

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 _{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	1.62	--	1.75	1.84	1	TOP SLAB	2.67	1.62	1	BOTTOM SLAB	5.79		
	HL-93 (OPERATING)	N/A		2.10	--	1.35	2.38	1	TOP SLAB	2.67	2.10	1	BOTTOM SLAB	5.79		
	HS-20 (INVENTORY)	36.000	②	1.84	66.24	1.75	1.84	1	TOP SLAB	2.67	2.29	1	TOP SLAB	5.79		
	HS-20 (OPERATING)	36.000		2.38	85.68	1.35	2.38	1	TOP SLAB	2.67	2.97	1	TOP SLAB	5.79		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.34	45.09	1.40	3.34	1	TOP SLAB	2.67	4.18	1	EXTERIOR WALL	0.86	
		SNGARBS2	20.000		3.13	62.60	1.40	3.13	1	TOP SLAB	2.67	4.01	1	TOP SLAB	0.87	
		SNAGRIS2	22.000		3.34	73.48	1.40	3.34	1	TOP SLAB	2.67	4.18	1	EXTERIOR WALL	0.86	
		SNCOTTS3	27.250		2.34	63.77	1.40	2.43	1	TOP SLAB	2.67	2.34	1	BOTTOM SLAB	5.79	
		SNAGGRS4	34.925		2.26	78.93	1.40	2.39	1	TOP SLAB	2.67	2.26	1	BOTTOM SLAB	5.79	
		SNS5A	35.550		2.67	94.92	1.40	2.93	1	TOP SLAB	2.67	2.67	1	BOTTOM SLAB	5.79	
		SNS6A	39.950		2.14	85.49	1.40	2.68	1	TOP SLAB	2.67	2.14	1	BOTTOM SLAB	5.79	
		SNS7B	42.000	③	2.10	88.20	1.40	2.74	1	TOP SLAB	2.67	2.10	1	BOTTOM SLAB	5.79	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.28	108.24	1.40	3.34	1	TOP SLAB	2.67	3.28	1	BOTTOM SLAB	5.79	
		TNT4A	33.075		2.84	93.93	1.40	2.89	1	TOP SLAB	2.67	2.84	1	BOTTOM SLAB	5.79	
		TNT6A	41.600		2.43	101.09	1.40	2.50	1	TOP SLAB	2.67	2.43	1	BOTTOM SLAB	5.79	
		TNT7A	42.000		2.66	111.72	1.40	2.66	1	TOP SLAB	2.67	2.67	1	BOTTOM SLAB	5.79	
		TNT7B	42.000		2.31	97.02	1.40	2.75	1	TOP SLAB	2.67	2.31	1	BOTTOM SLAB	5.79	
		TNAGRIT4	43.000		2.80	120.40	1.40	2.89	1	TOP SLAB	2.67	2.80	1	BOTTOM SLAB	5.79	
TNAGT5A	45.000		2.80	126.00	1.40	3.03	1	TOP SLAB	2.67	2.80	1	BOTTOM SLAB	5.79			
TNAGT5B	45.000		2.77	124.65	1.40	2.89	1	TOP SLAB	2.67	2.77	1	BOTTOM SLAB	5.79			

LOAD FACTORS:

