

# PRELIMINARY INFORMATION SHEET



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|          | HEAVY DUTY STEEL BEAM GUARDRAIL                | 6/13/97 |  |          |
|          | TWISTED END TERMINAL                           |         |  |          |
| G-1D     | ANCHOR FOR STEEL BEAM RAIL                     |         |  |          |
|          | STEEL BEAM GUARDRAIL (40MPH & LESS)            |         |  |          |
|          | HEAVY DUTY STEEL BEAM GUARDRAIL                | 6/13/97 |  |          |

FINAL HYDRAULIC REPORT

**HYDROLOGIC DATA** Date: March, 2000

DRAINAGE AREA: 18.62 sq. km  
 CHARACTER OF TERRAIN: Forested, hilly to mountainous  
 STREAM CHARACTERISTICS: Small to med., stable, perennial, straight  
 NATURE OF STREAMBED: Cobbles to large boulders

PEAK FLOW DATA

|                 |                |
|-----------------|----------------|
| Q 2.33 = 11 cms | Q 50 = 45 cms  |
| Q 10 = 25 cms   | Q 100 = 57 cms |
| Q 25 = 37 cms   | Q 500 = 78 cms |

DATE OF FLOOD RECORD: Unknown  
 ESTIMATED DISCHARGE: Unknown  
 WATER SURFACE ELEV.: Unknown  
 NATURAL STREAM VELOCITY: @Q50 = 4.0mps  
 ICE CONDITIONS: Slight  
 DEBRIS: Moderate  
 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: N/A

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

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Single Span Rolled Beam  
 YEAR BUILT: 1937  
 CLEAR SPAN(NORMAL TO STREAM): 16.3m  
 VERTICAL CLEARANCE ABOVE STREAMBED: 4.6 m  
 WATERWAY OF FULL OPENING: 50 sq m  
 DISPOSITION OF STRUCTURE: Remove  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Unknown

WATER SURFACE ELEVATIONS AT:

|                 |                    |
|-----------------|--------------------|
| Q2.33 = 214.7 m | VELOCITY = 2.9 mps |
| Q10 = 215.3 m   | 4.6 mps            |
| Q25 = 215.6 m   | 4.9 mps            |
| Q50 = 215.8 m   | 5.0 mps            |
| Q100 = 216.2 m  | 3.7 mps*           |

LONG TERM STREAMBED CHANGES: none

IS THE ROADWAY OVERTOPPED BELOW Q100: No  
 FREQUENCY: N/A  
 RELIEF ELEVATION: N/A  
 DISCHARGE OVER ROAD @Q100: None

UPSTREAM STRUCTURE

TOWN: Duxbury DISTANCE: 4 km  
 HIGHWAY #: TH 35 STRUCTURE #: B25  
 CLEAR SPAN: 2.4 m CLEAR HEIGHT: 2.4 m  
 YEAR BUILT: Unknown FULL WATERWAY: 4.5 sq m  
 STRUCTURE TYPE: Steel Boiler Tube

DOWNSTREAM STRUCTURE

TOWN: Moretown DISTANCE: 1.6 km  
 HIGHWAY #: VT 100B STRUCTURE #: 1  
 CLEAR SPAN: 8.2 m CLEAR HEIGHT: 1.8 m  
 YEAR BUILT: 1927 FULL WATERWAY: 15.0 sq m  
 STRUCTURE TYPE: Concrete T-Beam Bridge

LOAD FACTOR / LOAD RATING (TONS)

| LOADING LEVELS | TRUCK |    |     |        |         |         |
|----------------|-------|----|-----|--------|---------|---------|
|                | H     | HS | SS2 | 6 AXLE | 3A STR. | AA STR. |
| INVENTORY      | 0     | 0  |     |        |         |         |
| POSTED         | 0     | 0  | 0   | 0      | 0       | 0       |
| OPERATING      | 0     | 0  | 0   | 0      | 0       | 0       |

TRAFFIC DATA

| YEAR | ADT  | DHV | % D | % T | ADTT |
|------|------|-----|-----|-----|------|
| 2005 | 3700 | 510 | 55  | 6   | 230  |
| 2023 | 4900 | 670 | 55  | 6   | 290  |

20 year ESAL for flexible pavement from 18KP to 0 : 2,884,000  
 20 year ESAL for flexible pavement from 18KP to 0 : 6,987,000  
 Design Speed: 80 km/h

PROPOSED STRUCTURE

STRUCTURE TYPE: Single Span Steel Girder w/ Integral Abutments

CLEAR SPAN(NORMAL TO STREAM): 16.6 m  
 VERTICAL CLEARANCE ABOVE STREAMBED: 4.4 m  
 WATERWAY OF FULL OPENING: 51 sq m

WATER SURFACE ELEVATIONS AT:

|                 |                    |
|-----------------|--------------------|
| Q2.33 = 214.6 m | VELOCITY = 3.2 mps |
| Q10 = 215.2 m   | 3.5 mps            |
| Q25 = 215.5 m   | 5.0 mps            |
| Q50 = 215.7 m   | 5.3 mps            |
| Q100 = 216.1 m  | 3.6 mps*           |

IS THE ROADWAY OVERTOPPED BELOW Q100: No  
 FREQUENCY: N/A  
 RELIEF ELEVATION: N/A  
 DISCHARGE OVER ROAD @Q100: None

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 217.5 m ave  
 VERTICAL CLEARANCE: @Q100 1.4 m ave

SCOUR: 0.3 m contraction scour @ Q500

REQUIRED CHANNEL PROTECTION: Type IV Stone

PERMIT INFORMATION

AVERAGE DAILY FLOW: 0.4cms DEPTH OR ELEVATION:  
 ORDINARY LOW WATER: 0.2cms 0.1m  
 ORDINARY HIGH WATER: 4.9cms 0.5m

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: Two-Way Single Span  
 CLEAR SPAN (NORMAL TO STREAM): 11.2 m (minimum)  
 VERTICAL CLEARANCE ABOVE STREAMBED: 2.0 m (minimum)  
 WATERWAY AREA OF FULL OPENING: 20.0 sq m (minimum)

ADDITIONAL INFORMATION

\* Velocities for both existing and proposed structures were reported from the downstream fascia of the bridges. The Q100 velocities through the bridges drop off as there is no longer a hydraulic jump induced, as is the case with all other flow regimes.

DESIGN CRITERIA

- DESIGN LIVE LOAD AASHTO MS-22.5
- DESIGN SPAN 16.4 M
- ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL ON LEDGE
- ALLOWABLE LOAD FOR PILING TYPE ESTIMATED LENGTH
- STRUCTURAL STEEL AASHTO GRADE 420
- REINFORCING STEEL GRADE 30 Mpa
- CONCRETE CLASS A f'c : 30 Mpa
- CONCRETE CLASS B f'c : 25 Mpa
- SILICA - FUME CONCRETE f'c : 35 Mpa
- SOIL UNIT WEIGHT 140 kcm
- DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL

TRAFFIC MAINTENANCE

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

PROJECT NAME: DUXBURY  
 PROJECT NUMBER: STP 013-4(24)

FILE NAME: /str586e059e059PLds PLOT DATE: 8/17/00  
 PROJECT LEADER: C. KELLER DRAWN BY: R. PELLETT  
 DESIGNED BY: B. NYQUIST CHECKED BY: M.E.M.

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