. Crossing Structure Survey Site Summary

Structure Number	Town	Date Surveyed	Wetlands Present	Streams Present	RTE Species Present / Suspected	Potential Bat Roost Trees Present
BR 9	Castleton	7/18/22	No	Yes	No	Yes
BR 14	Ira	7/18/22	No	Yes	No	Yes
BR 19	Sunderland	7/19/22	No	Yes	No	Yes
BR 25	Londonderry	7/19/22	Yes	Yes	No	No
BR 28	Killington	7/18/22	No	Yes*	No	Yes
BR 36	Bridgewater	7/18/22	No	Yes	No	Yes
BR 58A	Dorset	7/18/22	No	Yes	No	Yes
BR 61	Rupert	7/19/22	No	Yes	No	Yes

*Stream is present within Stantec's Study Area but not observed at the VTrans structure

3.1 SURVEY AREA DESCRIPTION

The Project sites and Stantec's survey limits are located in landscapes with scattered rural residential and agricultural development and the roadway corridor with associated transportation infrastructure. Given that the Project will address a series of road crossing structures, the ecological conditions are characterized by a stream and/or the presence of surface waters (including wetlands). Surrounding upland floodplains and riparian areas generally consist or hardwood to mixed forests. Characteristic tree species observed at Project sites include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), gray birch, American basswood (*Tilia americana*), ash-leaf maple (*Acer negundo*), eastern hemlock (*Tsuga canadensis*), and white ash (*Fraxinus americana*). Non-native invasive species, most notably garlic mustard (*Alliaria petiolata*), Morrow's honeysuckle (*Lonicera morrowii*), glossy false-buckthorn (*Frangula alnus*), and European buckthorn (*Rhamnus cathartica*), are well established at multiple Project sites. As the culverts are located within existing, developed road corridors, the vegetative conditions along roadways are maintained through routine mowing and have in some areas been planted with a grass and forb seed mix typical of roadsides, lawns, and construction revegetation practices.

3.2 WETLAND AND WATERCOURSE DELINEATION

Wetlands were delineated at only the BR 25 culvert crossing site, with a total of two wetlands present. Both of these delineated wetlands are anticipated to be Class 2 wetlands under the Vermont Wetland Rules, pending confirmation of this classification by the Vermont Department of Environmental Conservation (DEC) Wetlands Program. Table 2 summarizes the results of the wetland delineation. Representative Photographs are provided in Appendix B. Completed Vermont Wetland Evaluation Forms are provided in Appendix C.

Watercourses (i.e., streams) were delineated within the survey limits of all eight of the Project sites. Seven of the eight crossing structures were found to convey stream channels, and one culvert (BR 28) was found to not be associated with any stream (or ditch). Of the streams delineated, one stream exhibited indication of a perennial flow regime and all other channels were assessed as intermittent. It is notable that drought conditions have developed in parts of Vermont during the 2022 growing season, according to the National Drought Mitigation Center, however, there were not drought conditions present at the Project sites at the time of Stantec's field assessments. Conditions at all eight crossing sites were ranked as "Abnormally Dry" as of July 19, 2022, but did not meet the rank as either moderate, severe, or extreme drought. Table 3 summarizes the results of the watercourse delineation. Representative Photographs are provided in Appendix B.

Table 3. Summary of Delineated Wetlands

Structure Number/ Identifier	Town	Wetland Identifier	Wetland Community Classification[1]	Dominant and Characteristic Vegetation	Hydric Soil Criteria	Evidence of Hydrology	Anticipated VT Wetland Class	Additional Notes
BR 25	Londonderry	BR25-W1	PEM	Shrubs: gray willow (*Salix bebbiana*) Herbs: purple-stem American-aster (*Symphyotrichum puniceum*), late goldenrod (*Solidago gigantea*), reed canary grass (*Phalaris arundinacea*)	Depleted Matrix	Saturation, geomorphic position, oxidized rhizospheres on living roots	Class II	Wetland extends to south/southeast beyond limits of investigation area; ongoing disturbance in wetland from agriculture; diffuse flow within wetland becomes channelized and develops into stream BR25-S1
BR 25	Londonderry	BR25-W2	PEM	Herbs: broad-leaf cat-tail (*Typha latifolia*) reed canary grass (*Phalaris arundinacea*), eastern marsh fern (*Thelypteris palustris*), true forget-me-not (*Myosotis scorpioides*)	Depleted Matrix	Surface water, high water table, saturation, saturation visible on aerial imagery, geomorphic position, oxidized rhizospheres on living roots	Class II	Topographically defined wetland boundary in natural depressional area bounded by farm access driveway and Route 11

Table 4. Summary of Delineated Watercourses

Structure Number/ Identifier	Town	Stream Identifier	Stream Name	Flow Type	Bankfull Width (ft)	Ordinary High Water Mark Width (ft)	Dominant Substrates	Additional Notes
BR 9	Castleton	BR9-S1	Unnamed	Intermittent	5	5	Sand – Silt – Gravel	Downgradient end of culvert north side of Rte 4A is excavated ditch and not a natural stream channel; recently excavated ditch channel (2022) assumed jurisdictional because conveys flow from natural stream channel upgradient and appears to convey flow towards east to confluence with another natural stream channel.
BR 14	Ira	BR14-S1	Unnamed tributary to Castleton River	Intermittent	15	13	Gravel – Cobble	Observed two white-tailed deer traveling through bridge as alternative to crossing Rte 4A during fieldwork; substrate in stream bed noted to be larger upstream and downstream than within and immediately downstream from bridge crossing.
BR 19	Sunderland	BR19-S1	Unnamed tributary to Fayville Branch	Perennial	12–13	12	Cobble – Gravel	Forested uplands in riparian corridor provide dense shade to channel.
BR 25	Londonderry	BR25-S1	Unnamed	Intermittent	4	4	Sand – Silt – Gravel	Channel develops from diffuse flow through wetland that occurs at outlet of culvert and extends beyond edge of investigation area downgradient in natural swale between hay/pasture fields
BR 28	Killington	BR28-S1	Unnamed tributary to Kent Brook	Intermittent	9	4	Cobble – Boulder	Map data (VHD, USGS) indicates Kent Brook passes under Rte 4 at BR 28 location, but no stream channel and no crossing structure observed in the field; Stream BR28-S1 is tributary to the BR 28 crossing, flowing generally west to east through culvert under private driveway to the west of BR 28; BR28-S1 is step-pool type habitat with dense shade from surrounding forest, steep slopes in riparian corridor
BR 36	Bridgewater	BR36-S1	Unnamed tributary to Ottaqueechee River	Intermittent	9	6	Cobble – Gravel	Culvert observed to be at grade with inlet and outlet stream channel; channel somewhat shaded by herbaceous and shrub vegetation on south side of Rte 4; PSS-PEM wetland complex and small River Cobble Shore natural community[1] (per Stantec incidental observation) occurs along Ottaqueechee River outside of Stantec delineation area.
BR 58A	Dorset	BR58A-S1	Unnamed	Intermittent	4	3	Sand – Silt – Gravel	Channel appears to have been straightened/excavated previously to accommodate surrounding agricultural use; no channel present upstream (inlet) end of culvert.
BR 61	Rupert	BR61-S1	Unnamed tributary to Mettowee River	Intermittent	12	12	Cobble – Gravel	Mild evidence of bank instability in sloughing, exposed roots, bank shelf; structure (barn?) is threatened and actively collapsing into the channel within approximately 150 feet north from investigation area.

[1] Thompson, E.S., E. Sorenson, and R.J. Zaino. 2019, Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont, 2nd Edition. Published by The Nature Conservancy, Vermont Department of Fish and Wildlife, and Vermont Land Trust, distributed by Chelsea Green Publishing.

3.3 RTE SPECIES ASSESSMENT

3.3.1 Database Review

The RTE species database review was conducted in July 2022. From the database review, no EOs were identified within or immediately adjacent to any of the eight Project crossing sites. Available EO records within an approximately 1-mile radius were assessed to inform the potential target species or habitats during Stantec's July 2022 field survey. EOs from the vicinity were referenced against the known habitat criteria for each species and compared to available habitats within each Project site.

Additionally, the USFWS Information, Planning, and Conservation System (IPaC) database was queried for a list of federally listed Endangered and Threatened species within any of the eight Project sites. From the IPaC database review, all eight crossings are within the range of the northern long-eared bat (*Myotis septentrionalis*; MYSE); however, currently there is no designated critical habitat for MYSE.[9]

Stantec then reviewed the Vermont Fish and Wildlife Department map database for observed and potential summer habitat as well as known winter hibernacula for the Indiana bat (*Myotis sodalis*; MYSO). Of the eight crossing sites, two were identified: BR 58A in Dorset, which is a town known for a winter hibernaculum site, and BR 61 in Rupert, which is recognized as a town in the potential summer range for Indiana bat.

3.3.2 Field Survey – RTE Plants

The RTE plant assessment was conducted concurrent with wetland and watercourse delineations between July 18 and 20, 2022. The goal of the RTE plant assessment was to identify the presence of RTE plants that have not previously been documented onsite and/or identify additional potential habitats for RTE plants based on those species known from the neighboring landscape. Field survey methods were meander-based assessments and recorded representative vegetative assemblages, with particular attention towards any on site conditions that were suitable habitat for state- or federally protected species known to occur within the vicinity of the Project sites based on the NHI database query radius. No RTE plants were observed during the field survey. Further consultation with ANR may be necessary to determine if follow up targeted surveys are recommended at one or more of the crossing locations depending on the nature of the proposed Project construction activities and the information presented herein.

3.3.3 Field Survey – RTE Animals

As described above, Stantec conducted a database review to determine if there are any known hibernacula or summer roost locations for MYSE or MYSO (or other RTE bats) at any of the Project sites or vicinity. According to the Vermont Fish and Wildlife Department Regulatory Review Guidance for

[9] No critical habitat for the northern long-eared bat has been designated nationwide.

Protecting Northern Long-eared Bats and Their Habitats[10], the typical size of trees present at all eight of the Project crossing sites meet the minimum criteria for potential roosting habitat for MYSE, although they may not have the exfoliating bark and/or hollows that render them suitable roosting trees. Observations of every tree within the delineation area to identify individual trees with suitable roosting habitat was not performed; however, incidental observation of trees exhibiting particularly high roost suitability and/or roosting features (exfoliating or peeling bark, cracks and crevices, cavities) were made.

General observation of other RTE animal species were made during Stantec's July 2022 fieldwork. There were no detailed, target, or specific presence/absence surveys for RTE animals, and there are no EO records from the NHI database for RTE animals at any of the eight crossing sites. No observations of RTE animals were made during the July 2022 field assessment. Stantec observed two male white-tailed deer (*Odocoileus virginiana*) utilizing BR 14 in Ira as a travelway to cross under Vermont Route 4A. Stantec also observed two relatively large (approximately 2-foot) snake sheds and a bird nest of an unidentified species along the concrete blocks at BR 9 in Castleton.

3.4 WILDLIFE HABITAT AND AOP

Of the eight Project crossing sites, six had been previously assessed as part of Stantec's 2017 Hot 200 study and so data from the Hot 200 was reviewed. The six sites included in the Hot 200 study are:

- BR 9 (Castleton, Vermont Route 4A);
- BR 19 (Sunderland, US Route 7);
- BR 25 (Londonderry, Vermont Route 11);
- BR 28 (Killington, US Route 4);
- BR 58A (Dorset, Vermont Route 30); and
- BR 61 (Rupert, Vermont Route 30).

For the two Project sites not included in the Hot 200 study—BR 14 in Ira (Vermont Route 14) and BR 36 in Bridgewater (US Route 4)—inspection records from the VT Culverts database available online via the Vermont Association of Planning & Development Agencies (VAPDA) were reviewed. Inspection notes from the VT Culverts database are generally focused on the structural condition of a culvert crossing and do not represent an assessment of wildlife habitat or AOP; however, the notes may be interpreted to anticipate possible wildlife habitat and/or AOP concerns.

Detailed results of this assessment are presented in the Records Review of Habitat and Aquatic Organism Passage summary table in Appendix D. In high level summary, the BR 19 crossing in Sunderland and BR 28 in Killington were identified in the Hot 200 study as being a "top priority for wildlife

[10] Vermont Fish and Wildlife Department. 2017. Regulatory Review Guidance for Protecting Northern Long-Eared Bats and Their Habitats.

passage" categorization for habitat and also as having "prime fish habitat" category under the AOP analysis. BR 28 in Killington was also found to have the highest BFW to culvert span ratio of all eight Project sites (where data is available) indicating a high potential for improving AOP. In contrast, BR 58A in Dorset was categorized as "little or no need for extra provisions for wildlife passage" and "natural barrier within 100 feet of crossing" for the wildlife habitat and AOP analyses, respectively.

4.0 CONCLUSIONS

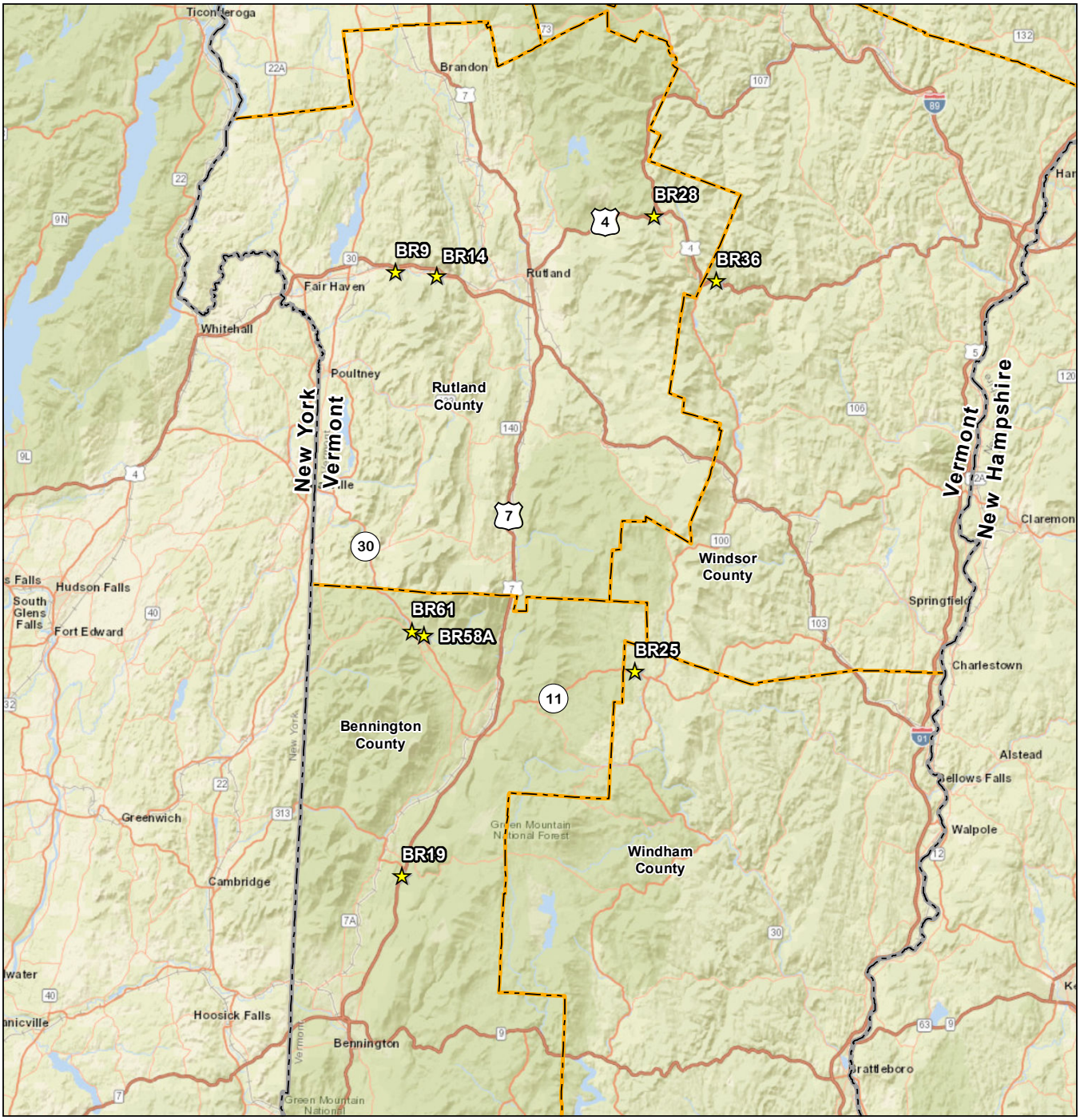
Stantec conducted a delineation of wetlands and surface waters as well as made observations of RTE species and potential habitats within the proximity of eight road crossing structures located in Bennington, Rutland, and Windsor counties in Vermont in support of VTrans' Statewide- Southwest STP CULV(91) Project. The field surveys were informed by a pre-field desktop and database review.

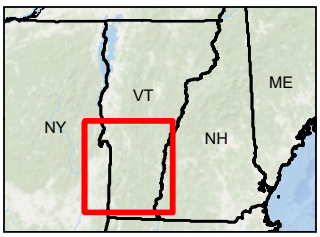
Data were collected for assessed resources at each crossing site as described above and shown in the appendices. Based on Stantec's assessments, there are streams present at seven of the eight crossing locations, and streams were observed within the investigation area (which included the Project crossing structure and nearby vicinity as shown in the Appendix A maps) at all eight sites. Wetlands were delineated at one of the crossing sites, and are anticipated to be considered Class II and, therefore, State-significant. Streams and wetlands are subject to state and federal regulation, and State-significant wetlands and their buffers are regulated by the Vermont DEC. Based on the delineated wetland and water resources and pending the development of Project site plans, Stantec recommends consultation with the USACE and the Vermont DEC Wetlands Program to determine if and what applicable permit authorizations are required prior to Project construction.

No observations of RTE plants were made, and there are no known EO records for RTE plants at any of the Project locations. Although no occurrences or known habitat for RTE animals are present at any of the crossing sites, Stantec observed trees and forested areas that could be considered potentially suitable for summer roosting habitat by RTE bats, notably MYSE and MYSO. Pending the timing of construction and/or the final design for Project crossing structure replacements, follow up survey(s) for RTE species may be recommended. The database review for wildlife habitat and AOP considerations could inform prioritization of site(s) for funding, design, and construction. Based on available data from previous assessments of wildlife habitat and AOP conditions, BR 28 in Killington and BR 19 in Sunderland are the highest priority sites for improving wildlife crossing and AOP.

APPENDICES

Appendix A WETLAND AND WATERCOURSE DELINEATION MAPS





Legend

- Crossing Structure Location
- County Line
- State Line

0 10 Miles

(At original document size of 8.5x11)
1:633,600

N

Stantec

Notes

1. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
2. Data Sources: Base features obtained from the Vermont Center for Geographic Information (VCGI).
3. Background: Topographic base map provided by ArcGIS online World Topographic Map.

Project Location
Rutland, Bennington, Winsor, Windham Counties Vermont

Prepared by PWB on 2022-08-18
TR by KWH on 2022-08-18
IR Review by CAF on 2022-08-18

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
1

Title
Project Location Index Map

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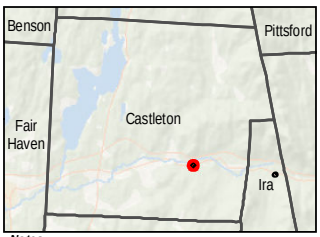

Legend

- GPS-Located Culvert
- Jurisdictional Ditch
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 9

Title
Wetland and Waters Delineation Map

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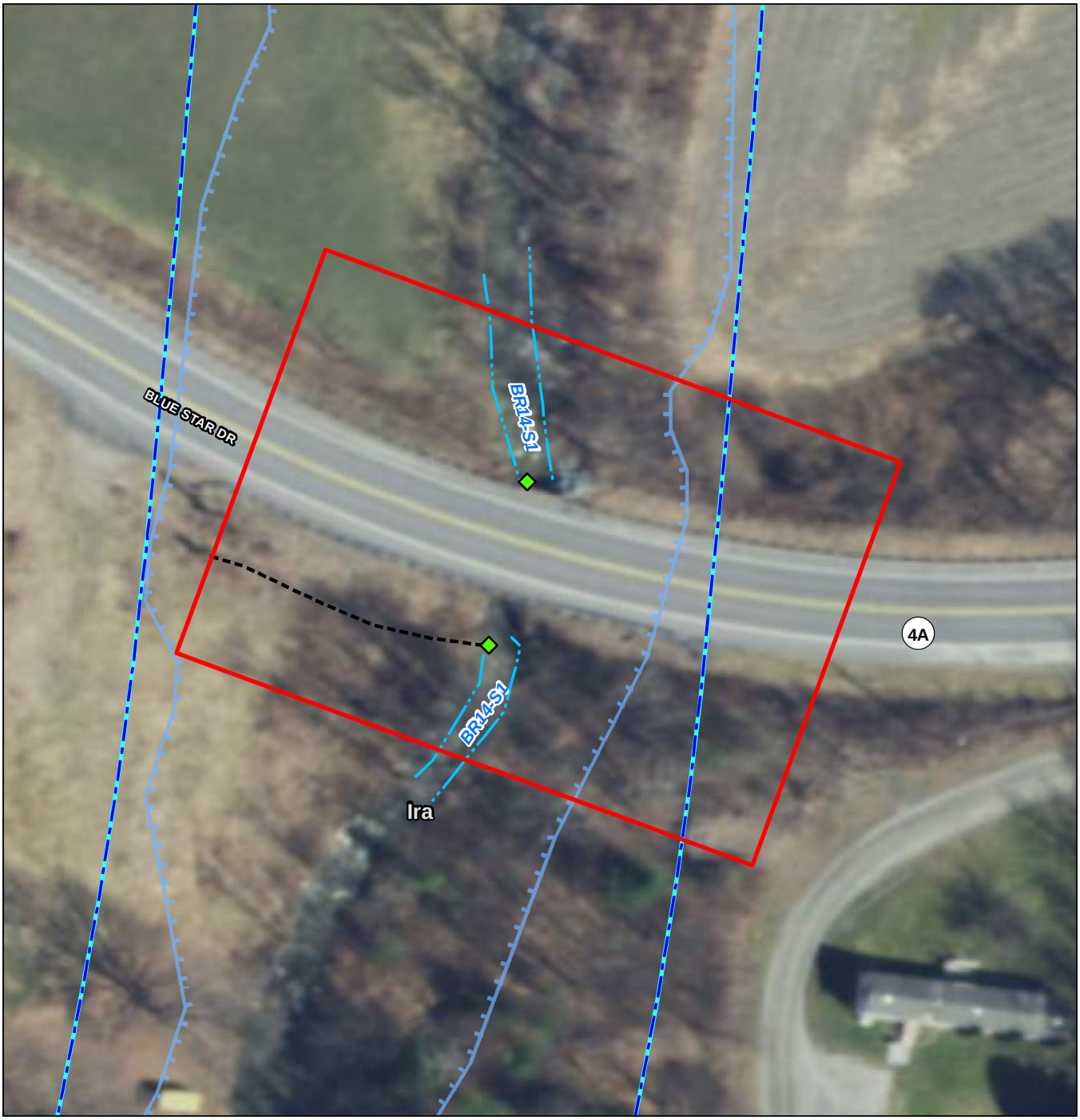

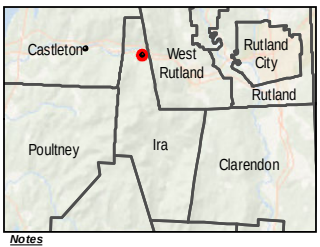

Legend

- GPS-Located Bridge Edge
- Jurisdictional Ditch
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project
195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 14

Title
Wetland and Waters Delineation Map

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

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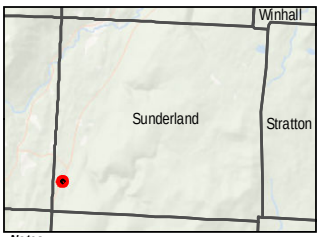

