

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 <sub>LL</sub> )	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	2.75	--	1.75	9.56	1	TOP SLAB	5.62	2.75	1	EXT WALL	2.72		
	HL-93 (OPERATING)	N/A		3.56	--	1.35	12.39	1	TOP SLAB	5.62	3.56	1	EXT WALL	2.72		
	HS-20 (INVENTORY)	36.000	②	2.75	99.0	1.75	9.56	1	TOP SLAB	5.62	2.75	1	EXT WALL	2.72		
	HS-20 (OPERATING)	36.000		3.56	128.2	1.35	12.39	1	TOP SLAB	5.62	3.56	1	EXT WALL	2.72		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500	③	3.43	42.9	1.40	21.86	1	EXT WALL	6.94	3.43	1	EXT WALL	2.72	
		S3C	21.500	③	3.43	73.7	1.40	16.26	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S3A	22.750	③	3.43	78.0	1.40	15.32	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S4A	26.750	③	3.43	91.8	1.40	14.31	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S5A	30.500	③	3.43	104.6	1.40	12.58	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S6A	34.500	③	3.43	118.3	1.40	11.57	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S7B	38.500	③	3.43	132.1	1.40	11.68	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		S7A	40.000	③	3.43	137.2	1.40	11.57	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250	③	3.43	96.9	1.40	13.74	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		T5B	32.000	③	3.43	109.8	1.40	12.96	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		T6A	36.000	③	3.43	123.5	1.40	11.68	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
		T7A	40.000	③	3.43	137.2	1.40	11.48	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72	
	T7B	40.000	③	3.43	137.2	1.40	12.17	1	TOP SLAB	5.62	3.43	1	EXT WALL	2.72		

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	--

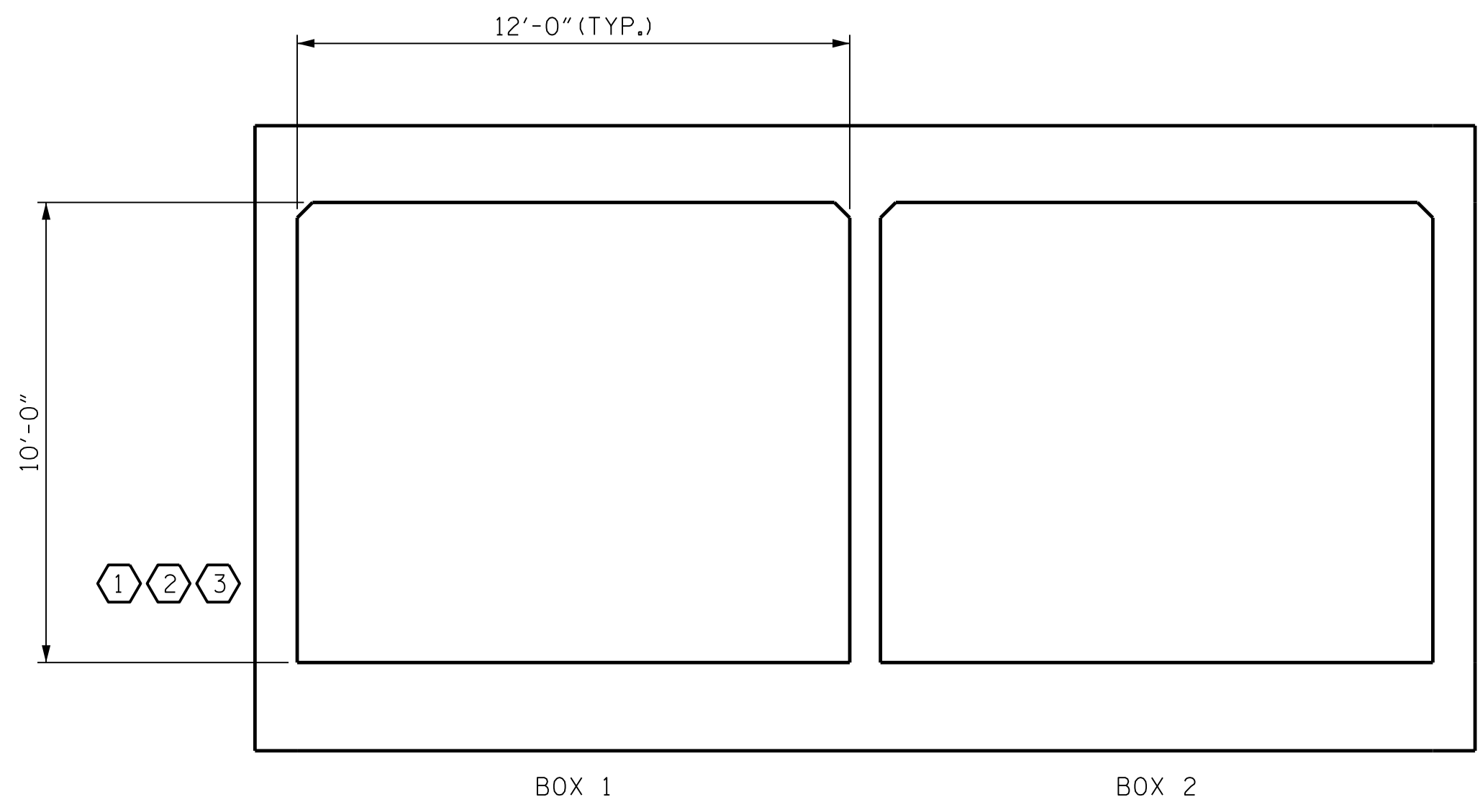
NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

LL SURCHARGE DEPTH = 2.00 FT.

WHERE ELEMENT TYPE EQUALS "WALL", DISTANCE MEASURED FROM BOTTOM OF BOTTOM SLAB.

⊕	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 DOWN STREAM)

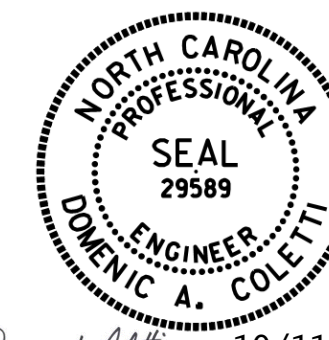
PROJECT NO. U-2579AB

FORSYTH COUNTY

STATION: 768+62.23 -L-

SHEET 11 OF 11

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



10/11/2021

REVISIONS						SHEET NO. C1-11 TOTAL SHEETS 11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

PLOT DRIVER: NCDOT\_STRUCTURES\_DEFAULT\_PLOTTER.plt PENTABLE: NCDOT\_STRUCTURES\_DEFAULT\_PEN.tbl  
USER: PETERSO DATE: 5/20/2021 TIME: 9:55:34 AM  
FILE: ...RATING\_SUMMARY

DES BY: T. MCALEENAN	DATE: 09/19	DWG BY: T. MCALEENAN	DATE: 09/19
DES CHK: R. TURNAGE	DATE: 09/19	CHK BY: R. TURNAGE	DATE: 09/19