

FINAL HYDRAULICS REPORT

HYDROLOGIC DATA

DRAINAGE AREA = 63.9 sq. MILES
 CHARACTER OF TERRAIN: MIXED USE FROM RURAL TO URBAN, FORESTED AND OPEN PONDS
 CHARACTER & TYPE OF STREAM: SINGLE, INCISED, SEMI-ALLUVIAL
 NATURE OF STREAMBED: LEDGE, GRAVEL, SAND

02.33= 2000 cfs 050= 6500 cfs
 010= 3725 cfs 0100= 8125 cfs
 025= 5050 cfs 0500= 13500 cfs

DATE OF FLOOD OF RECORD: 1927
 WATER SURFACE ELEV.: UNKNOWN ESTIMATED DISCHARGE: UNKNOWN
 NATURAL STREAM VELOCITY: @ 025 = 13.2 fps
 ICE CONDITIONS: MODERATE TO HEAVY DEBRIS: MODERATE
 DOES THE STREAM REACH MAXIMUM HIGH WATER ELEVATION RAPIDLY: NO
 IS ORDINARY RISE RAPID? NO
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? YES
 IF YES, DESCRIBE: BACKWATER FROM LAMOILLE RIVER

WATERSHED STORAGE: 1.3% HEADWATERS - UNIFORM THROUGHOUT WATERSHED X IMMEDIATELY ABOVE SITE

EXISTING STRUCTURE

STRUCTURE TYPE: TWO SPAN ROLLED STEEL BEAM BRIDGE YEAR BUILT: 1938
 CLEAR SPAN (NORMAL TO STREAM): 135 ft.
 VERTICAL CLEARANCE ABOVE STREAMBED: 10.5 ft.
 WATERWAY OF FULL OPENING: 1535 sqft
 DISPOSITION OF STRUCTURE: TO BE REMOVED AND DISPOSED OF BY CONTRACTOR
 ABUTMENT NO. LAND PIER TO REMAIN
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: UNKNOWN

WATER SURFACE ELEV. @ 02.33= 498.3 VELOCITY= 10.1 fps
 010= 500.0 ft = 12.0 fps
 025= 501.1 ft = 13.2 fps
 050= 502.1 ft = 14.1 fps
 0100= 503.1 ft = 15.1 fps

LONG TERM STREAM BED CHANGES: NONE KNOWN
 IS THE ROADWAY OVERTOPPED BELOW THE 0100? NO FREQUENCY: NA
 RELIEF ELEVATION: 501.6 ft. DISCHARGE OVER ROAD @ 0100: NONE

UPSTREAM STRUCTURE: TOWN: JOHNSON DISTANCE: 2320 ft.
 HIGHWAY NO.: VT RT 15 STRUCTURE NO.: CB 4
 NOTE: STRUCTURE TYPE IS A COVERED BRIDGE

DOWNSTREAM STRUCTURE: TOWN: JOHNSON DISTANCE: 2140 ft.
 HIGHWAY NO.: VT RT 15 STRUCTURE NO.: BR 37
 NOTE: STRUCTURE TYPE IS A PLATE GIRDER

DESIGN CRITERIA:

- DESIGN LIVE LOAD AASHTO HS-25-44
- DESIGN SPAN 149.0 ft (SPAN 1 = 73', SPAN 2 = 76')
- ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL N/A ON LEDGE 10.0 k ip/sf ESTIMATED LENGTH N/A
- ALLOWABLE LOAD FOR PILING N/A TYPE N/A
- STRUCTURAL STEEL AASHTO GRADE AASHTO M270 M / M270 GRADE 50 W
- REINFORCING STEEL GRADE 60
- CONCRETE, HIGH PERFORMANCE CLASS A f_c : 4000 PSI
 CONCRETE, HIGH PERFORMANCE CLASS B f_c : 3500 PSI

TRAFFIC MAINTENANCE:

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

PROPOSED STRUCTURE

STRUCTURE TYPE: TWO SPAN CONTINUOUS CURVED PLATE GIRDER BRIDGE
 CLEAR SPAN (NORMAL TO STREAM): 133 ft.
 VERTICAL CLEARANCE ABOVE STREAMBED: 10.5 ft.
 WATERWAY OF FULL OPENING: 1475 sqft

WATER SURFACE ELEV. @ 02.33= 498.3 VELOCITY= 10.1 fps
 010= 500.0 ft = 12.0 fps
 025= 501.1 ft = 13.2 fps
 050= 502.1 ft = 14.1 fps
 0100= 503.1 ft = 15.1 fps

