

FINAL HYDRAULICS REPORT

HYDROLOGIC DATA

DRAINAGE AREA: 9.5 sq. mi. (24.6 sq. km)  
 CHARACTER OF TERRAIN: Hilly to mountainous  
 CHARACTER & TYPE OF STREAM: Perennial, straight, narrow flood plain,  
not braided or anabranching  
 NATURE OF STREAMBED: Gravel and cobbles, with some ledge upstream

02.33= 600 cfs (17.0 cms)      050= 2100 cfs (59.5 cms)  
 010= 1200 cfs (34.0 cms)      0100= 2500 cfs (70.8 cms)  
 025= 1700 cfs (48.1 cms)      0500= 4250 cfs (120.3 cms)

DATE OF FLOOD OF RECORD: Unknown  
 WATER SURFACE ELEV.: Unknown ESTIMATED DISCHARGE: Unknown  
 NATURAL STREAM VELOCITY @ 0.25 = 9.7 fps (3.0 mps)  
 ICE CONDITIONS: Moderate      DEBRIS: Moderate  
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEVATION RAPIDLY? Yes  
 IS ORDINARY RISE RAPID? Yes  
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No  
 IF YES, DESCRIBE: \_\_\_\_\_

WATERSHED STORAGE: 1% HEADWATERS: UNIFORM THROUGHOUT WATERSHED X  
 IMMEDIATELY ABOVE SITE \_\_\_\_\_

EXISTING STRUCTURE

STRUCTURE TYPE: Single span steel beam bridge      YEAR BUILT: 1940  
 CLEAR SPAN (NORMAL TO STREAM): 20 ft. (6.1 m)  
 VERTICAL CLEARANCE ABOVE STREAMBED: 8 ft. (2.4 m)  
 WATERWAY OF FULL OPENING: 146 sq. ft. (13.6 sq. m)  
 DISPOSITION OF STRUCTURE: Remove

TYPE OF MATERIAL UNDER SUBSTRUCTURE: East abutment on ledge, west  
abutment unknown  
 WATER SURFACE ELEV. @ 02.33= 968.5      VELOCITY= 7.0 fps (2.1 mps)  
 010= 971.1      "      12.4 fps (3.8 mps)  
 025= 975.1      "      11.2 fps (3.4 mps)  
 050= 975.4      "      13.6 fps (4.1 mps)  
 0100= 976.1      "      13.9 fps (4.2 mps)

LONG TERM STREAM BED CHANGES: 1.5 ft. (0.5 m) of scour through bridge,  
no signs of aggradation or degradation  
 IS THE ROADWAY OVERTOPPED BELOW THE 0100? Yes      FREQUENCY: 020  
 RELIEF ELEVATION: 974.0      DISCHARGE OVER ROAD @ 0100: 480 cfs (13.6 cms)

UPSTREAM STRUCTURE: TOWN: Reading      DISTANCE: 1.1 mi. (1.8 km)  
 HIGHWAY NO.: I.H. 8      STRUCTURE NO.: 6  
 STRUCTURE TYPE: Corrugated Galvanized Metal Plate Pipe Arch  
 CLEAR SPAN: 19 ft. (5.8 m)      CLEAR HEIGHT: 12 ft. (3.7 m)  
 YEAR BUILT: 1941      FULL WATERWAY: 157 sq. ft. (14.6 sq. m)

DOWNSTREAM STRUCTURE: TOWN: Reading      DISTANCE: 0.4 mi. (0.6 km)  
 HIGHWAY NO.: I.H. 51      STRUCTURE NO.: 29  
 STRUCTURE TYPE: Corrugated Galvanized Metal Plate Arch  
 CLEAR SPAN: 25 ft. (7.6 m)      CLEAR HEIGHT: 8.5 ft. (2.6 m)  
 YEAR BUILT: 1963      FULL WATERWAY: Unknown

DESIGN CRITERIA:

- DESIGN LIVE LOAD AASHTO: HS-25-44
- DESIGN SPAN: 60'-0"
- ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL: N.A.      ON LEDGE: 10 KSF
- ALLOWABLE LOAD FOR PILING: N.A.      TYPE: N.A.      ESTIMATED LENGTH: N.A.
- STRUCTURAL STEEL AASHTO GRADE: M 270/M 270 GRADE 50W
- REINFORCING STEEL GRADE: 60
- CONCRETE HIGH PERFORMANCE CLASS A: f' = 4000 PSI  
 CONCRETE HIGH PERFORMANCE CLASS B: f' = 3500 PSI

TRAFFIC MAINTENANCE:

- IS TRAFFIC TO BE MAINTAINED? NO      IF YES, ON EXISTING STRUCTURE: N.A.      OR ON TEMPORARY BRIDGE: N.A.
- TEMPORARY BRIDGE REQUIREMENTS: ONE OR TWO WAY      N.A.      TRAFFIC CONTROL SIGNALS REQUIRED: N.A.  
 MINIMUM CLEAR SPAN (NORMAL TO STREAM): N.A.      VERTICAL CLEARANCE ABOVE STREAMBED: N.A.  
 WATERWAY OF FULL OPENING: N.A.  
 ARE SIDEWALKS REQUIRED? N.A.      IF SO, ON WHAT SIDE? \_\_\_\_\_  
 STRUCTURE TYPE: N.A.

