

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 _L)	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	1.12	--	1.75	1.12	1	TOP SLAB	6.21	1.27	1	BOTTOM SLAB	11.71		
	HL-93 (OPERATING)	N/A		1.45	--	1.35	1.45	1	TOP SLAB	6.21	1.64	1	TOP SLAB	11.71		
	HS-20 (INVENTORY)	36.000	②	1.16	41.76	1.75	1.16	1	TOP SLAB	6.21	1.52	1	TOP SLAB	11.71		
	HS-20 (OPERATING)	36.000		1.51	54.36	1.35	1.51	1	TOP SLAB	6.21	1.98	1	TOP SLAB	11.71		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.34	31.59	1.40	2.34	1	TOP SLAB	6.21	3.01	1	BOTTOM SLAB	11.71	
		SNGARBS2	20,000		2.19	43.80	1.40	2.19	1	TOP SLAB	6.21	2.75	1	TOP SLAB	11.71	
		SNAGRIS2	22,000		2.18	47.96	1.40	2.18	1	TOP SLAB	11.71	2.58	1	BOTTOM SLAB	11.71	
		SNCOTTS3	27,250		1.40	38.15	1.40	1.40	1	TOP SLAB	6.21	1.81	1	BOTTOM SLAB	11.71	
		SNAGGRS4	34,925		1.48	51.69	1.40	1.48	1	TOP SLAB	6.21	1.64	1	BOTTOM SLAB	11.71	
		SNS5A	35,550		1.62	57.59	1.40	1.67	1	TOP SLAB	6.21	1.62	1	BOTTOM SLAB	11.71	
		SNS6A	39,950		1.44	57.53	1.40	1.55	1	TOP SLAB	6.21	1.44	1	BOTTOM SLAB	11.71	
		SNS7B	42,000		1.40	58.80	1.40	1.48	1	TOP SLAB	11.71	1.40	1	BOTTOM SLAB	11.71	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.75	57.75	1.40	1.93	1	TOP SLAB	11.71	1.75	1	BOTTOM SLAB	11.71	
		TNT4A	33,075		1.66	54.90	1.40	1.66	1	TOP SLAB	6.21	1.74	1	BOTTOM SLAB	11.71	
		TNT6A	41,600		1.45	60.32	1.40	1.62	1	TOP SLAB	11.71	1.45	1	BOTTOM SLAB	11.71	
		TNT7A	42,000		1.44	60.48	1.40	1.63	1	TOP SLAB	11.71	1.44	1	BOTTOM SLAB	11.71	
		TNT7B	42,000		1.44	60.48	1.40	1.54	1	TOP SLAB	6.21	1.44	1	BOTTOM SLAB	11.71	
		TNAGRIT4	43,000		1.34	57.62	1.40	1.54	1	TOP SLAB	11.71	1.34	1	BOTTOM SLAB	11.71	
TNAGT5A	45,000		1.28	57.60	1.40	1.52	1	TOP SLAB	11.71	1.28	1	BOTTOM SLAB	11.71			
TNAGT5B	45,000		③	1.28	57.60	1.40	1.34	1	TOP SLAB	11.71	1.28	1	BOTTOM SLAB	11.71		

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.