IS THE ROADWAY OVERTOPPED BELOW THE 0100? NO FREQUENCY: NA
 RELIEF ELEVATION: 501.6 ft. DISCHARGE OVER ROAD @ 0100: NA
 AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 498.4 ft.
 VERTICAL CLEARANCE: @ 025 = 3.6 ft.
 SCOUR: SCOUR IS NOT AN ISSUE HERE, THERE IS LEDGE IN MANY AREAS.
 REQUIRED CHANNEL PROTECTION: STONE FILL, TYPE IV

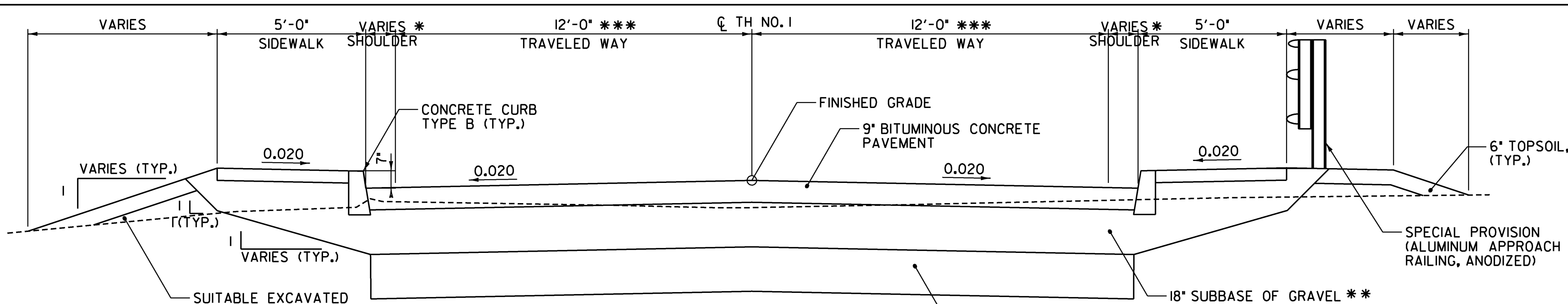
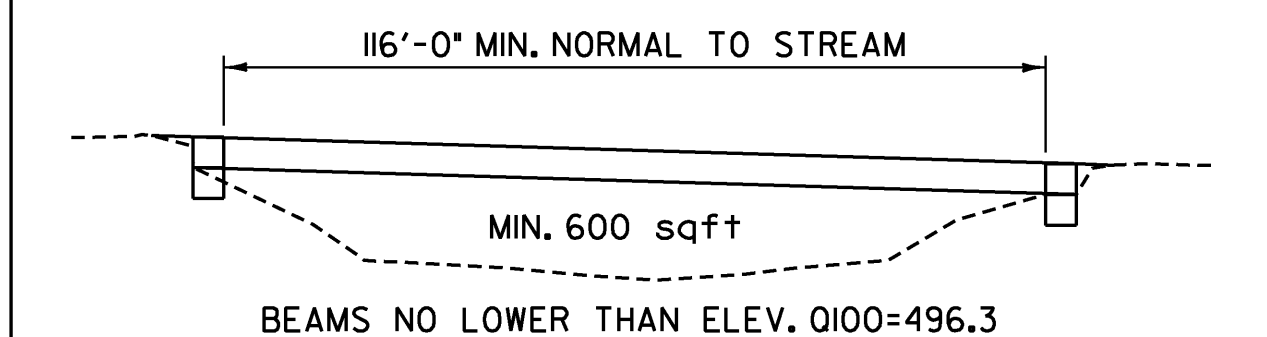
PERMIT INFORMATION

AVERAGE DAILY FLOW: 130 cfs
 ORDINARY LOW WATER: 60 cfs DEPTH: 1.5 ft.
 ORDINARY HIGH WATER: 860 cfs DEPTH: 2.8 ft.

ADDITIONAL COMMENTS

ELEVATIONS REPORTED ARE THOSE ELEVATIONS 200' UPSTREAM BEFORE THE CONTRACTION SECTION OF THE BRIDGE.
 AT THE BRIDGE, 025 = 494.8' AND 0100 = 498.0'

