

## 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		
						MOMENT				SHEAR						
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	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	1.09	--	1.75	1.11	1	TOP SLAB	6.75	1.09	1	TOP SLAB	12.75		
	HL-93 (OPERATING)	N/A		1.41	--	1.35	1.43	1	TOP SLAB	6.75	1.41	1	TOP SLAB	12.75		
	HS-20 (INVENTORY)	36.000	2	1.14	41.04	1.75	1.15	1	TOP SLAB	6.75	1.14	1	TOP SLAB	12.75		
	HS-20 (OPERATING)	36.000		1.47	52.92	1.35	1.49	1	TOP SLAB	6.75	1.47	1	TOP SLAB	12.75		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.30	31.05	1.40	2.30	1	TOP SLAB	6.75	2.88	1	TOP SLAB	12.75	
		SNGARBS2	20.000		2.15	43.00	1.40	2.15	1	TOP SLAB	6.75	2.49	1	TOP SLAB	12.75	
		SNAGRIS2	22.000		2.30	50.60	1.40	2.30	1	TOP SLAB	6.75	2.61	1	TOP SLAB	12.75	
		SNCOTTS3	27.250	3	1.35	36.79	1.40	1.38	1	TOP SLAB	6.75	1.35	1	TOP SLAB	12.75	
		SNAGGRS4	34.925		1.59	55.53	1.40	1.66	1	TOP SLAB	6.75	1.59	1	TOP SLAB	12.75	
		SNS5A	35.550		1.49	52.97	1.40	1.58	1	TOP SLAB	6.75	1.49	1	TOP SLAB	12.75	
		SNS6A	39.950		1.48	59.13	1.40	1.57	1	TOP SLAB	6.75	1.48	1	TOP SLAB	12.75	
		SNS7B	42.000		1.48	62.16	1.40	1.63	1	TOP SLAB	6.75	1.48	1	TOP SLAB	12.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.98	65.34	1.40	2.22	1	BOTTOM SLAB	6.75	1.98	1	BOTTOM SLAB	12.75	
		TNT4A	33.075		1.57	51.93	1.40	1.65	1	TOP SLAB	6.75	1.57	1	TOP SLAB	12.75	
		TNT6A	41.600		1.48	61.57	1.40	1.69	1	TOP SLAB	6.75	1.48	1	TOP SLAB	12.75	
		TNT7A	42.000		1.51	63.42	1.40	1.66	1	TOP SLAB	6.75	1.51	1	TOP SLAB	12.75	
		TNT7B	42.000		1.55	65.10	1.40	1.60	1	TOP SLAB	6.75	1.55	1	TOP SLAB	12.75	
		TNAGRIT4	43.000		1.52	65.36	1.40	1.65	1	BOTTOM SLAB	6.75	1.52	1	BOTTOM SLAB	12.75	
TNAGT5A	45.000		1.53	68.85	1.40	1.85	1	TOP SLAB	6.75	1.53	1	TOP SLAB	12.75			
TNAGT5B	45.000		1.49	67.05	1.40	1.65	1	TOP SLAB	6.75	1.49	1	TOP SLAB	12.75			

**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:**

- 1.
- 2.
- 3.
- 4.

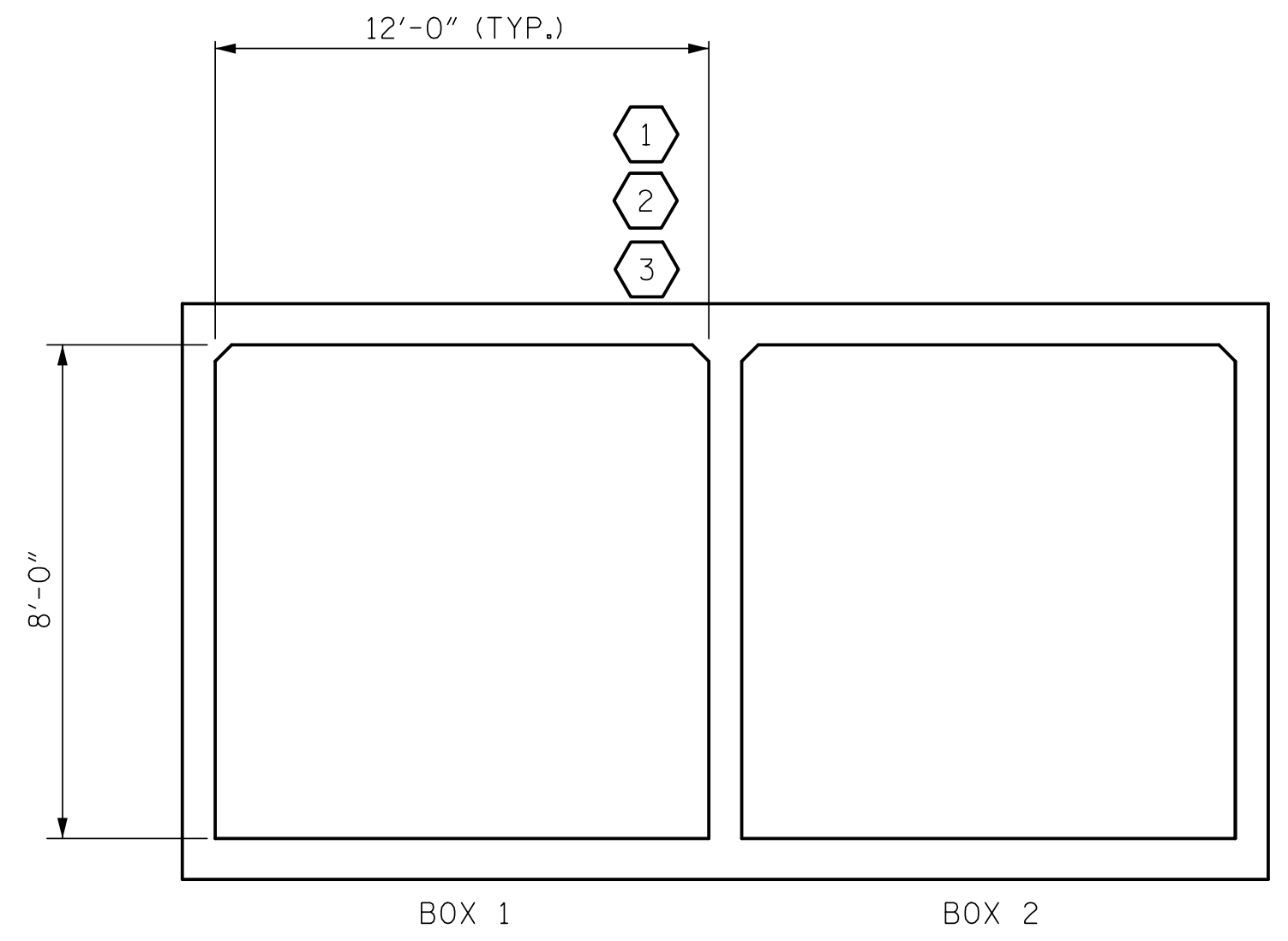
# CONTROLLING LOAD RATING

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. A-0009CA  
GRAHAM COUNTY  
 STATION: 195+16.00 -L-

SHEET 2 OF 7

6/1/2022

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C6-2
1			3			TOTAL SHEETS
2			4			7

ASSEMBLED BY : ZCS	DATE : 2/21
CHECKED BY : MGC	DATE : 6/21
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC