STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report - Jay

FOR

Jay - BHF 0278(3)

VT ROUTE 242,
Bridge 10 Over Jay Branch

December 20, 2012

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I. Site Information

The bridge is located in a rural area along VT Route 242, approximately 2.3 miles west of the intersection with VT 101. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Major Collector, State Highway.
Bridge Type	Concrete T-Beams
Bridge Span	28 feet
Year Built	1927, Reconstructed 1964
Ownership	State of Vermont

Need

The following is a list of the deficiencies of Bridge 10 and VT 242 in this location.

1. The Superstructure and Deck are in poor to fair condition, and the bridge is classified as Structurally Deficient.

2. The existing bridge is undersized hydraulically and constricts the natural channel width. The bridge has insufficient freeboard to pass the state standard (Q50) flood.

3. The downstream Wingwall of abutment 2 is experiencing undermining, and scour is an issue.

Traffic Data

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2015 and 2035.

TRAFFIC DATA	2015	2035
AADT	1400	1500
DHV	290	300
ADTT	170	240
%T	11.6	15.6
%D	62	62

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 between 1500 and 2000, with a design speed of 40 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 5.3	11'/1' (24')	10'/3' (26')	Substandard.
Bridge Lane and Shoulder Widths	VSS Table 5.3	11'/4' (30')	10'/3' (26')	
Clear Zone Distance	VSS Table 5.5		14' fill / 12' cut	
Banking			8% (max)	
Speed		40 mph (Posted)	40 mph (Design)	
Horizontal Alignment	AASHTO Green Book Exhibit 3-26	Bridge located in a curve with R=1000'	R_{min}=485'	
Vertical Grade	VSS Table 5.6	Bridge located in transition from (-)1.9647% grade to (-)0.5884% grade	7% (max) for level terrain	
K Values for Vertical Curves	VSS Table 5.1	Bridge located on sag (K = 136)	60 crest / 60 sag	
Vertical Clearance Issues	VSS Section 5.8	Does not pass Q25	1'-0" above Q50.	
Stopping Sight Distance	VSS Table 5.1	570'	275'	
Bicycle/Pedestrian Criteria	VSS Table 5.8	4' Shoulder on bridge.	3' Shoulder	2' from design + 1' due to %T > 10%
Bridge Railing	SDM Section 13.2	Galvanized HDSB, Surface mounted.	TL-2	Substandard

Inspection Report Summary

Deck Rating	4	Poor
Superstructure Rating	5	Fair
Substructure Rating	6	Satisfactory
Channel Rating	6	Satisfactory

08/31/2011: Assessment inspection after TS Irene, the left downstream bank area is in need of added anti-erosion protection. The downstream wingwall of abutment No.2 is in need of added anti-scour and undermining protection. PLB

05/18/2011: The abutments have some spalling in sistered up t-beams continue to deteriorate and the deck continues to deteriorate in bay 2. DCP/FRE

05/05/2009: The deck in bay #2 has heavy deterioration with the potential for additional full depth hole formation. The sistered t-beams (3+4) have heavy spalling along the lower third. The deck and superstructure should be replaced in the next few years with precast units. MJ/DS

Hydraulics
From preliminary hydraulics report:
The existing bridge is undersized hydraulically. The beams are in the water at about the Q25, so the bridge does not have 1' of freeboard at Q50, as required to meet the standards. Water does not overtop the roadway below Q100.

Recommendation:
We recommend a new bridge have at least a 40' clear span between abutments, measured perpendicular to the channel. The new bridge should be properly aligned with the channel.
At this time we recommend the bottom of beams be no lower than elevation 1033.0'

Utilities

There are overhead utility lines at a distance to the north of the bridge, these should not impact construction. There is a sewer line connected to the south side of the bridge. There is an as yet unidentified pipe on the north side of the bridge. These will have to be taken into consideration during design and construction.

Right Of Way

The existing Right-of-Way is shown on the Layout sheet. It depends upon which option is chosen as to whether or not the work can be done inside the existing Right-of-Way.

Environmental Resources

The environmental resources present at this project are shown on the layout sheets.

Agricultural:

The soil in the area has been identified as Sheepscot gravelly fine sandy loam, a statewide significant soil. No areas at the site have been identified as containing prime agricultural soils.

Archaeological:

Two historic Euro-American foundation remains in the SE quadrant as well as a sensitive field in the SW. The foundation remains appear to be related to a complex of sawmills that dotted the landscape in this region of Jay in the decades following the original settlement of the town in the early 1800s. These areas are shown on the layout.

Biological:

The Jay Branch, at the bridge, is classified as a cold waters fishery. There are no wetlands at the bridge site. There are no threatened or endangered species, or deer wintering habitat.

Hazardous Materials:

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

Historic:

Per the resource ID, the bridge and adjacent properties are not historic.

Stormwater:

The Jay Branch is not listed as an impaired waterway according to the Vermont Department of Environmental Conservation, Water Quality Division.

II. Maintenance of Traffic

The Vermont Agency of Transportation is in the process of finalizing 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 will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with faster construction techniques and incentives to contractors to complete projects early. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of precast 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 A: Temporary Bridge

Initial investigations indicate a one-way temporary bridge with traffic signals would be appropriate based on the Design Hourly Volume (DHV) count.

Due to the existing channel alignment upstream of the existing structure, placing a temporary bridge there would be very difficult, requiring blasting of ledge back away from the structure for suitable approaches. It would also impact the archeological site off of the southern corner of the existing bridge, require the acquisition of Right-of-Way, and in general be the more expensive of the two sides.

A temporary bridge downstream from the existing structure would also require an amount of right-of-way acquisition from the owners of the properties adjacent to the existing bridge. A downstream temporary bridge may impact the archeologically sensitive area off of the western corner of the existing bridge, but only to a level that would be easily cleared. And the roadway required would impact the parking space/driveway of the residence near the bridge.

Both an upstream and downstream temporary bridge would require Right-of-Way, and have impacts to archeologically sensitive areas. Additionally, either option would add time and cost to the project development phase of the project, due to Right-of-Way acquisition. However, the downstream option will have the lowest cost during the construction phase of the project.

This option would also increase the amount of time and cost for the Construction phase of this project. Maintaining traffic along the existing corridor will result in shorter travel distances for through traffic than providing an off-site detour would. However, travel times for through traffic will still increase with the installation of a temporary bridge because of delays during construction. These delays will result from a lower speed limit, queuing at temporary traffic signals, and stoppages caused by the delivery of materials, movement of equipment and work required in the road.

Option B: Phased Construction

Phased construction is the construction of one lane partially or fully off of the existing structure, while maintaining at least one lane on the existing structure. When traffic is transitioned onto the new lane, the remaining existing structure demolished, and the second lane constructed. Based on the traffic volumes, it is reasonable to close one lane of traffic, and maintain one lane of traffic, both ways, with a traffic signal. It is then possible to build half the bridge at a time.

With the existing structure width, it is possible to do a deck replacement on existing abutments as phased construction, as well as a full structure replacement, utilizing either precast or cast-in-place construction.

While this option would not have any impacts to the nearby sensitive lands, the need to acquire additional Right-of-Way may be needed. This would increase the time and money required in Project Development.

Phased construction would cost more and take longer to construct than utilizing an off-site detour, due to the fact that you are not building the two halves at the same time. While the through distance would remain the same during construction, the travel time will increase for the same reasons as those mentioned for a temporary bridge.

Option C: Off-Site Detour

This option would close the bridge and detour traffic onto VT route 118 in Montgomery, to VT route 105, to VT route 101, and back to VT route 242 in Troy. This detour has an end-to-end distance of 42 miles, and adds approximately 16 miles to the through travel distance, and would be appropriate for all vehicles, including heavier trucks. See the appendices for the proposed detour route.

There are other local bypass routes that could see an increase in traffic if the bridge were closed during construction. One bypass route that may see additional traffic during a road closure consists of Sargents Way, to Gendron Road, to Cross Road, because it only adds 0.85 miles to the through travel distance. This bypass is inappropriate for truck traffic because it contains gravel class 3 town highways, and thus is not suitable as an official detour route.

This option would eliminate the need for a temporary bridge, which would significantly decrease cost and time of both Project Development and Construction. This option would not require extra Right-of-Way. There would be no stoppages due to this construction, and there would be a greatly reduced possibility of accidental collisions in the work zone.

III. Alternatives Discussion

The existing roadway at the bridge location meets current standards. Thus, the alternatives presented here are based on improvement of the condition of the bridge and channel.

Alternative 1: No Action

This alternative would involve leaving the bridge in its current condition. This we would consider if we could believe that the structure would require no repair work to it within the next 10 years. With the visible degradation of the concrete beams and the soffit of the deck, we do not believe

that this is the case. Therefore the No Action alternative is not recommended, and shall not be considered further.

Alternative 2: Deck and Superstructure Replacement.

There are deck/superstructure replacement options available. The most attainable of these would be to remove the existing deck and superstructure, and replace them, probably with precast modules (NEXT beams or Precast Bridge Units). This alternative would not change the span of the bridge, nor would it do any significant work to the substructure. Since the existing width exceeds the minimum width required, we propose maintaining the existing width. Also some stream work would be advised to correct the scour that is showing at the outlet. This option may be complicated by the sewer line that is attached to the upstream side of the bridge.

The deck/superstructure replacement alternative would be the least expensive option and contain the fewest impacts to the surrounding area. Accelerated Bridge Construction would be possible if a precast deck is utilized, and there would be no impacts to the surrounding lands outside of the staging area(s) and any temporary bridge (if chosen). But the deck/superstructure replacement alternative is not a full replacement. No significant work would be done to the substructure, and while the substructure is rated at a 6 (Satisfactory), degradation is apparent, and that will continue to worsen, giving this alternative a 40 year projected life span, opposed to the 80 year life span of the replacement alternative. Also, this alternative would do little to fix the hydraulic restriction, and any scour protection would likely reduce the channel opening. Due to the location of the sewer line, phasing may not be possible with this alternative, or may require the relocation of the existing utilities (adding time and expense to the project).

