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FINAL HYDRAULIC REPORT

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TOWN: Bethel COUNTY: Windsor
 PROJECT #: BRF 0241 (33) C/2 STREAM: 3rd Br. White River
 HIGHWAY #: VT 12 STRUCTURE #: 31

CLEAR SPAN: unk. CLEAR HEIGHT: unk.
 YEAR BUILT: unk. FULL WATERWAY: unk.
 STRUCTURE TYPE: 2-span deck girder

HYDROLOGIC DATA
 DRAINAGE AREA: 352 sq km
 CHARACTER OF TERRAIN: Mountainous, rolling hills and agricultural lands
 STREAM CHARACTERISTICS: Perennial, sinuous, not braided, equiwidth
 NATURE OF STREAMBED: Gravel to cobble, boulders and ledge

PROPOSED STRUCTURE
 STRUCTURE TYPE: 2-span, plate girder (main span), voided slab (approach span)
 CLEAR SPAN(NORMAL TO STREAM): Total = 51.8 m (42.4 m main span)
 VERTICAL CLEARANCE ABOVE STREAMBED: 10.8 m (over main channel)
 WATERWAY OF FULL OPENING: Total = 440 square meters

PEAK FLOW DATA

| | |
|---------------------------|--------------------------|
| Q 2.33 = <u>169.9 cms</u> | Q 50 = <u>396.4 cms</u> |
| Q 10 = <u>283.2 cms</u> | Q 100 = <u>509.7 cms</u> |
| Q 25 = <u>348.3 cms</u> | Q 500 = <u>736.2 cms</u> |

WATER SURFACE ELEVATIONS AT:

| | |
|------------------------|--------------------------|
| Q2.33 = <u>170.9 m</u> | VELOCITY= <u>1.6 mps</u> |
| Q10 = <u>171.8 m</u> | " <u>2.1 mps</u> |
| Q25 = <u>172.1 m</u> | " <u>2.5 mps</u> |
| Q50 = <u>172.4 m</u> | " <u>2.7 mps</u> |
| Q100 = <u>173.0 m</u> | " <u>3.0 mps</u> |

DATE OF FLOOD RECORD: November 1927
 ESTIMATED DISCHARGE: Unknown
 WATER SURFACE ELEV.: Unknown
 NATURAL STREAM VELOCITY: @ Q50 = 2.7 mps
 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? Yes
 IF YES, DESCRIBE: Bethel Mills dam is just below this site and effects low flow conditions.

IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 176.5 m
 DISCHARGE OVER ROAD @Q100: None
 AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 177.8 m
 VERTICAL CLEARANCE: @ Q50 = 5.4 m

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

SCOUR: Maximum contraction scour @ Q500 = 0.5 m
Maximum pier scour @ Q500 = 2.2 m
 REQUIRED CHANNEL PROTECTION: Type III Stone Fill

EXISTING STRUCTURE INFORMATION
 STRUCTURE TYPE: 4-span, plate girder (main span) w/ 3-rolled beam approach spans
 YEAR BUILT: 1928
 CLEAR SPAN(NORMAL TO STREAM): Total = 72.6 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 8.7 m (over main channel)
 WATERWAY OF FULL OPENING: Total = 450 square meters
 DISPOSITION OF STRUCTURE: Remove
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: Refer to boring logs

PERMIT INFORMATION

| | |
|------------------------------------|---------------------|
| AVERAGE DAILY FLOW: <u>8 cms</u> | DEPTH OR ELEVATION: |
| ORDINARY LOW WATER: <u>4 cms</u> | <u>168.3 m</u> |
| ORDINARY HIGH WATER: <u>73 cms</u> | <u>169.8 m</u> |

WATER SURFACE ELEVATIONS AT:

| | |
|------------------------|---------------------------|
| Q2.33 = <u>170.9 m</u> | VELOCITY = <u>1.7 mps</u> |
| Q10 = <u>171.9 m</u> | " <u>2.2 mps</u> |
| Q25 = <u>172.1 m</u> | " <u>2.6 mps</u> |
| Q50 = <u>172.4 m</u> | " <u>2.7 mps</u> |
| Q100 = <u>173.1 m</u> | " <u>3.1 mps</u> |