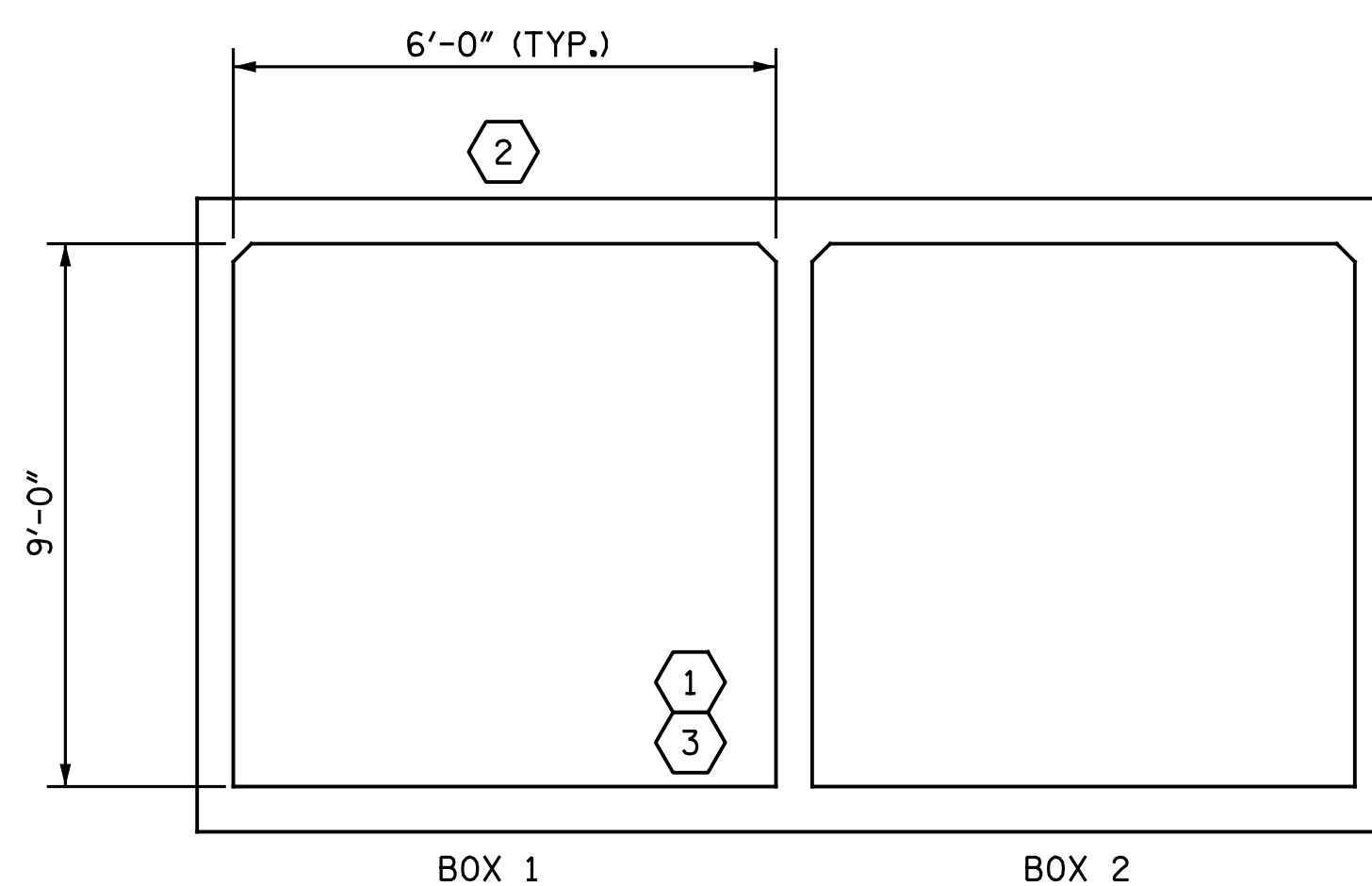
DESIGN LOAD RATING FACTORS

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.

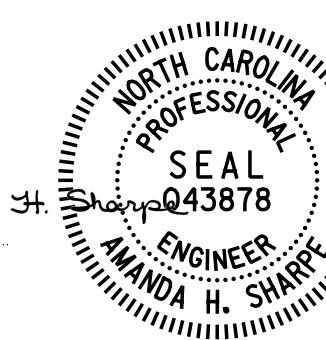
Ⓝ CONTROLLING LOAD RATING
① DESIGN LOAD RATING (HL-93)
② DESIGN LOAD RATING (HS-20)
③ LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY (LOOKING DOWNSTREAM)

PROJECT NO. I-5986B
JOHNSTON COUNTY
 STATION: 35+91.00 -Y33-

DocuSigned by:
 Amanda H. Sharpe
 81D9FF4CECF4D2



4/7/2020

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

Michael Baker INTERNATIONAL	REVISIONS						SHEET NO. CI-5 TOTAL SHEETS 5
	NO.	BY:	DATE:	NO.	BY:	DATE:	
	1			3			
	2			4			

ASSEMBLED BY : N. B. SPEAKS	DATE : 2-10-20
CHECKED BY : A. H. SHARPE	DATE : 2-13-20
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC