

PRELIMINARY INFORMATION SHEET

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FINAL HYDRAULIC REPORT

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HYDROLOGIC DATA Date: Oct. 2007

DRAINAGE AREA : 218.5 sq. mi.
 CHARACTER OF TERRAIN : Hilly to mountainous
 STREAM CHARACTERISTICS : Straight, locally anabranching, incised and semi-alluvial
 NATURE OF STREAMBED : Sand, gravel and cobbles

PEAK FLOW DATA

Q 2.33 = 6,000 cfs	Q 50 = 16,800 cfs
Q 10 = 11,400 cfs	Q 100 = 19,400 cfs
Q 25 = 14,500 cfs	Q 500 = 28,000 cfs

DATE OF FLOOD OF RECORD : September 1938
 ESTIMATED DISCHARGE : Unknown
 WATER SURFACE ELEV. : Unknown
 NATURAL STREAM VELOCITY : @ Q25 = 5.9 fps
 ICE CONDITIONS : Moderate
 DEBRIS : Moderate
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
 IS ORDINARY RISE RAPID? No
 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 : Two span truss bridge
 YEAR BUILT : 1939
 CLEAR SPAN(NORMAL TO STREAM): 224 ft.
 VERTICAL CLEARANCE ABOVE STREAMBED: 18 ft.
 WATERWAY OF FULL OPENING: 2,800 sq. ft.
 DISPOSITION OF STRUCTURE : Replace superstructure
 TYPE OF MATERIAL UNDER SUBSTRUCTURE : Gravel and sand over silt and clay

WATER SURFACE ELEVATIONS AT:

Q2.33 = 506.5 ft.	VELOCITY = 4.2 fps
Q10 = 510.3 ft.	" 5.4 fps
Q25 = 512.0 ft.	" 5.9 fps
Q50 = 513.1 ft.	" 6.3 fps
Q100 = 514.4 ft.	" 6.3 fps

LONG TERM STREAMBED CHANGES : None noted.

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes
 FREQUENCY: Q30
 RELIEF ELEVATION: 512.2 ft.
 DISCHARGE OVER ROAD @Q100: 1,570 cfs

UPSTREAM STRUCTURE

TOWN: Pownal DISTANCE: 4.3 mi.
 HIGHWAY #: T.H. 8 STRUCTURE #: 42
 CLEAR SPAN: 188 ft. CLEAR HEIGHT: 19 ft.
 YEAR BUILT: 1949 FULL WATERWAY: 3,100 sq. ft.
 STRUCTURE TYPE: 3 span steel beam bridge

DOWNSTREAM STRUCTURE

TOWN: Pownal DISTANCE: 1.8 mi.
 HIGHWAY #: VT Rte. 346 STRUCTURE #: 7
 CLEAR SPAN: 216 ft. CLEAR HEIGHT: 17 ft.
 YEAR BUILT: 1983 FULL WATERWAY: 3,390 sq. ft.
 STRUCTURE TYPE: 2 span plate girder bridge

LOAD FACTOR LOAD RATING (TONS)

LOADING LEVELS (LOAD FACTOR)	TRUCK						
	H	H5	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
INVENTORY A=2.171 B=1.00	32	46					
POSTED A=1.551 B=1.40	45	64	123		108	111	120
OPERATING A=1.304 B=1.67		76	147	167	128	132	

STRENGTH RF = $\frac{M_{LL} - 1.3 M_{DE}}{A \times M_{LL}}$ SERVICEABILITY RF = $\frac{0.95 F_y S_{LL} + M_{DE}}{1.67 M_{LL}}$

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
1998	690	100	57	1	55
2018	940	130	57	2	95

20 year ESAL for flexible pavement from 1998 to 2018 : 295,000
 40 year ESAL for flexible pavement from 1998 to 2038 : 801,000
 Design Speed : 25 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: 2 span plate girder bridge

CLEAR SPAN(NORMAL TO STREAM): 224 ft.
 VERTICAL CLEARANCE ABOVE STREAMBED: 18 ft.
 WATERWAY OF FULL OPENING: 2,900 sq. ft.

WATER SURFACE ELEVATIONS AT:

Q2.33 = 506.5 ft.	VELOCITY = 4.2 fps
Q10 = 510.3 ft.	" 5.4 fps
Q25 = 512.0 ft.	" 5.9 fps
Q50 = 513.1 ft.	" 6.3 fps
Q100 = 514.2 ft.	" 6.6 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Q100
 RELIEF ELEVATION: 514.2 ft.
 DISCHARGE OVER ROAD @Q100: 0 cfs

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 514.3 ft. span 1, 517.3 ft. span 2
 VERTICAL CLEARANCE: @ Q25 = 2.3 ft. span 1, 5.3 ft. span 2

SCOUR: 4' contraction scour and 7' pier scour = 11' total scour at pier, for Q100 and Q500

REQUIRED CHANNEL PROTECTION: Stone Fill, Type II

PERMIT INFORMATION

AVERAGE DAILY FLOW: 455 cfs	DEPTH OR ELEVATION:
ORDINARY LOW WATER: 200 cfs	Elevation 498 ft.
ORDINARY HIGH WATER: 2,575 cfs	Elevation 502 ft.

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: Temporary bridge installed under a separate contract.
 CLEAR SPAN (NORMAL TO STREAM):
 VERTICAL CLEARANCE ABOVE STREAMBED:
 WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

- DESIGN CRITERIA**
- DESIGN LIVE LOAD AASHTO HS-25-44
 - DESIGN SPAN SPAN #1 - 134'; SPAN #2 - 96' C/L BRG. TO C/L BRG.
 - ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL 4 ksf (VVV3 AND VVV4)
ON LEDGE N/A
 - DESIGN LOAD FOR PILING 105 kips (PILES FOR VVV1 AND VVV2)
TYPE HP 12 X 53
ESTIMATED LENGTH 88 FT. (SEE BORING LOGS FOR FURTHER INFORMATION)
ULTIMATE PILE CAPACITY 315 kips (WITH A FACTOR OF SAFETY OF 3.0)
 - STRUCTURAL STEEL AASHTO M 270M 270 GRADE 50W
 - REINFORCING STEEL GRADE 60
 - CONCRETE, HIGH PERFORMANCE CLASS A fc: 4000 psi
CONCRETE, HIGH PERFORMANCE CLASS B fc: 3500 psi
 - DESIGN SOIL UNIT WEIGHT 140 pcf
 - DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL 3.0 ksf (VVV3 AND VVV4)

- TRAFFIC MAINTENANCE**
- IS TRAFFIC TO BE MAINTAINED? YES
IF YES, ON EXISTING STRUCTURE? NO
OR ON TEMPORARY BRIDGE? YES*
ONE OR TWO-WAY TRAVEL? ONE LANE - TWO-WAY TRAVEL
 - TRAFFIC CONTROL SIGNALS REQUIRED? NO
 - ARE SIDEWALKS REQUIRED? NO
IF SO, ON WHAT SIDE?
- * TEMPORARY BRIDGE ALREADY INSTALLED

PROJECT NAME: POWNAL
 PROJECT NUMBER: BRZ 1441(19) C/2
 FILE NAME: 87e045pi.xls PLOT DATE: 2/27/2008
 PROJECT LEADER: R. Whitcomb DRAWN BY: L. Bullock
 DESIGNED BY: C. Carlson CHECKED BY: C. Carlson
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