Alternative 3: Complete Bridge Replacement with a new structure

This alternative involves removing the old bridge and replacing it with a new structure. While the bridge width would remain the same, the span would be increased to a span of at least 40 feet to allow proper hydraulic clearance. Since the existing width exceeds the minimum width required, we propose maintaining the existing width. Unfortunately this alternative would probably not be able to be done under Accelerated Bridge Construction, due to the amount of bedrock visible in the area requiring the construction of a cast in place footing/subfooting, and the need for the existing sewer line to be relocated.

This alternative would include a new structure with an estimated life span of 80 years. The hydraulic capacity of the structure would be significantly improved, making this alternative the only one to meet all design criteria. On the flip side this alternative would be the most expensive, take the longest to complete, require the acquisition of Right-of-Way, and have the greatest impacts to traffic and adjacent properties. A temporary bridge, phased construction, or an offsite detour would be required.

IV. Alternatives Summary

Based on the existing site conditions, bridge condition, and recommendations from hydraulics, there are three viable alternatives:
Alternative 1: Do nothing
Alternative 2: Deck/Superstructure Replacement
Alternative 3: Complete Replacement
A cost evaluation for each of the alternatives is shown on the next page.
Please note that the Preliminary Engineering costs and Project Development duration given are from the point at which the project has been defined, and are for comparison only.

Jay BHF 0278(3)		Do Nothing	Alt 2a	Alt 2b	Alt 2c	Alt 3a	Alt 3b	Alt 3c
			Deck/Superstructure Replacement			Complete Replacement		
			Temp Bridge	Phased	Offsite Detour	Temp Bridge	Phased	Offsite Detour
COST	Bridge Cost	$0	$258,000	$283,000	$258,000	$377,000	$414,000	$377,000
	Removal of Structure	$0	$20,000	$22,000	$20,000	$29,000	$32,000	$29,000
	Roadway	$0	$121,000	$115,000	$113,000	$139,000	$133,000	$131,000
	Maintenance of Traffic	$0	$100,000	$40,000	$15,000	$100,000	$40,000	$15,000
	Construction Costs	$0	$499,000	$460,000	$406,000	$645,000	$619,000	$552,000
	Construction Engineering + Contingencies	$0	$174,700	$161,000	$121,800	$225,800	$216,700	$165,600
	Total Construction Costs w CEC	$0	$673,700	$621,000	$527,800	$870,800	$835,700	$717,600
	Preliminary Engineering	$0	$174,700	$161,000	$142,100	$258,000	$247,600	$220,800
	Right of Way	$0	$65,000	$0	$0	$65,000	$40,700	$40,700
	Total Project Costs	$0	$913,400	$782,000	$669,900	$1,193,800	$1,124,000	$979,100
SCHEDULING	Project Development Duration		5 years	3 years	3 years	5 years	4 years	4 years
	Construction Duration		18 months	18 months	4 months	18 months	18 months	6 months
	Mobility Impacts		32 weeks	8 weeks	3 weeks	32 weeks	12 weeks	6 weeks
ENGINEERING	Typical Section - Roadway (feet)	30'	30'	30'	30'	30'	30'	30'
	Typical Section - Bridge (feet)	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4
	Geometric Design Criteria	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Traffic Safety	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Alignment Change	No	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	No Change	No Change	No Change	No Change	Meets Std.	Meets Std.	Meets Std.
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	Possible	Possible	Possible	Change	Change	Change
OTHER	ROW Acquisition	No	Yes	No	No	Yes	Yes	Yes
	Road Closure	No	No	No	Yes	No	No	Yes
	Design Life	~10 years	40 years	40 years	40 years	80 years	80 years	80 years

V. Conclusion

The recommendation of Vtrans is to use a total replacement of the structure, with phased construction for traffic maintenance (Alternative 3b).

VI. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo dated 8/29/2012
- Geotechnical Report
- Utilities Memo
- Natural Resources Memo
- Hazardous Waste Sites Map
- Archeology Memo
- Historic Memo
- Proposed Detour Route
- Plans
    - Existing Conditions
    - Proposal
        - Typical Sections
        - Layout
        - Profile
    - Traffic Maintenance
        - Temporary Bridge
            - Layout
            - Profile
        - Phased Construction
            - Layout
            - Typical Sections

Jay Branch, Upstream of Bridge

Jay Branch, Downstream of Bridge
03.22.2012

Girder & Soffit Degradation

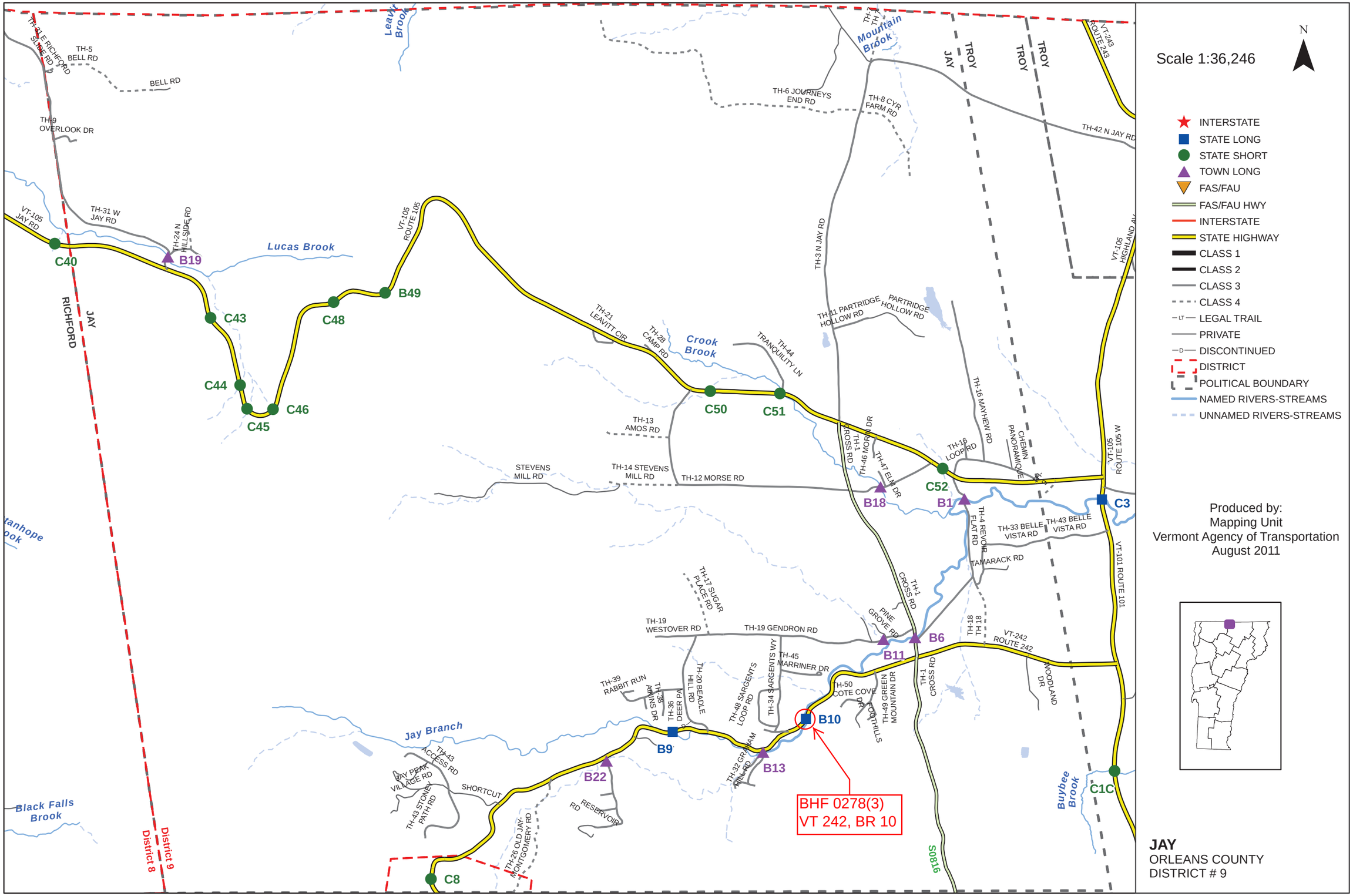
Abutment Degradation at Outlet

Proposed Location for Temporary Bridge.
Looking South at Outlet of Bridge.

Temporary Bridge Approach.
Looking North from bridge.

Looking at Sewer Line on the Inlet side, Entering Southern Abutment

Looking at Sewer Line on the Inlet side, Entering Northern Abutment



Scale 1:36,246
N
INTERSTATE
STATE LONG
STATE SHORT
TOWN LONG
FAS/FAU
FAS/FAU HWY
INTERSTATE
STATE HIGHWAY
CLASS 1
CLASS 2
CLASS 3
CLASS 4
LEGAL TRAIL
PRIVATE
DISCONTINUED
DISTRICT
POLITICAL BOUNDARY
NAMED RIVERS-STREAMS
UNNAMED RIVERS-STREAMS
Produced by:
Mapping Unit
Vermont Agency of Transportation
August 2011
JAY
ORLEANS COUNTY
DISTRICT # 9
BHF 0278(3)
VT 242, BR 10
Lucas Brook
Crook Brook
Jay Branch
Black Falls Brook
Buybee Brook
Mountain Brook
Leavitt Brook
RICHFORD
JAY
TROY
District 8
District 9
C40
C43
C44
C45
C46
C48
C50
C51
C52
C3
C1C
C8
B19
B49
B18
B1
B6
B11
B10
B9
B13
B22
TH-5 BELL RD
BELL RD
TH-9 OVERLOOK DR
TH-31 W JAY RD
VT-105 JAY RD
TH-24 N HILLSIDE RD
VT-105 ROUTE 105
TH-21 LEAVITT CIR
TH-28 CAMP RD
TH-44 TRANQUILITY LN
TH-13 AMOS RD
STEVENS MILL RD
TH-14 STEVENS MILL RD
TH-12 MORSE RD
TH-6 JOURNEYS END RD
TH-8 CYR FARM RD
TH-42 N JAY RD
TH-3 N JAY RD
TH-11 PARTRIDGE HOLLOW RD
PARTRIDGE HOLLOW RD
TH-16 MAYHEW RD
TH-16 LOOP RD
CHEMIN PANORAMIQUE
TH-1 CROSS RD
TH-46 MORIN DR
TH-47 ELM DR
TH-4 REVOIR FLAT RD
TH-33 BELLE VISTA RD
TH-43 BELLE VISTA RD
TAMARACK RD
VT-101 ROUTE 101
VT-105 ROUTE 105 W
VT-243 ROUTE 243
VT-105 HIGHLAND AV
TH-17 SUGAR PLACE RD
TH-19 WESTOVER RD
TH-19 GENDRON RD
PINE GROVE RD
TH-18 TH 18
VT-242 ROUTE 242
WOODLAND DR
TH-45 MARRINER DR
TH-50 COTE COVE DR
TH-49 GREEN MOUNTAIN DR
FOOTHILLS
TH-39 RABBIT RUN
TH-38 AMINS DR
TH-36 DEER PA
TH-20 BEADLE HILL RD
TH-48 SARGENTS LOOP RD
TH-34 SARGENTS WY
TH-32 GRAHAM HILL RD
TH-43 ACCESS RD
JAY PEAK VILLAGE RD
TH-43 STONEY PATH RD
SHORTCUT
RESERVOIR RD
TH-26 OLD JAY-MONTGOMERY RD
S0816

