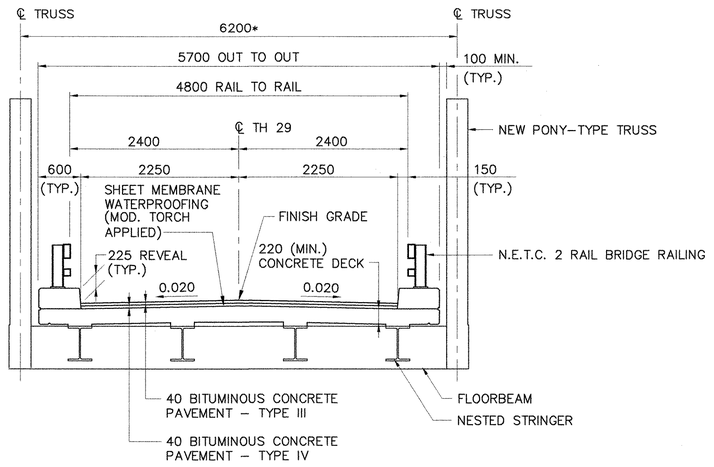
TH 29 BRIDGE

40 BITUMINOUS CONCRETE PAVEMENT, TYPE III (PG 58–28)
40 BITUMINOUS CONCRETE PAVEMENT, TYPE IV (PG 58–28)



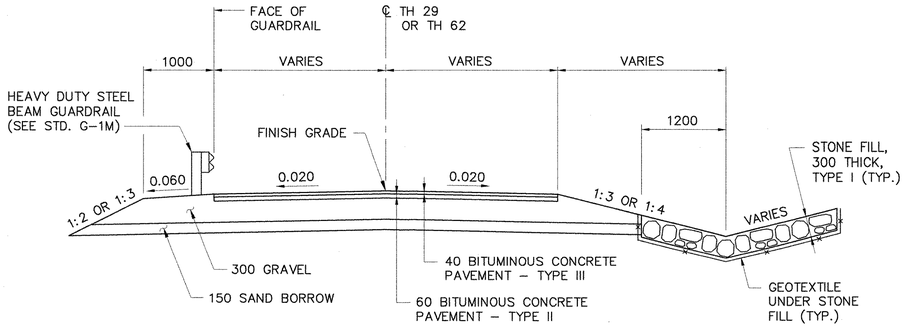
* DIMENSIONS TO BE CONFIRMED BY TRUSS MANUFACTURER

BRIDGE TYPICAL SECTION

SCALE: 1:40

TH 29 & TH 62

40 BITUMINOUS CONCRETE PAVEMENT, TYPE III (PG 58–28)
60 BITUMINOUS CONCRETE PAVEMENT, TYPE II (PG 58–28)
300 GRAVEL
150 SAND BORROW



TYPICAL WITH GUARDRAIL TYPICAL WITHOUT GUARDRAIL TYPICAL DITCH

APPROACH ROADWAY TYPICAL SECTION – PAVED

SCALE: 1:40

MATERIAL TOLERANCES	
MATERIAL ITEM	THICKNESS TOLERANCE (mm)
PAVEMENT	±5 (TOTAL THICKNESS)
AGGREGATE SURFACE COURSE	±10
GRAVEL	±30
SAND BORROW	±30

0 1000 2000 3000
SCALE IN MILLIMETERS

FINAL HYDRAULICS REPORT

VAOT Metric

HYDROLOGIC DATA

DRAINAGE AREA= 279 km²
CHARACTER OF TERRAIN: HILLY TO MOUNTAINOUS, WITH FLOODPLAIN DEVELOPMENT
CHARACTER & TYPE OF STREAM: SMALL TO MEDIUM, PARTIALLY ALLUVIAL, SINUOUS, NON–INCISED FLOODPLAIN, WITH PERENNIAL BUT FLASHY FLOW HABITAT
NATURE OF STREAMBED: GRAVEL, COBBLES, SMALL BOULDERS