TEMPORARY BRIDGE SKETCH
 NOT TO SCALE



TYPICAL ROADWAY SECTION

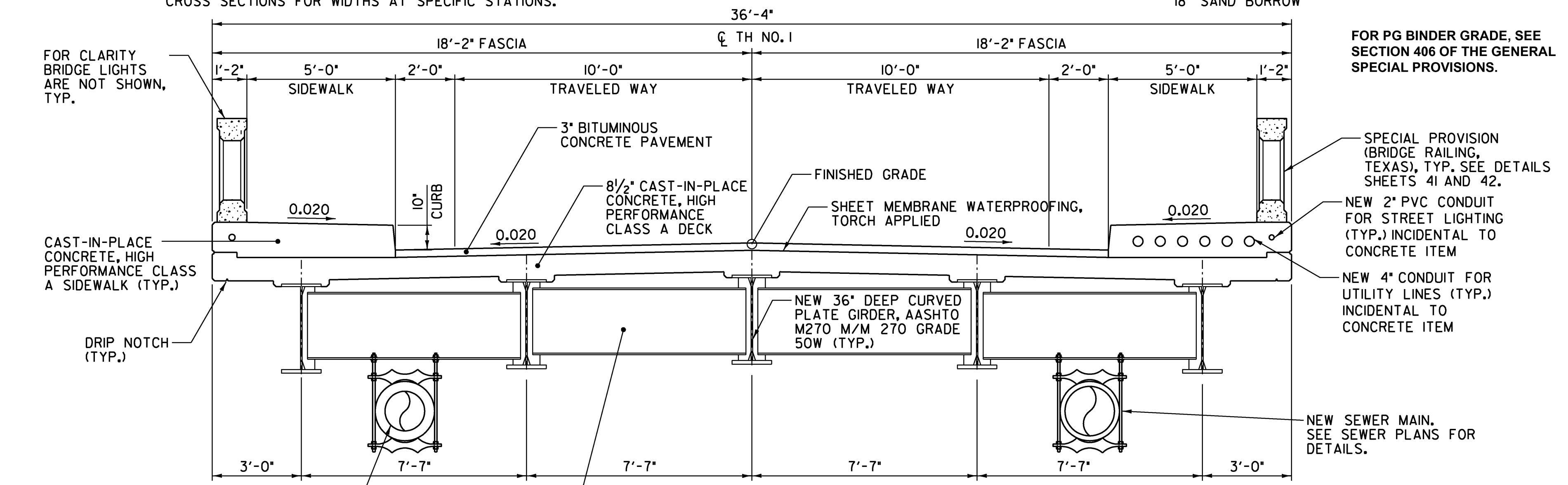
SCALE: 3/8" = 1'-0"

TYPICAL ROADWAY SECTION

1 1/2" BITUMINOUS CONCRETE PAVEMENT (TYPE IV)
 1 1/2" BITUMINOUS CONCRETE PAVEMENT (TYPE IV)
 3" BITUMINOUS CONCRETE PAVEMENT (TYPE I)
 3" BITUMINOUS CONCRETE PAVEMENT (TYPE I)
 18" SUBBASE OF GRAVEL
 18" SAND BORROW

- ** SHOULDER WIDTH VARIES THROUGH PROJECT. REFER TO ROADWAY CROSS SECTIONS FOR WIDTHS AT SPECIFIC STATIONS.
- ** DEPTH VARIES, SEE SUBBASE TRANSITION DETAIL, SHEET 48.
- ** TRAVELED WAY VARIES. REFER TO SITE PLAN AND ROADWAY CROSS SECTIONS FOR WIDTHS AT SPECIFIC STATIONS.

NOTE:
 SEE SHEET NO. 48 FOR ADDITIONAL PARTIAL SECTION TYPICALS.



TYPICAL BRIDGE SECTION

SCALE: 3/8" = 1'-0"

TYPICAL BRIDGE SECTION

1 1/2" BITUMINOUS CONCRETE PAVEMENT (TYPE IV) TOP
 1 1/2" BITUMINOUS CONCRETE PAVEMENT (TYPE IV) BOTTOM

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	30	60					
POSTED A=1.55 B=1.40	43	83	164		127	115	121
OPERATING A=1.30 B=1.67		100	198	256	153	139	

STRENGTH RF = $\frac{0.9 M_N - 1.3 M_{DL}}{A \times M_{LL+I}}$ SERVICEABILITY RF = $B \left[\frac{0.95 F_y S_{LL+I} - M_{DL} S_{LL+I} - M_{SD} S_{LL+I}}{1.67 M_{LL+I}} \right]$

NOTE:
 FOR DESIGN OF THE BRIDGE GIRDERS, THE DEAD LOAD EXPERIENCED FROM THE CONCRETE BRIDGE RAILING AND THE CONCRETE SIDEWALK WAS DISTRIBUTED 60% TO THE EXTERIOR BEAMS AND 40% TO THE FIRST INTERIOR BEAMS.