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

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

Inspection Report for JAY **bridge no.:** 00010 **District:** 9

Located on: VT 00242 ML **over** JAY BRANCH **approximately** 2.3 MI W JCT 101 **Owner:** 01 STATE-OWNED

CONDITION

Deck Rating: 4 POOR

Superstructure Rating: 5 FAIR

Substructure Rating: 6 SATISFACTORY

Channel Rating: 6 SATISFACTORY

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 200278001010122

Federal Sufficiency Rating: 80

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1927 **Year Reconstructed:** 1964

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 02

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 16

ADT: 000780 **% Truck ADT:** 06

Year of ADT: 1998

GEOMETRIC DATA

Length of Maximum Span (ft): 0024

Structure Length (ft): 000028

Lt Curb/Sidewalk Width (ft): 0

Rt Curb/Sidewalk Width (ft): 0

Bridge Rdwy Width Curb-to-Curb (ft): 29.9

Deck Width Out-to-Out (ft): 34.5

Appr. Roadway Width (ft): 030

Skew: 15

Bridge Median: 0 NO MEDIAN

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

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: CONCRETE T-BEAM

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

Kind of Material and/or Design: 1 CONCRETE

Deck Structure Type: 1 CONCRETE CIP

Type of Wearing Surface: 6 BITUMINOUS

Type of Membrane 2 PREFORMED FABRIC

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 1 MEETS CURRENT STANDARD

Transitions: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail: 1 MEETS CURRENT STANDARD

Approach Guardrail Ends: 1 MEETS CURRENT STANDARD

Structural Evaluation: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Deck Geometry: 5 BETTER THAN MINIMUM TOLERABLE CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 5 OCCASIONAL OVERTOPPING OF BRIDGE & ROADWAY WITH SIGNIFICANT TRAFFIC DELAYS

Approach Roadway Alignment: 7 BETTER THAN MINIMUM CRITERIA

Scour Critical Bridges: 8 STABLE FOR SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 2 ALLOWABLE STRESS (AS)

Posting Status: A OPEN, NO RESTRICTION

Bridge Posting: 5 NO POSTING REQUIRED

Load Posting: 01 NO LOAD POSTING SIGNS EXIST NEAR BRIDGE

Posted Vehicle: POSTING NOT REQUIRED

Posted Weight (tons):

Design Load: 2 H 15

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 052011 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

08/31/2011 Assessment inspection after Tropical Storm Irene (Round #1). The left downstream bank area is in need of added anti-erosion protection. The downstream wingwall of abutment No.2 is in need of added anti-scour and undermining protection. PLB

5/18/2011 The abutments have some spalling.in sistered up t-beams continue to deteriorate and the deck continues to deteriorate in bay2. ~DCP/FRE

05/05/2009 - The deck in bay #2 has heavy deterioration with the potential for additional full depth hole formation. The sistered T-beams (3+4) have heavy spalling along the lower third. The deck and superstructure should be replaced in the next few years with precast units. - MJ/DS

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: David Willey, Hydraulics Project Supervisor

DATE: August 29, 2012

SUBJECT: Jay BHF 0278(3), VT 242 Br. 10 over jay Branch

We have completed a Preliminary Hydraulic Study for the subject project, and offer the following information:

The existing structure was built in 1927 and reconstructed in 1964. It is a single span concrete T-beam bridge, with a hydraulic clear span length of 22'. This bridge constricts the channel width. There is exposed ledge upstream that forces the water toward the southwest corner of the bridge. A large scour hole has formed through the bridge area.

The existing bridge is undersized hydraulically. The beams are in the water at about the Q25, so the bridge does not have 1' of freeboard at Q50, as required to meet the standards. Water does not overtop the roadway below Q100.

A replacement bridge should be longer to fit the channel. We recommend a new bridge have at least a 40' clear span between abutments, measured perpendicular to the channel. The new bridge should be properly aligned with the channel. A longer bridge will be required to provide the recommended hydraulic clear span length, if the abutments are not aligned with the channel. Most of the bridge lengthening should be on the southwest end of the bridge. Stone fill should match the upstream and downstream channel banks and should not constrict the channel. At this time we recommend the bottom of beams be no lower than elevation 1033.0'. If a lower bottom of beam elevation is desirable, we could try to refine the recommended minimum bottom of beam elevation after we know the exact new abutment and stone fill locations. It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks.

Please contact us if you have any questions or need additional information.

DCW

cc: Hydraulics Chrono File
Hydraulics Project File via NJW

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, Project Manager, Structures

CEE CCB

From: Callie Ewald, Geotechnical Engineer, via Christopher C. Benda, P.E., Soils and Foundations Engineer

Date: May 29th, 2012

Subject: Jay BHF 0278(3) – Route 242, BR 10 Preliminary Geotechnical Information

In an effort to assist the Structures Section with their bridge type study, the Soils and Foundations Unit within the Materials and Research Section has completed a review of available geological data near VT Route 242 crossing over Jay Branch in Jay, Vermont. This review included our in-house bridge boring files, record plans, USDA Natural Resources Conservation soil survey records, surficial geology and bedrock maps of the State and the Agency of Natural Resources Well logs.

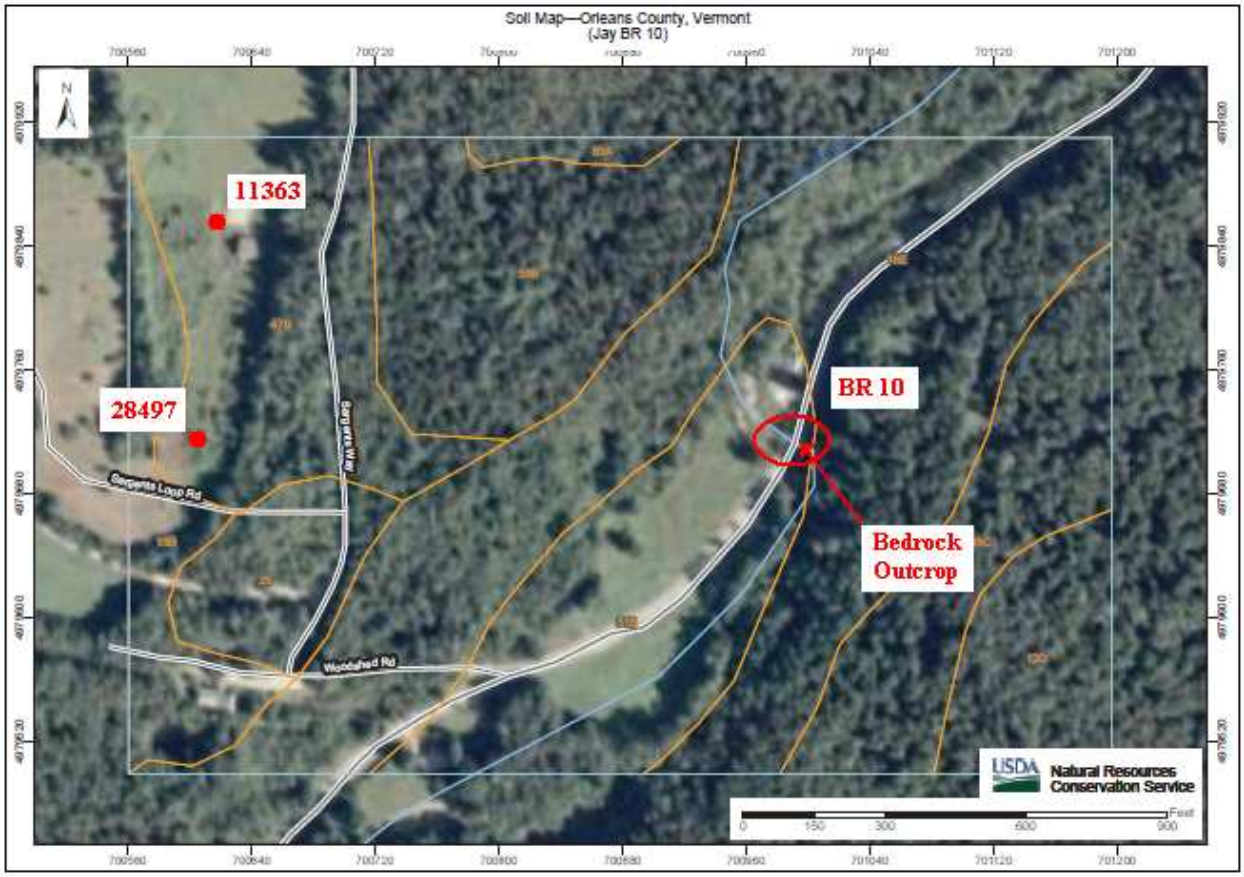


Figure 1, USDA Soil Survey and ANR Well Data near Bridge 6

Based on subsurface information reported by well drilling reports on file at ANR and the USDA web soil survey, the surficial geology in the vicinity of the subject area is expected to consist of a

mixture of clay, sand, gravel, and hardpan. USDA soil descriptions and two well locations within half of a mile are shown in Figure 1 and summarized in Table 1.

