

## 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 (VLL)	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	1.13	--	1.75	1.13	1	TOP SLAB	5.87	1.25	1	TOP SLAB	13.26		
	HL-93 (OPERATING)	N/A		1.47	--	1.35	1.47	1	TOP SLAB	5.87	1.63	1	TOP SLAB	13.26		
	HS-20 (INVENTORY)	36.000	②	1.33	47.70	1.75	1.33	1	TOP SLAB	5.87	1.49	1	BOTTOM SLAB	13.67		
	HS-20 (OPERATING)	36.000		1.72	61.84	1.35	1.72	1	TOP SLAB	5.87	1.93	1	BOTTOM SLAB	13.67		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.42	32.61	1.40	2.42	1	TOP SLAB	6.23	4.37	1	TOP SLAB	13.26	
		SNGARBS2	20.000		2.26	45.26	1.40	2.26	1	TOP SLAB	5.87	3.35	1	BOTTOM SLAB	13.67	
		SNAGRIS2	22.000		2.42	53.15	1.40	2.42	1	TOP SLAB	6.23	3.04	1	BOTTOM SLAB	13.67	
		SNCOTTS3	27.250	③	1.42	38.58	1.40	1.42	1	TOP SLAB	5.87	1.73	1	TOP SLAB	13.26	
		SNAGGRS4	34.925		1.59	55.41	1.40	1.59	1	TOP SLAB	6.23	1.87	1	TOP SLAB	13.26	
		SNS5A	35.550		1.54	54.63	1.40	1.54	1	TOP SLAB	6.23	1.81	1	TOP SLAB	13.26	
		SNS6A	39.950		1.53	61.31	1.40	1.53	1	TOP SLAB	6.23	1.68	1	BOTTOM SLAB	13.67	
		SNS7B	42.000		1.57	65.98	1.40	1.57	1	TOP SLAB	5.87	1.59	1	TOP SLAB	13.26	
	TRUCK TRACTOR SEMI-TRAILER (TTS1)	TNAGRIT3	33.000		2.03	67.00	1.40	2.38	1	TOP SLAB	5.50	2.03	1	BOTTOM SLAB	13.67	
		TNT4A	33.075		1.68	55.70	1.40	1.68	1	TOP SLAB	5.87	2.02	1	BOTTOM SLAB	13.67	
		TNT6A	41.600		1.59	66.24	1.40	1.66	1	TOP SLAB	6.23	1.59	1	TOP SLAB	13.26	
		TNT7A	42.000		1.61	67.46	1.40	1.80	1	TOP SLAB	5.87	1.61	1	BOTTOM SLAB	13.67	
		TNT7B	42.000		1.57	65.89	1.40	1.57	1	TOP SLAB	6.23	1.60	1	BOTTOM SLAB	13.67	
		TNAGRIT4	43.000		1.56	66.98	1.40	1.61	1	TOP SLAB	5.87	1.56	1	BOTTOM SLAB	13.67	
TNAGT5A	45.000		1.49	67.20	1.40	1.66	1	TOP SLAB	5.87	1.49	1	BOTTOM SLAB	13.67			
TNAGT5B	45.000		1.49	67.20	1.40	1.66	2	TOP SLAB	1.10	1.49	1	BOTTOM SLAB	13.67			

