

LOAD AND RESISTANCE FACTOR RATING (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 <sub>LL</sub> )	MOMENT				SHEAR				
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (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	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	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)	SNSH	13.500		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNGARBS2	20.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNAGRIS2	22.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNCOTTS3	27.250		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNAGGRS4	34.925		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNS5A	35.550		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNS6A	39.950		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		SNS7B	42.000		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 (T/S/T)	TNAGRIT3	33.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		TNT4A	33.075		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		TNT6A	41.600		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		TNT7A	42.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		TNT7B	42.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
		TNAGRIT4	43.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
	TNAGT5A	45.000		N/A	N/A	1.40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	
	TNAGT5B	45.000		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	1.04	N/A	N/A	1.12	1	TOP SLAB	4.54	1.04	1	EXT. WALL	1.45	2

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	--

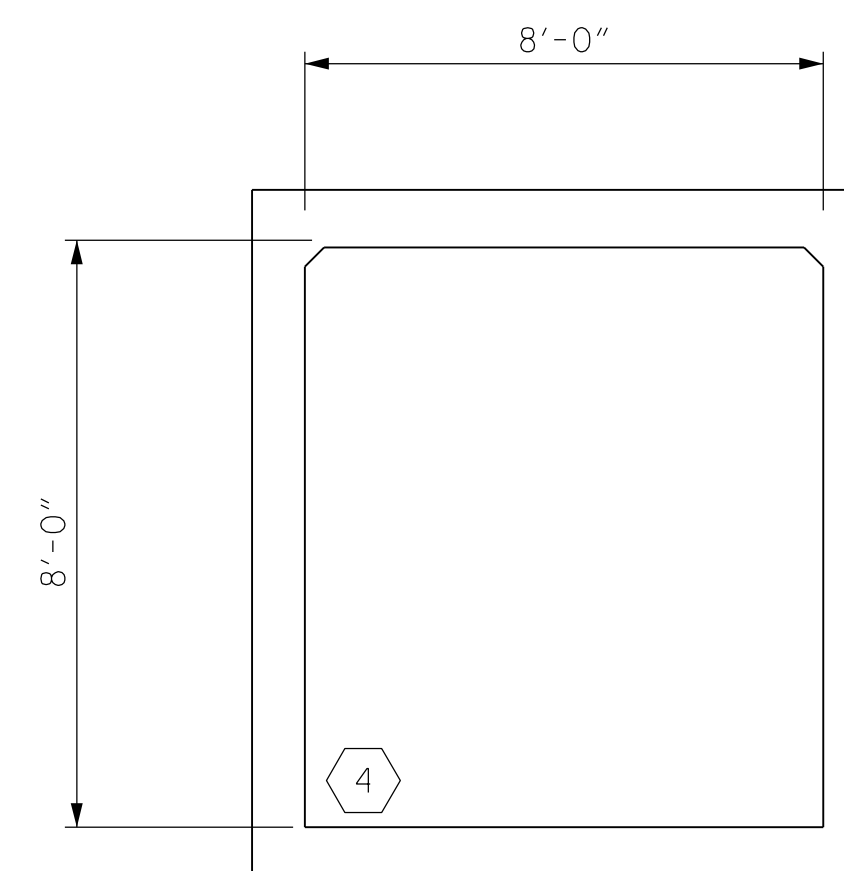
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- EFFECTS OF LIVE LOAD MAY BE NEGLECTED ACCORDING TO AASHTO LRFD 3.6.1.2.6 (DESIGN FILL=46.0')
- CULVERTS WITH DEEP FILL SHOULD BE EVALUATED FOR THE EFFECTS OF PERMANENT LOADS ONLY ACCORDING TO "THE MANUAL FOR BRIDGE EVALUATION 6A.5.2.3A"

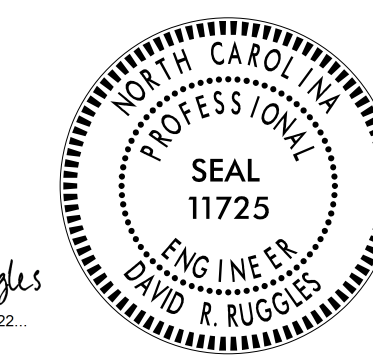
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	PERMANENT LOAD RATING
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY  
(LOOKING DOWNSTREAM)

PROJECT NO. R-2707C  
CLEVELAND COUNTY  
STATION: 453+07.00 -L-

SHEET 5 OF 5



2/10/2017

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
SINGLE 8 FT. X 8 FT.  
CONCRETE BOX CULVERT  
70°SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C12-05
1			3			TOTAL SHEETS 5
2			4			

DRAWN BY: H.ASSFOURA DATE: 11/16  
CHECKED BY: D. RUGGLES DATE: 11/16  
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 11/16