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#### STANDARDS LIST

B-5	SLOPE GRADING, EMBANKMENTS, MUCK	06-01-1994
B-71	STANDARD FOR RESIDENTIAL AND COMMERCIAL DRIVES	07-08-2005
C-2A	PORTLAND CEMENT CONCRETE SIDEWALK DRIVE ENTRANCES WITH SIDEWALK A	10-14-2005
C-3A	SIDEWALK RAMPS	03-10-2008
C-10	CURBING	02-11-2008
D-1	PRECAST REINFORCED CONCRETE DROP INLET DETAILS	06-01-1994
D-15	PRECAST REINF CONC. MH-GRATES, CAST IRON GRATE WITH FRAME, TYPE D & E	06-01-1994
E-119	UTILITY WORK ZONE	03-01-2004
E-121	STANDARD SIGN PLACEMENT - CONVENTIONAL ROAD	08-08-1995
E-123	GUIDE SIGN PLACEMENT - MISCELLANEOUS DETAILS	03-16-2004
E-127	ROUTE MARKINGS AT RURAL INTERSECTIONS	08-08-1995
E-136B	STATE ROUTE MARKER SIGN DETAILS	08-08-1995
E-141	REGULATORY SIGN DETAILS	09-20-1995
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1b	BOX BEAM GUARD RAIL	06-01-1994
T-1	TRAFFIC CONTROL GENERAL NOTES	08-06-2012
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-29	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-36	CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS FOR PAVING	08-06-2012
T-40	DELINEATORS AND MILEPOSTS	01-02-2013
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-44	MILE MARKER DETAILS STATE AND TOWN HIGHWAYS	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

### FINAL HYDRAULIC REPORT

#### HYDROLOGIC DATA

Date: January 2014

DRAINAGE AREA: 6.4 sq. mi.  
 CHARACTER OF TERRAIN: Rural, mostly forested  
 STREAM CHARACTERISTICS: Incised, sinuous, alluvial  
 NATURE OF STREAMBED: Cobbles, gravel, sand

#### PEAK FLOW DATA

Q 2.33 =	500 cfs	Q 50 =	1260 cfs
Q 10 =	840 cfs	Q 100 =	1460 cfs
Q 25 =	1060 cfs	Q 500 =	1970 cfs

DATE OF FLOOD OF RECORD: Unknown  
 ESTIMATED DISCHARGE: Unknown  
 WATER SURFACE ELEV.: Unknown  
 NATURAL STREAM VELOCITY: @ Q50 = 13.9 cfs  
 ICE CONDITIONS: Moderate  
 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:

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

#### EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Single span concrete T-beam  
 YEAR BUILT: 1925  
 CLEAR SPAN(NORMAL TO STREAM): 21.5'  
 VERTICAL CLEARANCE ABOVE STREAMBED: ~7'  
 WATERWAY OF FULL OPENING: 140 sq. ft.  
 DISPOSITION OF STRUCTURE: Replace - leave east abutment  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

#### WATER SURFACE ELEVATIONS AT:

Q2.33 =	824.4'	VELOCITY =	13.3 fps
Q10 =	826.1'	"	15.3 fps
Q25 =	827.8'	"	13.0 fps
Q50 =	827.8'	"	13.9 fps
Q100 =	827.9'	"	13.4 fps

LONG TERM STREAMBED CHANGES: None noted

IS THE ROADWAY OVERTOPPED BELOW Q100: Yes  
 FREQUENCY: Below Q10  
 RELIEF ELEVATION: 825.3'  
 DISCHARGE OVER ROAD @Q100: 800 cfs

#### UPSTREAM STRUCTURE

TOWN: Burke DISTANCE: 1720'  
 HIGHWAY #: TH 8 STRUCTURE #: 19  
 CLEAR SPAN: CLEAR HEIGHT:  
 YEAR BUILT: FULL WATERWAY:  
 STRUCTURE TYPE:

#### DOWNSTREAM STRUCTURE

TOWN: Burke DISTANCE: 470'  
 HIGHWAY #: STRUCTURE #:  
 CLEAR SPAN: CLEAR HEIGHT:  
 YEAR BUILT: FULL WATERWAY:  
 STRUCTURE TYPE: Confluence with East Branch Passumpsic River

#### LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A STR.	4A STR.	5A SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY	1.5	1.13					
POSTING							
OPERATING	1.87	1.46	1.77	1.03	1.34	1.21	1.42
COMMENTS:							