Legend

- GPS-Located Culvert
- Delineated Perennial Stream (OHW/Stream Center)
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

195601752

Figure No.
BR 19

Title
Wetland and Waters Delineation Map

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

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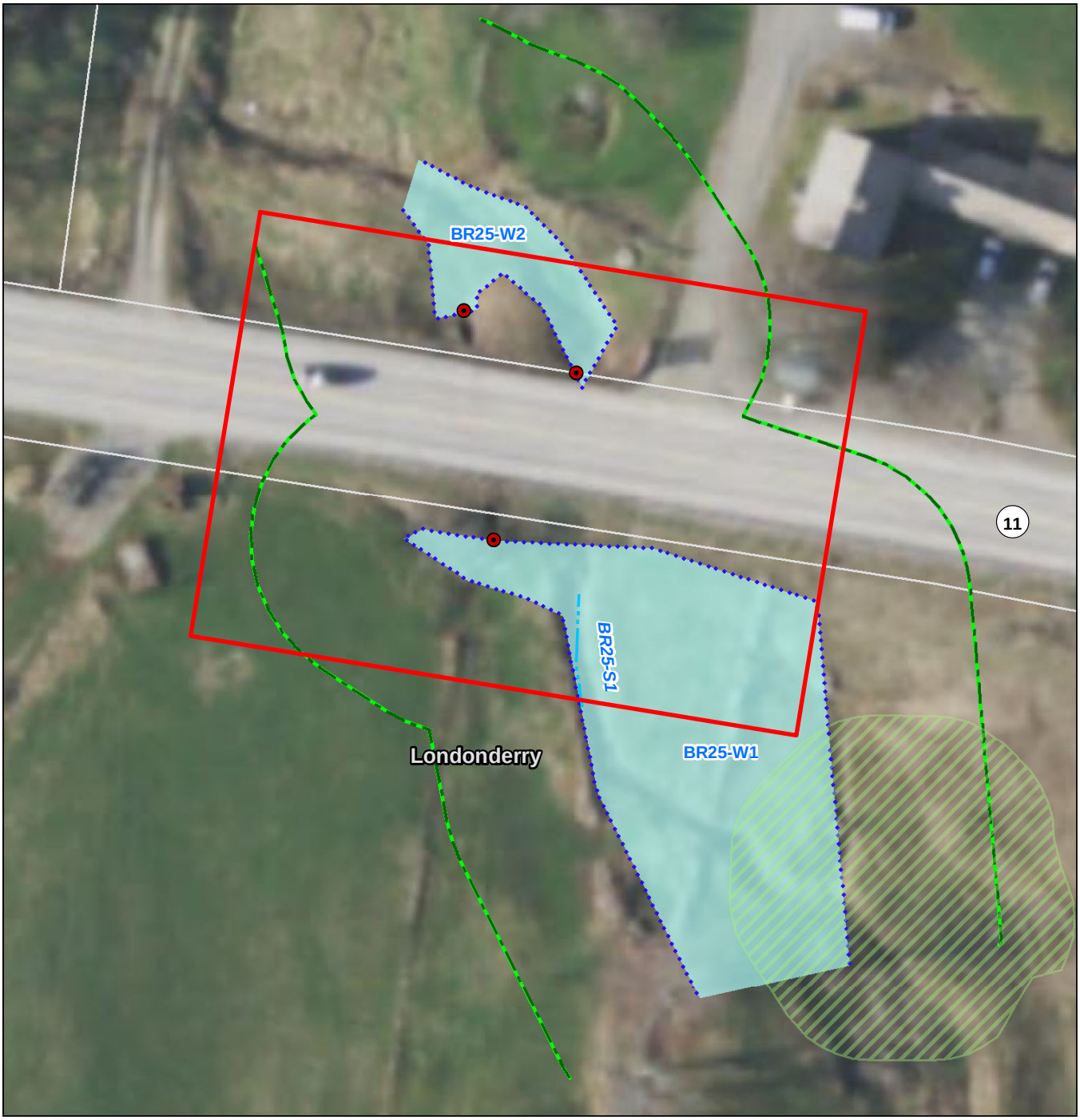

Legend

- GPS-Located Culvert
- Delineated Intermittent Stream (OHW/Stream Center)
- Delineated Wetland
- Class II Wetland Buffer
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
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Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 25

Title
Wetland and Waters Delineation Map

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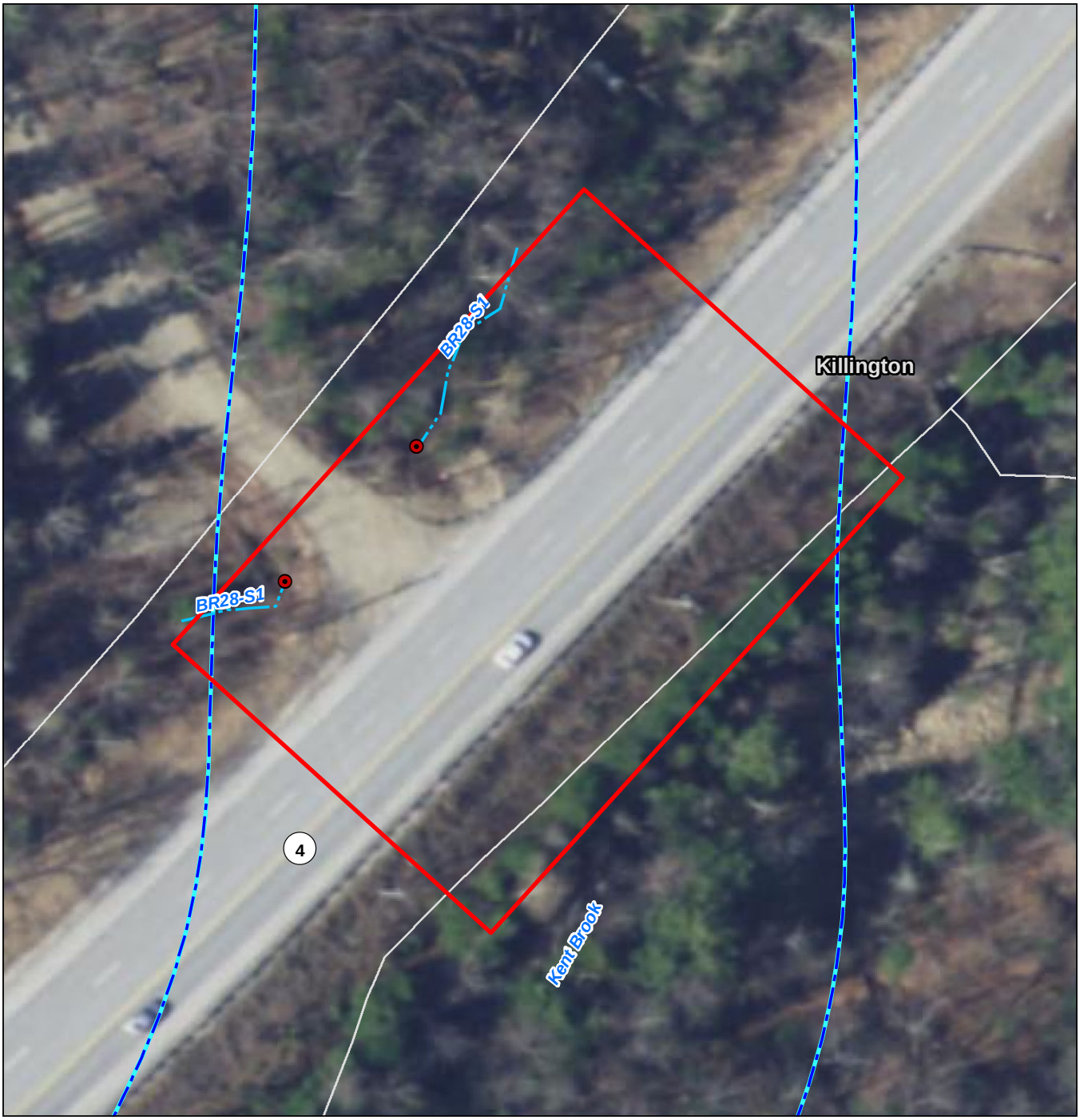

Legend

- GPS-Located Culvert
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers
(not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
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N

Stantec

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 28

Title
Wetland and Waters Delineation Map

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Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Legend

- GPS-Located Culvert
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers
(not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 36

Title
Wetland and Waters Delineation Map

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Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Legend

- GPS-Located Culvert
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits
- Parcel Boundary

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 58A

Title
Wetland and Waters Delineation Map

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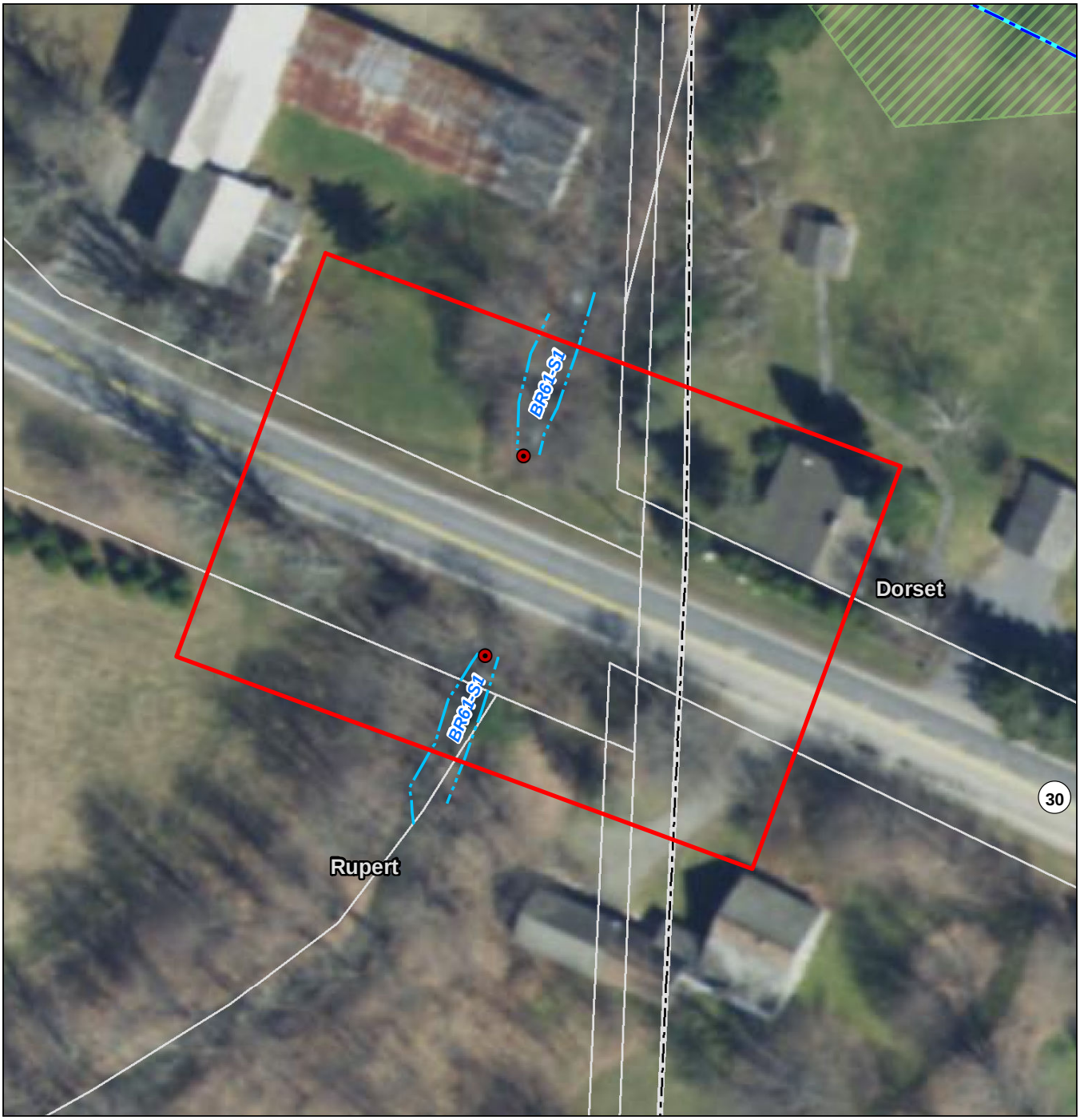

Legend

- GPS-Located Culvert
- Delineated Intermittent Stream (OHW/Stream Center)
- Approximate Survey Limits
- Municipal Boundary
- Parcel Boundary

Vermont Regulatory Resource Layers (not all layers are present within map extent)

- VHD Stream
- Vermont DEC River Corridor
- NWI Wetland
- VSWI Wetland
- 100 Year Flood Zone (Zone A and AE)
- Floodway

0 40 Feet
(At original document size of 8.5x11)
1:600

N

Notes

1. Wetland and waters delineations conducted by Stantec (Fenner) between July 18-20, 2022. Delineation and proposed classification has not been field verified by VT DEC and/or USACE.
2. Wetland boundaries and streams were located utilizing an EOS Arrow GNSS/GPS Receiver. Expected accuracy of GPS data is within 1-2 meters of actual position.
3. Coordinate System: NAD 1983 StatePlane Vermont FIPS 4400 Feet
4. Data Sources: Vermont Center for Geographic Information (VCGI), FEMA.
5. Background: VCGI Color Imagery Service

Stantec

Project Location
Rutland and Bennington Counties
Vermont

Prepared by PWB on 2022-08-03
TR by KWH on 2022-08-03
IR Review by CF on 2022-08-03

Client/Project 195601752
VTrans
Statewide- Southwest STP CULV(91)
Rutland and Bennington Counties

Figure No.
BR 61

Title
Wetland and Waters Delineation Map

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Appendix B REPRESENTATIVE PHOTOGRAPHS

Photo 1. View looking south through the **BR 9** culvert under VT-4A in Castleton. Stantec, July 18, 2022

Photo 2. A representative view of recent ditch excavation work on the north side of VT-4A, downgradient from the **BR 9** culvert crossing. Photo view looking generally west. Stantec, July 18, 2022.

Photo 3. A view looking generally south (upgradient) from the inlet of **BR 9** culvert. Photo view shows the intermittently dry streambed of Stream BR9-S1. Stantec, July 18, 2022.

Photo 4. A representative view of conditions in the **BR 14** culvert crossing of VT-4A in Ira. Photo view looking generally north. Stantec, July 18, 2022.

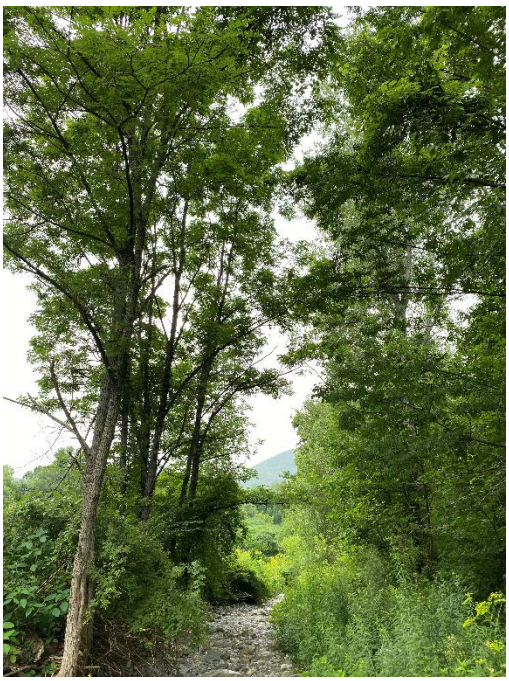


Photo 5. Photo view looking generally north along the delineated channel of intermittent Stream BR14-S1, taken from the outlet (north) end of the **BR 14** VT-4A crossing. Stantec, July 18, 2022.

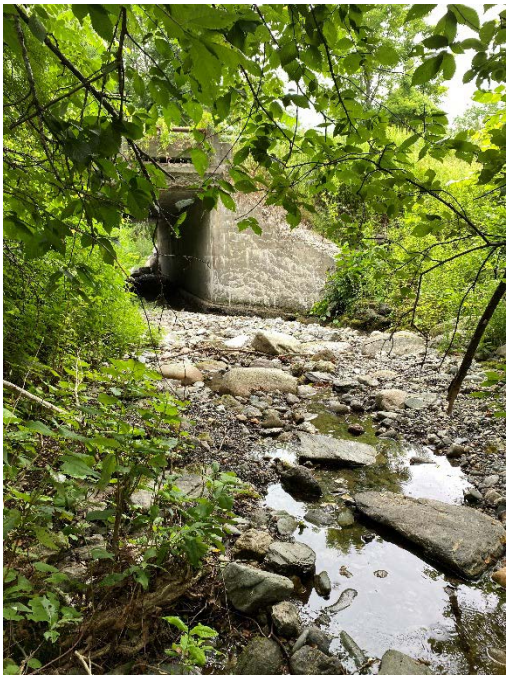


Photo 6. A view of **BR 14** in Ira, looking north towards the inlet (south) end of the crossing structure. Stantec, July 18, 2022.

Photo 7. Photograph taken from the north edge of US-4 in Killington towards the sign for **BR 28**. Photo view shows steep slope down towards forest where Stream BR28-S1 was delineated. Stantec, July 18, 2022

Photo 8. A view looking generally south towards US-4 and the assumed approximate location of the upgradient/inlet end of the **BR 28** culvert (culvert not found in field, appears to have been buried by fill, debris, organic material, other). Stantec, July 18, 2022.

Photo 9. A view looking generally west along the edge of US-4 at the sign for **BR 28** and the assumed approximate location of the downgradient/outlet end of the **BR 28** culvert (culvert not found in field). Stantec, July 18, 2022.

Photo 10. Representative conditions of Stream BR28-S1 and adjacent forest to the north of the US-4 corridor on the upgradient end of the **BR 28** crossing. Photo view looking generally to the east. Stantec, July 18, 2022.

Photo 11. Photo view looking to the north from the downgradient end of **BR 36** crossing under US-4 in Bridgewater. Stantec, July 18, 2022.

Photo 12. Representative conditions in Stream BR36-S1, looking downstream (generally south) from the **BR 36** outlet. Stream BR28-S1 confluences into Ottaqueechee River beyond photo view. Stantec, July 18, 2022.

Photo 13. A representative view of upstream conditions on the north side of US-4 in Bridgewater, with culvert inlet of **BR 36** visible in the photo foreground. Stantec, July 19, 2022

Photo 14. Stream channel conditions (intermittent) and surrounding forest cover on the south side of **BR 61** in Dorset, upgradient from the crossing under VT-30. Stantec, July 19, 2022.

Photo 15. Photo view looking north towards the inlet of **BR 61** where it crosses VT-30. Photo view shows culvert dry streambed conditions and some evidence of dynamic channel with exposed roots on mature trees. Stantec, July 19, 2022.

Photo 16. A representative view of Stream BR61-S1 with the culvert **BR 61** visible in photo background, looking upstream (north) from the southern edge of the investigation area. Stantec, July 18, 2022.

Photo 17. Photo view looking at the inlet of the **BR 58A** culvert structure in Rupert where it crosses VT-30. Culvert inlet is on the north side of VT-30 within a mowed/maintained lawn area. Stantec, July 19, 2022.

Photo 18. A view looking north from the inlet (north) end of **BR 58A**. Photo view shows edge of wetland area in the background (within tall herbs/shrubs), beyond the limits of the investigation area.

Stantec, July 19, 2022.

Photo 19. Photograph taken looking generally north at the outlet end of **BR 58A** where Stream BR58A-S1 flows generally south. Stantec, July 19, 2022

Photo 20. A view looking generally south at the culvert inlet of **BR 19** where Stream BR19-S1 flows into the crossing structure towards its confluence with Fayville Branch, crossing under US-7 in Sunderland. Stantec, July 19, 2022.

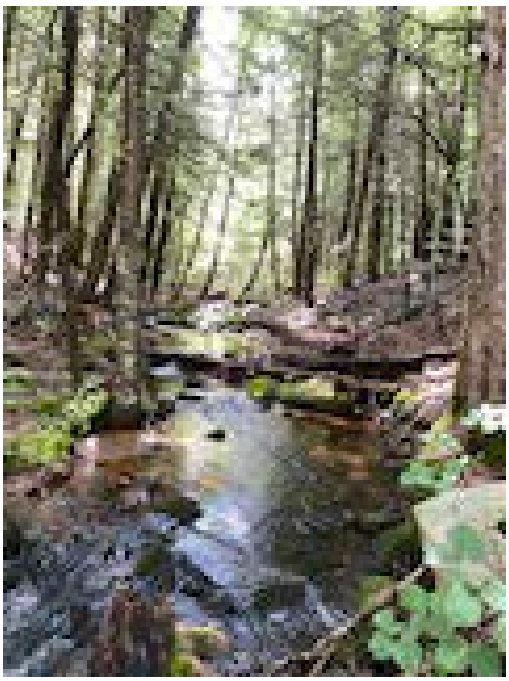


Photo 21. A view looking east (upstream) at conditions of Stream BR19-S1 and surrounding forest before it flows into **BR 19-7**. Stantec, July 19, 2022.

Photo 22. A view looking at the outlet of BR 19-7 on the east side of US-7, photo view looking generally east at vegetative cover downgradient from the crossing culvert. Stantec, July 19, 2022.

Photo 23. Photo view looking generally north (upgradient) at the outlet end of **BR 25** where it crossed VT-11 in Londonderry. Stantec, July 19, 2022.

Photo 24. Representative conditions on the south of VT-11 downgradient from **BR 25** in Stream BR25-S1, at where a stream channel originates from diffuse overland flow of water through Wetland BR25-W1. Stantec, July 19, 2022.

Photo 25. Photo view looking generally south (downgradient) at the inlet end of **BR 25** where it crosses under VT-11 in Londonderry. Stantec, July 19, 2022.

Photo 26. Representative conditions looking north from the edge of VT-11 towards Wetland BR25-W1, upgradient from the BR 25 culvert crossing. Stantec, July 19, 2022.

Appendix C VERMONT WETLAND EVALUATION FORMS

VERMONT WETLAND EVALUATION FORM

Wetland ID#:_____ Project #:_____

Date: _____ Investigator:_____

SUMMARY OF FUNCTIONAL EVALUATION:
Each function gets a score of 0= not present; L = Low; P = Present; or H = High.

1. Water Storage for Flood Water and Storm Runoff ☐	**6. Rare, Threatened, and Endangered Species Habitat** ☐
2. Surface & Ground Water Protection ☐	**7. Education and Research in Natural Sciences** ☐
3. Fish Habitat ☐	**8. Recreational Value and Economic Benefits** ☐
4. Wildlife Habitat ☐	**9. Open Space and Aesthetics** ☐
5. Exemplary Wetland Natural Community ☐	**10. Erosion Control through Binding and Stabilizing the Soil** ☐

Note:

- ***When to use this form:*** This is a field form to help you compile data needed to evaluate the 10 possible functions and values of a wetland as described in the Vermont Wetland Rules. All information in this form is replicated in the applications for both wetland determinations and wetland permits.
- ***Both a desktop review and field examination*** should be employed to accurately determine surrounding land use, hydrology, hydroperiod, vegetation, position in the landscape, and physical attributes.
- ***The entire wetland or wetland complex*** in question must be evaluated to determine the level of function in all ten (10) categories for accurate classification. A wetland complex can be defined as a series of interconnected wetland types.
- ***The surrounding upland and outflow area*** of the wetland should be examined to determine land use, development, nearby natural resources, and hydrology. The surrounding land use, previous development, and cumulative impacts may play a role in the current function of the wetland. For best results please read all descriptions prior to scoring activity.
- ***Evaluation***: The first portion in each section determines whether the wetland does or does not provide the function. If none of the conditions listed in the first section are met, proceed

to the next section. If any of these conditions are met, determine if the wetland provides this function at a higher or lower level based on the information listed in the subsequent sections.

