

CHECKED _____ DATE _____
 BACK CHECKED _____ DATE _____
 CORRECTED _____ DATE _____
 VERIFIED _____ DATE _____
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 DRAWING CHECKED AGAINST CALCULATIONS
 AND CALCULATION CHECK CONFIRMED.
 BY _____ DATE 8/10/2017
 P005774g

LOAD AND RESISTANCE FACTOR RATING (LRFR) LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	BOX NUMBER	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft.)	RATING FACTOR	BOX NUMBER	ELEMENT TYPE		DISTANCE FROM LEFT END OF SPAN (ft.)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	N/A	N/A	--	1.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
	HL-93 (OPERATING)	N/A	N/A	N/A	--	1.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
	HS-20 (INVENTORY)	36.000	N/A	N/A	N/A	1.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
	HS-20 (OPERATING)	36.000	N/A	N/A	N/A	1.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S3C	21.500	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S3A	22.750	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S4A	26.750	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S5A	30.500	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S6A	34.500	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		S7B	38.500	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
	S7A	40.000	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		T5B	32.000	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		T6A	36.000	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		T7A	40.000	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		T7B	40.000	N/A	N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
		PERMANENT LOADS		N/A	4	1.00	N/A	N/A	1.00	1	T	10.5	1.04	1	T	10

LOAD FACTORS

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX. FACTOR	MIN. FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS

- EFFECTS OF LIVE LOAD MAY BE NEGLECTED ACCORDING TO AASHTO LRFD 3.6.1.2.6A (DESIGN FILL = 40.0')
- CULVERTS WITH DEEP FILLS SHOULD BE EVALUATED FOR THE EFFECTS OF PERMANENT LOADS ONLY ACCORDING TO "THE MANUAL FOR BRIDGE EVALUATION 6A.5.12.10.3A".

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

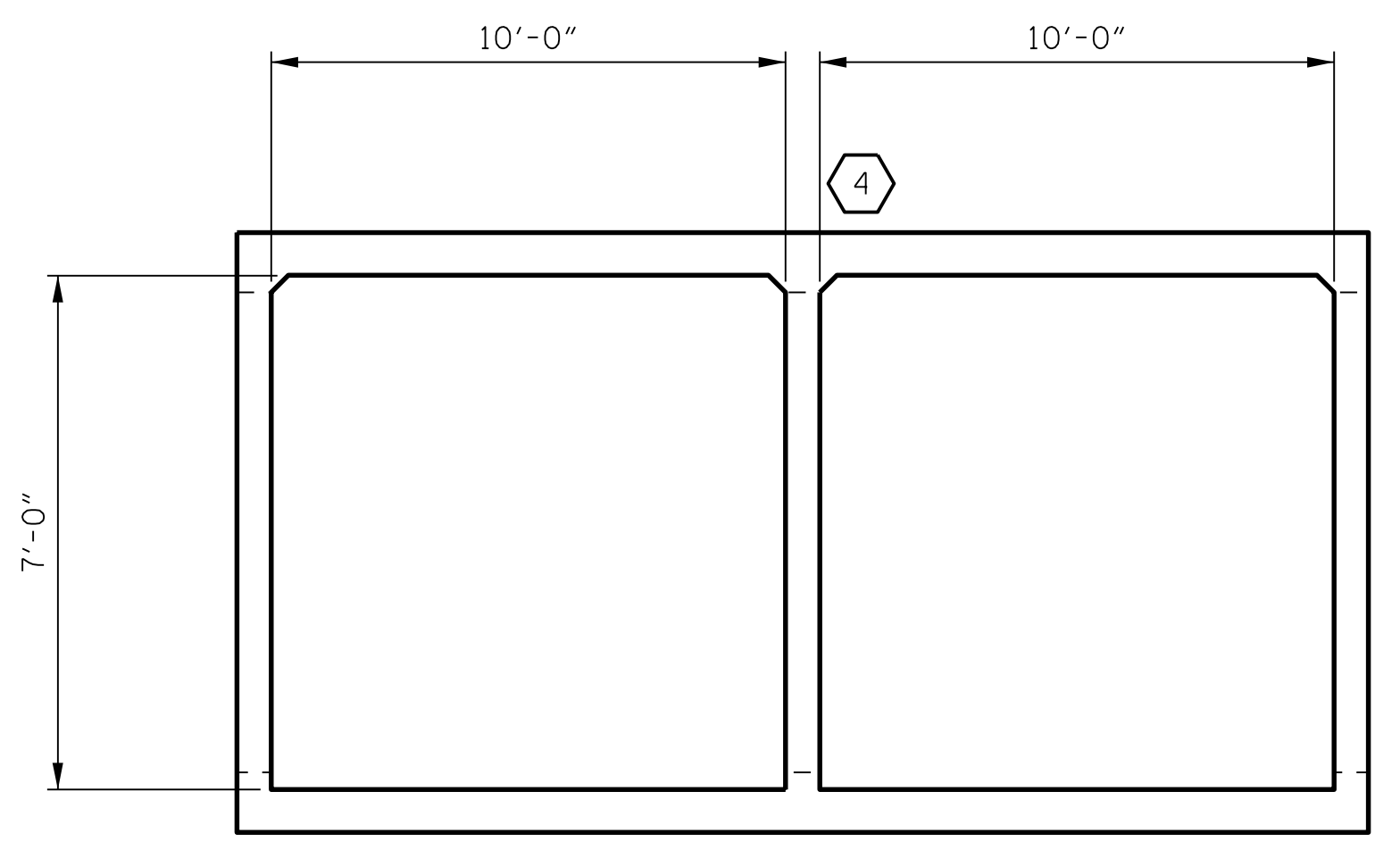
3 LEGAL LOAD RATING **

4 PERMANENT LOAD RATING

** SEE CHART FOR VEHICLE TYPE

ELEMENT TYPE

T - TOP OF SLAB
B - BOTTOM OF SLAB



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. I-4729A
POLK COUNTY
 STATION: 16 + 47.10 -RP_F-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
**LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS
 (INTERSTATE TRAFFIC)**

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY :
PARSONS

5540 CenterView Drive, Suite 217
 Raleigh, NC 27606-3386
 NC LICENSE No. F-0246

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY : K. E. LOFTON DATE : 7-17
 CHECKED BY : D. WHONG DATE : 7-17
 DESIGN ENGINEER : S. T. PHAN DATE : 7-17

ASSEMBLED BY : K. E. LOFTON DATE : 7-17
 CHECKED BY : D. WHONG DATE : 7-17
 DRAWN BY : WMC 7/11 REV. 10/1/11 MAA/GM
 CHECKED BY : GM 7/11

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			6