Q2.33=	99 cms	Q50=	412 cms
Q10=	233 cms	Q100=	510 cms
Q25=	326 cms	Q500=	801 cms

DATE OF FLOOD OF RECORD: JULY 1973
WATER SURFACE ELEV.: UNKNOWN ESTIMATED DISCHARGE: 412 cms ±
NATURAL STREAM VELOCITY @ Q25 2.5 m/s
ICE CONDITIONS: MODERATE TO HEAVY DEBRIS: MODERATE
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEVATION RAPIDLY? YES
IS ORDINARY RISE RAPID? YES
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? YES
IF YES, DESCRIBE. CVPS DAM APPROX. 4 km UPSTREAM

WATERSHED STORAGE 1% HEADWATERS ____ UNIFORM THROUGHOUT WATERSHED X
IMMEDIATELY ABOVE SITE ____

EXISTING STRUCTURE

STRUCTURE TYPE: PRATT THROUGH TRUSS W/ TIMBER DECK YEAR BUILT: 1890
CLEAR SPAN (NORMAL TO STREAM): 25.9 m ±
VERTICAL CLEARANCE ABOVE STREAMBED: 4.6 m ±
WATERWAY OF FULL OPENING: 119 m²
DISPOSITION OF STRUCTURE: REMOVE

TYPE OF MATERIAL UNDER SUBSTRUCTURE: UNKNOWN

WATER SURFACE ELEV. (SEE NOTE 4)			
	Q2.33=	217.0	VELOCITY= 1.7 m/s
	Q10=	218.3	" 2.7 m/s
	Q25=	219.1	" 3.1 m/s
	Q50=	220.0	" 2.9 m/s
	Q100=	220.5	" 3.1 m/s

LONG TERM STREAM BED CHANGES: UNKNOWN

IS THE ROADWAY OVERTOPPED BELOW THE Q100? YES FREQUENCY: (SEE NOTE 1)
RELIEF ELEVATION: 218.8 m DISCHARGE OVER ROAD @ Q100: 115 cms

UPSTREAM STRUCTURE: TOWN: CAVENDISH DISTANCE: 2.7 km
HIGHWAY NO.: T.H. 30 STRUCTURE NO.: 44
STRUCTURE TYPE: TWO SPAN STEEL BEAM WITH CONCRETE DECK
CLEAR SPAN: 2X12.2 m=24.4 m ± CLEAR HEIGHT: 3.7 m ±
YEAR BUILT: 1974 FULL WATERWAY: UNKNOWN

DOWNSTREAM STRUCTURE: TOWN: WEATHERSFIELD DISTANCE: 6.4 km
HIGHWAY NO.: T.H. 20 STRUCTURE NO.: 66
STRUCTURE TYPE: WOODEN, COVERED BRIDGE
CLEAR SPAN: 29.3 m ± CLEAR HEIGHT: 7.3 m ±
YEAR BUILT: 1840 FULL WATERWAY: UNKNOWN

PROPOSED STRUCTURE

STRUCTURE TYPE: PONY TRUSS WITH CONCRETE DECK
CLEAR SPAN (NORMAL TO STREAM): 30.5 m
VERTICAL CLEARANCE ABOVE STREAMBED: 4 m
WATERWAY OF FULL OPENING: 125 m²

WATER SURFACE ELEV. (SEE NOTE 4)			
	Q2.33=	217.1	VELOCITY= 2.2 m/s
	Q10=	218.2	" = 3.1 m/s
	Q25=	218.9	" = 3.6 m/s
	Q50=	219.5	" = 4.0 m/s
	Q100=	220.7	" = 3.1 m/s

IS THE ROADWAY OVERTOPPED BELOW THE Q100? YES FREQUENCY: (SEE NOTE 2)
RELIEF ELEVATION: 218.8 DISCHARGE OVER ROAD @ Q100: 111 cms

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 219.4
VERTICAL CLEARANCE @ Q25 0.5 m
SCOUR: 0.8 m (Q100 CONTRACTION SCOUR)
REQUIRED CHANNEL PROTECTION: STONE FILL, TYPE IV

