STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version 11.06.15

LRFD

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AS BUILT "REBAR" DETAIL

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

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2009	2900	390	65	6.1	210
2029	3500	460	65	10	420

20 year ESAL for flexible pavement from 2009 to 2029 : 1562000

40 year ESAL for flexible pavement from 2009 to 2049 : 3833000

Design Speed : 50 mph

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Feb. 7, 2011

DRAINAGE AREA : 4.5 sq. mi.
CHARACTER OF TERRAIN : Relatively flat to small hills
STREAM CHARACTERISTICS : Backwater area to Lake Champlain
NATURE OF STREAMBED : Silt and sand

PEAK FLOW DATA

Q 2.33 =	90 cfs	Q 50 =	320cfs
Q 10 =	200 cfs	Q 100 =	400 cfs
Q 25 =	260cfs	Q 500 =	560 cfs

DATE OF FLOOD OF RECORD : Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ Q50 = Less than 1 fps due to lake backwater
ICE CONDITIONS : Moderate to Heavy
DEBRIS: Light
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
IS ORDINARY RISE RAPID? No
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? Yes
IF YES, DESCRIBE: Water surface elevations at this site are controlled by Lake Champlain. This site is in a backwater bay of the lake.

WATERSHED STORAGE: 3%
HEADWATERS:
UNIFORM:
IMMEDIATELY ABOVE SITE: X

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Two 5' RCP's
YEAR BUILT: 1949
CLEAR SPAN(NORMAL TO STREAM): 5' + 5' = 10' total
VERTICAL CLEARANCE ABOVE STREAMBED: 5'
WATERWAY OF FULL OPENING: two at 19.6 sq. ft. = 39.2 sq. ft. total
DISPOSITION OF STRUCTURE: Remove
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See boring logs.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	98.5'	VELOCITY =	2.3 fps
Q10 =	100.8'	"	5.1 fps
Q25 =	101.7'	"	6.6 fps
Q50 =	102.1'	"	7.0 fps
Q100 =	102.4'	"	7.0 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes
FREQUENCY: Just below Q25
RELIEF ELEVATION: 101.6'
DISCHARGE OVER ROAD @Q100: 126 cfs

UPSTREAM STRUCTURE

TOWN: Not Applicable
HIGHWAY # :
CLEAR SPAN:
YEAR BUILT:
STRUCTURE TYPE:
DISTANCE:
STRUCTURE #:
CLEAR HEIGHT:
FULL WATERWAY:

DOWNSTREAM STRUCTURE

TOWN: None - Lake Champlain
HIGHWAY # :
CLEAR SPAN:
YEAR BUILT:
STRUCTURE TYPE:
DISTANCE:
STRUCTURE #:
CLEAR HEIGHT:
FULL WATERWAY:

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						

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (10'-0" x 8'-0" x 71'-8" BOX).
2. CULVERT ENDS ARE SKEWED BY AN ANGLE OF 90°
3. CULVERT WILL BE SET AT A SLOPE OF 0.00 IN. ON 72 FT.
4. CULVERT WILL REQUIRE FISH PASSAGE ACCOMODATIONS
5. CULVERT CONSTRUCTION WILL REQUIRE A TEMPORARY PIPE

PROPOSED STRUCTURE

STRUCTURE TYPE: Pre-cast concrete box

CLEAR SPAN(NORMAL TO STREAM): 10'
VERTICAL CLEARANCE ABOVE STREAMBED: 8'
WATERWAY OF FULL OPENING: 80 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 =	98.8'	VELOCITY=	1.2 fps
Q10 =	100.4'	"	2.5 fps
Q25 =	101.1'	"	3.3 fps
Q50 =	101.5'	"	4.0 fps
Q100 =	102.0'	"	5.0 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes
FREQUENCY: Just above Q50
RELIEF ELEVATION: 101.6'
DISCHARGE OVER ROAD @Q100: 40 cfs

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 99.0' at inlet and outlet
VERTICAL CLEARANCE: @ Q50 = The box is submerged just above Q2.33.

SCOUR: Not applicable for a box structure.

REQUIRED CHANNEL PROTECTION: Stone Fill, Type III on roadway slopes.

PERMIT INFORMATION

AVERAGE DAILY FLOW:	9 cfs	
ORDINARY LOW WATER:	4 cfs	DEPTH OR ELEVATION:
ORDINARY HIGH WATER:	39 cfs	Elevation 94.0'
		Elevation 98.0'

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

Hydraulics at this site are controlled by Lake Champlain. All hydraulic information is based on equal frequency floods on the lake and Hospital Creek, and on NAVD88 vertical datum.
Vel. will be higher when the lake is lower. (Box Q50 vel. = 8.2 fps with mean lake level of 94.9'.)
Existing pipe hydraulics is approximate, due to the poor shape and condition of the pipes.

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:	10.0 FT 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:	---
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	---
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	---
11. CONCRETE, CLASS C	f'_c:	---
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	---
14. SOIL UNIT WEIGHT	γ:	0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	4.0 KSF
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
17. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	10.0 KSF
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
19. NOMINAL AXIAL PILE RESISTANCE	q_p:	---
20. PILE YIELD STRENGTH ASTM A572	f_y:	---
21. PILE SIZE		---
22. EST. PILE LENGTH	L_p:	
23. PILE RESISTANCE FACTOR	ϕ:	---
24. LATERAL PILE DEFLECTION	Δ:	---
25. BASIC WIND SPEED	V_{3s}:	---
26. MINIMUM GROUND SNOW LOAD	p_g:	---
27. SEISMIC DATA PGA : ---	S_s:	---
	S_1:	---

PROJECT NAME: **ADDISON**
PROJECT NUMBER: **STP CULV (14)**

FILE NAME: **s08b062.xlsm**
PROJECT LEADER: **K. HIGGINS**
DESIGNED BY: **J. SALVATORI**
PRELIMINARY INFORMATION SHEET

PLOT DATE: 2/6/2013
DRAWN BY: **J. SALVATORI**
CHECKED BY: **W. LAMMER**