

**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 (LL)	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	1.02	--	1.75	1.02	1	TOP SLAB	4.80	1.34	1	TOP SLAB	9.70		
	HL-93 (OPERATING)	N/A		1.32	--	1.35	1.32	1	TOP SLAB	4.80	1.74	1	TOP SLAB	9.70		
	HS-20 (INVENTORY)	36.000	②	1.33	47.70	1.75	1.33	1	TOP SLAB	4.53	1.44	1	BOTTOM SLAB	9.67		
	HS-20 (OPERATING)	36.000		1.72	61.84	1.35	1.72	1	TOP SLAB	4.53	1.86	1	BOTTOM SLAB	9.67		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.40	32.40	1.40	2.40	1	TOP SLAB	4.53	2.87	1	TOP SLAB	9.70	
		SNGARBS2	20.000		2.25	44.96	1.40	2.25	1	TOP SLAB	4.53	2.64	1	TOP SLAB	9.70	
		SNAGRIS2	22.000		2.40	52.79	1.40	2.40	1	TOP SLAB	4.53	2.63	1	BOTTOM SLAB	9.67	
		SNCOTTS3	27.250	③	1.27	34.67	1.40	1.27	1	TOP SLAB	4.53	1.66	1	TOP SLAB	9.70	
		SNAGGRS4	34.925		1.57	54.73	1.40	1.57	1	TOP SLAB	4.80	1.80	1	BOTTOM SLAB	9.67	
		SNS5A	35.550		1.47	52.32	1.40	1.47	1	TOP SLAB	4.53	1.73	1	TOP SLAB	9.70	
		SNS6A	39.950		1.47	58.80	1.40	1.47	1	TOP SLAB	4.53	1.71	1	BOTTOM SLAB	9.67	
		SNS7B	42.000		1.53	64.10	1.40	1.53	1	TOP SLAB	4.53	1.68	1	BOTTOM SLAB	9.67	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.12	69.92	1.40	2.40	1	TOP SLAB	4.53	2.12	1	BOTTOM SLAB	9.67	
		TNT4A	33.075		1.51	50.04	1.40	1.51	1	TOP SLAB	4.53	1.97	1	TOP OF SLAB	9.70	
		TNT6A	41.600		1.57	65.13	1.40	1.57	1	TOP SLAB	4.80	1.73	1	TOP OF SLAB	9.70	
		TNT7A	42.000		1.63	68.58	1.40	1.63	1	TOP SLAB	4.53	1.84	1	TOP OF SLAB	9.70	
		TNT7B	42.000		1.51	63.54	1.40	1.51	1	TOP SLAB	4.53	1.80	1	TOP OF SLAB	9.70	
		TNAGRIT4	43.000		1.44	62.11	1.40	1.44	1	TOP SLAB	4.53	1.77	1	BOTTOM SLAB	9.67	
TNAGT5A	45.000		1.48	66.42	1.40	1.48	1	TOP SLAB	4.53	1.60	1	BOTTOM SLAB	9.67			
TNAGT5B	45.000		1.51	67.74	1.40	1.51	1	TOP SLAB	4.53	1.51	1	BOTTOM SLAB	9.67			

LOAD FACTORS:

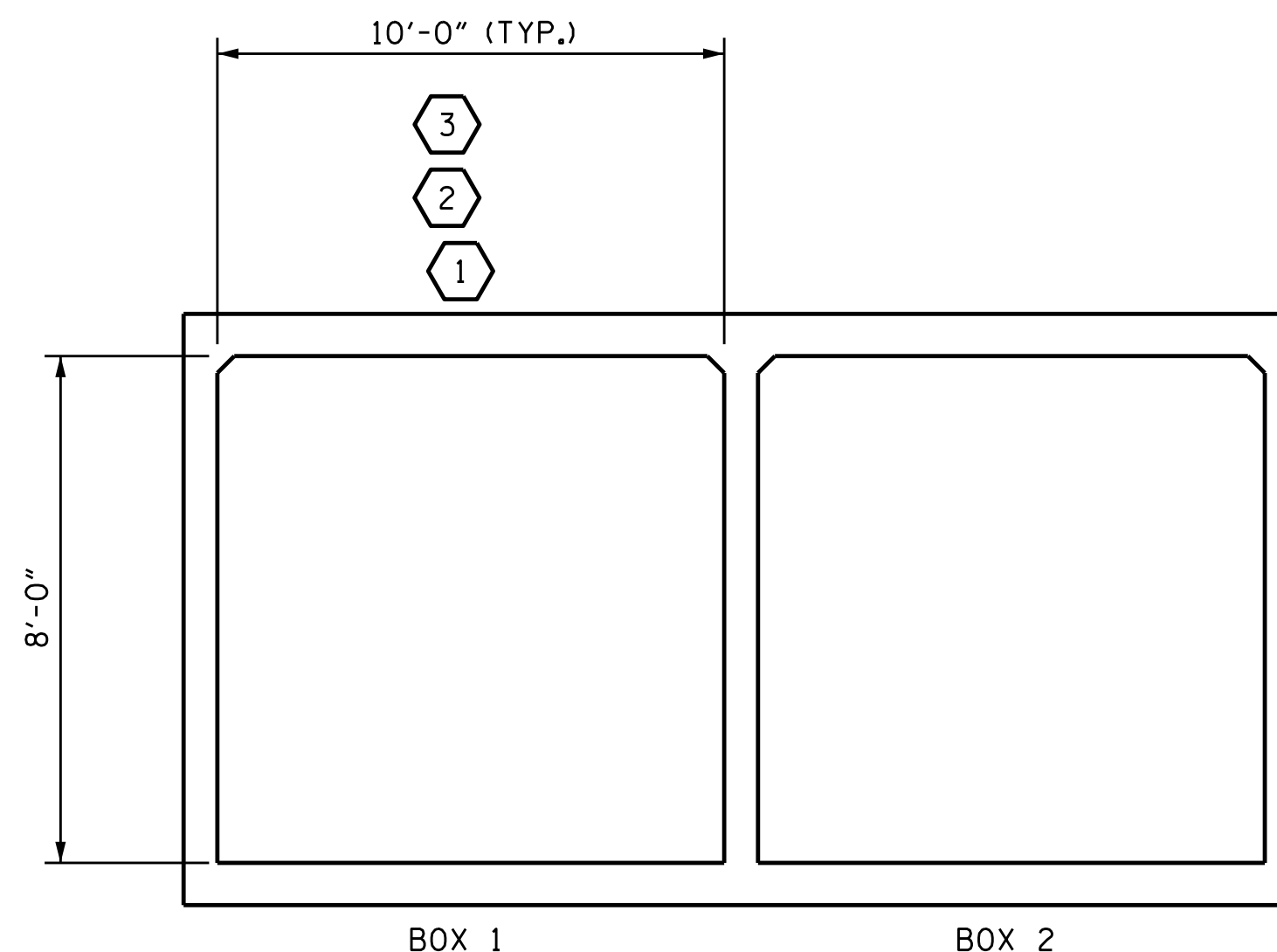
DESIGN LOAD RATING FACTORS

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-3109A
ALAMANCE COUNTY
STATION: 19+77.00 -Y10-

SHEET 5 OF 5



Designed by: *Kristy W. Alford*
F2458389308F40E
3/16/2017

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			C3-5
2			4			5

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : A.C. OUTLAW DATE : 4/24/14
CHECKED BY : K.W. ALFORD DATE : 2/17
DRAWN BY : WMC 7/11 REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11