Table 1, Well Log and USDA Soil Survey Descriptions

Well Number/ Map Symbol	Overburden Description/ Map Unit Name	Depth to Bedrock (ft)
Pa	Sheepscot gravelly fine sandy loam	N/A
11363	Shallow sandy clay & hardpan	26
28497	Shallow clay & hardpan	5

The Natural Resources Conservation Service USDA soil descriptions from Figure 1 indicate that the subject area is classified as Sheepscot gravelly fine sandy loam. These deposits are typically sands and gravels found in outwash plains and stream terraces and are evidenced in the water well records nearby and the 1970 Surficial Geologic Map of Vermont. Some shallow clay was encountered in the well logs and can be found on the bank just downstream of the bridge. Bedrock in the area is expected to be foliated schist and quartzite according to the new 2012 Bedrock Map of Vermont. Bedrock was seen just upstream of the bridge in the stream (see Figure 2). Record plans for this bridge from 1927 show an approximate ledge line, denoting that the current abutments are sitting on bedrock.

Figure 2, Bedrock outcrop just upstream of BR 10

Based on this information, and the existence of shallow bedrock, possible foundation options for a bridge replacement include the following:

- Reinforced concrete abutments on spread footings
- Stub abutments with spread footings founded on mechanically stabilized earth (MSE) walls.

When considering MSE Walls, please recognize that open graded backfill should be used below the flood elevation to limit the possibility of excess pore pressure build up behind the walls. Also, the addition of steel sheeting for scour protection should be evaluated.

We recommend a boring be taken at each corner of the proposed bridge, in order to more fully assess the subsurface conditions at the site including, but not limited to, the soil properties, ground water conditions and depth of bedrock. A boring at each corner will aide in providing a bedrock profile across each abutment.

Figure 3, Bridge 10 Looking East on Route 242

Borings in all corners within the roadway appear to be feasible (see Figure 3). Utility lines that run under the roadway shoulder and bridge should be considered when choosing boring locations. However, final recommendations for borings can be provided once an alignment and preliminary structure type have been selected.

If you have any questions, please feel free to call us at 828-1235.

c: WEA/Read File
CCB/Project File
CEE

AGENCY OF TRANSPORTATION
INTEROFFICE MEMORANDUM
Utilities & Permits Unit

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

FROM: Jim Clancy, Project Supervisor, Utilities & Permits Unit

DATE: August 14, 2012

SUBJECT: Request for Utility Information – Jay BHF 0278(3)

The utilities in the vicinity of this project are listed below:

Aerial Utilities – These aerial lines run outside the project area, to the north of the bridge and should not impact construction.

Barton Electric – Don Bowen, 802-525-4747
Comcast – Bruce Bowser, 802-225-1801
Telephone Operating Company of VT, LLC – Dan Maple, 802-295-8152

Sewer – a sewer line is connected to the south side of the bridge. There is a pipe connected to the north side of the bridge and this has not been identified. I am in the process of identifying this pipe through the process of elimination.

Troy-Jay Waste Water Treatment Facility – Steve Button, 802-988-2636

State of Vermont
Program Development Division
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

[phone] 802-828-3979
[fax] 802-828-2334
[ttd] 800-253-0191

Agency of Transportation

To: Jeff Ramsey, VTrans Environmental Specialist

From: Glenn Gingras, VTrans Environmental Biologist

Date: 3/29/12

Subject: Jay BHF 0278(3) - Natural Resource ID

Project Description: Rehabilitation of Bridge No. 10 on VT 242 in Jay, over Jay Branch.

I have completed my natural resource report for the above referenced project. My evaluation has included wetlands/watercourses, wildlife habitat, agricultural soils, and rare, threatened and endangered species.

Wetlands/Watercourses
I have reviewed state wetland mapping and have visited the project area and no wetlands exist within the immediate area of the project.

Jay Brook flows through the project area it would be considered to be a cold water stream. The brook would support a variety of aquatic organisms and would be subject to in stream restrictions during fish spawning periods (typically JUNE 1-OCT 1). Any impact below ordinary high water would be subject to US COE jurisdiction.

Wildlife Habitat

Fisheries and other aquatic organisms exist within Jay Brook. Terrestrial wildlife within the project area would typically consist of small mammals such as mink, weasel, and fisher. Larger mammals such as deer, coyote, moose and black bear also could be expected to use this corridor. There are no mapped deer wintering areas within the project area.

Rare, Threatened and Endangered Species
After reviewing existing information on VT Fish and Wildlife's Non Game and Natural Heritage programs database, I have determined there are no threatened, endangered or rare species of concern within the project area.

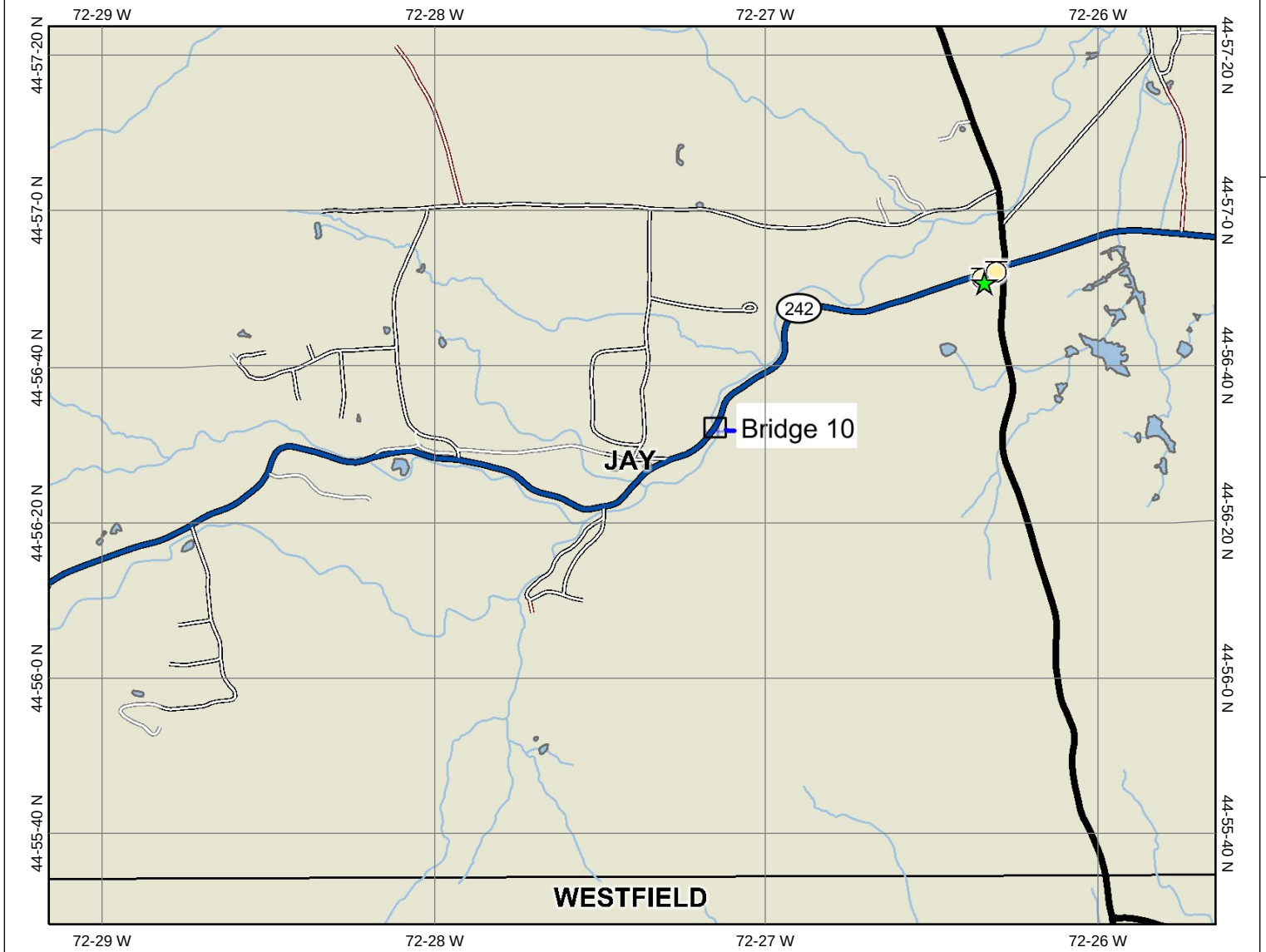
Agricultural Soils:

No prime soils are present within the project area. There is a Sheepscot gravelly fine sandy loam present throughout the project area and it is statewide significant.

ANR Environmental Interest Locator

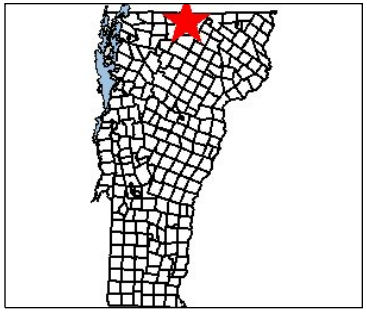
Vermont Agency of Natural Resources (ANR)

Hazardous Waste Locations



0 2400 4800 7200 ft.

Map center: 503417, 271154



Legend

- Brownfields
- Hazardous Waste Site
- Hazardous Waste Site Generator
- Underground Storage Tank
- Roads
  - US Highway
  - Vermont State Highway
  - Class One
  - Class Two
  - Legal Trail
  - Emergency U-Turn Area
  - Proposed Class Two
  - Proposed Class Three
  - Proposed Vermont State Highway
  - Proposed US Highway
  - Proposed Interstate
  - Discontinued
  - Interstate
  - Class Three
  - Class Four
  - State/National Forest Highway
  - Military Road (No Public Access)
  - Private Road
- Hydrography Lakes and Ponds (VHD 5k)
- Hydrography (VHD 5k)
- VT County Boundary
- VT Town Boundaries (No Fill)
- VT State Boundary (Fill)

VT State Plane Meters (NAD83)

N

Scale: 1:24,909

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

URL: http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp

9/27/12

VERMONT

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

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

Agency of Transportation

To: Jeff Ramsey, VTrans Environmental Specialist

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

Date: 6/11/2012

Subject: Jay BHF 0278(3) – Archaeological Resource ID

Jeff,

A field visit for Jay BHF 0278(3) was conducted on June 8th 2012 in order to map archaeological sensitivity in the general area around Bridge 10 along VT 242 in Jay. We were able to locate two historic Euro-American foundation remains in the SE quadrant as well as a sensitive field in the SW. The foundation remains appear to be related to a complex of sawmills that dotted the landscape in this region of Jay in the decades following the original settlement of the town in the early 1800s.

These areas of sensitivity have been mapped into the archaeological geodatabase and are ready for inclusion in future CADD plans.

Please feel free to contact me with any comments or questions,

Brennan

Brennan Gauthier
VTrans Assistant Archaeologist
tel. 802-828-3965
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation

Jay BHF 0278(3)
Arch Sensitivity
N
0 0.004 0.008 0.016 0.024 0.032
1:1,033
Miles
Mill Foundation
Mill Foundation
Map created by BCG,
PDD-Environmental Section
on 6/11/2012.

Ramsey, Jeff

From: O'Shea, Kaitlin
Sent: Thursday, April 12, 2012 5:01 PM
To: Ramsey, Jeff
Subject: Pilot Project - Jay BHF 0278(3) Historic Resource ID

Good afternoon,

I have completed the historic resource ID for Jay BHF 0278(3): Bridge 10 and the adjacent properties are not historic.

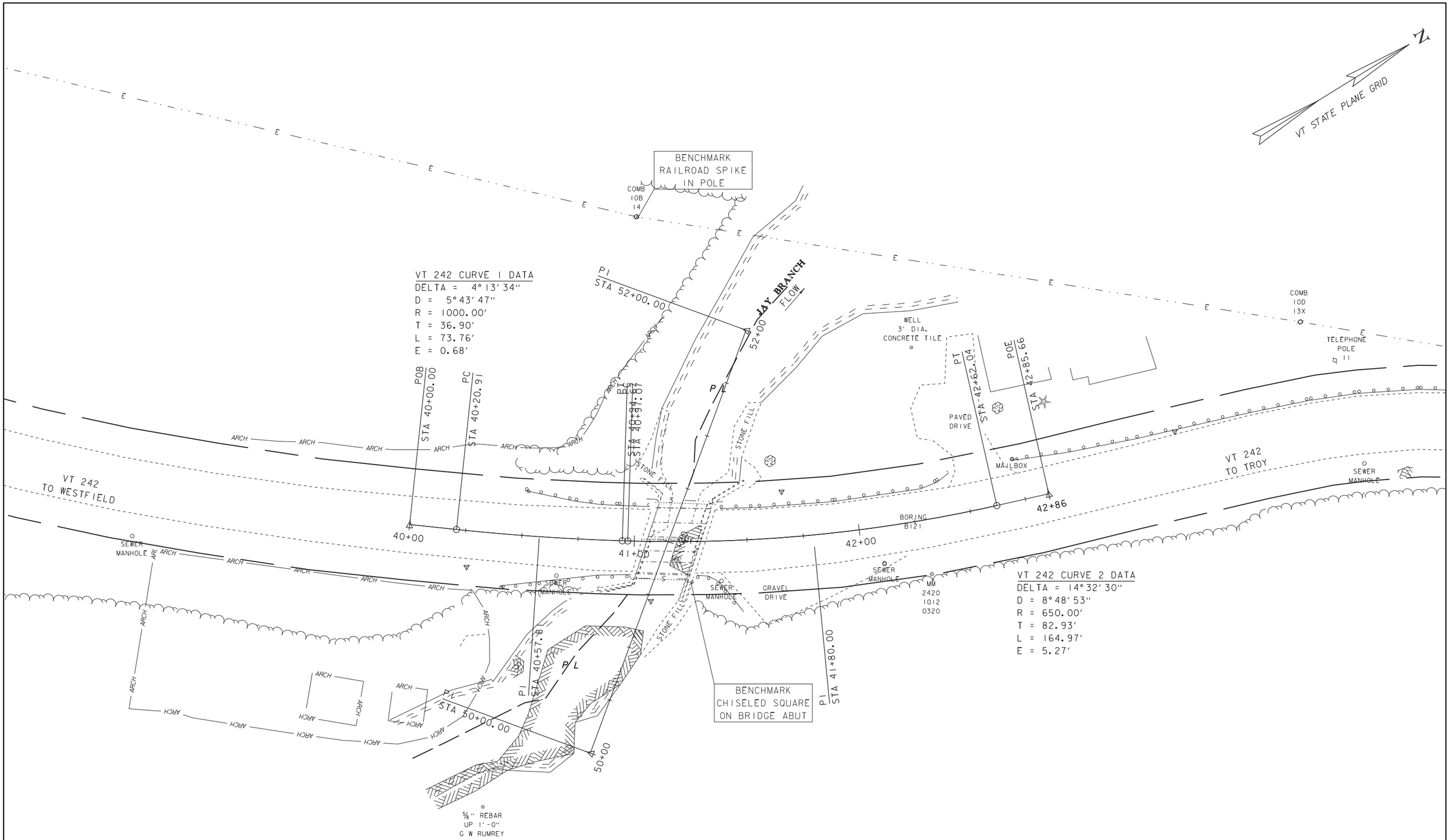
This resource ID is part of the GPS/GIS Pilot Project. As discussed, initial review for historic resources is completed via desk review (maps, bridge inspection photos, Google Earth) and can be determined to have no historic resources without site visits. Other projects will require a site visit in order to determine if there are historic resources located within the project area. Historic resources will continue to be identified on a map and scanned for the project files. When appropriate, historic resources will be mapped by the GPS in order to compare and contrast the effectiveness and application of these resource ID procedures.

I am keeping a spreadsheet for these pilot projects which outlines review methods, resource notes, resource ID and how the ID is submitted (GPS data, email memo, resource map, etc.) I'll bring this to the next project meeting.

Let me know if you have any questions.
Thanks,
Kaitlin

Kaitlin O'Shea
Historic Preservation Specialist
Vermont Agency of Transportation

802-279-0869
Kaitlin.O'Shea@state.vt.us

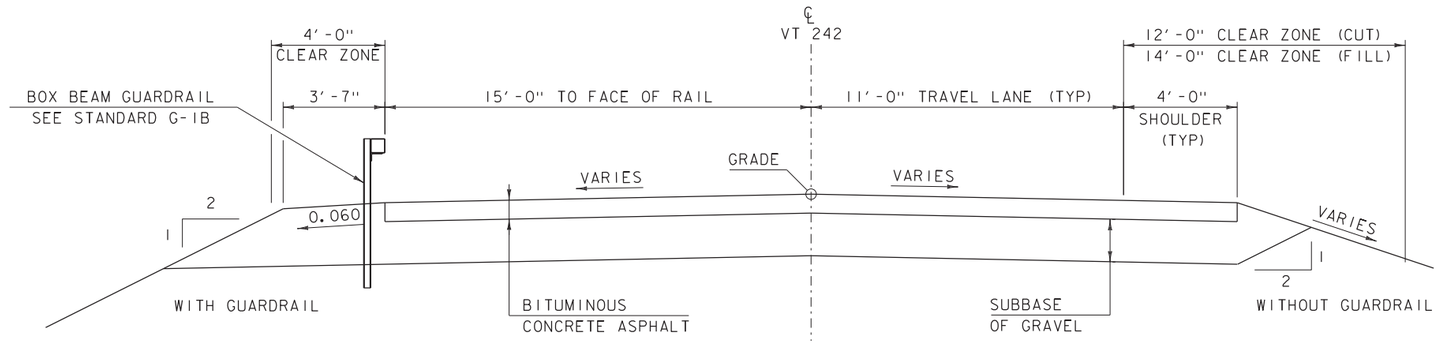


EXISTING CONDITIONS

SCALE 1" = 20'-0"

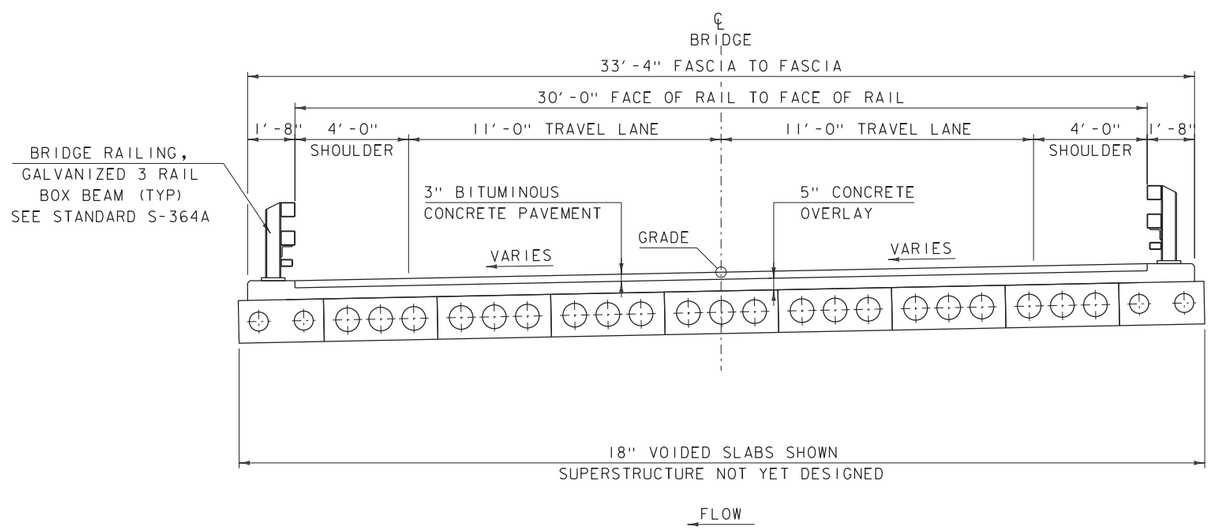
20 0 20

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12c154\s12c154bdr.dgn	PLOT DATE: 04-SEP-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
EXISTING CONDITIONS SHEET	SHEET 1 OF 8