- ***Presumptions:*** Please note that many wetlands are already presumed to be significant under the Vermont Wetland Rules. A wetland is presumed to be significant if:
    - The wetland is mapped on the VSWI map
    - The wetland is contiguous to a VSWI mapped wetland
    - The wetland meets the presumptions of significance under Section 4.6
    - The wetland has a preliminary determination that it is Class II

1. Water Storage for Flood Water and Storm Runoff

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Constricted outlet or no outlet and an unconstricted inlet.
- ☐ Physical space for floodwater expansion and dense, persistent, emergent vegetation or dense woody vegetation that slows down flood waters or stormwater runoff during peak flows and facilitates water removal by evaporation and transpiration.
- ☐ If a stream is present, its course is sinuous and there is sufficient woody vegetation to intercept surface flows in the portion of the wetland that floods.
- ☐ Physical evidence of seasonal flooding or ponding such as water stained leaves, water marks on trees, drift rows, debris deposits, or standing water.
- ☐ Hydrologic or hydraulic study indicates wetland attenuates flooding.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level:

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☐ Significant flood storage capacity upstream of the wetland, and the wetland in question provides this function at a negligible level in comparison to upstream storage (unless the upstream storage is temporary such as a beaver impoundment).
- ☐ Wetland is contiguous to a major lake or pond that provides storage benefits independently of the wetland.
- ☐ Wetland's storage capacity is created primarily by recent beaver dams or other temporary structures.
- ☐ Wetland is very small in size, not contiguous to a stream, and not part of a collection of small wetlands in the landscape that provide this function cumulatively.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ History of downstream flood damage to public or private property.
- ☐ Any of the following conditions present downstream of the wetland, but upstream of a major lake or pond, could be impacted by a loss or reduction of the water storage function.
  - ☐ 1. Developed public or private property.
  - ☐ 2. Stream banks susceptible to scouring and erosion.
  - ☐ 3. Important habitat for aquatic life.
- ☐ The wetland is large in size and naturally vegetated.

☐ Any of the following conditions present upstream of the wetland may indicate a large volume of runoff may reach the wetland.

- ☐ 1. A large amount of impervious surface in urbanized areas.
- ☐ 2. Relatively impervious soils.
- ☐ 3. Steep slopes in the adjacent areas.

2. Surface and Ground Water Protection

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Constricted or no outlets.
- ☐ Low water velocity through dense, persistent vegetation.
- ☐ Hydroperiod permanently flooded or saturated.
- ☐ Wetlands in depositional environments with persistent vegetation wider than 20 feet.
- ☐ Wetlands with persistent vegetation comprising a defined delta, island, bar or peninsula.
- ☐ Presence of seeps or springs.
- ☐ Wetland contains a high amount of microtopography that helps slow and filter surface water.
- ☐ Position in the landscape indicates the wetland is a headwaters area.
- ☐ Wetland is adjacent to surface waters.
- ☐ Wetland recharges a drinking water source.
- ☐ Water sampling indicates removal of pollutants or nutrients.
- ☐ Water sampling indicates retention of sediments or organic matter.
- ☐ Fine mineral soils and alkalinity not low.
- ☐ The wetland provides an obvious filter between surface water or ground water and land uses that may contribute point or nonpoint sources of sediments, toxic substances or nutrients to the wetland, such as: steep erodible slopes; row crops; dumps; areas of pesticide, herbicide or fertilizer application; feed lots; parking lots or heavily traveled road; and septic systems.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☐ Presence of dead forest or shrub areas in sufficient amounts to result in diminished

nutrient uptake.

- ☐ Presence of ditches or channels that confine water and restrict contact of water with vegetation.
- ☐ Wetland is very small in size, not contiguous to a stream, and not part of a collection of small wetlands in the landscape that provide this function cumulatively.
- ☐ Current use in the wetland results in disturbance that compromises this function.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ The wetland is adjacent to a well head or source protection area, and provides ground water recharge.
- ☐ The wetland provides flows to Class A surface waters.
- ☐ The wetland contributes to the protection or improvement of water quality of any impaired waters.
- ☐ The wetland is large in size and naturally vegetated.

3. Fish Habitat

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Contains woody vegetation that overhangs the banks of a stream or river and provides any of the following: shading that controls summer water temperature; cover including refuges created by overhanging branches or undercut banks; source of terrestrial insects as fish food; or streambank stability.
- ☐ Provides spawning, nursery, feeding or cover habitat for fish (documented or professionally judged). Common habitat includes deep marsh and shallow marsh associates with lakes and streams, and seasonally flooded wetlands associated with streams and rivers.
- ☐ Documented or professionally judged spawning habitat for northern pike.
- ☐ Provides cold spring discharge that lowers the temperature of receiving waters and creates summer habitat for salmonoid species.
- ☐ The wetland is located along a tributary that does not support fish, but contributes to a larger body of water that does support fish. The tributary supports downstream fish by providing cooler water, and food sources.

4. Wildlife Habitat

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Provides resting, feeding staging or roosting habitat to support waterfowl migration, and feeding habitat for wading birds. Good habitats for these species include open water wetlands.
- ☐ Habitat to support one or more breeding pairs or broods of waterfowl including all species of ducks, geese, and swans. Good habitats for these species include open water habitats adjacent shallow marsh, deep marsh, shrub wetland, forested wetland, or naturally vegetated buffer zone.
- ☐ Provides a nest site, a buffer for a nest site or feeding habitat for wading birds including but not limited to: great blue heron, black-crowned night heron, green-backed heron, cattle egret, or snowy egret. Good habitats for these species include open water or deep marsh adjacent to forested wetlands, or standing dead trees.
- ☐ Supports or has the habitat to support one or more breeding pairs of any migratory bird that requires wetland habitat for breeding, nesting, rearing of young, feeding, staging roosting, or migration, including: Virginia rail, common snipe, marsh wren, American bittern, northern water thrush, northern harrier, spruce grouse, Cerulean warbler, and common loon.
- ☐ Supports winter habitat for white-tailed deer. Good habitats for these species include softwood swamps. Evidence of use includes deer browsing, bark stripping, worn trails, or pellet piles.
- ☐ Provides important feeding habitat for black bear, bobcat, or moose based on an assessment of use. Good habitat for these types of species includes wetlands located in a forested mosaic.
- ☐ Has the habitat to support muskrat, otter or mink. Good habitats for these species include deep marshes, wetlands adjacent to bodies of water including lakes, ponds, rivers and streams.
- ☐ Supports an active beaver dam, one or more lodges, or evidence of use in two or more consecutive years by an adult beaver population.
- ☐ Provides the following habitats that support the reproduction of Uncommon Vermont amphibian species including:
  - ☐ 1. Wood Frog, Jefferson Salamander, Blue-spotted Salamander, or Spotted Salamander. Breeding habitat for these species includes vernal pools and small ponds.
  - ☐ 2. Northern Dusky Salamander and the Spring Salamander. Habitat for these species includes headwater seeps, springs, and streams.
  - ☐ 3. The Four-toed salamander; Fowler's Toad; Western or Boreal Chorus frog, or other amphibians found in Vermont of similar significance.

☐ Supports or has the habitat to support significant populations of Vermont amphibian species including, but not limited to Pickerel Frog, Northern Leopard Frog, Mink Frog, and others found in Vermont of similar significance. Good habitat for these types of species includes large marsh systems with open water components.

☐ Supports or has the habitat to support populations of uncommon Vermont reptile species including: Wood Turtle, Northern Map Turtle, Eastern Musk Turtle, Spotted Turtle, Spiny Softshell, Eastern Ribbonsnake, Northern Watersnake, and others found in Vermont of similar significance.

☐ Supports or has the habitat to support significant populations of Vermont reptile species, including Smooth Greensnake, DeKay's Brownsnake, or other more common wetland-associated species.

☐ Meets four or more of the following conditions indicative of wildlife habitat diversity:

- ☐ 1. Three or more wetland vegetation classes (greater than 1/2 acre) present including but not limited to: open water contiguous to, but not necessarily part of, the wetland, deep marsh, shallow marsh, shrub swamp, forested swamp, fen, or bog;
- ☐ 2. The dominant vegetation class is one of the following types: deep marsh, shallow marsh, shrub swamp or, forested swamp;
- ☐ 3. Located adjacent to a lake, pond, river or stream;
- ☐ 4. Fifty percent or more of surrounding habitat type is one or more of the following: forest, agricultural land, old field or open land;
- ☐ 5. Emergent or woody vegetation occupies 26 to 75 percent of wetland, the rest is open water;
- ☐ 6. One of the following:
  - ☐ i. hydrologically connected to other wetlands of different dominant classes or open water within 1 mile;
  - ☐ ii. hydrologically connected to other wetlands of same dominant class within 1/2 mile;
  - ☐ iii. within 1/4 mile of other wetlands of different dominant classes or open water, but not hydrologically connected;

☐ Wetland or wetland complex is owned in whole or in part by state or federal government and managed for wildlife and habitat conservation; and

☐ Contains evidence that it is used by wetland dependent wildlife species.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

☐ The wetland is small in size for its type and does not represent fugitive habitat in

developed areas (vernal pools and seeps are generally small in size, so this does not apply).

- ☐ The surrounding land use is densely developed enough to limit use by wildlife species (with the exception of wetlands with open water habitat). Can be negated by evidence of use.
- ☐ The current use in the wetland results in frequent cutting, mowing or other disturbance.
- ☐ The wetland hydrology and character is at a drier end of the scale and does not support wetland dependent species.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ The wetland complex is large in size and high in quality.
- ☐ The habitat has the potential to support several species based on the assessment above.
- ☐ Wetland is associated with an important wildlife corridor.
- ☐ The wetland has been identified by ANR-F&W as important habitat.

5. Exemplary Wetland Natural Community

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Wetlands that are identified as high quality examples of Vermont's natural community types recognized by the Natural Heritage Information Project of the Vermont Fish and Wildlife Department, including rare types such as dwarf shrub bogs, rich fens, alpine peatlands, red maple-black gum swamps and the more common types including deep bulrush marshes, cattail marshes, northern white cedar swamps, spruce-fir-tamarack swamps, and red maple-black ash seepage swamps are automatically significant for this function.

The wetland is also likely to be significant if any of the following conditions are met:

- ☐ Is an example of a wetland natural community type that has been identified and mapped by, or meets the ranking and mapping standards of, the Natural Heritage Information Project of the Vermont Fish and Wildlife Department.
- ☐ Contains ecological features that contribute to Vermont's natural heritage, including, but not limited to:
  - ☐ Deep peat accumulation reflecting a long history of wetland formation;
  - ☐ Forested wetlands displaying very old trees and other old growth characteristics;
  - ☐ A wetland natural community that is at the edge of the normal range for that type;

- ☐ A wetland mosaic containing examples of several to many wetland community types; or
- ☐ A large wetland complex with examples of several wetland community types.

6. Rare, Threatened, and Endangered Species Habitat

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Wetlands that contain one or more species on the federal or state threatened or endangered lists, as well as species that are rare in Vermont, are automatically significant for this function.

The wetland is also likely to be significant if any of the following apply:

- ☐ There is creditable documentation that the wetland provides important habitat for any species on the federal or state threatened or endangered species lists;
- ☐ There is creditable documentation that threatened or endangered species have been present in past 10 years;
- ☐ There is creditable documentation that the wetland provides important habitat for any species listed as rare in Vermont (S1 or S2 ranks), state historic (SH rank), or rare to uncommon globally (G1, G2, or G3 ranks) by the Natural Heritage Information Project of the Vermont Fish and Wildlife Department;
- ☐ There is creditable documentation that the wetland provides habitat for multiple uncommon species of plants or animals (S3 rank).

List name of species and ranking:

7. Education and Research in Natural Sciences

☐ Function is present and likely to be significant: Any of the following characteristics indicate the wetland provides this function.

- ☐ Owned by or leased to a public entity dedicated to education or research.
- ☐ History of use for education or research.
- ☐ Has one or more characteristics making it valuable for education or research.

8. Recreational Value and Economic Benefits

☐ Function is present and likely to be significant: Any of the following characteristics indicate the wetland provides this function.

- ☐ Used for, or contributes to, recreational activities.
- ☐ Provides economic benefits.
- ☐ Provides important habitat for fish or wildlife which can be fished, hunted or trapped under applicable state law.
- ☐ Used for harvesting of wild foods.

Comments:

9. Open Space and Aesthetics

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Can be readily observed by the public; and
  - ☐ Possesses special or unique aesthetic qualities; or
  - ☐ Has prominence as a distinct feature in the surrounding landscape;
- ☐ Has been identified as important open space in a municipal, regional or state plan.

10. Erosion Control through Binding and Stabilizing the Soil

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Erosive forces such as wave or current energy are present and any of the following are present as well:
  - ☐ Dense, persistent vegetation along a shoreline or stream bank that reduces an adjacent erosive force.
  - ☐ Good interspersion of persistent emergent vegetation and water along course of water flow.
  - ☐ Studies show that wetlands of similar size, vegetation type, and hydrology are important for erosion control.

What type of erosive forces are present?

- ☐ Lake fetch and waves
- ☐ High current velocities
- ☐ Water level influenced by upstream impoundment

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☐ The stream is artificially channelized and/or lacks vegetation that contributes to controlling the erosive force.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ The stream contains high sinuosity.
- ☐ Has been identified through fluvial geomorphic assessment to be important in maintaining the natural condition of the stream or river corridor.

VERMONT WETLAND EVALUATION FORM

Wetland ID#: BR25-W2 Project #: 195601752 - VTrans SW STP

Date: 2022-07-19 Investigator: Stantec (Fenner)

SUMMARY OF FUNCTIONAL EVALUATION:
Each function gets a score of 0= not present; L = Low; P = Present; or H = High.

1. Water Storage for Flood Water and Storm Runoff	P	**6. Rare, Threatened, and Endangered Species Habitat**	0
2. Surface & Ground Water Protection	P	**7. Education and Research in Natural Sciences**	0
3. Fish Habitat	0	**8. Recreational Value and Economic Benefits**	0
4. Wildlife Habitat	L	**9. Open Space and Aesthetics**	0
5. Exemplary Wetland Natural Community	0	**10. Erosion Control through Binding and Stabilizing the Soil**	L

Note:

- ***When to use this form:*** This is a field form to help you compile data needed to evaluate the 10 possible functions and values of a wetland as described in the Vermont Wetland Rules. All information in this form is replicated in the applications for both wetland determinations and wetland permits.
- ***Both a desktop review and field examination*** should be employed to accurately determine surrounding land use, hydrology, hydroperiod, vegetation, position in the landscape, and physical attributes.
- ***The entire wetland or wetland complex*** in question must be evaluated to determine the level of function in all ten (10) categories for accurate classification. A wetland complex can be defined as a series of interconnected wetland types.
- ***The surrounding upland and outflow area*** of the wetland should be examined to determine land use, development, nearby natural resources, and hydrology. The surrounding land use, previous development, and cumulative impacts may play a role in the current function of the wetland. For best results please read all descriptions prior to scoring activity.
- ***Evaluation***: The first portion in each section determines whether the wetland does or does not provide the function. If none of the conditions listed in the first section are met, proceed

to the next section. If any of these conditions are met, determine if the wetland provides this function at a higher or lower level based on the information listed in the subsequent sections.

- ***Presumptions:*** Please note that many wetlands are already presumed to be significant under the Vermont Wetland Rules. A wetland is presumed to be significant if:
    - The wetland is mapped on the VSWI map
    - The wetland is contiguous to a VSWI mapped wetland
    - The wetland meets the presumptions of significance under Section 4.6
    - The wetland has a preliminary determination that it is Class II

1. Water Storage for Flood Water and Storm Runoff

☒ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Constricted outlet or no outlet and an unconstricted inlet.
- ☒ Physical space for floodwater expansion and dense, persistent, emergent vegetation or dense woody vegetation that slows down flood waters or stormwater runoff during peak flows and facilitates water removal by evaporation and transpiration.
- ☐ If a stream is present, its course is sinuous and there is sufficient woody vegetation to intercept surface flows in the portion of the wetland that floods.
- ☐ Physical evidence of seasonal flooding or ponding such as water stained leaves, water marks on trees, drift rows, debris deposits, or standing water.
- ☐ Hydrologic or hydraulic study indicates wetland attenuates flooding.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level:

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☐ Significant flood storage capacity upstream of the wetland, and the wetland in question provides this function at a negligible level in comparison to upstream storage (unless the upstream storage is temporary such as a beaver impoundment).
- ☐ Wetland is contiguous to a major lake or pond that provides storage benefits independently of the wetland.
- ☐ Wetland's storage capacity is created primarily by recent beaver dams or other temporary structures.
- ☐ Wetland is very small in size, not contiguous to a stream, and not part of a collection of small wetlands in the landscape that provide this function cumulatively.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ History of downstream flood damage to public or private property.
- ☐ Any of the following conditions present downstream of the wetland, but upstream of a major lake or pond, could be impacted by a loss or reduction of the water storage function.
  - ☐ 1. Developed public or private property.
  - ☐ 2. Stream banks susceptible to scouring and erosion.
  - ☐ 3. Important habitat for aquatic life.
- ☐ The wetland is large in size and naturally vegetated.

☐ Any of the following conditions present upstream of the wetland may indicate a large volume of runoff may reach the wetland.

- ☐ 1. A large amount of impervious surface in urbanized areas.
- ☐ 2. Relatively impervious soils.
- ☐ 3. Steep slopes in the adjacent areas.

2. Surface and Ground Water Protection

■ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ■ Constricted or no outlets.
- ■ Low water velocity through dense, persistent vegetation.
- ☐ Hydroperiod permanently flooded or saturated.
- ☐ Wetlands in depositional environments with persistent vegetation wider than 20 feet.
- ☐ Wetlands with persistent vegetation comprising a defined delta, island, bar or peninsula.
- ■ Presence of seeps or springs.
- ☐ Wetland contains a high amount of microtopography that helps slow and filter surface water.
- ☐ Position in the landscape indicates the wetland is a headwaters area.
- ☐ Wetland is adjacent to surface waters.
- ☐ Wetland recharges a drinking water source.
- ☐ Water sampling indicates removal of pollutants or nutrients.
- ☐ Water sampling indicates retention of sediments or organic matter.
- ☐ Fine mineral soils and alkalinity not low.
- ■ The wetland provides an obvious filter between surface water or ground water and land uses that may contribute point or nonpoint sources of sediments, toxic substances or nutrients to the wetland, such as: steep erodible slopes; row crops; dumps; areas of pesticide, herbicide or fertilizer application; feed lots; parking lots or heavily traveled road; and septic systems.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☐ Presence of dead forest or shrub areas in sufficient amounts to result in diminished

nutrient uptake.

- ☐ Presence of ditches or channels that confine water and restrict contact of water with vegetation.
- ☐ Wetland is very small in size, not contiguous to a stream, and not part of a collection of small wetlands in the landscape that provide this function cumulatively.
- ☐ Current use in the wetland results in disturbance that compromises this function.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ The wetland is adjacent to a well head or source protection area, and provides ground water recharge.
- ☐ The wetland provides flows to Class A surface waters.
- ☐ The wetland contributes to the protection or improvement of water quality of any impaired waters.
- ☐ The wetland is large in size and naturally vegetated.

3. Fish Habitat

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Contains woody vegetation that overhangs the banks of a stream or river and provides any of the following: shading that controls summer water temperature; cover including refuges created by overhanging branches or undercut banks; source of terrestrial insects as fish food; or streambank stability.
- ☐ Provides spawning, nursery, feeding or cover habitat for fish (documented or professionally judged). Common habitat includes deep marsh and shallow marsh associates with lakes and streams, and seasonally flooded wetlands associated with streams and rivers.
- ☐ Documented or professionally judged spawning habitat for northern pike.
- ☐ Provides cold spring discharge that lowers the temperature of receiving waters and creates summer habitat for salmonoid species.
- ☐ The wetland is located along a tributary that does not support fish, but contributes to a larger body of water that does support fish. The tributary supports downstream fish by providing cooler water, and food sources.

4. Wildlife Habitat

☒ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Provides resting, feeding staging or roosting habitat to support waterfowl migration, and feeding habitat for wading birds. Good habitats for these species include open water wetlands.
- ☐ Habitat to support one or more breeding pairs or broods of waterfowl including all species of ducks, geese, and swans. Good habitats for these species include open water habitats adjacent shallow marsh, deep marsh, shrub wetland, forested wetland, or naturally vegetated buffer zone.
- ☐ Provides a nest site, a buffer for a nest site or feeding habitat for wading birds including but not limited to: great blue heron, black-crowned night heron, green-backed heron, cattle egret, or snowy egret. Good habitats for these species include open water or deep marsh adjacent to forested wetlands, or standing dead trees.
- ☐ Supports or has the habitat to support one or more breeding pairs of any migratory bird that requires wetland habitat for breeding, nesting, rearing of young, feeding, staging roosting, or migration, including: Virginia rail, common snipe, marsh wren, American bittern, northern water thrush, northern harrier, spruce grouse, Cerulean warbler, and common loon.
- ☐ Supports winter habitat for white-tailed deer. Good habitats for these species include softwood swamps. Evidence of use includes deer browsing, bark stripping, worn trails, or pellet piles.
- ☐ Provides important feeding habitat for black bear, bobcat, or moose based on an assessment of use. Good habitat for these types of species includes wetlands located in a forested mosaic.
- ☐ Has the habitat to support muskrat, otter or mink. Good habitats for these species include deep marshes, wetlands adjacent to bodies of water including lakes, ponds, rivers and streams.
- ☐ Supports an active beaver dam, one or more lodges, or evidence of use in two or more consecutive years by an adult beaver population.
- ☐ Provides the following habitats that support the reproduction of Uncommon Vermont amphibian species including:
  - ☐ 1. Wood Frog, Jefferson Salamander, Blue-spotted Salamander, or Spotted Salamander. Breeding habitat for these species includes vernal pools and small ponds.
  - ☐ 2. Northern Dusky Salamander and the Spring Salamander. Habitat for these species includes headwater seeps, springs, and streams.
  - ☐ 3. The Four-toed salamander; Fowler's Toad; Western or Boreal Chorus frog, or other amphibians found in Vermont of similar significance.

☐ Supports or has the habitat to support significant populations of Vermont amphibian species including, but not limited to Pickerel Frog, Northern Leopard Frog, Mink Frog, and others found in Vermont of similar significance. Good habitat for these types of species includes large marsh systems with open water components.

☒ Supports or has the habitat to support populations of uncommon Vermont reptile species including: Wood Turtle, Northern Map Turtle, Eastern Musk Turtle, Spotted Turtle, Spiny Softshell, Eastern Ribbonsnake, Northern Watersnake, and others found in Vermont of similar significance.

☐ Supports or has the habitat to support significant populations of Vermont reptile species, including Smooth Greensnake, DeKay's Brownsnake, or other more common wetland-associated species.

☐ Meets four or more of the following conditions indicative of wildlife habitat diversity:

- ☐ 1. Three or more wetland vegetation classes (greater than 1/2 acre) present including but not limited to: open water contiguous to, but not necessarily part of, the wetland, deep marsh, shallow marsh, shrub swamp, forested swamp, fen, or bog;
- ☐ 2. The dominant vegetation class is one of the following types: deep marsh, shallow marsh, shrub swamp or, forested swamp;
- ☒ 3. Located adjacent to a lake, pond, river or stream;
- ☒ 4. Fifty percent or more of surrounding habitat type is one or more of the following: forest, agricultural land, old field or open land;
- ☐ 5. Emergent or woody vegetation occupies 26 to 75 percent of wetland, the rest is open water;
- ☒ 6. One of the following:
  - ☐ i. hydrologically connected to other wetlands of different dominant classes or open water within 1 mile;
  - ☒ ii. hydrologically connected to other wetlands of same dominant class within 1/2 mile;
  - ☐ iii. within 1/4 mile of other wetlands of different dominant classes or open water, but not hydrologically connected;

☐ Wetland or wetland complex is owned in whole or in part by state or federal government and managed for wildlife and habitat conservation; and

☐ Contains evidence that it is used by wetland dependent wildlife species.

