

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

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	1.67	--	1.75	2.49	1	EXTERIOR WALL	6.47	1.67	1	EXTERIOR WALL	11.78		
	HL-93 (OPERATING)	N/A		2.16	--	1.35	3.23	1	EXTERIOR WALL	6.47	2.16	1	EXTERIOR WALL	11.78		
	HS-20 (INVENTORY)	36.000	②	1.70	61.08	1.75	2.49	1	EXTERIOR WALL	6.47	1.70	1	EXTERIOR WALL	11.78		
	HS-20 (OPERATING)	36.000		2.20	79.18	1.35	3.23	1	EXTERIOR WALL	6.47	2.20	1	EXTERIOR WALL	11.78		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.16	29.10	1.40	3.10	1	EXTERIOR WALL	6.47	2.16	1	EXTERIOR WALL	11.78	
		SNGARBS2	20.000		2.15	43.10	1.40	3.10	1	EXTERIOR WALL	6.47	2.15	1	EXTERIOR WALL	11.78	
		SNAGRIS2	22.000		2.16	47.42	1.40	3.10	1	EXTERIOR WALL	6.47	2.16	1	EXTERIOR WALL	11.78	
		SNCOTTS3	27.250		2.11	57.58	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
		SNAGGRS4	34.925		2.12	73.95	1.40	3.10	1	EXTERIOR WALL	6.47	2.12	1	EXTERIOR WALL	11.78	
		SNS5A	35.550	③	2.11	75.02	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
		SNS6A	39.950		2.11	84.33	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
		SNS7B	42.000		2.11	88.64	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.12	69.92	1.40	3.10	1	EXTERIOR WALL	6.47	2.12	1	EXTERIOR WALL	11.78	
		TNT4A	33.075		2.12	70.10	1.40	3.10	1	EXTERIOR WALL	6.47	2.12	1	EXTERIOR WALL	11.78	
		TNT6A	41.600		2.11	87.88	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
		TNT7A	42.000		2.12	88.84	1.40	3.10	1	EXTERIOR WALL	6.47	2.12	1	EXTERIOR WALL	11.78	
		TNT7B	42.000		2.11	88.73	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78	
		TNAGRIT4	43.000		2.12	91.10	1.40	3.10	1	EXTERIOR WALL	6.47	2.12	1	EXTERIOR WALL	11.78	
	TNAGT5A	45.000		2.11	95.17	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78		
	TNAGT5B	45.000		2.11	95.03	1.40	3.10	1	EXTERIOR WALL	6.47	2.11	1	EXTERIOR WALL	11.78		

**LOAD FACTORS**

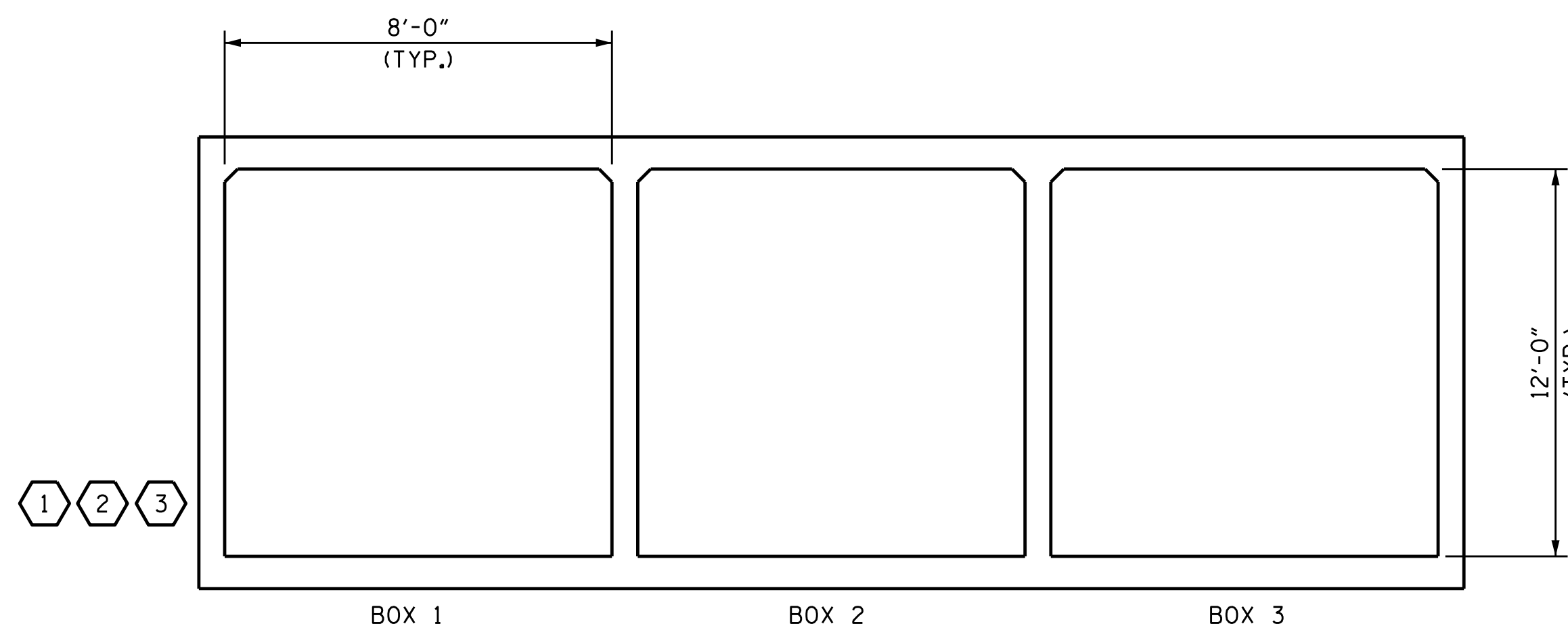
DESIGN LOAD RATING FACTORS

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.

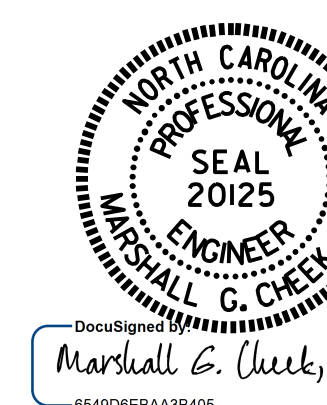
⊕	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



**LRFR SUMMARY**  
LOOKING DOWNSTREAM

PROJECT NO. U-3633  
GASTON COUNTY  
STATION: 54+22.00 -L-

SHEET 13 OF 13



Marshall G. Cheek, Jr.  
65490

11/21/2016

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

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
C-13  
TOTAL SHEETS  
13

DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

ASSEMBLED BY : M.K. BEARD	DATE : 10/4/16
CHECKED BY : H.A. LOCKLEAR	DATE : 10/4/16
DRAWN BY : WMC 7/11	REV. 10/1/11
CHECKED BY : GM 7/11	MAA/GM