PROPOSED VT 242 TYPICAL SECTION

SCALE 3/8" = 1'-0"



PROPOSED BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"

DIMENSIONS ARE RADIAL UNLESS NOTED

MATERIAL TOLERANCES

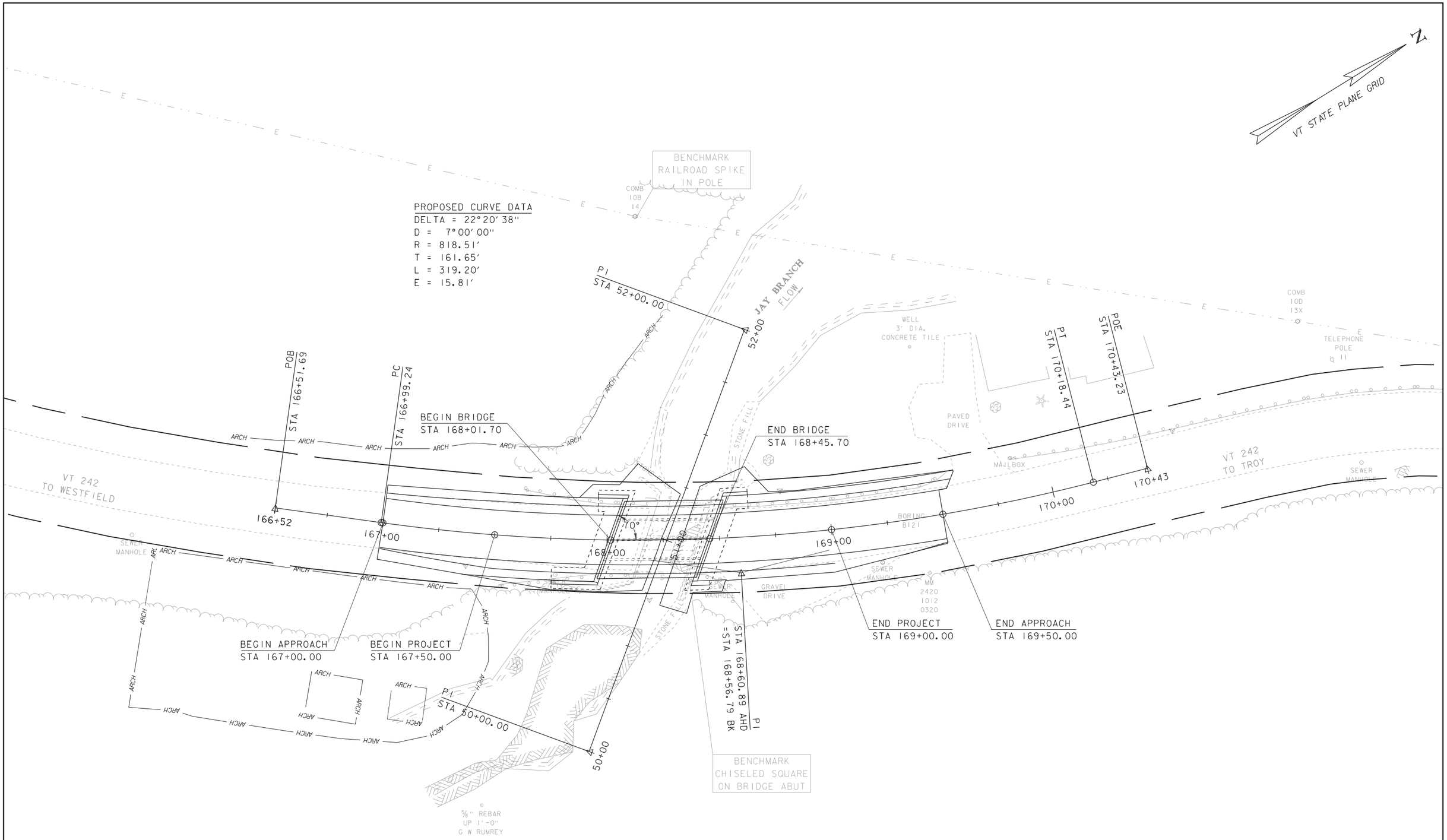
(IF USED ON PROJECT)

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

PROJECT NAME: JAY
PROJECT NUMBER: BHF 0278(3)

FILE NAME: 12cl54\sl2cl54typical.dgn
PROJECT LEADER: C.P.WILLIAMS
DESIGNED BY: D.D.BEARD
TYPICAL SECTIONS

PLOT DATE: 20-DEC-2012
DRAWN BY: D.D.BEARD
CHECKED BY: ------
SHEET 1 OF 8

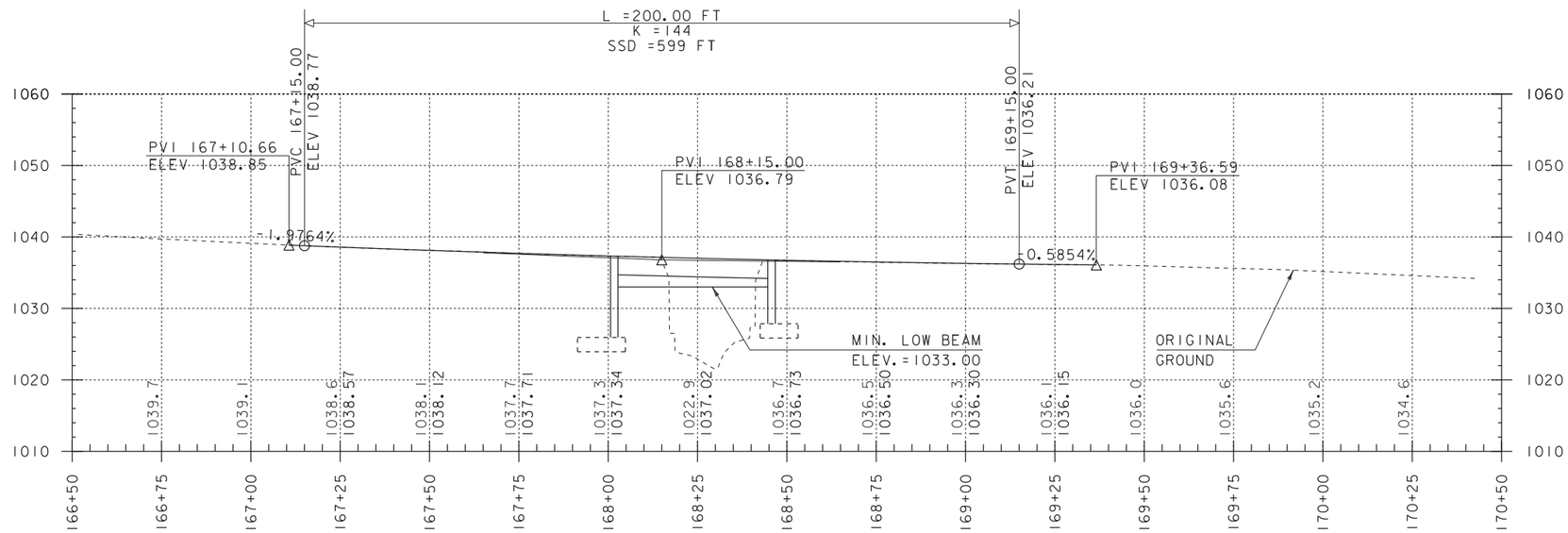


FULL BRIDGE REPLACEMENT LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12cl54\sl2cl54bdr.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
FULL BRIDGE REPLACEMENT LAYOUT SHEET	SHEET 2 OF 8



VT RT 242 FULL BRIDGE REPLACEMENT PROFILE

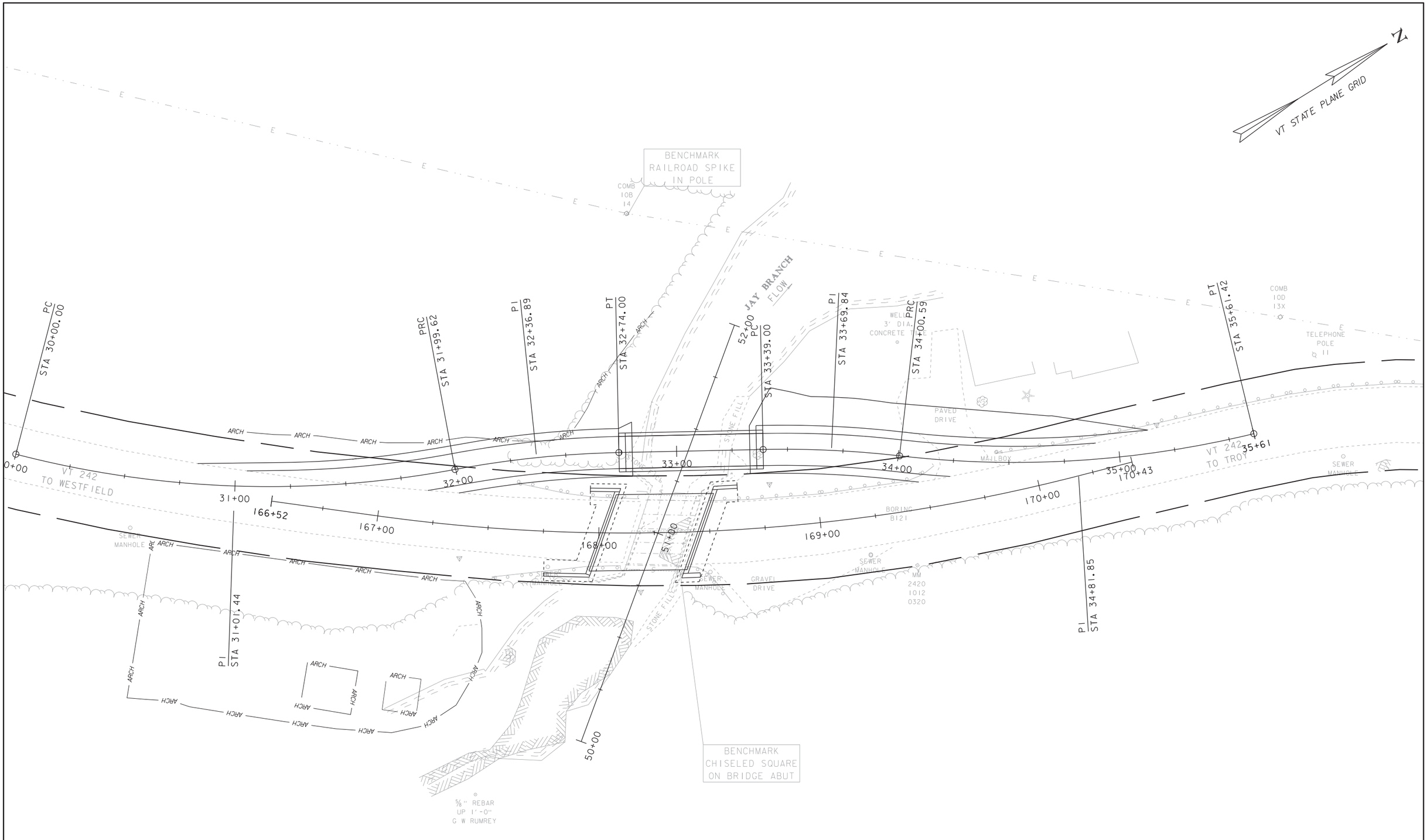
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12c154\s12c154profile.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
FULL BRIDGE REPLACEMENT PROFILE SHEET	SHEET 3 OF 8