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☒ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

☒ The wetland is small in size for its type and does not represent fugitive habitat in

developed areas (vernal pools and seeps are generally small in size, so this does not apply).

- [x] The surrounding land use is densely developed enough to limit use by wildlife species (with the exception of wetlands with open water habitat). Can be negated by evidence of use.
- [ ] The current use in the wetland results in frequent cutting, mowing or other disturbance.
- [ ] The wetland hydrology and character is at a drier end of the scale and does not support wetland dependent species.

- [ ] Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.
  - [ ] The wetland complex is large in size and high in quality.
  - [ ] The habitat has the potential to support several species based on the assessment above.
  - [ ] Wetland is associated with an important wildlife corridor.
  - [ ] The wetland has been identified by ANR-F&W as important habitat.

5. Exemplary Wetland Natural Community

- [ ] Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.
  - [ ] Wetlands that are identified as high quality examples of Vermont's natural community types recognized by the Natural Heritage Information Project of the Vermont Fish and Wildlife Department, including rare types such as dwarf shrub bogs, rich fens, alpine peatlands, red maple-black gum swamps and the more common types including deep bulrush marshes, cattail marshes, northern white cedar swamps, spruce-fir-tamarack swamps, and red maple-black ash seepage swamps are automatically significant for this function.

  The wetland is also likely to be significant if any of the following conditions are met:

  - [ ] Is an example of a wetland natural community type that has been identified and mapped by, or meets the ranking and mapping standards of, the Natural Heritage Information Project of the Vermont Fish and Wildlife Department.
  - [ ] Contains ecological features that contribute to Vermont's natural heritage, including, but not limited to:
    - [ ] Deep peat accumulation reflecting a long history of wetland formation;
    - [ ] Forested wetlands displaying very old trees and other old growth characteristics;
    - [ ] A wetland natural community that is at the edge of the normal range for that type;

- ☐ A wetland mosaic containing examples of several to many wetland community types; or
- ☐ A large wetland complex with examples of several wetland community types.

6. Rare, Threatened, and Endangered Species Habitat

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Wetlands that contain one or more species on the federal or state threatened or endangered lists, as well as species that are rare in Vermont, are automatically significant for this function.

The wetland is also likely to be significant if any of the following apply:

- ☐ There is creditable documentation that the wetland provides important habitat for any species on the federal or state threatened or endangered species lists;
- ☐ There is creditable documentation that threatened or endangered species have been present in past 10 years;
- ☐ There is creditable documentation that the wetland provides important habitat for any species listed as rare in Vermont (S1 or S2 ranks), state historic (SH rank), or rare to uncommon globally (G1, G2, or G3 ranks) by the Natural Heritage Information Project of the Vermont Fish and Wildlife Department;
- ☐ There is creditable documentation that the wetland provides habitat for multiple uncommon species of plants or animals (S3 rank).

List name of species and ranking:

7. Education and Research in Natural Sciences

☐ Function is present and likely to be significant: Any of the following characteristics indicate the wetland provides this function.

- ☐ Owned by or leased to a public entity dedicated to education or research.
- ☐ History of use for education or research.
- ☐ Has one or more characteristics making it valuable for education or research.

8. Recreational Value and Economic Benefits

☐ Function is present and likely to be significant: Any of the following characteristics indicate the wetland provides this function.

- ☐ Used for, or contributes to, recreational activities.
- ☐ Provides economic benefits.
- ☐ Provides important habitat for fish or wildlife which can be fished, hunted or trapped under applicable state law.
- ☐ Used for harvesting of wild foods.

Comments:

9. Open Space and Aesthetics

☐ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ☐ Can be readily observed by the public; and
  - ☐ Possesses special or unique aesthetic qualities; or
  - ☐ Has prominence as a distinct feature in the surrounding landscape;
- ☐ Has been identified as important open space in a municipal, regional or state plan.

10. Erosion Control through Binding and Stabilizing the Soil

■ Function is present and likely to be significant: Any of the following physical and vegetative characteristics indicate the wetland provides this function.

- ■ Erosive forces such as wave or current energy are present and any of the following are present as well:
  - ☐ Dense, persistent vegetation along a shoreline or stream bank that reduces an adjacent erosive force.
  - ☐ Good interspersion of persistent emergent vegetation and water along course of water flow.
  - ☐ Studies show that wetlands of similar size, vegetation type, and hydrology are important for erosion control.

What type of erosive forces are present?

- ☐ Lake fetch and waves
- ☒ High current velocities
- ☐ Water level influenced by upstream impoundment

If any of the above boxes are checked, the wetland provides this function. Complete the following to determine if the wetland provides this function above or below a moderate level.

☒ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *lower* level.

- ☒ The stream is artificially channelized and/or lacks vegetation that contributes to controlling the erosive force.

☐ Check box if any of the following conditions apply that may indicate the wetland provides this function at a *higher* level.

- ☐ The stream contains high sinuosity.
- ☐ Has been identified through fluvial geomorphic assessment to be important in maintaining the natural condition of the stream or river corridor.

Appendix D HABITAT AND AQUATIC ORGANISM PASSAGE RECORDS REVIEW SUMMARY

Appendix D, Table 1. Records Review of Habitat and Aquatic Organism Passage

Structure ID	Road	Town	County	Rare, Threatened, Endangered (RTE) Species[1]	Bankfull Width : Span Ratio	Habitat Connectivity	Aquatic Organism Passage
					Data source: BR 14 and BR 36 from VT Culvert Inventory[2] BR 9, BR 19, BR 25, BR 28, BR 58A, and BR 61 from Hot 200 Culvert Study[3] (VT Culvert inventory data used when data not available from Hot 200)		
BR 9	Vermont Route 4A	Castleton	Rutland	No EO records of RTE species at crossing location;	1.67	Little or no need for extra provisions for wildlife passage	Natural barrier within 100’ of crossing
BR 14	Vermont Route 4A	Ira	Rutland	No EO records of RTE species at crossing location;	No data available (structure not in Hot 200)	No specific comments on habitat connectivity; multiple assessments between 2012 and 2022 note the poor structural condition of the bridge structure	
BR 19	US Route 7	Sunderland	Bennington	No EO records of RTE species at crossing location;	1.5	Top priority for wildlife passage	Prime fish habitat
BR 25	Vermont Route 11	Londonderry	Bennington	No EO records of RTE species at crossing location;	0.18	Moderate need for wildlife passage	Natural barrier within 100’ of crossing
BR 28	US Route 4	Killington	Rutland	No EO records of RTE species at crossing location;	2.18	Top priority for wildlife passage	Prime fish habitat
BR 36	US Route 4	Bridgewater	Rutland	No EO records of RTE species at crossing location;	No data available (structure not in Hot 200)	No specific comments on habitat connectivity; comments from inspections conducted between 2015 and 2020 note poor condition of culvert, placement of riprap at inlet and outlet, rust scale and staining of culvert meta, and perforations throughout invert. Based on these notes, it can be assumed that habitat conditions in the crossing structure are diminished	
BR 58A	Vermont Route 30	Dorset	Bennington	No EO records of RTE species at crossing location;	No data available (BFW not measurable based on field conditions)	Little or no need for extra provisions for wildlife passage	Natural barrier within 100’ of crossing
BR 61	Vermont Route 30	Rupert	Bennington	No EO records of RTE species at crossing location;	2.17	Little or no need for extra provisions for wildlife passage	Low slope, no outlet drop, hydraulically adequate

[1]Vermont Natural Heritage Inventory: Vermont Agency of Natural Resources, Natural Resources Atlas; https://anrmaps.vermont.gov/websites/anra5/
[2] Hot 200 Culvert Study: Stantec, 2017 (project 195311430 under contract for VTrans)
[3] Vermont Culvert Inventory: Vermont association of Planning & Development Agencies, VTrans; accessible online at https://www.vtculverts.org/

Appendix G: 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: 2/7/2023

Subject: Statewide Southwest STP CULV(91) Archaeological Resource Identification

Dear Julie Ann,

I have completed my background research and field inspection of the proposed culvert projects located in the towns of Bridgewater, Castleton, Dorset, Ira, Killington, Londonderry, Rupert and Sunderland in Bennington, Windsor, Windham and Rutland Counties. During the resource identification process, I surveyed a broad area adjacent to each project location in order to provide sufficient coverage to include various project iterations given the unscoped nature of the request. I will submit each resource ID as an individual documents to allow for easy inclusion in the scoping report.

Dorset Bridge No. 58A, VT Route 30, Dorset, Bennington County, Vermont

A field visit was conducted in May of 2022 in order to identify areas of archaeological sensitivity within a broad area adjacent to the existing structure. The current culvert carries a small, dry stream channel under Vermont Route 30 in Dorset.

Currently, there are no archaeologically sensitive areas within the four quadrants surrounding the culvert due to the disturbed nature. A core sample shows gravel and mixed soil deposition likely related to the roadway construction and shoulder work.

Please feel free to reach out with any questions or concerns about this project,

Brennan

VTrans Working to Get You There
Vermont Agency of Transportation

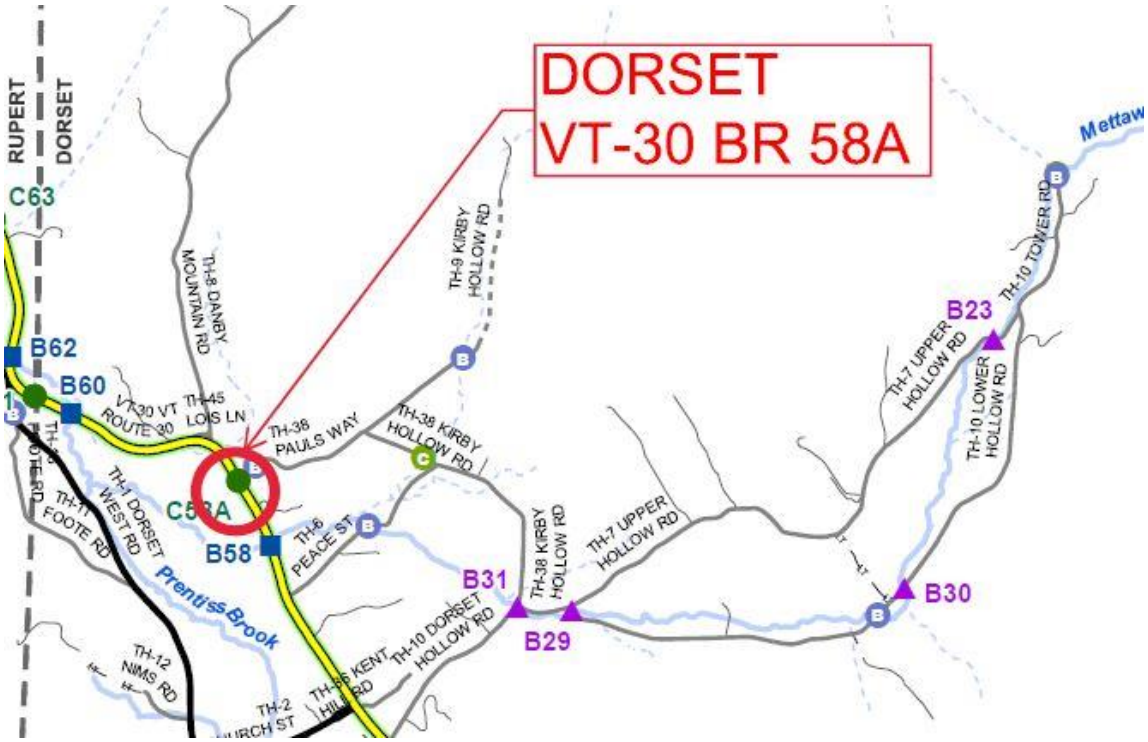


Figure 1: Project Location.

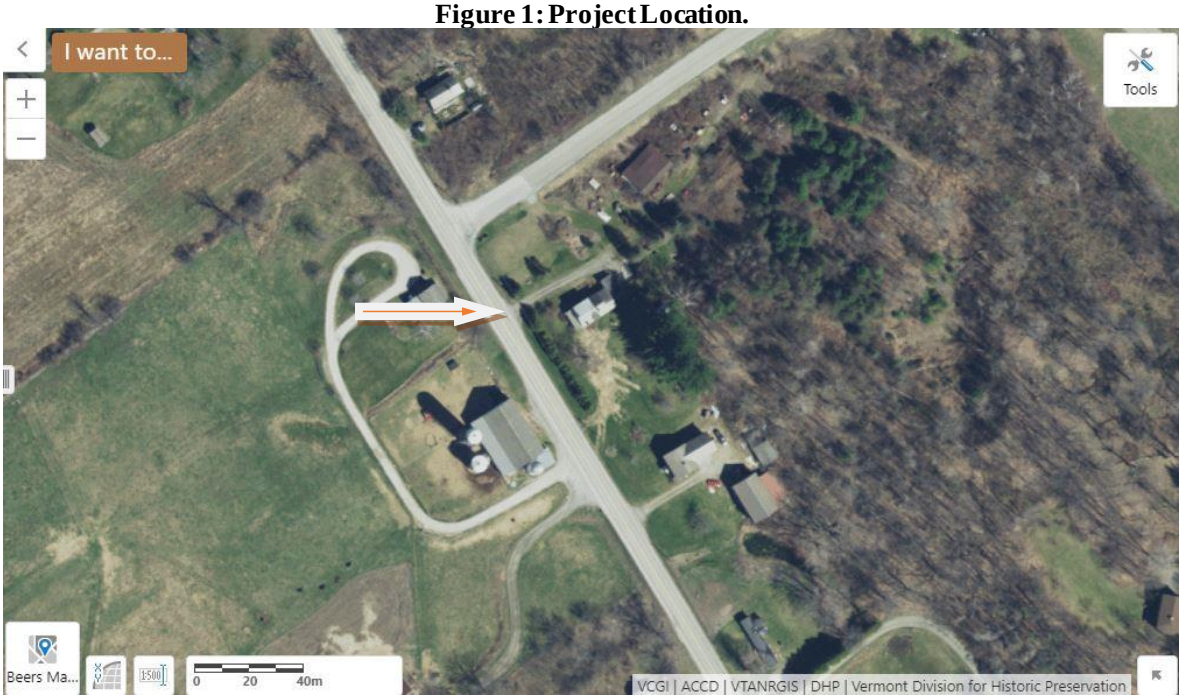


Figure 2: Project Aerial View.

Appendix H: 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

Historic Preservation Resource Identification Memo

To: Julie Ann Held, VTrans Environmental Specialist
Cc: Brennan Gauthier, VTrans Señor Archaeologist

Date: 08/11/2022

Subject: Statewide Southwest STP CULV(91)

Julie Ann,

This resource identification included surveying broad, general areas that could potentially be affected by culvert or small bridge replacement projects at the locations below. Several structures have National Register-eligible properties within a likely project Area of Potential Effect (APE). **Historically significant properties identified have been mapped in Esri FieldMaps.** Once a specific scope and design is developed at each location, further potential impacts and avoidance measures can be identified within a defined project APE to satisfy requirements under Section 106, Section 4(f), and NEPA.

Bridgewater: Br. 36, US Route 4

- No historic properties identified within a likely project APE.
- Although over 50 years of age, Bridge 36 is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.
- Adjacent single-family house at 1081 US Route 4 does not retain sufficient integrity for inclusion in the National Register (*Figure 3*).

Castleton: Br. 9, VT Route 4A

- **One historic property was identified** within a likely project APE at **968 VT Route 4A** (*Figure 6*). This National Register-eligible house is listed in the Vermont State Register (1103-21; 1980) and likely would not be affected by a future project at Bridge 9; however, Section 4(f) review might be necessary if easements are required from the parcel associated with the building.
- Although over 50 years of age, Bridge 9 is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Dorset: Br. 58A, Vermont Route 30

- A potentially **National-register eligible farmstead** was identified within a likely project **APE at 4299 and 4343 Vermont Route 30** (*Figure 9*). Further research, including better images of the farmhouse, is necessary to make a more definitive determination; however, this complex should be considered historically significant during project design. Section 4(f) review might be necessary if easements are required from the parcel associated with the farm complex.
- Although over 50 years of age, Bridge 58A is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Ira: Br. 14, Vermont Route 30

- No historic properties were identified within a likely project APE.
- Although over 50 years of age, Bridge 14 does not appear to possess the significance necessary for inclusion in the National Register under its type within the Vermont Bridges MPDF.

Killington: Br. 28, Us Route 4

- No historic properties were identified within a likely project APE.
- Although over 50 years of age, Bridge 28 is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Londonderry: Br. 25, Vermont Route 11

- A potentially **National-register eligible farmstead** was identified within a likely project **APE at 825 Vermont Route 11 (Taylor Farm) in Londonderry** (*Figure 16*). Further research, including better images of the farmhouse, is necessary to make a more definitive determination; however, this complex should be considered historically significant during project design. Section 4(f) review might be necessary if easements are required from the parcel associated with the farm complex.
- Although over 50 years of age, Bridge 25 is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Rupert: Br. 61, Vermont Route 30

- Two potentially **National-register eligible buildings** were identified within a likely project **APE at 209 Vermont Route 30 in Dorset and 40 Vermont Route 30 in Rupert** (*Figures 19-20*). Further research is necessary to make a more definitive determination; however, the parcels associated with these two properties should be considered historically significant during project design. Section 4(f) review might be necessary if easements are required from either parcel.
- Although over 50 years of age, Bridge 30 is a common example of its type and does not possess the historic significance necessary for inclusion in the National Register.

Sunderland: Br. 19-7, US Route 7

- Less than 50 years of age, Bridge 19-7 is a common example of its type and does not possess the Exceptional historic significance necessary for inclusion in the National Register. There are no other buildings, structures, or objects within a likely project APE.

Please, let me know if there are any questions.

Images and Illustrations

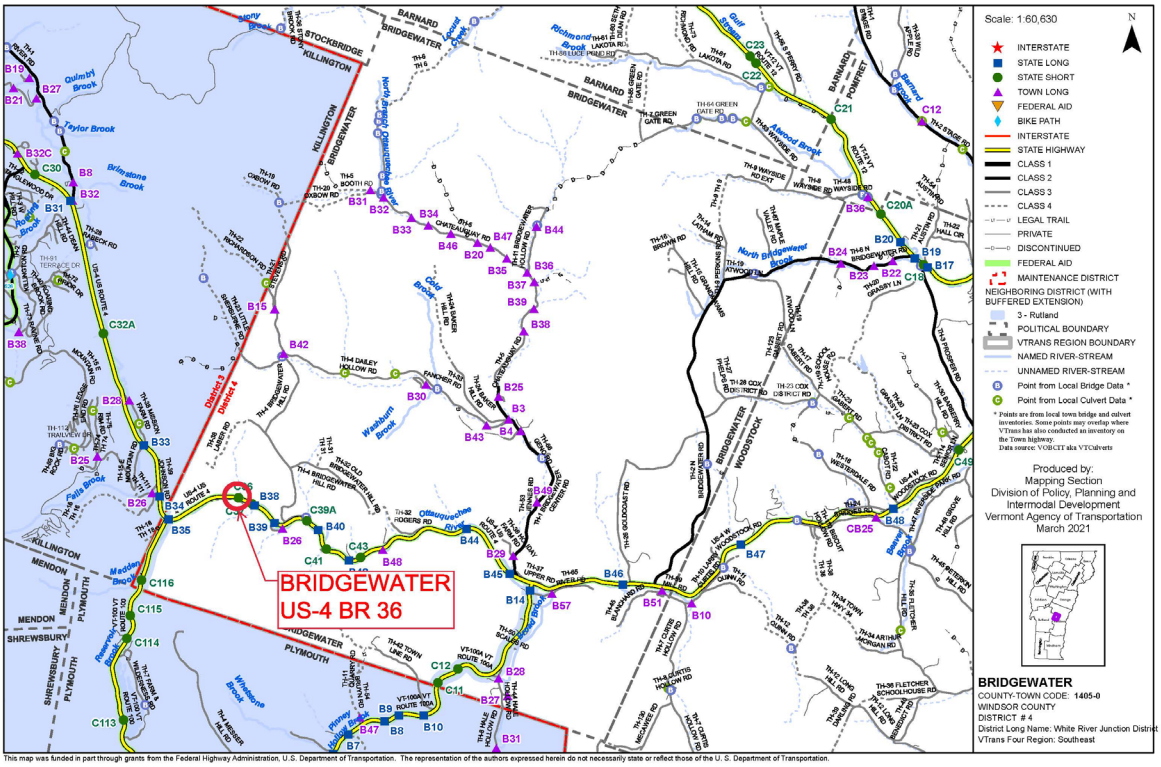


Figure 1. Bridge 36 location in Bridgewater.

Figure 2. Survey area at Bridge 36 in Bridgewater, near 1081 US Route 4.

Figure 3. Vacant, deteriorated house near Bridge 36, at 1081 US Route 4 in Bridgewater. August 2022.

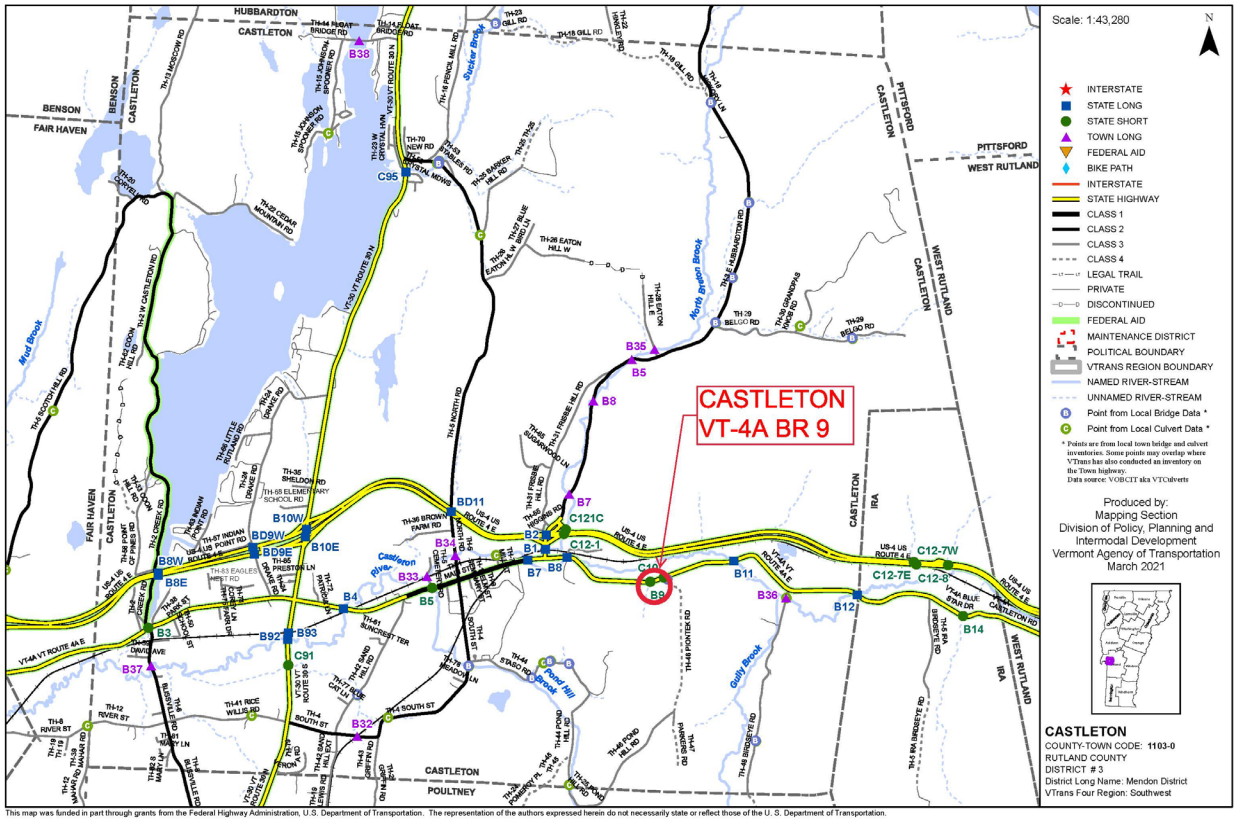


Figure 4. Bridge 9 location in Castleton.