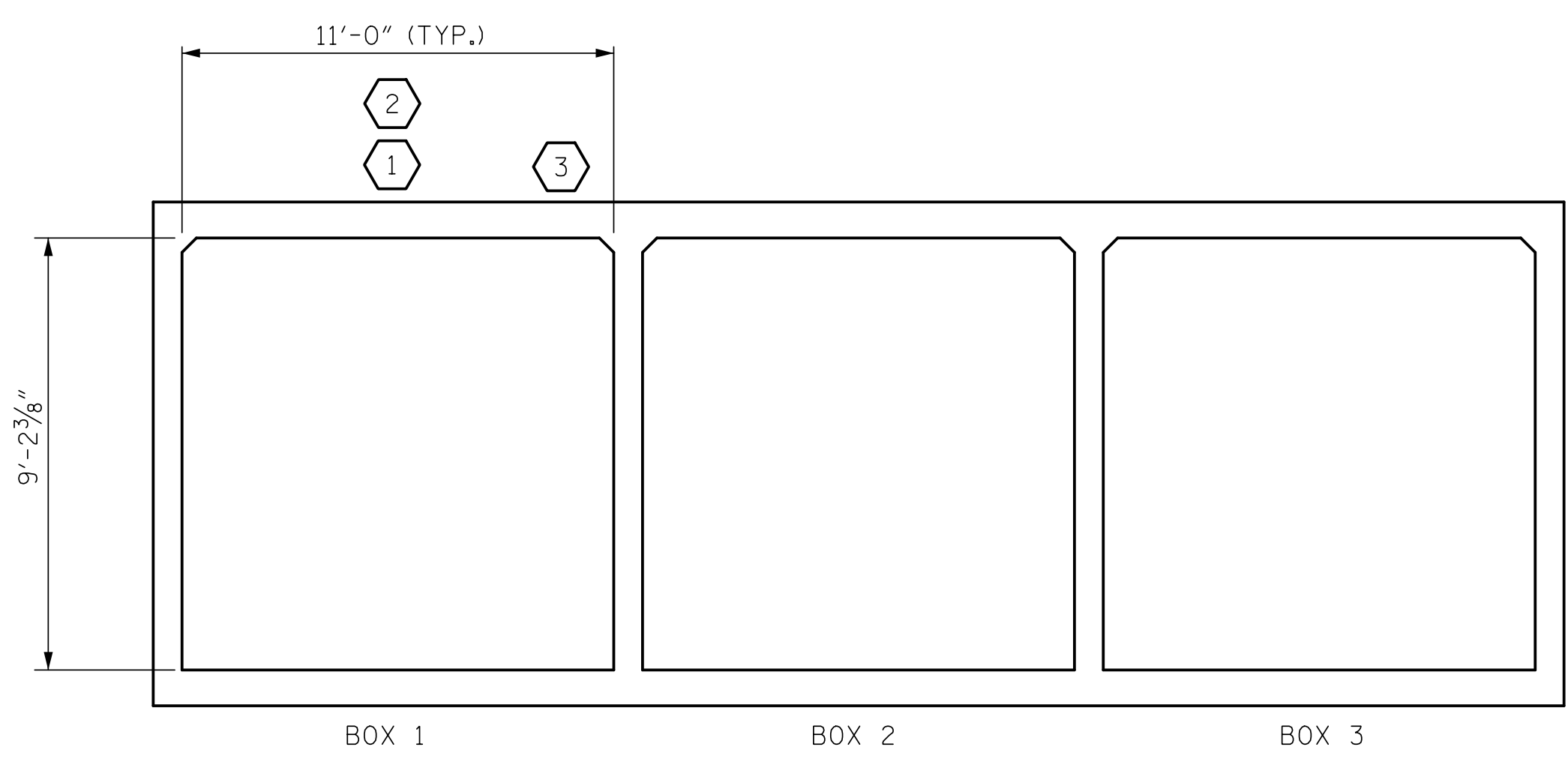
CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

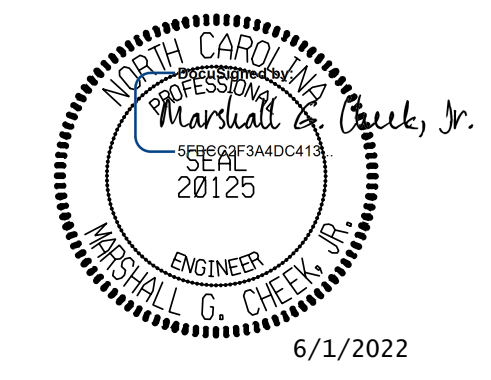
** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. A-0009CA
GRAHAM COUNTY
 STATION: 113+69.00 -L-

SHEET 2 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**LRFR SUMMARY FOR
 REINFORCED CONCRETE
 BOX CULVERTS**
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : ZCS	DATE : 6/21
CHECKED BY : MGC	DATE : 9/21
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
 706 HILLSBOROUGH STREET
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 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C4-2
2			4			TOTAL SHEETS 8