LOAD FACTOR LOAD RATING (TONS)

LOADING LEVELS (LOAD FACTOR)	TRUCK						
	H	HS	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
INVENTORY A=2.17; B=1.00	49	60					
POSTED A=1.55; B=1.40	68	85	110		75	77	97
OPERATING A=1.30; B=1.67		101	131	153	90	92	

STRENGTH RF =  $\frac{0.9 M_N - 1.3 M_{DL}}{A \times M_{LL+1}}$       SERVICEABILITY RF = B  $\left[ \frac{.95 F_y S_{LL+1} - M_{DL} S_{DL} - M_{SD} S_{SD}}{1.67 M_{LL+1}} \right]$

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
1998	230	30	60	6	15
2018	310	40	60	7	25

18 kip ESAL for flexible pavement from 1998 to 2018: 148,000  
 18 kip ESAL for flexible pavement from N.A. to N.A.: N.A.  
 Design speed: 30 mph

PROPOSED STRUCTURE

STRUCTURE TYPE: Single span steel beam bridge with concrete deck  
 CLEAR SPAN (NORMAL TO STREAM): 31 ft. (9.5 m) effective clear span  
 VERTICAL CLEARANCE ABOVE STREAMBED: 9.5 ft. (2.9 m)  
 WATERWAY OF FULL OPENING: 254 sq. ft. (23.6 sq. m)

WATER SURFACE ELEV. @ 02.33= 968.5      VELOCITY= 6.1 fps (1.9 mps)  
 010= 970.3      "      10.1 fps (3.1 mps)  
 025= 971.6      "      11.8 fps (3.6 mps)  
 050= 972.4      "      12.6 fps (3.8 mps)  
 0100= 973.3      "      13.3 fps (4.1 mps)

IS THE ROADWAY OVERTOPPED BELOW THE 0100? No      FREQUENCY: N.A.  
 RELIEF ELEVATION: 975.0      DISCHARGE OVER ROAD @ 0100: None

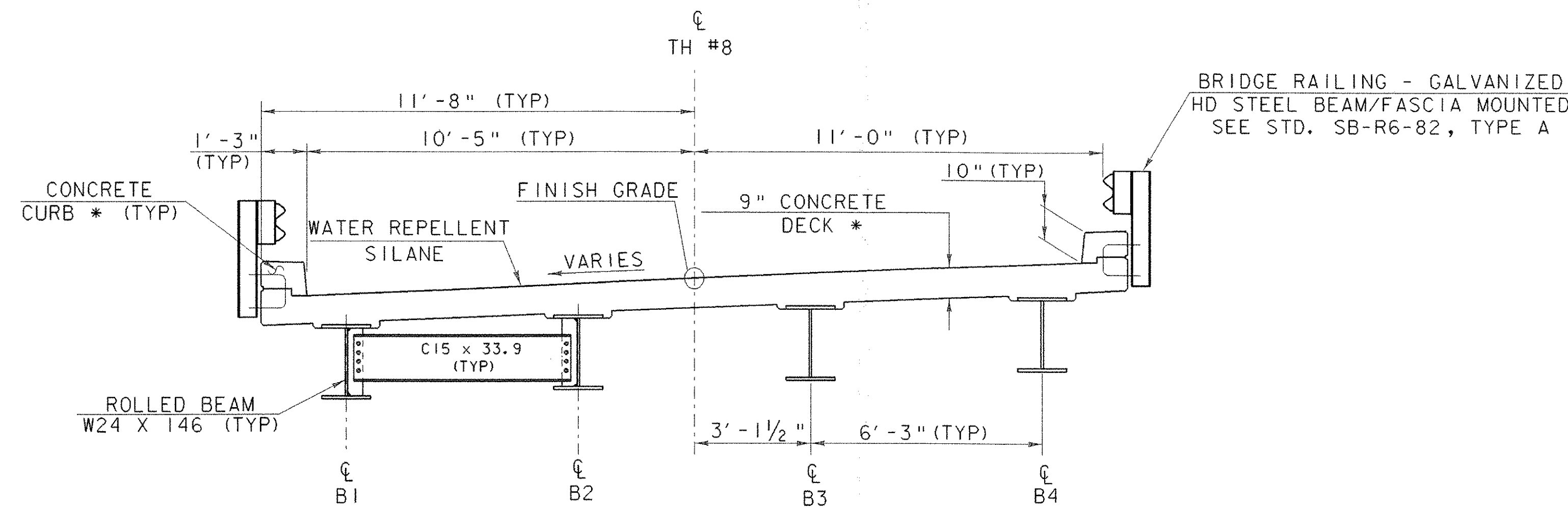
AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 973.0  
 VERTICAL CLEARANCE @ 0.25 = 1.4 ft. (0.4 m)