Figure 5. Survey area at Bridge 9 in Castleton, near 968 Vermont Route 4A.

Figure 6. Vermont State Register-listed Onion House at 968 VT Route 4A in Castleton, near Bridge 9. August 2022.

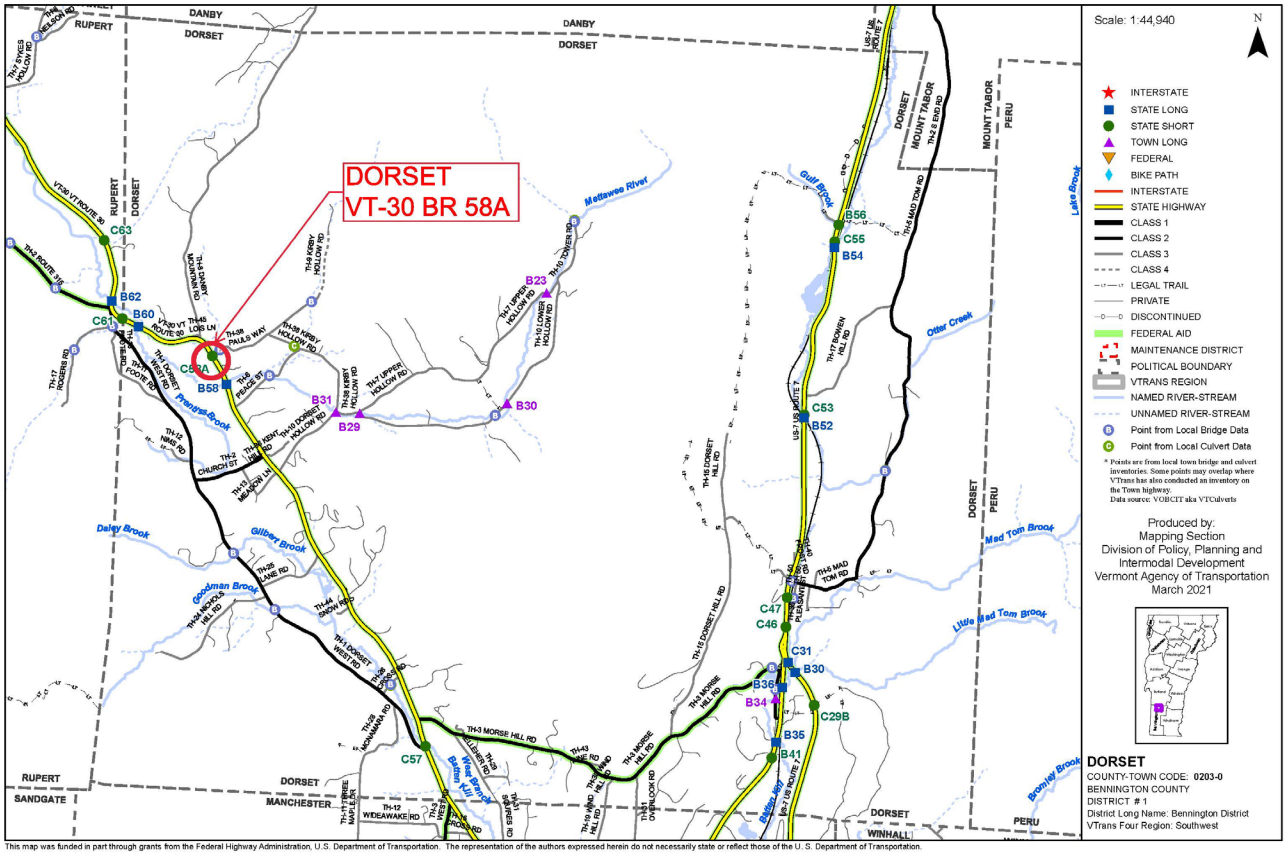


Figure 7. Bridge 58A location in Dorset.

Figure 8. Survey area at Bridge 58A in Dorset, near 4343 Vermont Route 30.

Figure 9. Potentially National Register-eligible farm complex near Br. 58A in Dorset at 4343 Vermont Route 30.

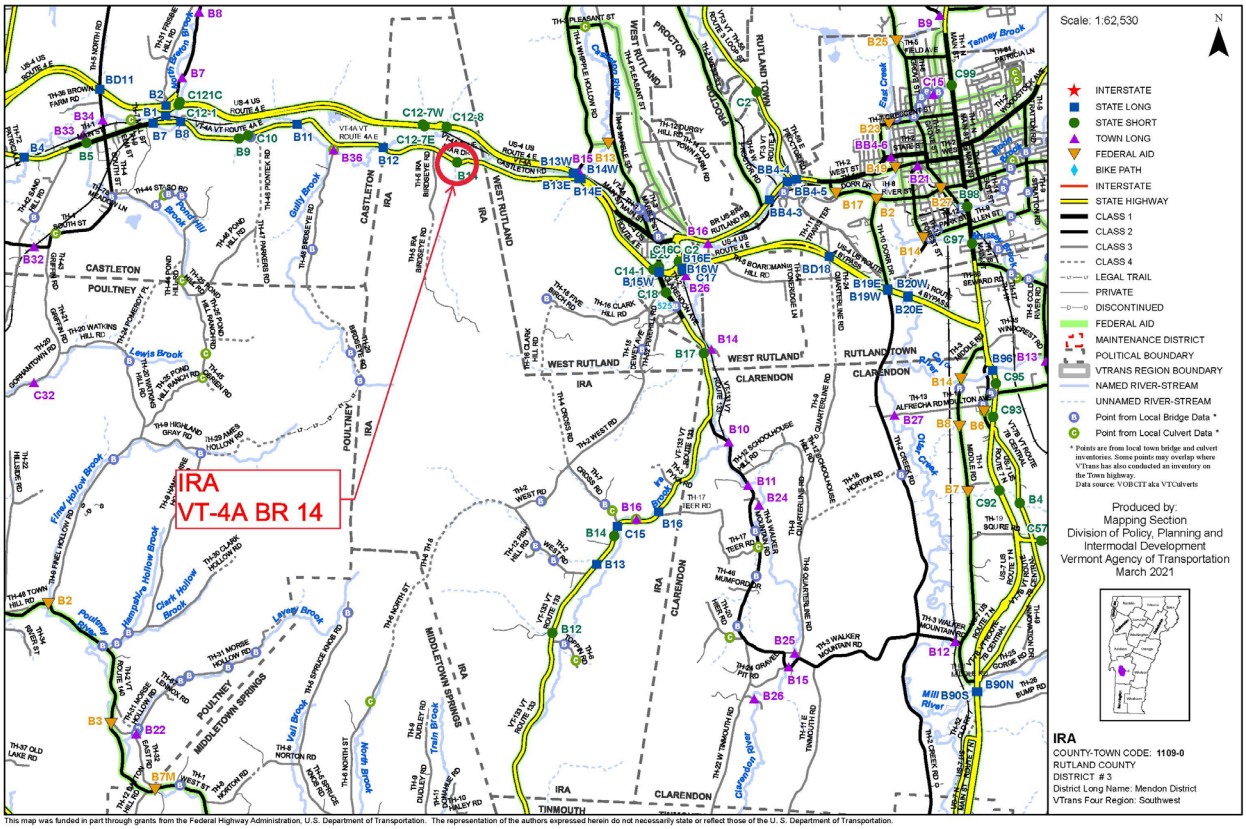


Figure 10. Bridge 14 location in Ira.

Figure 11. *Survey area at Bridge 14 in Ira on Vermont Route 30.*

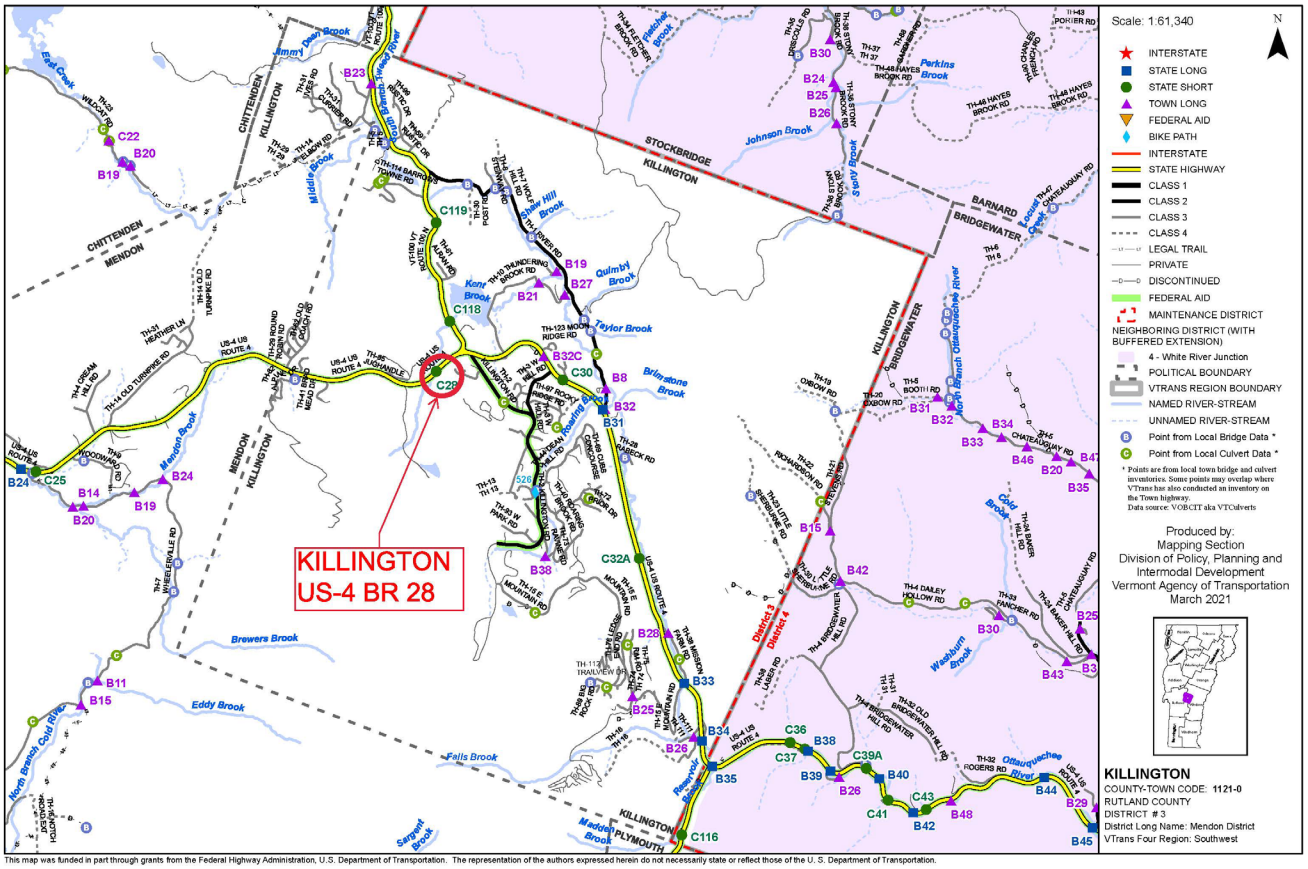


Figure 12. Bridge 28 location in Killington.

Figure 13. Survey area at Bridge 28 in Killington on US Route 4.

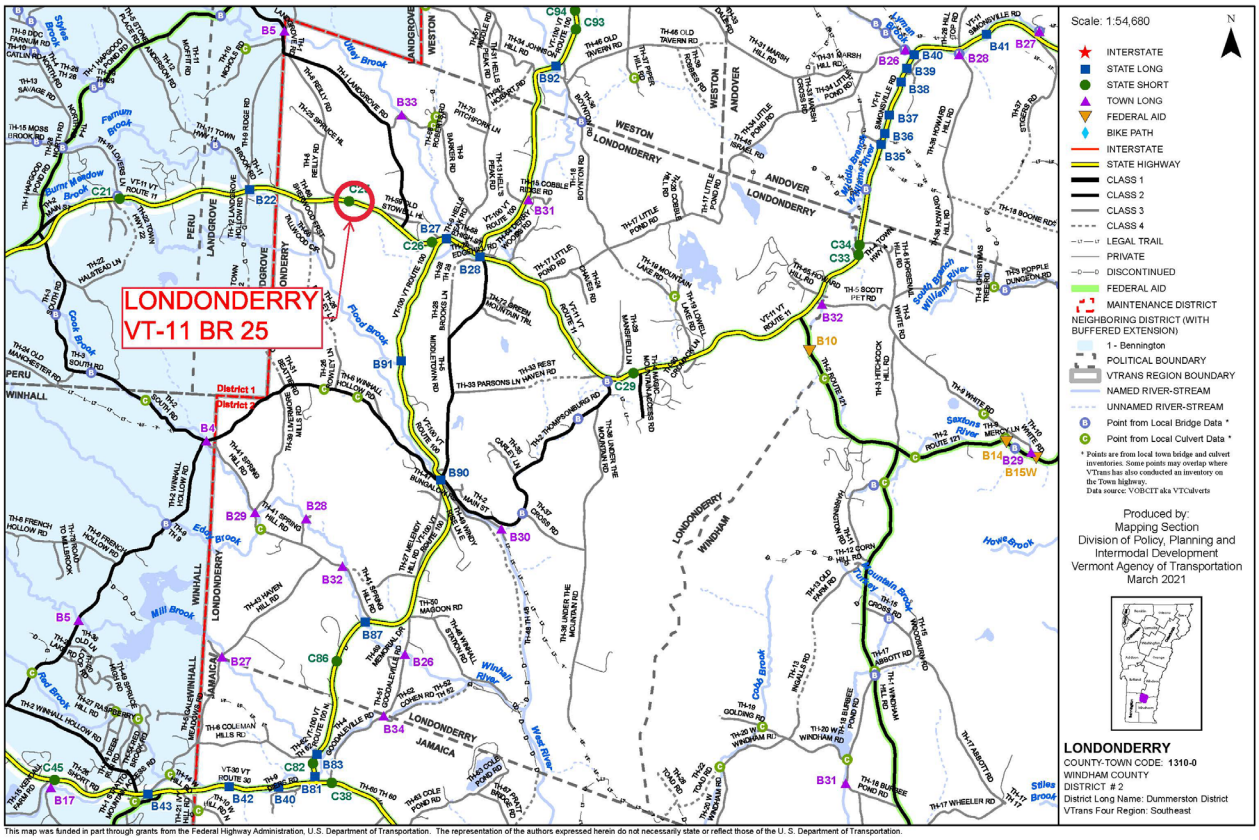


Figure 14. Bridge 25 location in Londonderry on Vermont Route 11.

Figure 15. Survey area at Bridge 25 in Londonderry on Vermont Route 11.

Figure 16. Potentially National Register-eligible farm complex at 825 Vermont Route 11 in Londonderry (Taylor Farm).

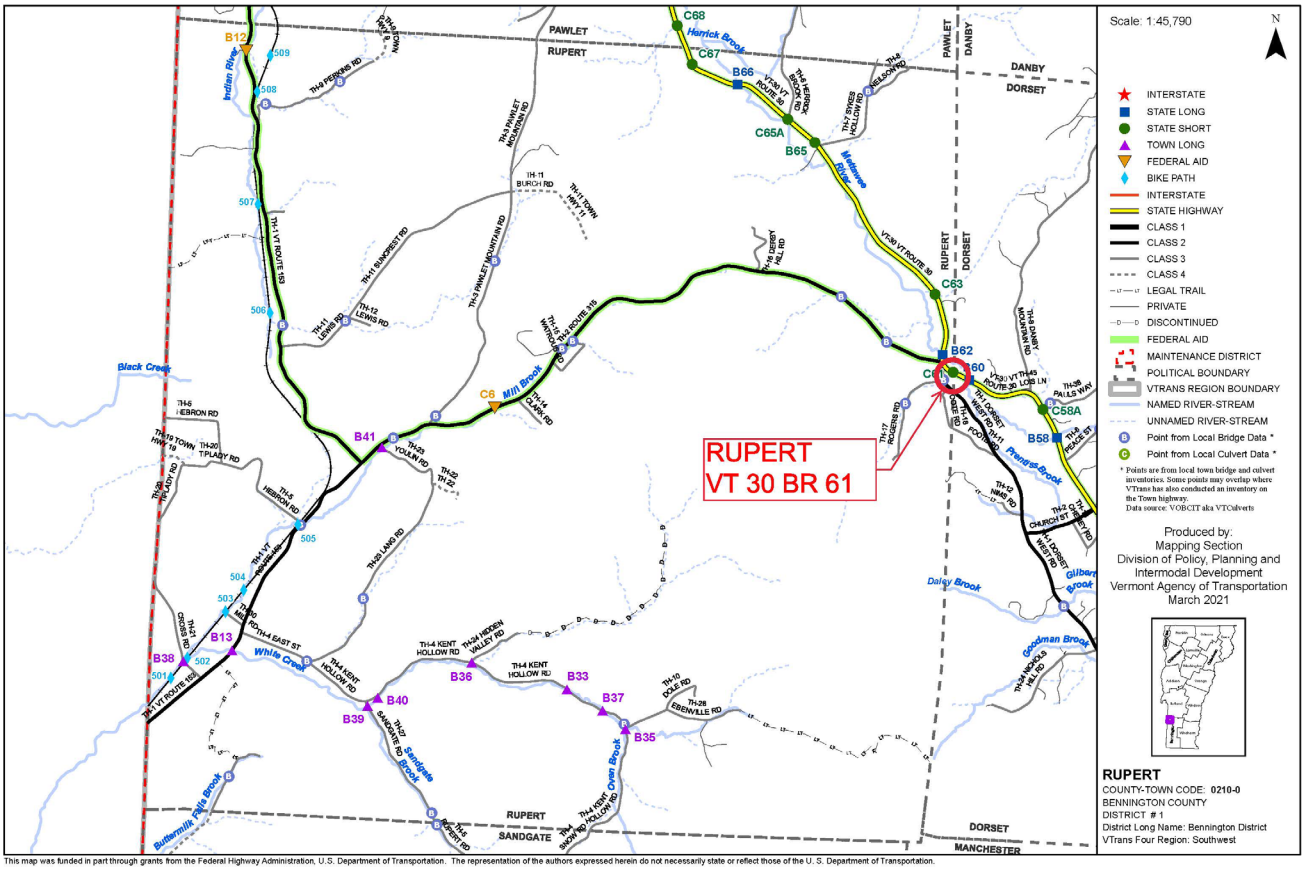


Figure 17. Bridge 61 location in Rupert on Vermont Route 30.

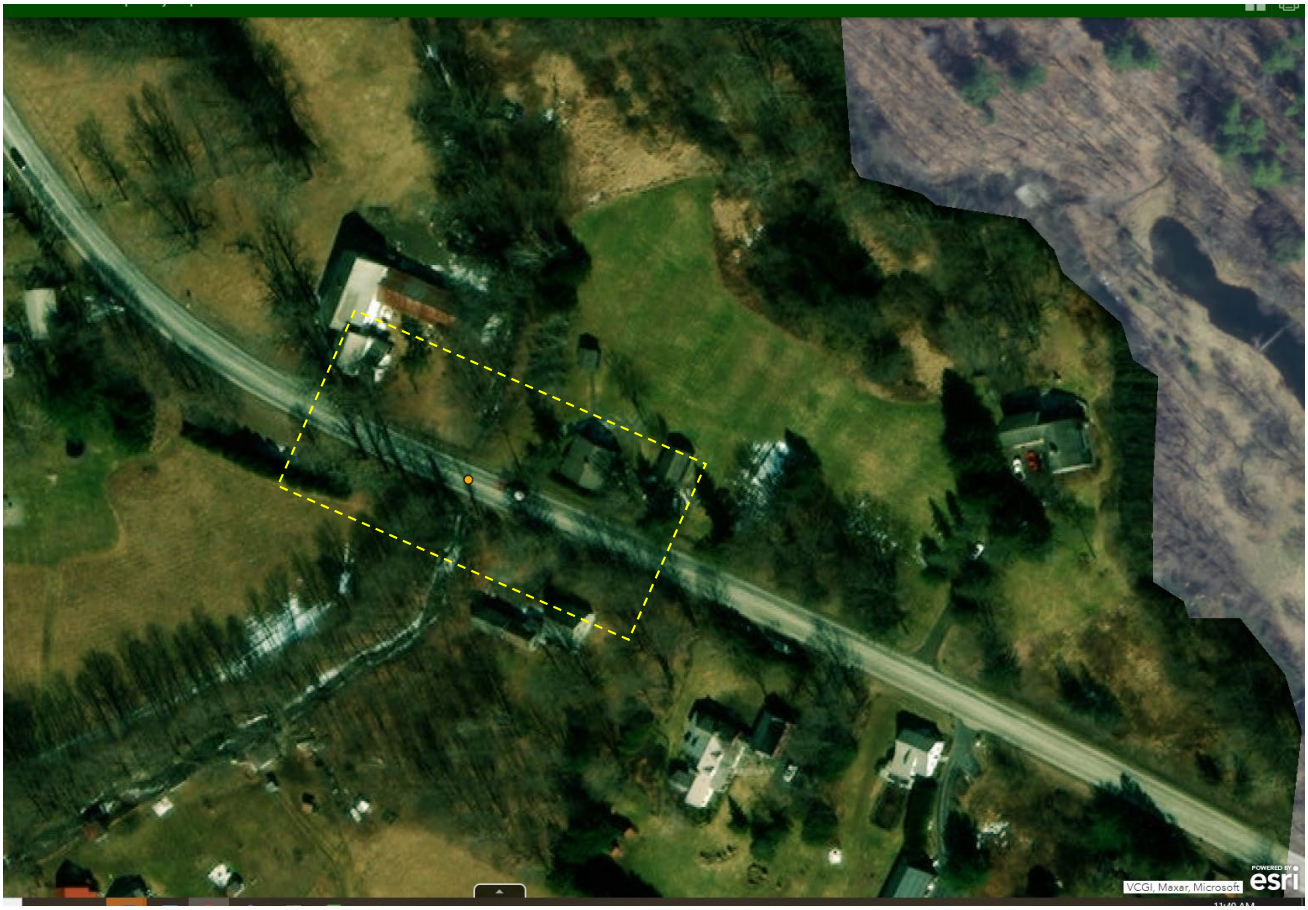


Figure 18. Survey area at Bridge 25 in Londonderry on Vermont Route 11.

Figure 19. *Potentially National Register-eligible single family house at* 209 Vermont Route 30 in Dorset.

Figure 20. Potentially National Register-eligible single-family house and associated barn at 40 Vermont Route 30 in Rupert.

