STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version
LRFD

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STANDARDS LIST

E-136B	STATE ROUTE MARKER SIGN DETAILS	08-08-1995
E-191	PAVEMENT MARKING DETAILS	02-01-1999
E-192	PAVEMENT MARKING DETAILS	10-12-2000
E-193	PAVEMENT MARKING DETAILS	08-18-1995
T-1	TRAFFIC CONTROL GENERAL NOTES	04-25-2016
T-2	TRAFFIC SIGN GENERAL NOTES	04-25-2016
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-11	CONSTRUCTION APPROACH SIGNING DIVIDED HIGHWAY ONE LANE CLOSED	08-06-2012
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	08-06-2012
T-24	TRAFFIC CONTROL FOR MAINTENANCE PAVEMENT MARKING OPERATION	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-29	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-35	CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS	08-06-2012
T-36	CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS FOR PAVING	08-06-2012
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013
T-92	ROUTE MARKER FRAME DETAILS	10-26-2015

STRUCTURES DETAIL SHEETS

SD-501.00	CONCRETE DETAILS AND NOTES	2/9/2012
SD-502.00	CONCRETE DETAILS AND NOTES	10/10/2012
HSD-400.01	SAFETY EDGE DETAILS	3/29/2016

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: October 2015

DRAINAGE AREA : 1.1 sq. mi.
CHARACTER OF TERRAIN : Hilly, mostly forested with some open and developed land
STREAM CHARACTERISTICS : Alluvial, sinuous, probably incised
NATURE OF STREAMBED : Gravel and cobbles

PEAK FLOW DATA - ANNUAL EXCEEDANCE PROBABILITY (AEP)

43% =	70 cfs	2% =	240 cfs
10% =	150 cfs	1% =	280 cfs
4% =	200 cfs	0.2% =	390 cfs

DATE OF FLOOD OF RECORD : Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ 2% AEP = 8.0 fps
ICE CONDITIONS : Moderate
DEBRIS: Light
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
IS ORDINARY RISE RAPID? Yes
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: < 1%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Corrugated metal pipe
YEAR BUILT: 1989
CLEAR SPAN(NORMAL TO STREAM): 6.5'
VERTICAL CLEARANCE ABOVE STREAMBED: 6.5'
WATERWAY OF FULL OPENING: 33 sq. ft.
DISPOSITION OF STRUCTURE: Remove and replace with a new structure
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs

WATER SURFACE ELEVATIONS AT:

43% AEP =	559.1'	VELOCITY =	9.5 fps
10% AEP =	560.9'	"	11.6 fps
4% AEP =	562.0'	"	12.4 fps
2% AEP =	562.9'	"	13.1 fps
1% AEP =	563.9'	"	13.4 fps

LONG TERM STREAMBED CHANGES: Channel bank erosion. Scour and possibly some channel degradation downstream.

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: No
FREQUENCY: Above 1% AEP
RELIEF ELEVATION: 567.1'
DISCHARGE OVER ROAD @ 1% AEP: None

UPSTREAM STRUCTURE

TOWN: NA - stream divides
DISTANCE:
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

DOWNSTREAM STRUCTURE

TOWN: St. Albans
DISTANCE: 500'
HIGHWAY # : VT 36
STRUCTURE #: 1A
CLEAR SPAN: 8'
CLEAR HEIGHT: 8'
YEAR BUILT: 1938 & 1989
FULL WATERWAY: 62 sq. ft.
STRUCTURE TYPE: Concrete box

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							
COMMENTS:	TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER						

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (10'-0" x 7'-0" x 90'-0" BOX)
2. CULVERT ENDS ARE SKEWED BY AN ANGLE OF 90°
3. CULVERT WILL BE SET AT A SLOPE OF 27.00 IN. ON 90 FT.
4. CULVERT WILL REQUIRE FISH PASSAGE ACCOMODATIONS
5. CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2014	6700	760	64	5.2	380
2034	6900	780	64	7.2	540

20 year ESAL for flexible pavement from 2014 to 2034 : 2541000
40 year ESAL for flexible pavement from 2014 to 2054 : 5.631.00
Design Speed : 40 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Precast concrete box

CLEAR SPAN(NORMAL TO STREAM): 10'
VERTICAL CLEARANCE ABOVE STREAMBED: 5'
WATERWAY OF FULL OPENING: 50 sq. ft.

WATER SURFACE ELEVATIONS AT:

43% AEP =	557.8'	VELOCITY=	6.8 fps
10% AEP =	558.9'	"	9.1 fps
4% AEP =	559.6'	"	10.1 fps
2% AEP =	560.1'	"	10.9 fps
1% AEP =	560.5'	"	11.5 fps

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: No
FREQUENCY: Above 1% AEP
RELIEF ELEVATION: 567.1'
DISCHARGE OVER ROAD @ 1% AEP: None

BRIDGE LOW CHORD ELEVATION: 561.0' at inlet
FREEBOARD: @ 2% AEP = 0.9' at inlet

SCOUR: Not calculated for a box.

REQUIRED CHANNEL PROTECTION: See Additional Information below.

PERMIT INFORMATION

AVERAGE DAILY FLOW:	-	DEPTH OR ELEVATION:
ORDINARY LOW WATER:	-	-
ORDINARY HIGH WATER:	-	-

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge required.
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

Stone Fill, Type II should be used on streambanks at the inlet.
Stone Fill, Type IV should be used on the banks at the outlet.
Special Provision (Stone Fill, Stream Bed Material)(Type II) should be used in the box and in the streambed.

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD		HL-93
2. FUTURE PAVEMENT	d_p:	3.0 INCH
3. CULVERT OPENING	D:	0.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	---
5. PRESTRESSING STRAND	f_y:	---
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11. CONCRETE, CLASS C	f'_c:	3.0 KSI
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	---
14. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	---
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
16. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
18. PILE RESISTANCE FACTOR	ϕ:	---
19. LATERAL PILE DEFLECTION	Δ:	---
20. BASIC WIND SPEED	V_{3s}:	---
21. MINIMUM GROUND SNOW LOAD	p_g:	---
22. SEISMIC DATA PGA : 0	S_s:	---
	S_1:	---
23.		---
24.		---
25.		---
26.		---

PROJECT NAME: **ST. ALBANS**
PROJECT NUMBER: **BF 0279(5)**

FILE NAME: **s12c598PI.DGN**
PROJECT LEADER: **J.B. MCCARTHY**
DESIGNED BY: **J. SALVATORI**
PRELIMINARY INFORMATION SHEET 1

PLOT DATE: 1/10/2017
DRAWN BY: **J. SALVATORI**
CHECKED BY: **J.B. MCCARTHY**
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