AS BUILT "REBAR" DETAIL		
LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

#### TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT	
2014	3600	460	55	5.9	240	20 year ESAL for flexible pavement from 2014 to 2034 : 2339000
2034	4100	530	55	8.6	410	40 year ESAL for flexible pavement from 2014 to 2054 : 5829000
						Design Speed: 30 mph

#### PROPOSED STRUCTURE

STRUCTURE TYPE: CONCRETE NEXT BEAM STRUCTURE ON INTEGRAL ABUTMENTS

CLEAR SPAN(NORMAL TO STREAM): ~38'  
 VERTICAL CLEARANCE ABOVE STREAMBED: ~7'  
 WATERWAY OF FULL OPENING: 207 sq. ft.

#### WATER SURFACE ELEVATIONS AT:

Q2.33 =	823.0'	VELOCITY=	9.9 fps
Q10 =	824.9'	"	11.9 fps
Q25 =	825.9'	"	13.0 fps
Q50 =	826.7'	"	13.9 fps
Q100 =	826.9'	"	13.4 fps

IS THE ROADWAY OVERTOPPED BELOW Q100: No  
 FREQUENCY: N/A  
 RELIEF ELEVATION: 828.3'  
 DISCHARGE OVER ROAD @Q100: N/A

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 827.6' (on the upstream side)  
 VERTICAL CLEARANCE: @Q50 = 0.9' (on the upstream side)

SCOUR: 0' of contact scour up to Q500

REQUIRED CHANNEL PROTECTION: Stone Fill Type III

#### PERMIT INFORMATION

AVERAGE DAILY FLOW: 15 cfs DEPTH OR ELEVATION:  
 ORDINARY LOW WATER: 10 cfs ~0.5'  
 ORDINARY HIGH WATER: 220 cfs ~2'

#### TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: Detour will be used.  
 CLEAR SPAN (NORMAL TO STREAM):  
 VERTICAL CLEARANCE ABOVE STREAMBED:  
 WATERWAY AREA OF FULL OPENING:

#### ADDITIONAL INFORMATION

#### TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

#### DESIGN VALUES

1. DESIGN LIVE LOAD	HL-93
2. FUTURE PAVEMENT	d <sub>p</sub> : 0.0 INCH
3. DESIGN SPAN	L: 56.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ: 1.57 INCH
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX)	f <sub>y</sub> : 270 KSI
6. PRESTRESSED CONCRETE STRENGTH	f' <sub>c</sub> : 10.0 KSI
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f' <sub>cr</sub> : 8.0 KSI
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f' <sub>c</sub> : 4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f' <sub>c</sub> : 4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f' <sub>c</sub> : 3.5 KSI
11. CONCRETE, CLASS C	f' <sub>c</sub> : 3.0 KSI
12. REINFORCING STEEL	f <sub>y</sub> : 60 KSI
13. STRUCTURAL STEEL AASHTO M270	f <sub>y</sub> : ---
14. SOIL UNIT WEIGHT	γ: 0.120 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q <sub>n</sub> : 8.0 KSF
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: 0.45
17. NOMINAL BEARING RESISTANCE OF ROCK	q <sub>n</sub> : ---
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	φ: ---
19. NOMINAL AXIAL PILE RESISTANCE	q <sub>p</sub> : 349.0 KIPS
20. PILE YIELD STRENGTH ASTM A572	f <sub>y</sub> : 50 KSI
21. PILE SIZE	HP 12X63
22. EST. PILE LENGTH AT ABUTMENT #1	L <sub>p1</sub> : 50 FT
EST. PILE LENGTH AT ABUTMENT #2	L <sub>p2</sub> : 55 FT
23. PILE RESISTANCE FACTOR	φ: 0.50
24. LATERAL PILE DEFLECTION	Δ: 0.19 INCH
25. BASIC WIND SPEED	V <sub>3s</sub> : ---
26. MINIMUM GROUND SNOW LOAD	p <sub>g</sub> : ---
27. SEISMIC DATA	PGA: 8 %g S <sub>s</sub> : 18 %g S <sub>1</sub> : 6 %g

PROJECT NAME: BURKE

PROJECT NUMBER: BRF 0269(13)

FILE NAME: I0c412/cos/z10c412p1.dgn PLOT DATE: 11/21/2014  
 PROJECT LEADER: J. BYATT DRAWN BY: M. HALEY  
 DESIGNED BY: S. BEAUMONT CHECKED BY: J. BYATT  
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