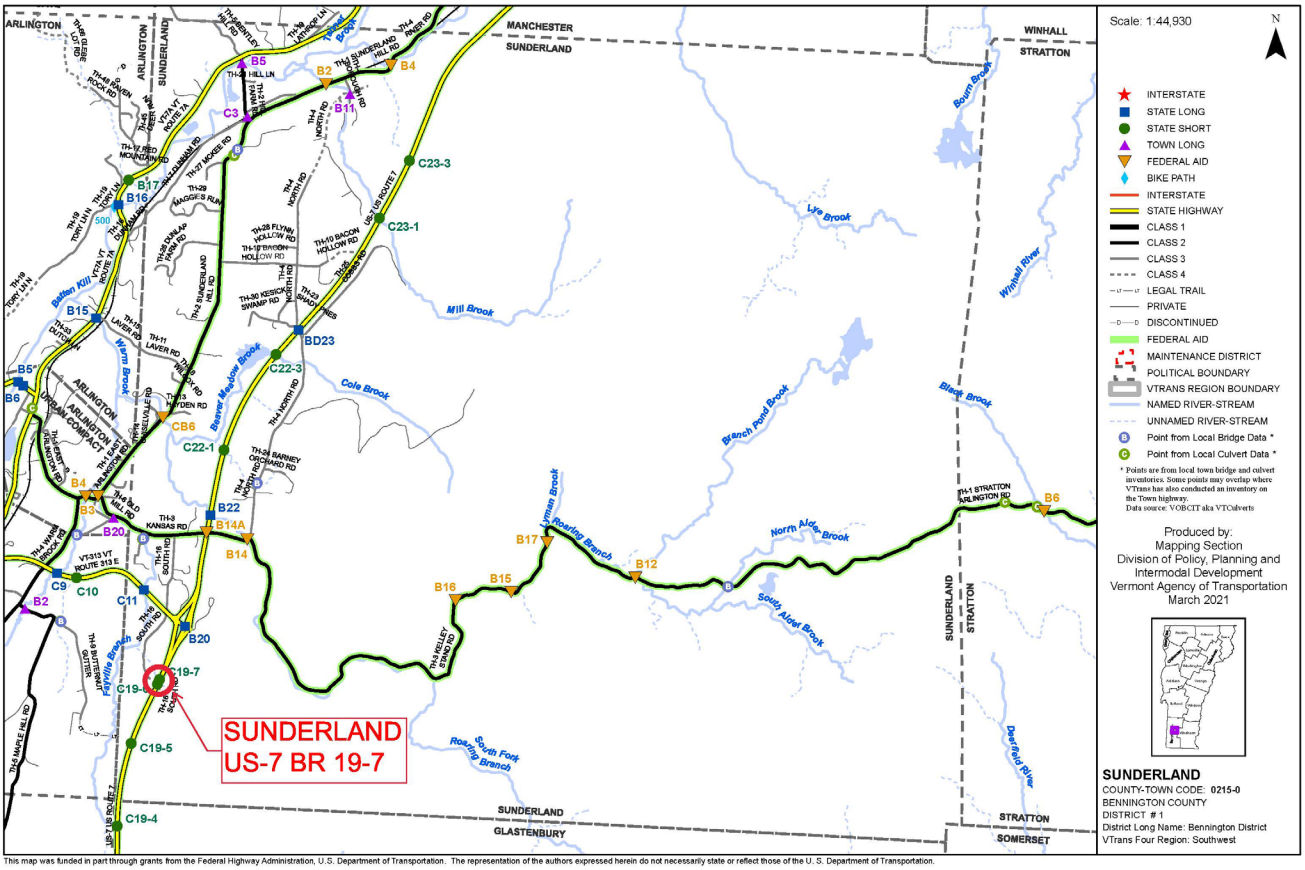


Figure 21. Bridge 19-7 location in Sunderland on US Route 7.

Figure 22. Survey area at Bridge 19-7 in Sunderland on US Route 7.

Appendix I: Local Input

Project Summary

This project, XTZYM\ JXYdXYU%HZQ[->6.%focuses on Culvert 58A on Route 30 in Dorset, 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.
   Route 30 sees over 4,000 daily trips, if the culvert is closed, those trips would be forced onto Town Highways. This is a concern as most of our roads are residential and have posted speeds of 30-35mph.
2. Is there a "slow season" or period of time from May through October where traffic is less or no events are scheduled?

   Before Memorial Day and the last 3 weeks in October would be the "slowest" times with regard to business impacts. Schools are out of session during the summer.

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.

   The culvert work (if closed) would cause fire, police, rescue personnel to have to detour over class 3 highways to access the Northern part of Route 30 in Dorset (and Rupert/beyond).

   Bennington County Sheriff's Department: Sgt. Chris Miller – Christopher.Miller@benningtonsheriff.org

   Dorset Fire Department: Chief Jacob Gribble – dorsetfire@comcast.net or 802-375-4233

   Town Road Foreman: Jim Hewes – dorsethighway@gmail.com or 802-362-5244

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?

   Mettowee Mill Nursery

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?

   Long Trail School (access from the North)

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

   Emergency Services
   Highway Department

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.

   Dorset West Road
   Church Street
   Foote Road

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.

   Yes, Dorset Chamber of Commerce – Cindy Loudenslager (owner of Dorset Union Store): cindy.loudenslager@gmail.com

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?
   Green Mountain Transit (upon request)

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)?

   Long Trail School is located on Pauls Way (very near the site)

   Dorset School is located on Morse Hill Road, with bus routes through this area.

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

   Bus routes mainly.

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

   Merck Forest & Farmland Center

Pedestrians and Bicyclists

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

   Minimal to moderate use. Cycling in the summer time and runners.

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

   No.

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

   Bike Lane would be great. Wider shoulders would be great too. Approaching from the North, this site is on the end of a blind curve.

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

   Probably not.

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).

   Not in the immediate future, but there is interest. We are just about to kick off a scoping study that would review the southern portions of Route 30 and a possible bike/pedestrian connection to the Manchester Rail Trail, along Route 30.

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?

   Minimal to moderate use. It's a chicken or egg thing. Traditionally very little shoulder width, but the Dorset West Road and Route 30 make a perfect 10-mile loop for cycling and running.

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?

   See note above.

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

   No

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

   No

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

   No

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

   No

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

None that we are aware of

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

   No

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

   Traffic impacts with the detour would be our biggest concern. Is this just a culvert replacement? Or will the new structure be something larger?

Land Use & Zoning

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

2. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the culvert? If so, please explain.
   No

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.
   No

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.
   GNAT-TV, Manchester Journal, WEQX, VPR, Town website and Facebook, Front porch forum.

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?

   Notice that we can provide to commuters and residents. Assuming they will call us with issues.

Appendix J: Crash Data

Vermont Agency of Transportation

General Yearly Summaries - Crash Listing: State Highways and All Federal Aid Highway Systems

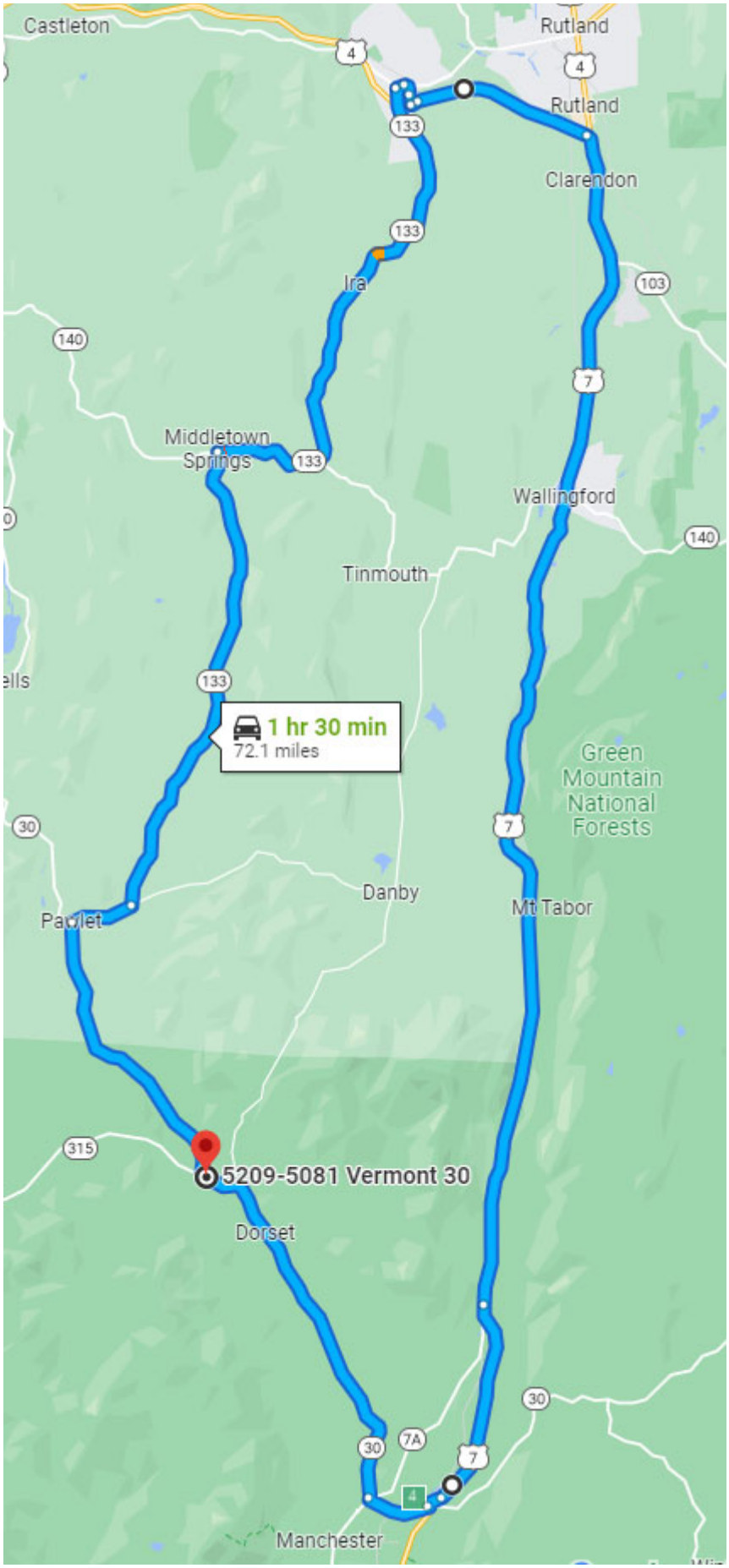
From 01/01/11 To 12/31/15 General Yearly Summaries Information

VT 30 Br 58A is located at MM. 4.1

*	Reporting Agency/ Number	Town	Mile Marker	Date MM/DD/YY	Time	Weather	Contributing Circumstances	Direction Of Collision	Number Of Injuries	Number Of Fatalities	Number Of Untimely Deaths	Direction	Road Group
Route: VT-30 Continued ...													
	VT0020400/12MC0 1560	Manchester	2.21	08/07/2012	23:52	Clear	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc, Distracted	Opp Direction Sideswipe	1	0	0	S	SH
	VT0020400/12MC0 2441	Manchester	2.55	12/16/2012	10:51	Snow	No improper driving	Other - Explain in Narrative	0	0	0	N	SH
	VT0020400/13MC0 0428	Manchester	2.76	03/23/2013	16:04	Cloudy	Failed to yield right of way, No improper driving	No Turns, Thru moves only, Broadside ^<	0	0	0	N	SH
	VTVSP0900/14C30 2886	Dorset	0.07	08/29/2014	10:59	Clear	No improper driving, Other improper action	Other - Explain in Narrative	1	0	0		SH
	VTVSP0900/11C30 1378	Dorset	0.5	06/24/2011	17:00	Cloudy	Operating defective equipment, No improper driving	Rear End	0	0	0		SH
	VTVSP0900/15C30 0496	Dorset	0.5	02/14/2015	12:34				0	0	0		SH
	VTVSP0900/11C30 1907	Dorset	0.75	08/21/2011	10:13	Clear	No improper driving, Failed to yield right of way, Inattention	Left Turn and Thru, Angle Broadside -->v--	1	0	0	N	SH
	VTVSP0900/15C30 1778	Dorset	0.81	06/16/2015	09:05	Rain	No improper driving, Failed to yield right of way	Left Turn and Thru, Head On ^v--	0	0	0	N	SH
	VTVSP0900/15C30 2706	Dorset	1.17	08/28/2015	12:22	Clear	No improper driving, Inattention	Rear End	2	0	0	N	SH
	VTVSP0900/11C30 2132	Dorset	1.3	09/16/2011	17:20	Clear	Driving too fast for conditions, Followed too closely	Rear End	0	0	0		SH
	VTVSP0900/14C30 2697	Dorset	2.53	08/10/2014	14:06	Clear	Inattention, Disregarded traffic signs, signals, markings, No improper driving	Left Turn and Thru, Angle Broadside -->v--	1	0	0		SH
	VTVSP0900/12C30 1457	Dorset	2.8	05/28/2012	05:04	Clear	Fatigued, asleep, Failure to keep in proper lane	Head On	0	0	0	N	SH
	VTVSP0900/15C30 2871	Dorset	2.8	09/11/2015	06:27	Cloudy	No improper driving, Followed too closely	Rear End	1	0	0	S	SH
	VTVSP0900/11C30 0848	Dorset	3.03	04/20/2011	14:51	Cloudy	No improper driving, Failed to yield right of way	No Turns, Thru moves only, Broadside ^<	0	0	0	E	SH
	VTVSP0900/15C30 0326	Dorset	3.13	02/01/2015	11:50	Clear	Failure to keep in proper lane, Operating defective equipment	Single Vehicle Crash	0	0	0	S	SH
	VTVSP0900/15C30 2454	Dorset	3.27	08/06/2015	10:40	Clear		Left Turn and Thru, Angle Broadside -->v--	2	0	0	N	SH
	VTVSP0900/14C30 3963	Dorset	3.29	12/02/2014	10:32	Clear	Other improper action	Same Direction Sideswipe	0	0	0	N	SH
	VTVSP0900/11C30 1937	Dorset	3.37	08/29/2011	12:54	Clear	No improper driving, Followed too closely	Rear End	0	0	0	E	SH
	VTVSP0900/13C30 2673	Dorset	3.59	09/11/2013	19:35	Rain	Swerving or avoiding due to wind, slippery surface, vehicle, object, non-motorist in roadway etc	Single Vehicle Crash	0	0	0	N	SH
	VTVSP0900/15C30 0335	Dorset	3.84	02/02/2015	13:10	Blowing Sand, Soil, Dirt, Snow	Driving too fast for conditions, No improper driving	Rear End	0	0	0	W	SH
	VTVSP0900/14C30 0055	Dorset	4.12	01/03/2014	23:10	Clear	No improper driving, Driving too fast for conditions, Failure to keep in proper lane	Head On	0	0	0		SH
	VTVSP0900/11C30 0680	Dorset	4.25	03/30/2011	05:00	Clear	Failure to keep in proper lane, Under the influence of medication/drugs/alcohol	Single Vehicle Crash	0	0	0	N	SH
	VTVSP0900/14C30 4176	Dorset	4.5	12/21/2014	02:07	Cloudy	Under the influence of medication/drugs/alcohol, Driving too fast for conditions	Single Vehicle Crash	2	0	0		SH
	VTVSP0900/14C30 0450	Dorset	4.51	02/10/2014	09:43				0	0	0		SH
	VTVSP0900/15C30 1265	Dorset	4.94	05/03/2015	11:28				0	0	0		SH
	VTVSP0900/13C30 0399	Dorset	4.95	02/11/2013	10:41				0	0	0		SH
	VTVSP0900/13C30 3886	Dorset	UNK	12/28/2013	22:46				0	0	0		SH

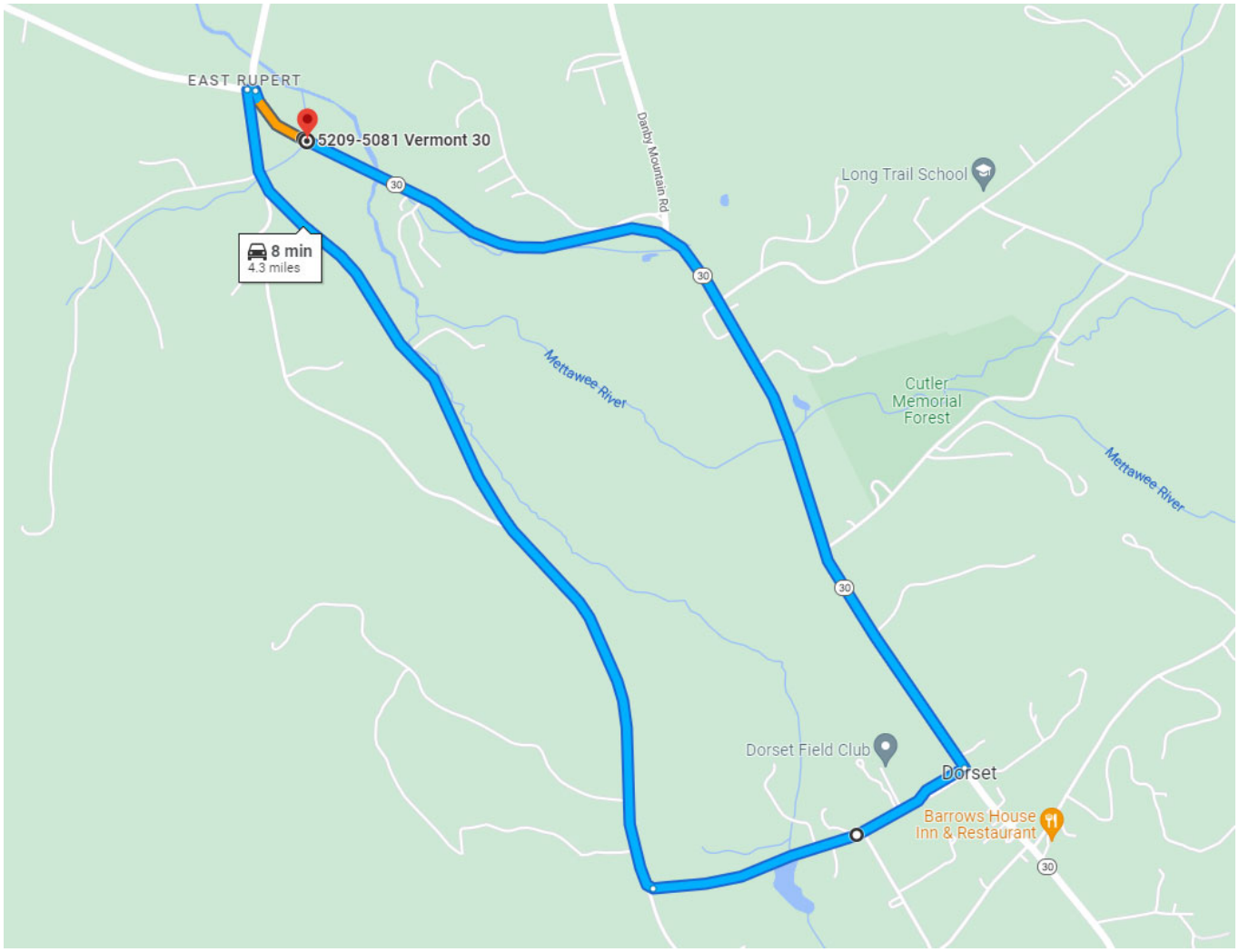
**Crash occurred prior to the last Highway Improvement Project. This data should not be used in a crash analysis. UNK indicates the Mile Marker is Unknown.*

Appendix K: Detour Map



Regional Detour Route: VT Route 30, to US Route 7, US Route 4, and VT Route 133, back to VT Route 30

Through Route: 15.7 miles
Detour Route: 56.4 miles
Added Distance: 40.7 miles
End-to-End Distance: 72.1 miles



Local Bypass Route: VT Route 30, to Church Street, Dorset West Road, Rupert Mountain Road, back to VT Route 30

Through Route: 2.0 miles
Detour Route: 2.3 miles
Added Distance: 0.3 miles
End-to-End Distance: 4.3 miles

Appendix L: Plans

VT STATE PLANE GRID

N

NF
FLETT, MICHAEL D. & MICHELLE

NF
GAFFNEY, ELEANOR A.
TRUSTEE

WOVEN WIRE FENCE

MAILBOXES 4212 4343

GRAVEL DRIVE

HVCTRL 101

COMB 261A

RWFL FENCE

APPROX. EXISTING STATE R.O.W.

VT ROUTE 30
TO MANCHESTER

VT ROUTE 30
TO RUPERT

226+00 227+00 228+00 229+00 230+00 231+00

N31°03'55.90"W

STA 229+68.00 =
TH 38 40+00.00
Δ= 90° 0' 0" RT

POB 40+00.00

N58°56'04"E

RC 40+30.54

24" RCP FLOW

COMB 4

SIGN R1-1 (PAUL'S WAY)

COMB 263

GRAVEL DRIVE

COMB 260

COMB 261

HVCTRL 2

SIGN (LONG TRAIL SCHOOL)

SIGN VR-017 (24,000)

MILEMARKER 0303 (25)

WATER SHUT OFF

NF
McWAYNE, MILTON

NF
FARRELL, THEDA M.

NF
McWAYNE, MILTON

NF
SOWKA, WILLIAM A. JR
& KATHLEEN M.

BENCHMARK
RR SPIKE
IN POLE
ELEV. = 902.48

STA 228+60.85 =
CHN 51+88.17
Δ= 90° 0' 0" LT

POT 51+77.57

POE 52+52.57

18" CPEP FLOW

S28°57'56"E

00+05

41+00

42+00

PI 41+07.73

CURVE(x)
DELTA = 03°42'55"
D = 02°24'27"
R = 2380.00'
T = 77.19'
L = 154.33'
e = 1.25'

15" CPEP FLOW

FIELD DRIVE

SIGN R2-1 (25)

HVCTRL 100

APPROX. EXISTING TOWN R.O.W.

