

## 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 (%LL)	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	①	1.35	---	1.75	1.54	1	TOP SLAB	3.47	1.35	1	BOTTOM SLAB	7.73		
	HL-93 ( OPERATING )	N/A		1.75	---	1.35	2.00	1	TOP SLAB	3.47	1.75	1	BOTTOM SLAB	7.73		
	HS-20 ( INVENTORY )	36.000	②	1.69	60.84	1.75	2.16	1	TOP SLAB	3.47	1.69	1	BOTTOM SLAB	7.73		
	HS-20 ( OPERATING )	36.000		2.19	78.84	1.35	2.80	1	TOP SLAB	3.47	2.19	1	BOTTOM SLAB	7.73		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH		3.03	37.88	1.40	4.36	1	TOP SLAB	3.47	3.03	1	EXTERIOR WALL	0.90		
		S3C	12.500		2.54	54.61	1.40	2.54	1	TOP SLAB	3.47	2.85	1	TOP SLAB	7.73	
		S3A	21.500		2.54	57.79	1.40	2.54	1	TOP SLAB	3.47	2.82	1	TOP SLAB	7.73	
		S4A	22.750		2.49	66.61	1.40	2.49	1	TOP SLAB	3.47	2.57	1	BOTTOM SLAB	7.73	
		S5A	26.750		2.34	71.37	1.40	2.42	1	TOP SLAB	3.47	2.34	1	BOTTOM SLAB	7.73	
		S6A	30.500		2.20	75.90	1.40	2.42	1	TOP SLAB	3.47	2.20	1	BOTTOM SLAB	7.73	
	TRUCK-TRAILER SEMI-TRAILER (TTST)	S7B	34.500		2.09	80.47	1.40	2.44	1	TOP SLAB	3.47	2.09	1	BOTTOM SLAB	7.73	
		S7A	38.500	③	2.20	88.00	1.40	2.41	1	TOP SLAB	3.47	2.20	1	BOTTOM SLAB	7.73	
		T4A	40.000		2.54	71.76	1.40	2.54	1	TOP SLAB	3.47	2.69	1	BOTTOM SLAB	7.73	
		T5B	28.250		2.36	75.52	1.40	2.59	1	TOP SLAB	3.47	2.36	1	BOTTOM SLAB	7.73	
		T6A	32.000		2.30	82.80	1.40	2.49	1	TOP SLAB	3.47	2.30	1	BOTTOM SLAB	7.73	
		T7A	36.000		2.18	87.20	1.40	2.49	1	TOP SLAB	3.47	2.18	1	BOTTOM SLAB	7.73	
	T7B	40.000		2.40	96.00	1.40	2.46	1	TOP SLAB	3.47	2.40	1	BOTTOM SLAB	7.73		

**LOAD FACTORS:**

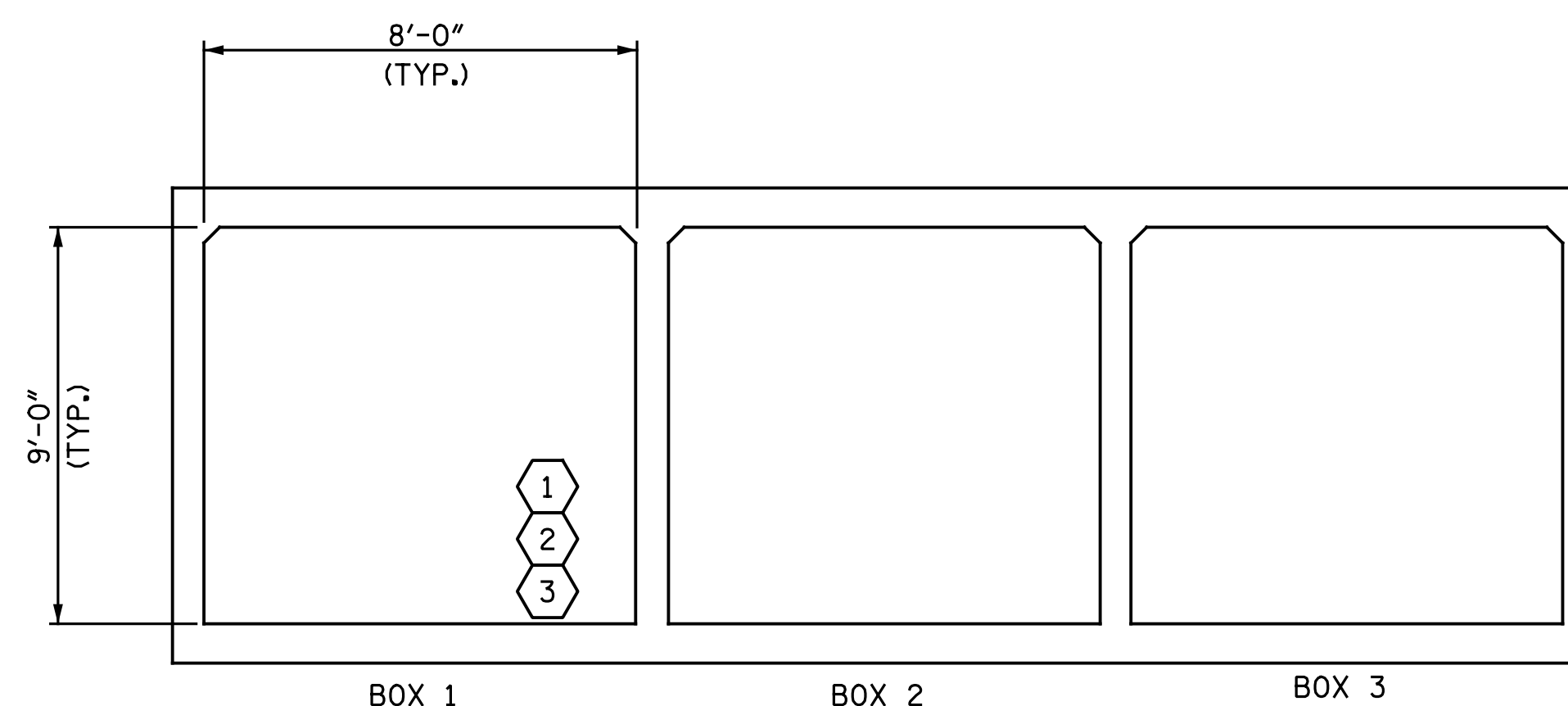
DESIGN LOAD RATING FACTORS

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:**

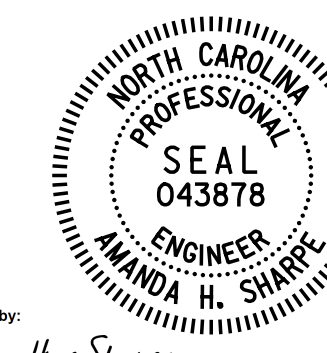
RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

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



**LRFR SUMMARY**  
(LOOKING DOWNSTREAM)

PROJECT NO. I-5878  
HARNETT COUNTY  
STATION: 1042+08.93 -L-



DocuSigned by:  
*Amanda H. Sharpe*  
4/9/2020

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

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

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-18-19
CHECKED BY : A. H. SHARPE	DATE : 2-7-20
DRAWN BY : WMC 7/11	REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11	REV. 12/17 MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C2-8
1			3			TOTAL SHEETS
2			4			8

**Michael Baker INTERNATIONAL**  
Michael Baker Engineering  
8000 Regency Parkway, Suite 600  
Cary, North Carolina 27518  
NC License No. : F-1084