TEMPORARY BRIDGE REQUIREMENTS
 STRUCTURE TYPE: Mabey Truss (Currently in Use)
 CLEAR SPAN (NORMAL TO STREAM): 59 m
 VERTICAL CLEARANCE ABOVE STREAMBED: 12.3 m
 WATERWAY AREA OF FULL OPENING: 522 square meters

LONG TERM STREAMBED CHANGES: None noted
 IS THE ROADWAY OVERTOPPED BELOW Q100: No
 FREQUENCY: Above Q100
 RELIEF ELEVATION: 176.5 m
 DISCHARGE OVER ROAD @Q100: None

ADDITIONAL INFORMATION

UPSTREAM STRUCTURE
 TOWN: Bethel DISTANCE: 125 m
 HIGHWAY #: NECR - RR mm 39 55 STRUCTURE #: unk.
 CLEAR SPAN: unk. CLEAR HEIGHT: unk.
 YEAR BUILT: unk. FULL WATERWAY: unk.
 STRUCTURE TYPE: Through truss

DESIGN CRITERIA

- DESIGN LIVE LOAD AASHTO: MS-22.5
- DESIGN SPAN: 55.960m
- ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL: N/A
ON LEDGE: 480 KPA
- ALLOWABLE LOAD FOR PILING: N/A
TYPE: N/A
ESTIMATED LENGTH:
- STRUCTURAL STEEL AASHTO GRADE: M270 M - GR GR345W
- REINFORCING STEEL GRADE: 420
- CONCRETE CLASS A (HPC-A) f'c: 30 Mpa
CONCRETE CLASS B (HPC-B) f'c: 25 Mpa
- SOIL UNIT WEIGHT: 22.00 Kn/m3
- DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL: N/A

DOWNSTREAM STRUCTURE
 TOWN: Bethel DISTANCE: 100 m
 HIGHWAY #: NECR - RR mm 39 40 STRUCTURE #: unk.

TRAFFIC MAINTENANCE

- IS TRAFFIC TO BE MAINTAINED? YES
IF YES, ON EXISTING STRUCTURE: EXISTING TEMPORARY BRIDGE
OR ON TEMPORARY BRIDGE:
- TEMPORARY BRIDGE REQUIREMENTS: ONE OF TWO WAY: N/A
TRAFFIC CONTROL SIGNALS REQUIRED: N/A
MINIMUM CLEAR SPAN (NORMAL TO STREAM): N/A
WATERWAY OF FULL OPENING: N/A
VERTICAL CLEARANCE ABOVE STREAMBED: N/A
ARE SIDEWALKS REQUIRED? N/A
IF SO, ON WHAT SIDE?
STRUCTURE TYPE:

LOAD FACTOR - LOAD RATING (METRIC TONS)

| LOADING LEVELS | TRUCK | | | | | | |
|----------------|-------|----|-----|--------|---------|---------|----------|
| | M | MS | 3S2 | 6 AXLE | 3A STR. | 4A STR. | 5A, 5EMI |
| INVENTORY | 28 | 50 | | | | | |
| POSTED | 39 | 70 | 76 | | 66 | 67 | 73 |
| OPERATING | | 83 | 91 | 99 | 79 | 80 | |

COMMENTS: SERVICIBILITY CONTROLS LOAD RATING

TRAFFIC DATA

| YEAR | ADT | DHV | % D | % T | ADTT |
|------|------|------|-----|-----|------|
| 2004 | 6300 | 820 | 52 | 3 | 200 |
| 2024 | 8400 | 1000 | 52 | 1 | 130 |

20 year ESAL for flexible pavement from 2004 to 2024 : 1,350,000
 40 year ESAL for flexible pavement from 2004 to 2044 : 3,148,000
 Design Speed : 40 km/h

PROJECT NAME: BETHEL
 PROJECT NUMBER: BRF 0241 (33)
 FILE NAME: s02c180pi.xls PLOT DATE: 2/17/2005
 PROJECT LEADER: C. P. WILLIAMS DRAWN BY: M. LONGSTREET
 DESIGNED BY: K. M. HIGGINS CHECKED BY: K. M. HIGGINS
 PRELIMINARY INFORMATION SHEET #1 SHEET 2 OF 130