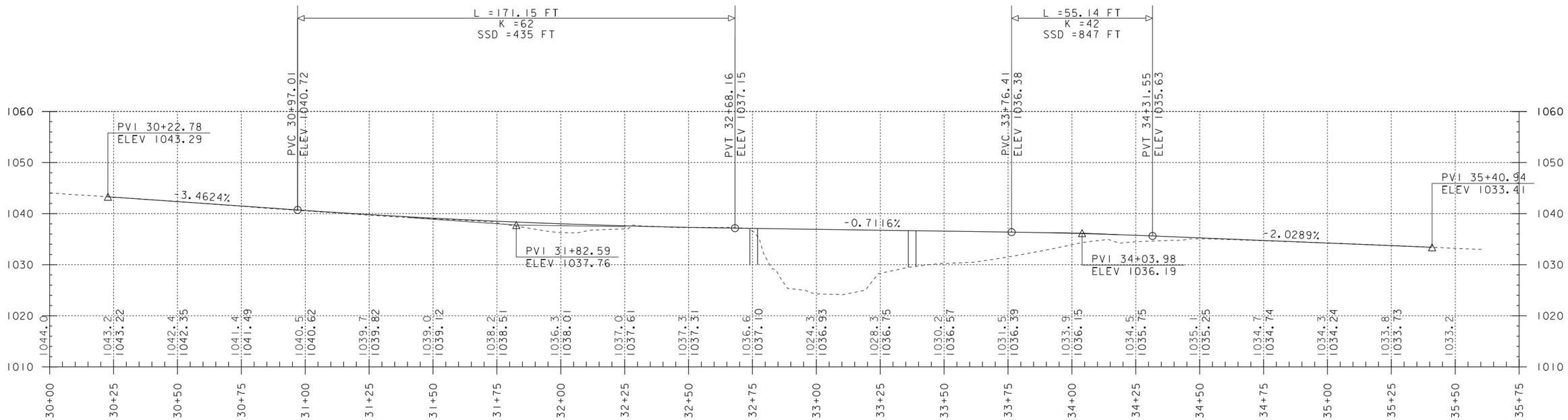


ONE WAY TEMPORARY BRIDGE LAYOUT

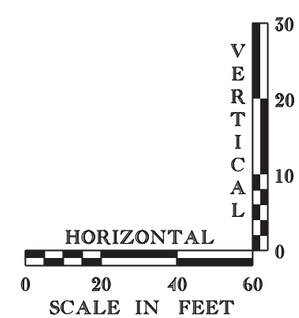
SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12c154\s12c154bdr.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
ONE WAY TEMPORARY BRIDGE LAYOUT SHEET	SHEET 4 OF 8



TEMPORARY BRIDGE PROFILE

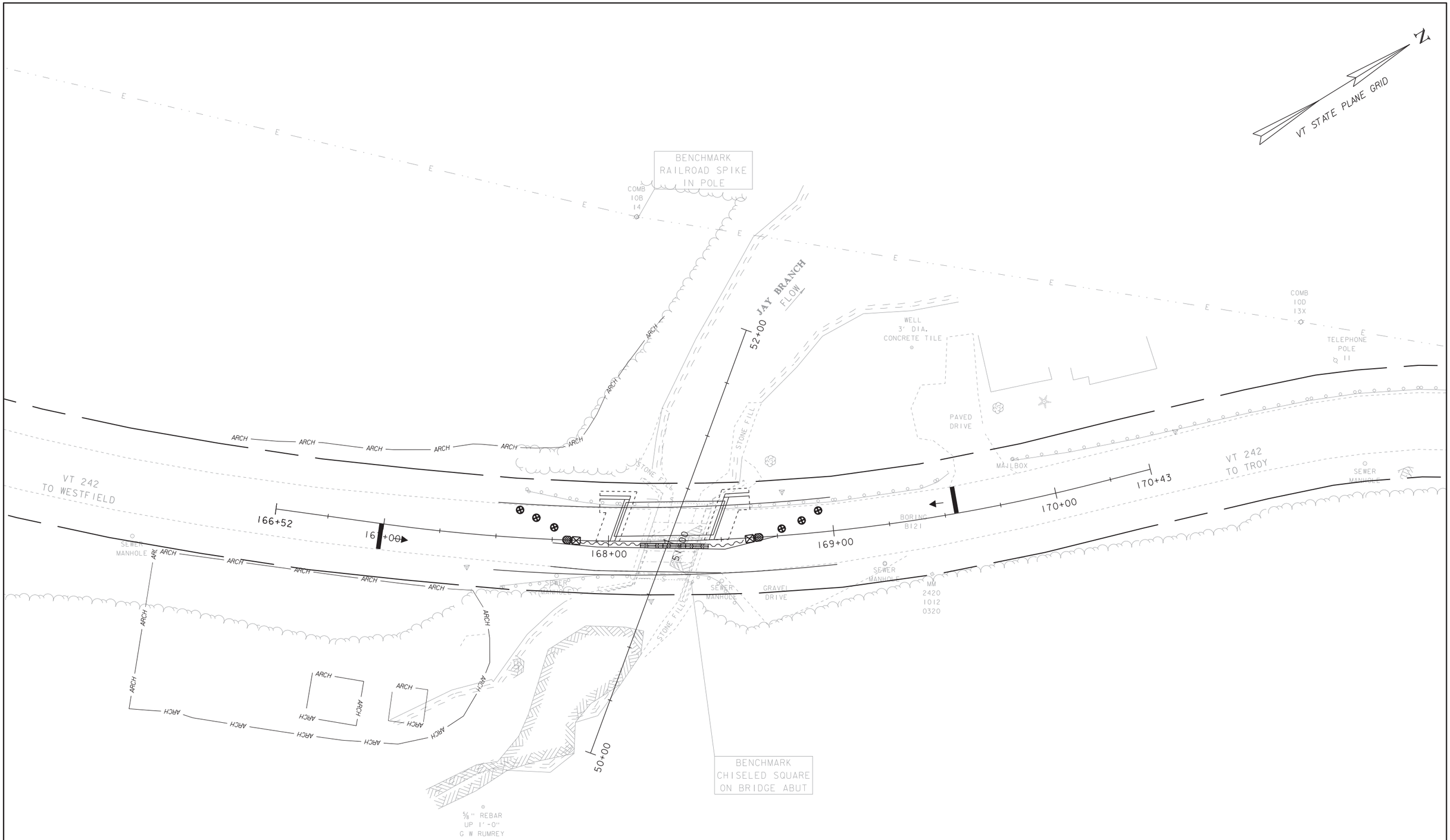


NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12cl54\sl2cl54tempbridge.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: D.D.BEARD	CHECKED BY: ------
TEMPORARY BRIDGE PROFILE	SHEET 5 OF 8