### LOAD FACTORS:

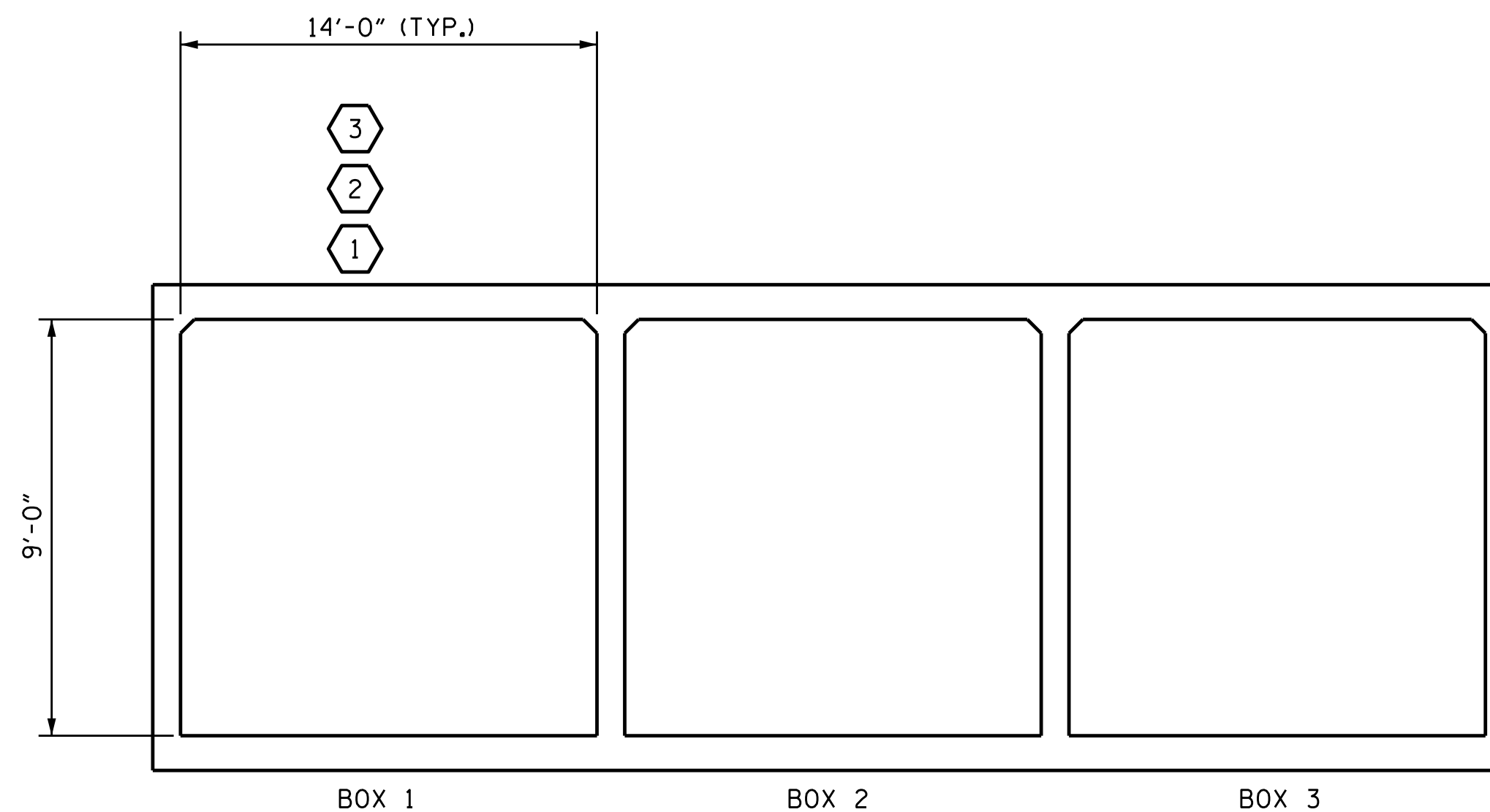
#### DESIGN LOAD RATING FACTORS

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	

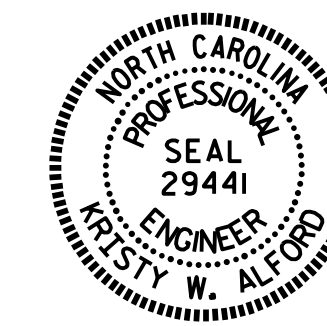


### LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-4490  
CUMBERLAND COUNTY  
 STATION: 19+26.42 -L-

SHEET 2 OF 18



DocuSigned by:  
 Kristy W. Alford  
 F24583930BF40E...

3/29/2016

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

ASSEMBLED BY : T.L. AVERETTE	DATE : 06-15
CHECKED BY : J.P. ADAMS	DATE : 08-15
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM

29-MAR-2016 09:20  
 R:\Structures\Plans\CULVERT19+26.42-L- PLANS\B4490\_culvert.dgn  
 jpodams

DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			18
2			4			

STD. NO. LRFR5