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2009	2500	280	51	3.4	80
2029	3100	350	51	4.6	140

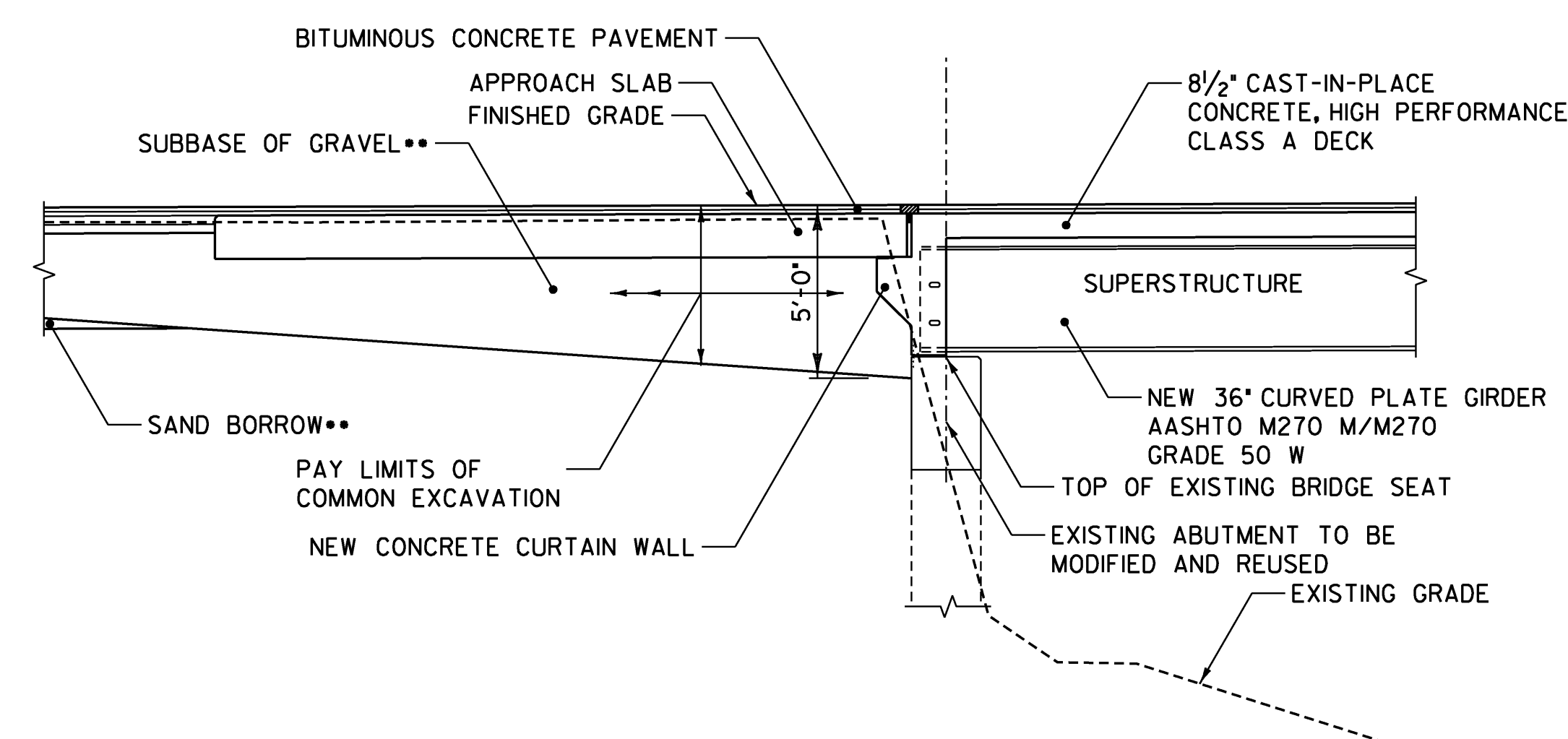
20 year ESAL for flexible pavement from 2009 to 2029: 324,000
 40 year ESAL for flexible pavement from 2009 to 2049: 753,000
 Design speed: 25 mph

MATERIAL TOLERANCE TABLE

MATERIAL ITEM	TOLERANCE
PAVEMENT	± 1/4" TOTAL THICKNESS
BASE COURSE	± 1/2"
SUBBASE	± 1"
SAND BORROW	± 1"



PLOTTED 2/10/2009



TYPICAL ABUTMENT NO. 1 SECTION

(NOT TO SCALE)

** DEPTHS VARIES SEE SUBBASE TRANSITION DETAIL, SHEET 48

NOTE:
 SEE SHEET NO. 2 FOR TYPICAL ABUTMENT NO. 2 SECTION.

STATE OF VERMONT
 AGENCY OF TRANSPORTATION

Town Of JOHNSON Bridge No. 5
 Highway No. 1 Log Sta. Surv. Sta.

TH NO. 1 OVER THE GIHON RIVER

PRELIMINARY INFORMATION

Designed By A.P. GUYETTE Drawn By A.P. GUYETTE
 Checked By Date Bridge Design Supervisor
 J. W. TUCKER 2/09 J. W. TUCKER Date 2/09

PROJECT JOHNSON PROJECT NO. BHO 1448 (29)
 I.G.C. info. z98j372pl.dgn D & K DWG NO.
 Bridge Sheet No. Sheet 3 of 68