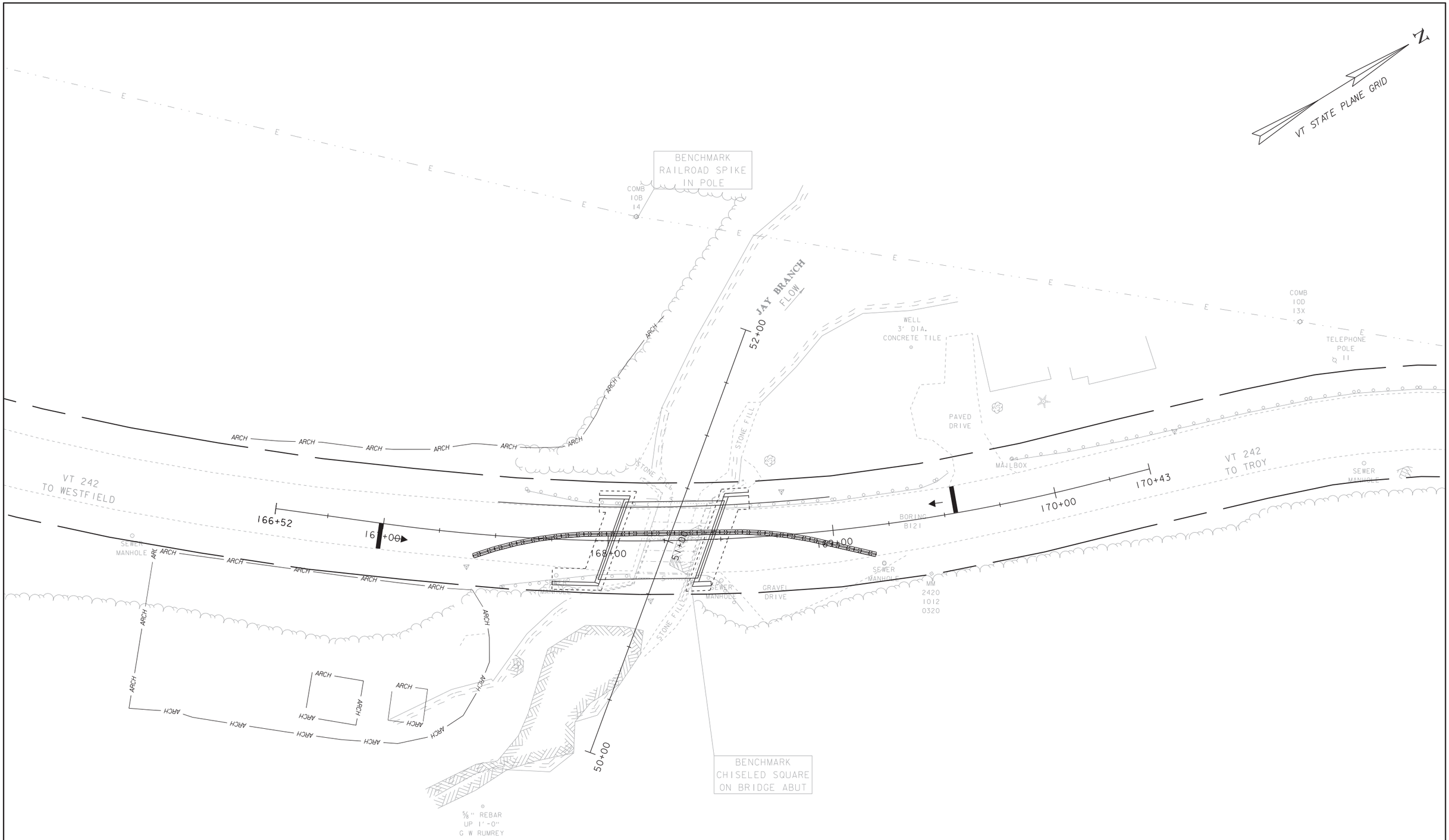


FULL BRIDGE REPLACEMENT PHASE I LAYOUT

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: I2cl54\sl2cl54bdr.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
REPLACEMENT PHASE ILAYOUT SHEET	SHEET 7 OF 8

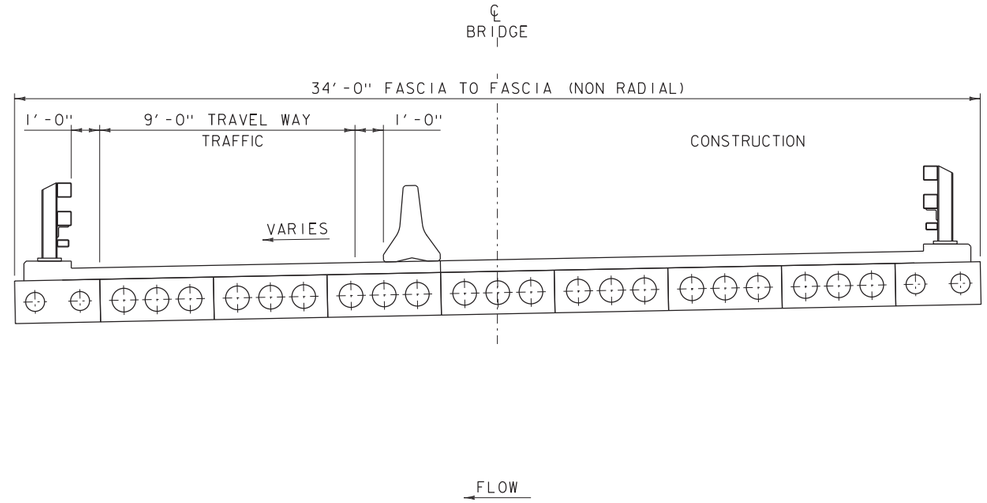


FULL BRIDGE REPLACEMENT PHASE 2 LAYOUT

SCALE 1" = 20'-0"

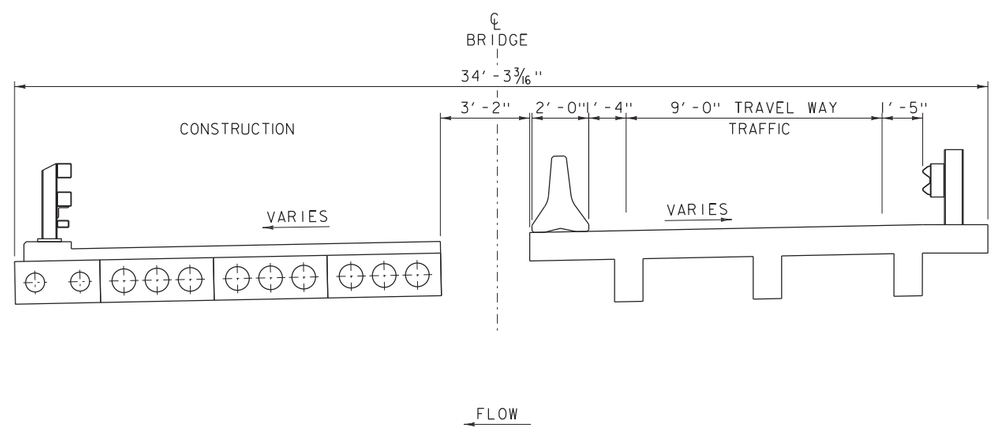
20 0 20

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12cl54\sl2cl54bdr.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: ------	CHECKED BY: ------
REPLACEMENT PHASE 2 LAYOUT SHEET	SHEET 8 OF 8



PROPOSED PHASE 2 BRIDGE TYPICAL SECTION

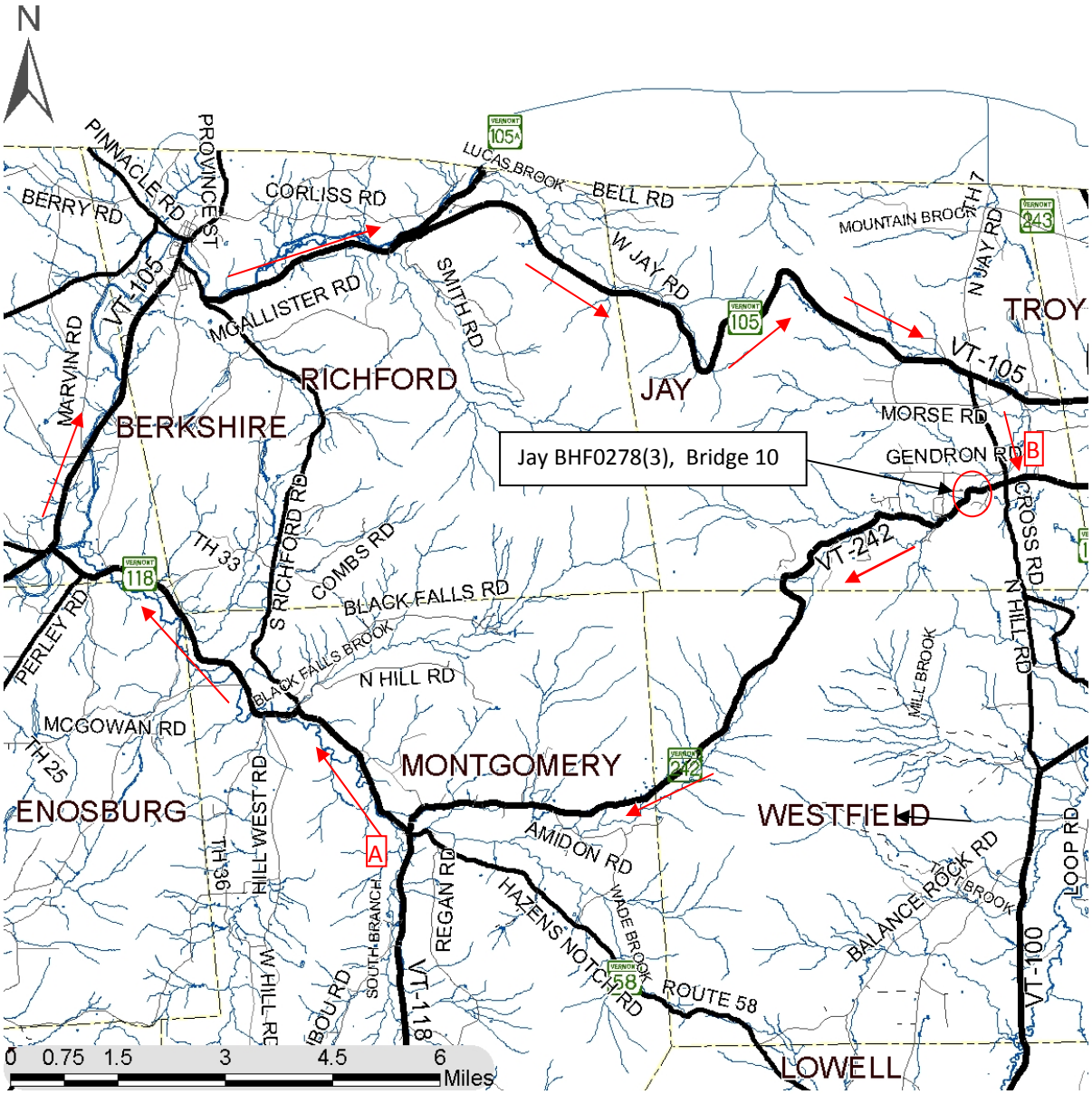
SCALE 3/8" = 1'-0"
DIMENSIONS ARE RADIAL UNLESS NOTED



PROPOSED PHASE 1 BRIDGE TYPICAL SECTION

SCALE 3/8" = 1'-0"
DIMENSIONS ARE RADIAL UNLESS NOTED

PROJECT NAME: JAY	
PROJECT NUMBER: BHF 0278(3)	
FILE NAME: 12c154\s12c154phasing.dgn	PLOT DATE: 19-DEC-2012
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: D.D.BEARD	CHECKED BY: ------
PHASING TYPICAL SECTIONS	SHEET 6 OF 8



JAY DETOUR
ORLEANS & FRANKLIN COUNTIES
DISTRICT 8 & 9

"A" to "B" Thru Route Length: 13 Miles
"A" to "B" Detour Route Length: 29 Miles
Added Length = 16 Miles