SCOUR: 1 ft. (0.3 m) of contraction scour at 0100 and 0500  
 REQUIRED CHANNEL PROTECTION: Stone fill, type III

PERMIT INFORMATION

AVERAGE DAILY FLOW: 20 cfs (0.6 cms)  
 ORDINARY LOW WATER: 9 cfs (0.3 cms)      DEPTH: 1 ft. (0.3 m)  
 ORDINARY HIGH WATER: 260 cfs (7.4 cms)      DEPTH: 3 ft. (0.9 m)

ADDITIONAL COMMENTS

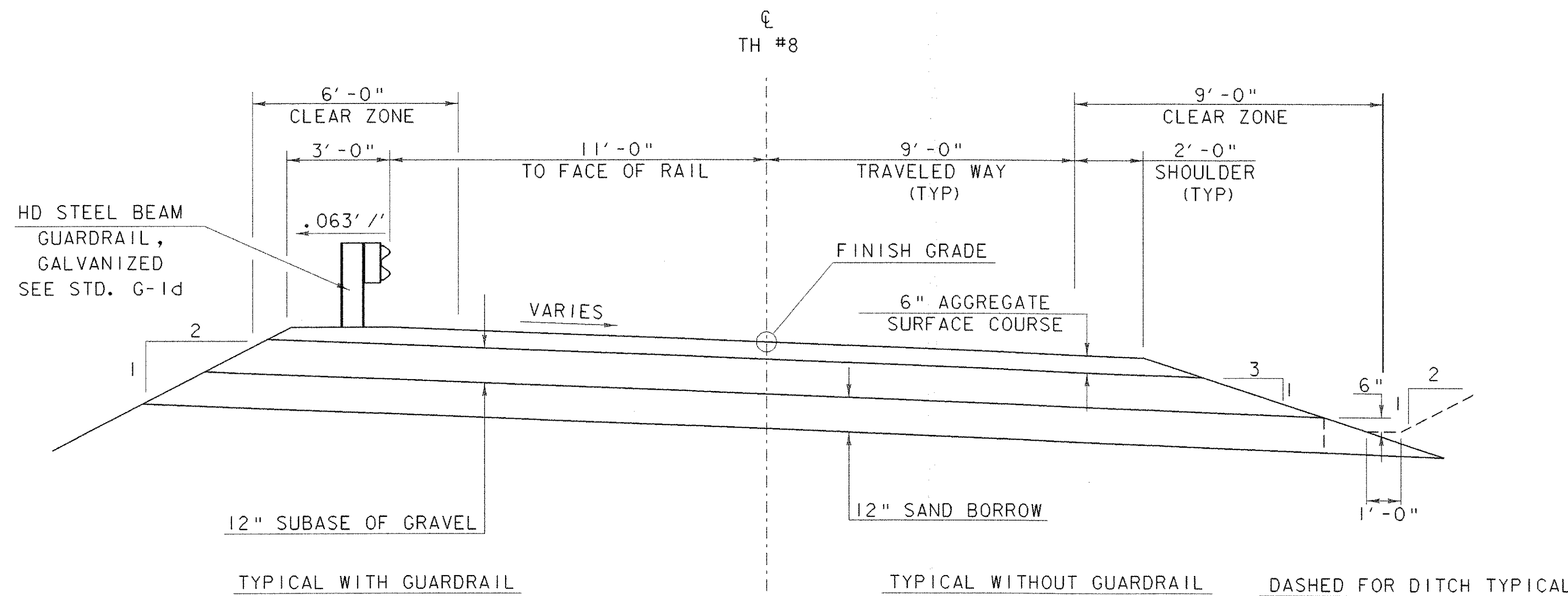


TYPICAL BRIDGE SECTION

SCALE 3/8" = 1'-0"

MATERIAL ITEM	TOLERANCE
AGG. SURF. COURSE	+/- 1"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

\* ITEM 900.608 SPECIAL PROVISION (HIGH PERFORMANCE CONCRETE, CLASS A LOW CEMENT)



TYPICAL ROADWAY SECTION

SCALE 3/8" = 1'-0"

STATE OF VERMONT AGENCY OF TRANSPORTATION

Town Of: READING      Bridge No.: B25  
 Highway No.: TH 8      Log Sta. Surv. Sta.

TH 8 OVER MILL BROOK

PRELIMINARY INFORMATION

Designed By: W. B. SYMONDS      Drawn By: W. B. SYMONDS  
 Checked By: Date      Bridge Design Supervisor  
P. M. THURBER      9/96      C. P. WILLIAMS      Date: 1/98

PROJECT: READING      PROJECT NO.: BRZ 1444 (23)

L.G.C. Info: 90\j058\structures\j058p1.dgn      s\j058p1.i  
 Bridge Sheet No.      Sheet 2 of 49