POB 50+00.00

TH-38 (PAUL'S WAY)

PT 41+8

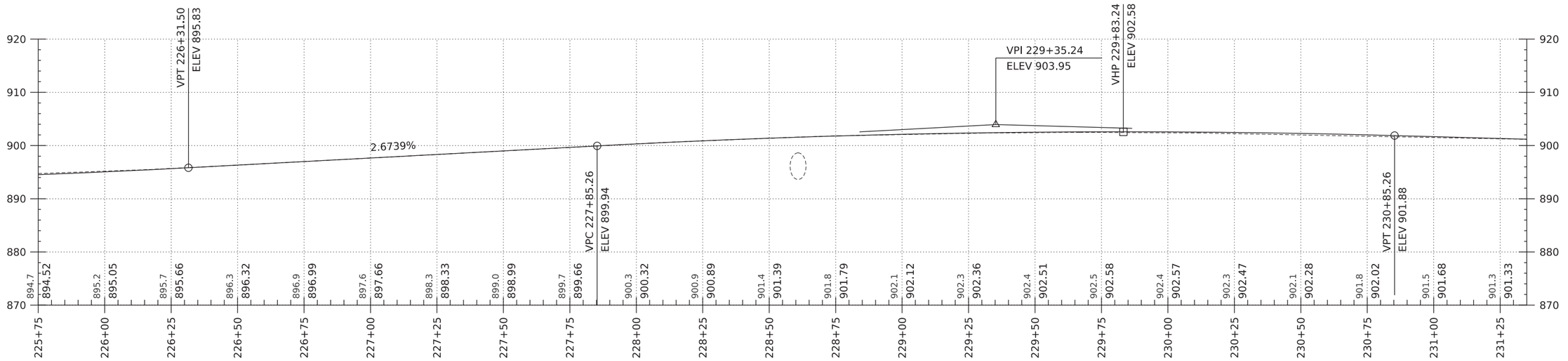
NF
LYNCH, JEFFERY C. & SUSAN

EXISTING CONDITIONS

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

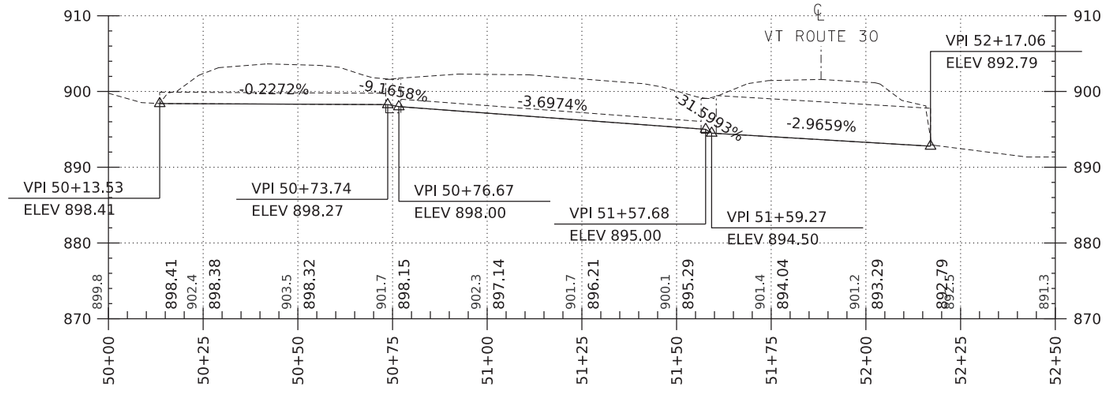
EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PROJECT NAME:	STATEWIDE - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)
FILE NAME: Dorset_BDR_Existing Conditions.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS LAYCUT	SHEET 1 OF 13



VT ROUTE 30 PROFILE

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

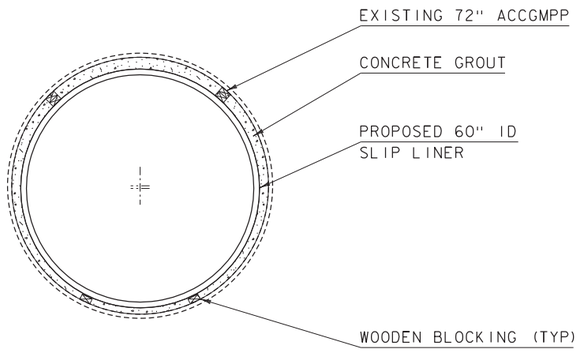


CULVERT 58A CHANNEL PROFILE

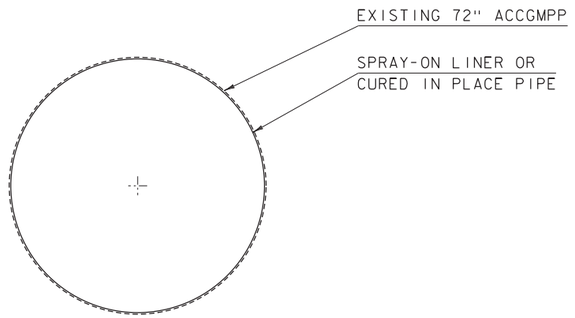
SCALE: HORIZONTAL 1"=20'-0"
VERTICAL 1"=10'-0"

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

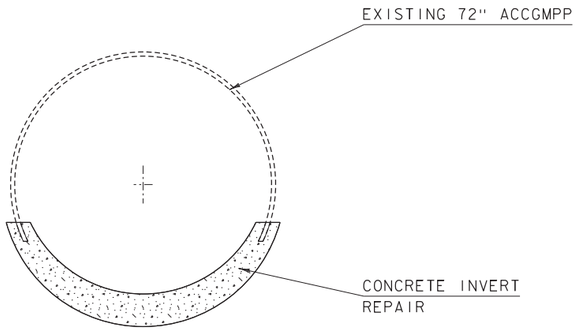
PROJECT NAME:	STATEWIDE - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)
FILE NAME: Dorset_profile.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING PROFILE SHEET	SHEET 2 OF 13



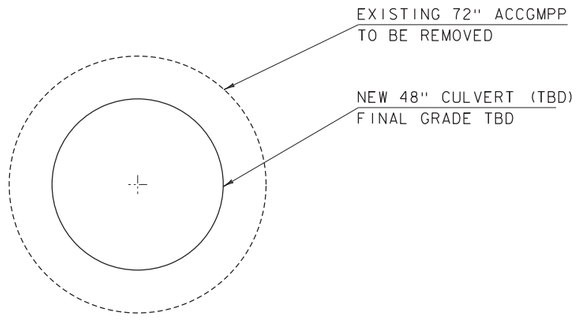
SLIP LINER TYPICAL SECTION



SPRAY ON LINER TYPICAL SECTION



INVERT REPAIR TYPICAL SECTION



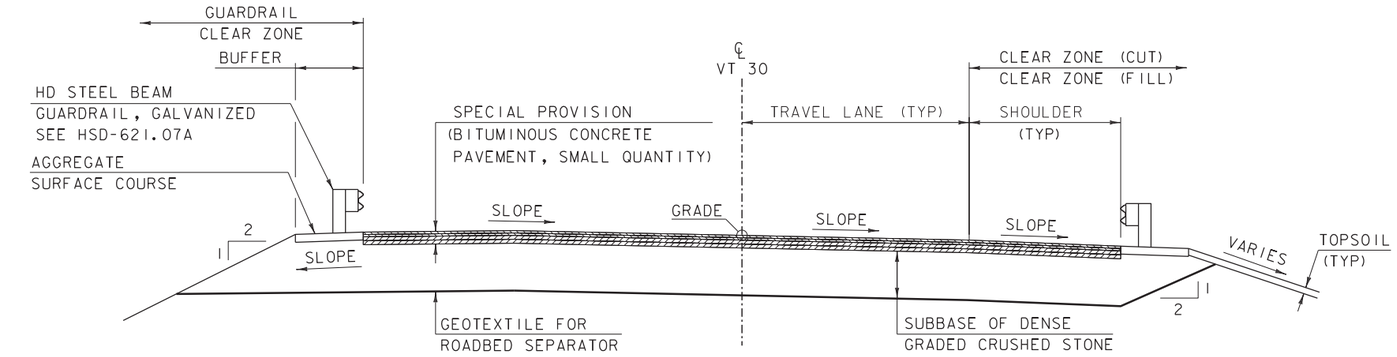
CULVERT REPLACEMENT TYPICAL SECTION

MATERIAL INFORMATION

	THICKNESS	TYPE
STONE FILL	2'-0"	TYPE II
STONE FILL, CULVERT LINING	2'-0"	E-STONE TYPE II
STONE FILL, STREAM BED MATERIAL	2'-0"	E-STONE TYPE II

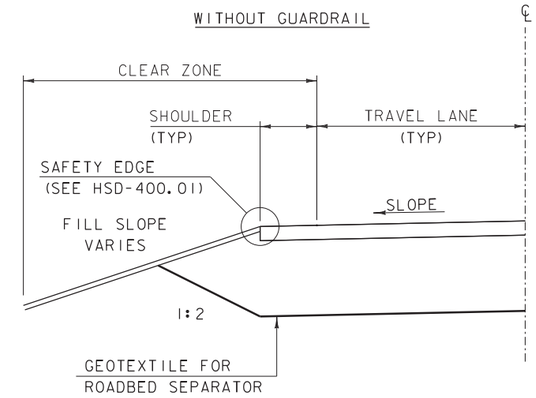
PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: s22b045_Dorset VT 30 Br 58A_Typ.dgn PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE DRAWN BY: D.D.BEARD
DESIGNED BY: ---------- CHECKED BY: ----------
CULVERT TYPICAL SECTIONS SHEET 3 OF 13



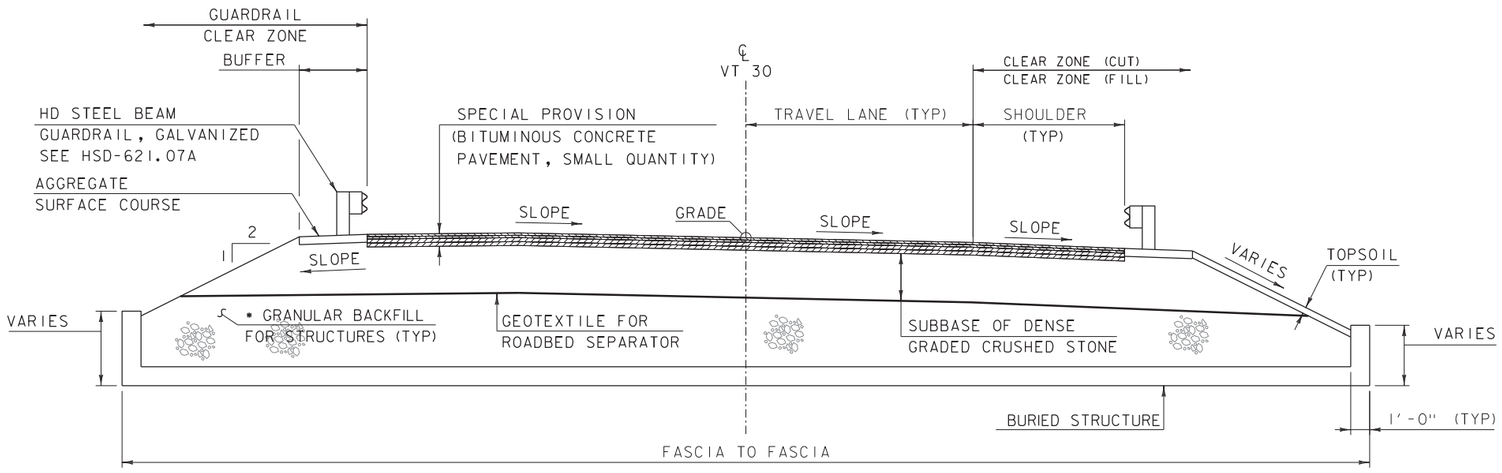
VT ROUTE 30 TYPICAL SECTION

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



ROADWAY TYPICAL SECTION

NOT TO SCALE



VT ROUTE 30 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)	12'-0"	---	12'-0"	---
CLEAR ZONE (FILL)	14'-0"	---	14'-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.

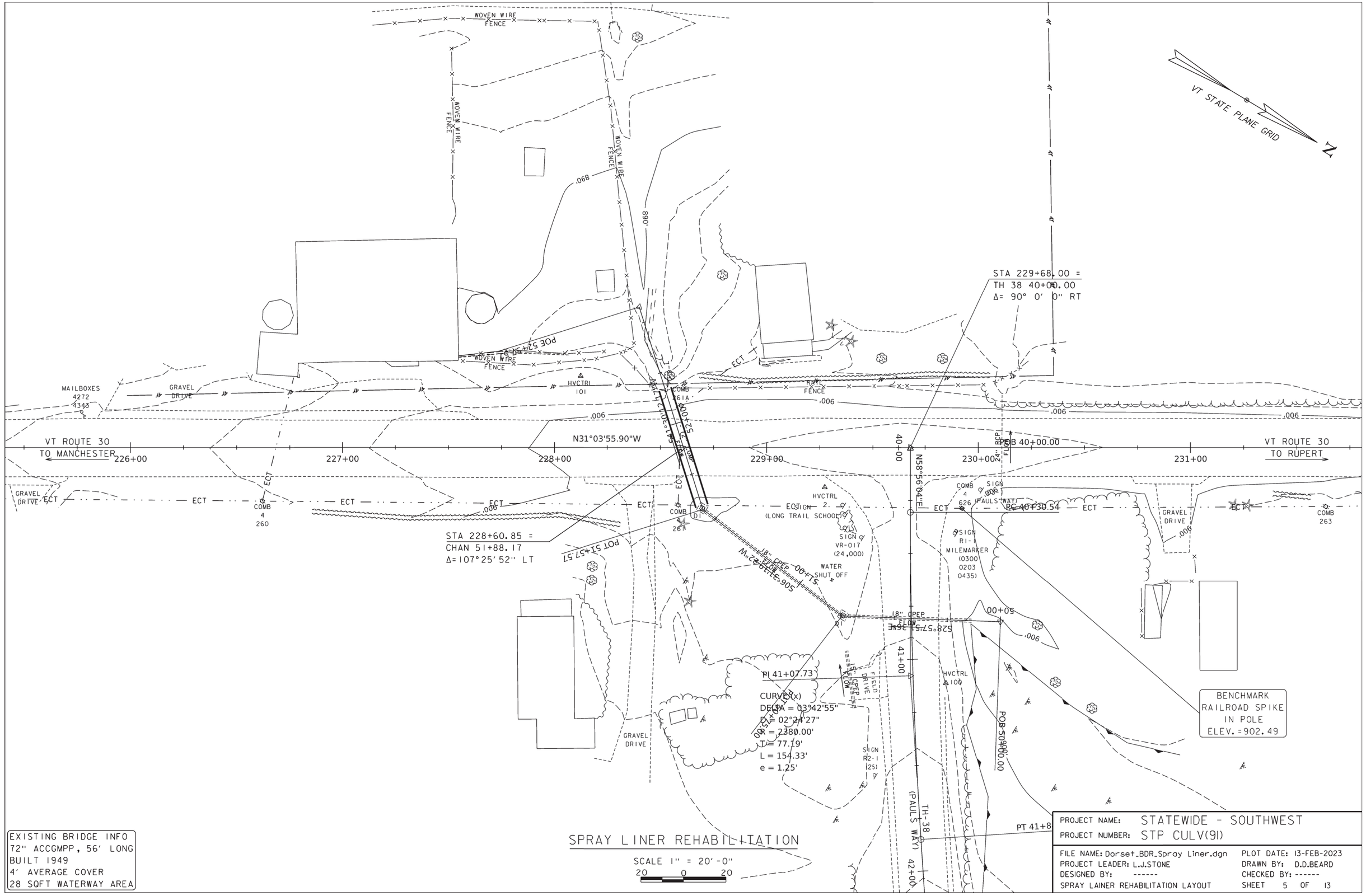
MATERIAL TOLERANCES

(IF USED ON PROJECT)

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

PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: s22b045_Dorset VT 30 Br 58A_Typ02.dgn PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE DRAWN BY: D.D.BEARD
DESIGNED BY: ------ CHECKED BY: ------
ROADWAY TYPICAL SECTIONS SHEET 4 OF 13



SPRAY LINER REHABILITATION

SCALE 1" = 20'-0"

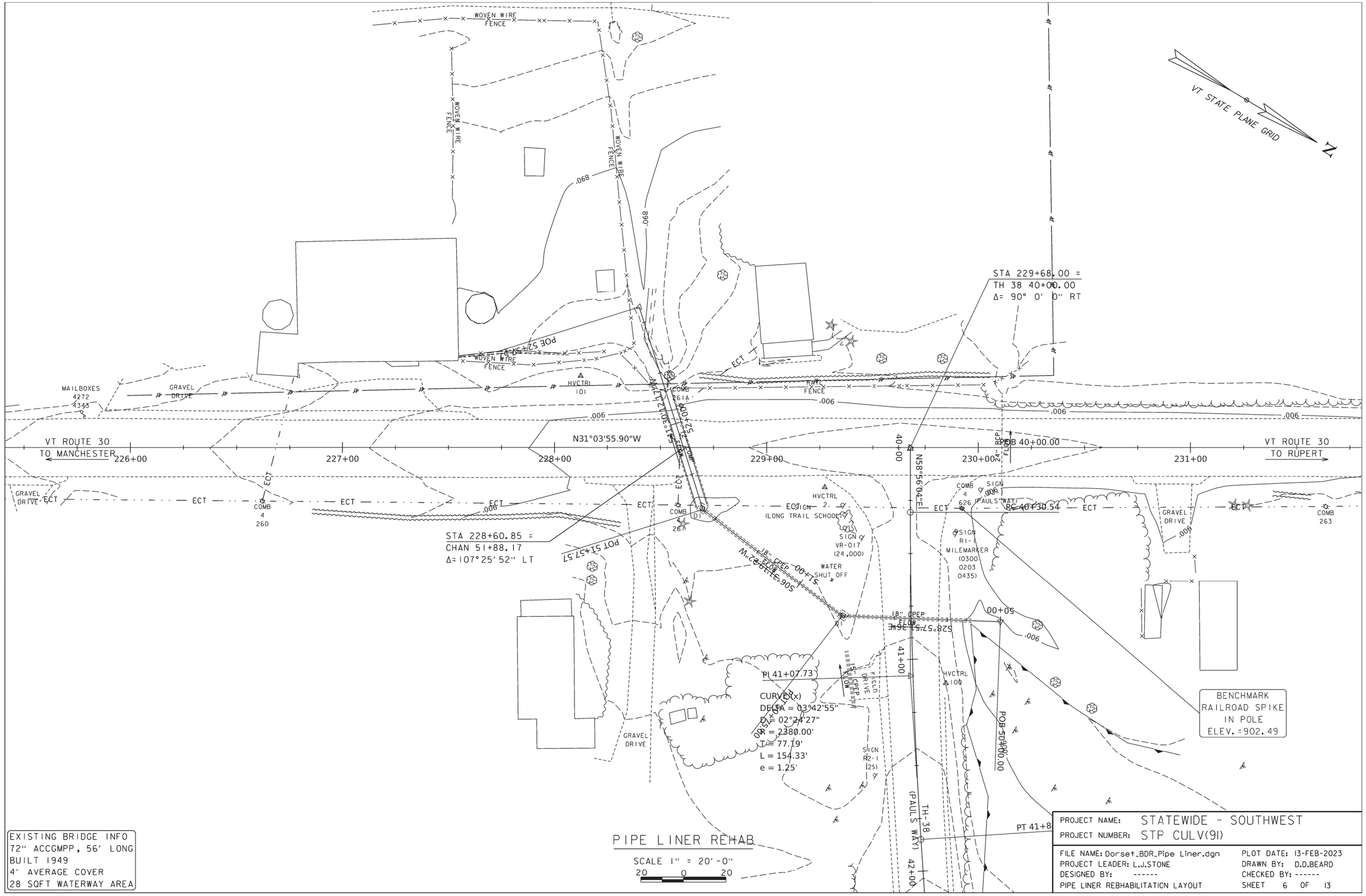
20 0 20

EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: Dorset_BDR_Spray Liner.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
SPRAY LAINER REHABILITATION LAYOUT

PLOT DATE: 13-FEB-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 5 OF 13

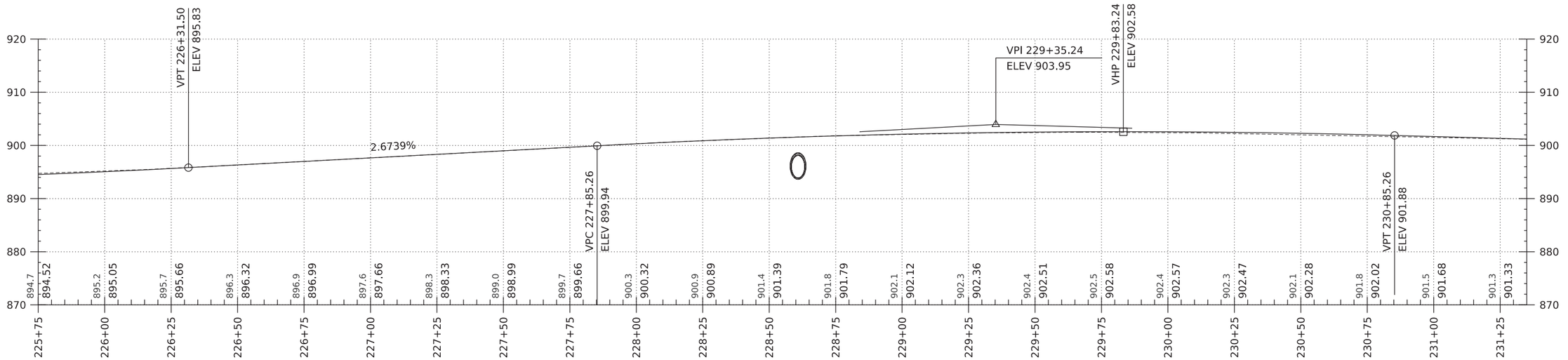


EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PIPE LINER REHAB

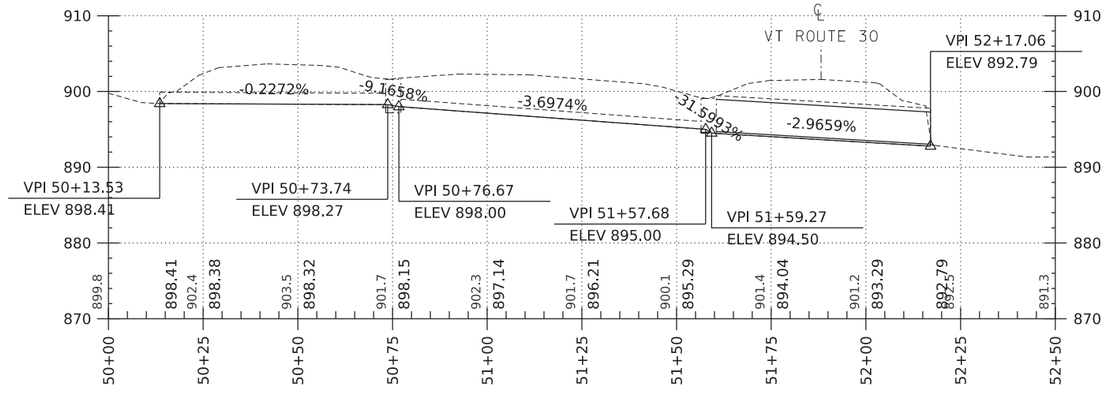
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME:	STATEWIDE - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)
FILE NAME: Dorset_BDR_Pipe Liner.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PIPE LINER REBHABILITATION LAYOUT	SHEET 6 OF 13



VT ROUTE 30 PROFILE

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

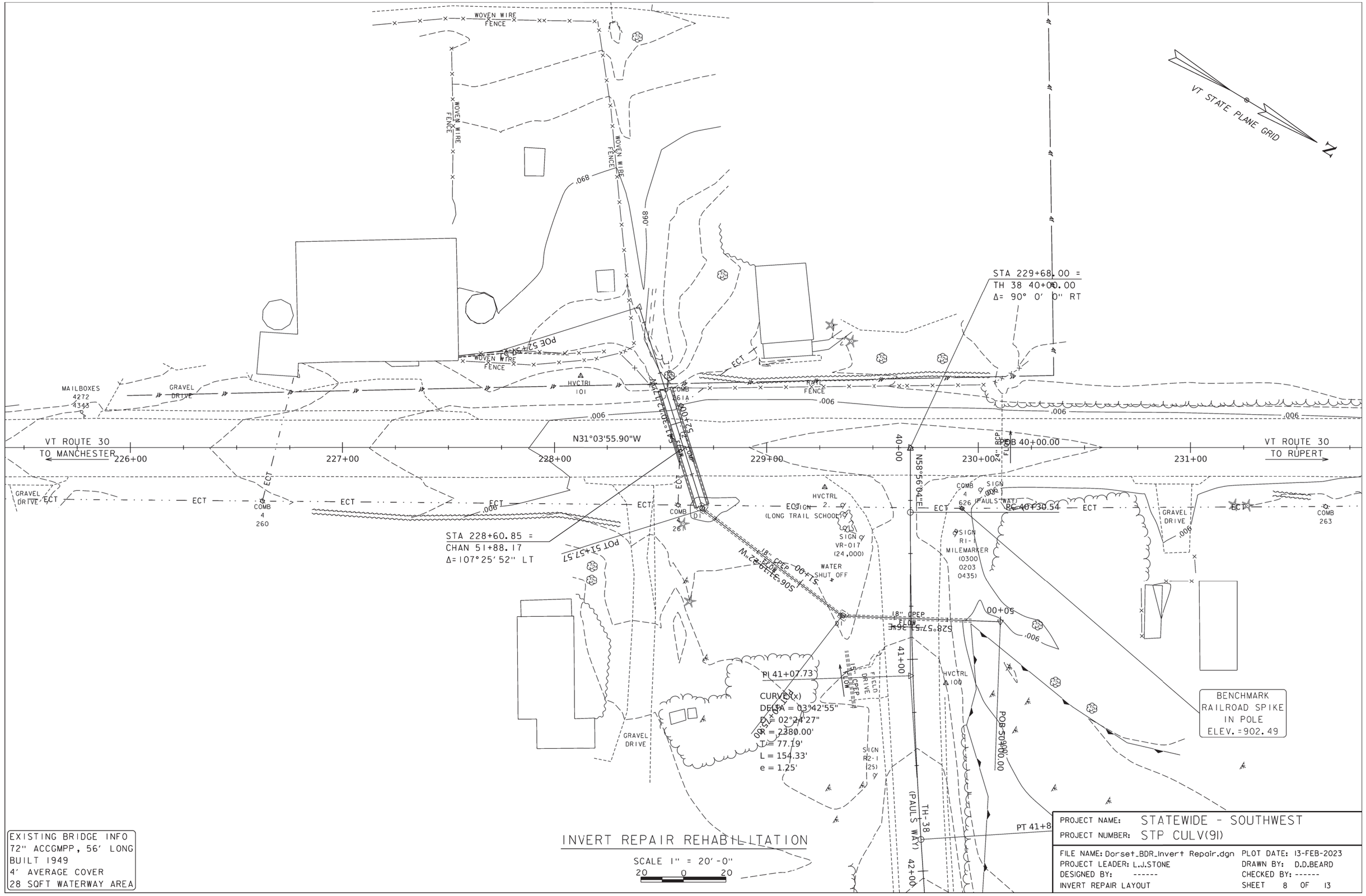


CULVERT 58A CHANNEL PROFILE

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 - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)
FILE NAME: Dorset_profile.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PIPE LINER REHABILITATION PROFILE SHEET	SHEET 7 OF 13



EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

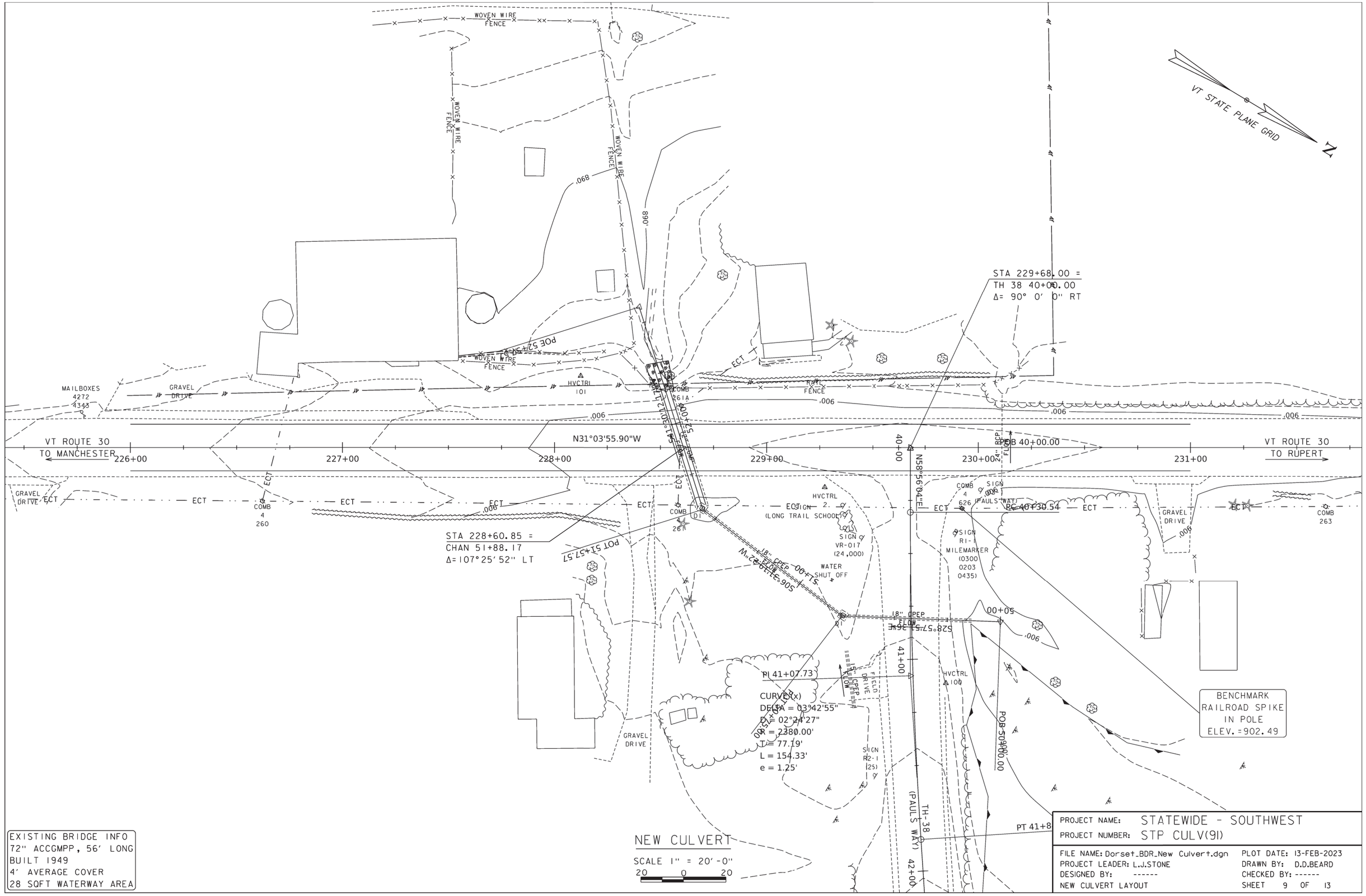
INVERT REPAIR REHABILITATION

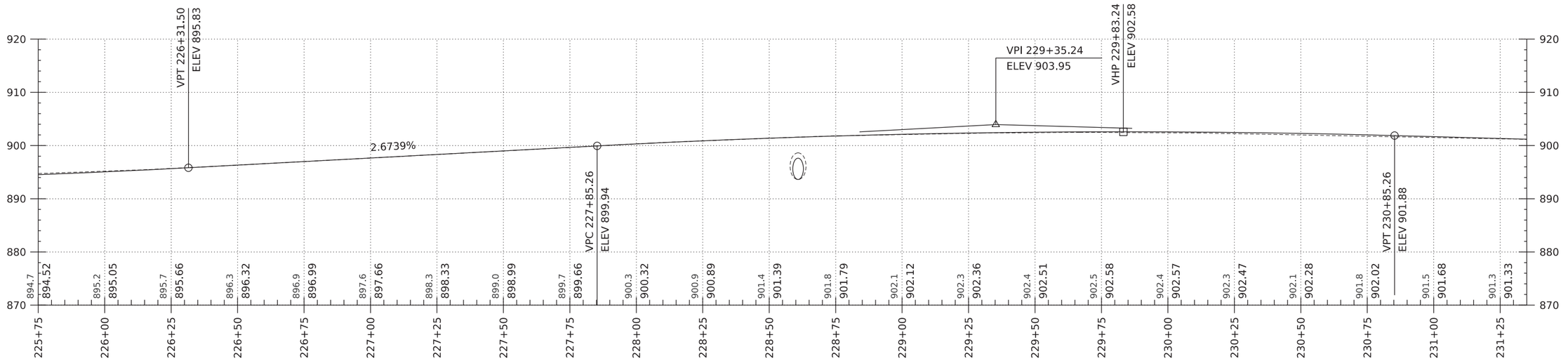
SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: Dorset_BDR_Invert Repair.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
INVERT REPAIR LAYOUT

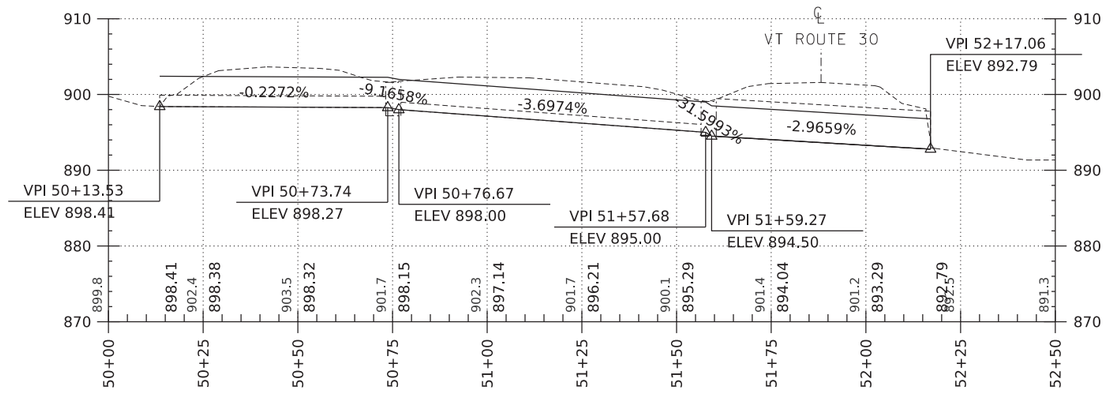
PLOT DATE: 13-FEB-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 8 OF 13


WOVEN WIRE FENCE
WOVEN WIRE FENCE
WOVEN WIRE FENCE
WOVEN WIRE FENCE
WOVEN WIRE FENCE
.068'
.068'
POE 52+54.54
MAILBOXES
4272
4343
GRAVEL DRIVE
HVCTRL
101
COMB
261A
ECT
RAIL FENCE
.006'
.006'
.006'
.006'
VT ROUTE 30
TO MANCHESTER
226+00
227+00
228+00
229+00
230+00
231+00
VT ROUTE 30
TO RUPERT
N31°03'55.90"W
N58°56'04"E
40+00
POB 40+00.00
24" FLOW
PC 40+30.54
GRAVEL DRIVE
ECT
COMB
4
260
COMB
261
HVCTRL
2
SIGN
(LONG TRAIL SCHOOL)
SIGN
VR-017
(24,000)
WATER
SHUT OFF
COMB
4
626
SIGN
(PAULS WAY)
SIGN
RI-
MILEMARKER
(0300
0203
0435)
COMB
263
GRAVEL DRIVE
.006'
STA 228+60.85 =
CHAN 51+88.17
Δ=107°25'52" LT
POT 51+57.57
18" CPEP FLOW
S06°34'42"W
51+00.00
18" CPEP FLOW
S28°57'53"E
00+05
.006'
41+00
PI 41+07.73
CURVE(x)
DELTA = 03°42'55"
D = 02°24'27"
R = 2380.00'
T = 77.19'
L = 154.33'
e = 1.25'
5" CPEP FLOW
FIELD DRIVE
HVCTRL
100
POB 50+00.00
SIGN
R2-1
(25)
TH-38
(PAULS WAY)
42+00
PT 41+8
STA 229+68.00 =
TH 38 40+00.00
Δ= 90° 0' 0" RT
VT STATE PLANE GRID
N
BENCHMARK
RAILROAD SPIKE
IN POLE
ELEV.=902.49
NEW CULVERT
SCALE 1" = 20'-0"
20 0 20
EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA
PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)
FILE NAME: Dorset_BDR_New Culvert.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
NEW CULVERT LAYOUT
PLOT DATE: 13-FEB-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 9 OF 13



VT ROUTE 30 PROFILE

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

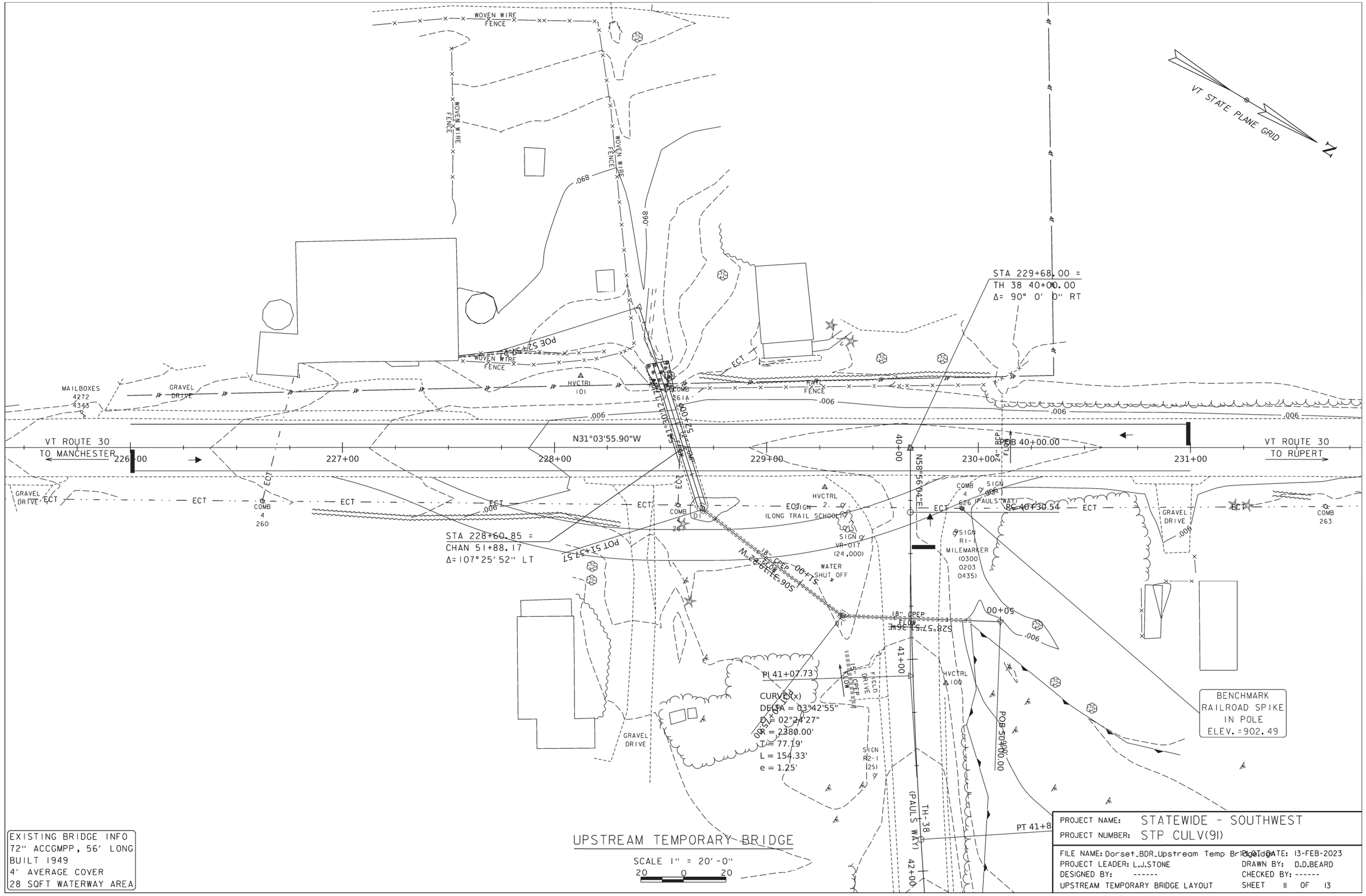


CULVERT 58A CHANNEL PROFILE

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 - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)
FILE NAME: Dorset_profile.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
NEW CULVERT PROFILE SHEET	SHEET 10 OF 13



UPSTREAM TEMPORARY BRIDGE

SCALE 1" = 20'-0"

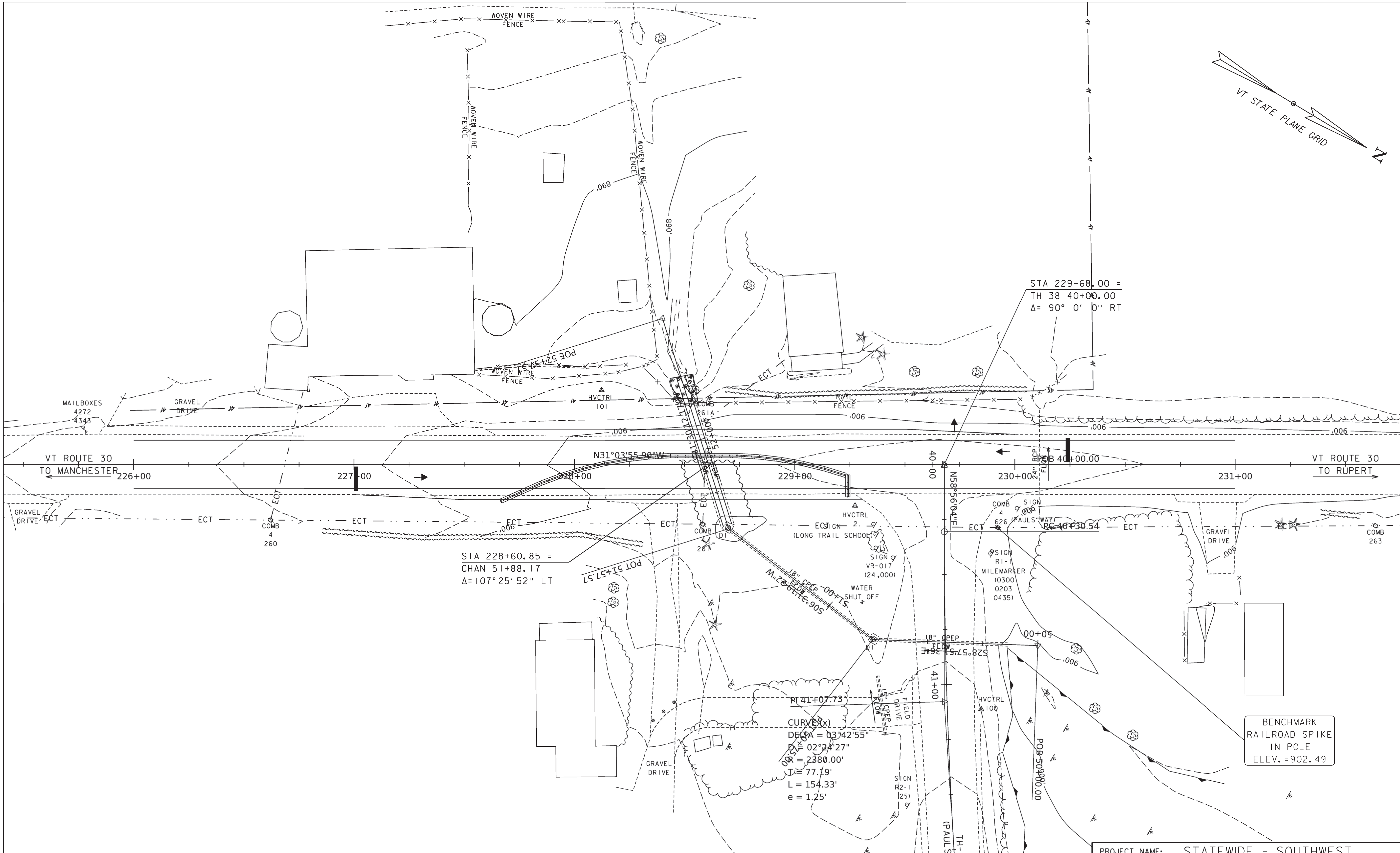
20 0 20

EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: Dorset_BDR_Upstream Temp Bridge.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
UPSTREAM TEMPORARY BRIDGE LAYOUT

PLOT DATE: 13-FEB-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 11 OF 13



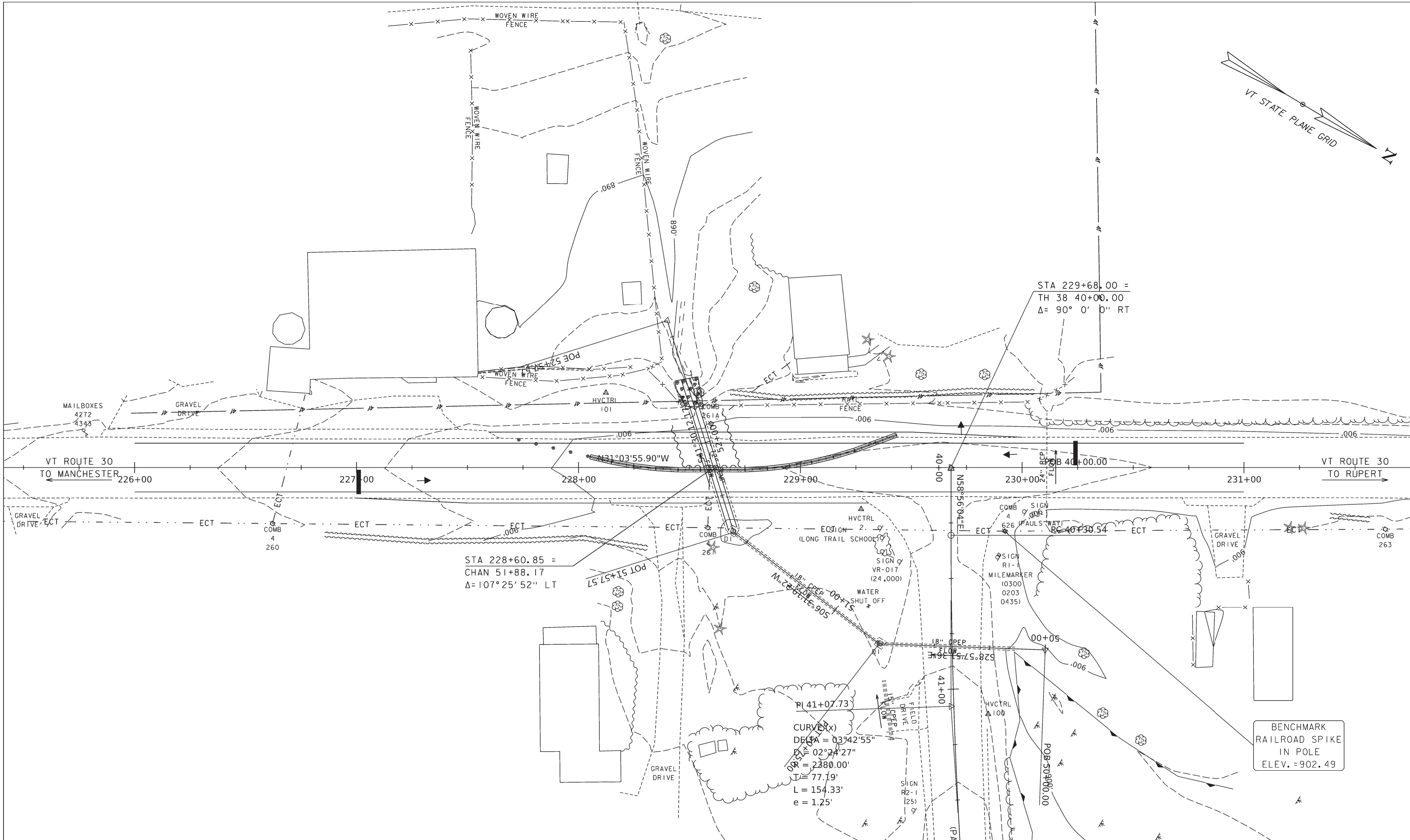
EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PHASE I

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

PROJECT NAME:	STATEWIDE - SOUTHWEST
PROJECT NUMBER:	STP CULV(91)

FILE NAME: Dorset_BDR_Phase I.dgn	PLOT DATE: 13-FEB-2023
PROJECT LEADER: L.J.STONE	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
PHASE I LAYOUT	SHEET 12 OF 13



EXISTING BRIDGE INFO
72" ACCGMPP, 56' LONG
BUILT 1949
4' AVERAGE COVER
28 SQFT WATERWAY AREA

PHASE 2

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

PROJECT NAME: STATEWIDE - SOUTHWEST
PROJECT NUMBER: STP CULV(91)

FILE NAME: Dorset_BDR_Phase 2.dgn
PROJECT LEADER: L.J.STONE
DESIGNED BY: ------
PHASE 2 LAYOUT

PLOT DATE: 13-FEB-2023
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 13 OF 13