PERMIT INFORMATION

AVERAGE DAILY FLOW: 6 cms
ORDINARY LOW WATER: 3 cms DEPTH: 0.2 m
ORDINARY HIGH WATER: 43 cms DEPTH: 1.1 m

TEMPORARY STRUCTURE

STRUCTURE TYPE: NOT ANTICIPATED
CLEAR SPAN (NORMAL TO STREAM): N/A
VERTICAL CLEARANCE ABOVE STREAMBED: N/A
WATERWAY OF FULL OPENING: N/A

ADDITIONAL COMMENTS

1. ORIGINAL STRUCTURE (AS MODELED 25+ YEARS AGO), WITHOUT SUPPLEMENTARY SUPPORT SYSTEM, OVERTOPPED AT Q50. VT 131 OVERTOPPED AT AN EVENT BETWEEN Q25 AND Q50.
2. PROPOSED SUPERSTRUCTURE DECK IS OVERTOPPED BETWEEN Q50 AND Q100. VT 131 IS OVERTOPPED AT Q50.
3. PEAK DISCHARGES FOR 10 YEAR, 50 YEAR, 100 YEAR AND 500 YEAR EVENTS WERE OBTAINED FROM FIS (APRIL 1981). 2.33 AND 25 YEAR EVENTS WERE APPROXIMATED USING GRAPHICAL METHODS.
4. WATER SURFACE ELEVATIONS ARE AT A LOCATION APPROXIMATELY 30.8 m UPSTREAM OF PROPOSED BRIDGE. VELOCITIES ARE PROVIDED AT THE BRIDGE.

VAOT Metric

DESIGN CRITERIA:
1. DESIGN LIVE LOAD AASHTO MS 22.5
2. DESIGN SPAN 31.1 m
3. ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL 350 kPa ON LEDGE 290 kPa
4. ALLOWABLE LOAD FOR PILING – TYPE – ESTIMATED LENGTH –
5. STRUCTURAL STEEL AASHTO GRADE 345
6. REINFORCING STEEL GRADE 420
7. CONCRETE HIGH PERFORMANCE CLASS A f'_c : 30 MPa
   CONCRETE HIGH PERFORMANCE CLASS B f'_c : 25 MPa

TRAFFIC MAINTENANCE:
1. IS TRAFFIC TO BE MAINTAINED? YES IF YES, ON EXISTING STRUCTURE YES OR ON TEMPORARY BRIDGE
2. TEMPORARY BRIDGE REQUIREMENTS: ONE OR TWO WAY N/A TRAFFIC CONTROL SIGNALS REQUIRED NO
   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? N/A
   STRUCTURE TYPE: N/A

*LOAD FACTOR LOAD RATING (METRIC TONNES)

LOADING LEVELS (LOAD FACTORS)	TRUCK						
	M	MS	3S2	6 AXLE	3A STR	4A STR	5A SEMI
INVENTORY A=2.17 B=1.00			■	■	■	■	■
POSTED A=1.55 B=1.40				■			
OPERATING A=1.30 B=1.67	■						■

STRENGTH RF= $\frac{\Phi M_N - 1.3M_{DL}}{A \times M_{LL+I}}$ *SERVICEABILITY RF= $B\,\frac{.95F_y S_{LL+I} - M_{DL\ S.U.} - M_{SDL\ S.U.}}{1.67\ M_{LL+I}}$

* SEE FABRICATION DRAWINGS FOR LOAD RATING.

TRAFFIC DATA
1998 ADT = 30
1998 DHV = 5
2018 ADT = 45
2018 DHV = 8
% D = 50
% T = <1.0
DESIGN SPEED = 40 km/h

VANASSE HANGEN BRUSTLIN, INC.

STATE OF VERMONT
AGENCY OF TRANSPORTATION

Town Of CAVENDISH	Bridge No. 45
	Log Sta.
Highway No. TH 29	Surv. Sta.
TH 29 OVER BLACK RIVER	

PRELIMINARY INFORMATION SHEET

Designed By S.M. HODGDON	Drawn By R.F. CLARK
Checked By S.M. GUNN Date 5/06	Bridge Design Supervisor C.D. BAKER Date 5/06
PROJECT CAVENDISH	PROJECT NO. BRO 1442(23)
I.G.C. Info.	
Bridge Sheet No. 50499PIS	Sheet 2 of 47

PLOTTED 5/15/2006