

## 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	1.09	--	1.75	1.09	1	TOP SLAB	4.96	1.14	1	TOP SLAB	10.60		
	HL-93 (OPERATING)	N/A		1.42	--	1.35	1.42	1	TOP SLAB	4.96	1.47	1	TOP SLAB	10.60		
	HS-20 (INVENTORY)	36.00	②	1.28	46.24	1.75	1.28	1	TOP SLAB	4.96	1.36	1	TOP SLAB	10.60		
	HS-20 (OPERATING)	36.00		1.67	59.94	1.35	1.67	1	TOP SLAB	4.96	1.76	1	TOP SLAB	10.60		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50		2.33	31.45	1.40	2.33	1	TOP SLAB	5.25	2.51	1	TOP SLAB	10.60	
		SNGARBS2	20.00		2.18	43.66	1.40	2.18	1	TOP SLAB	5.25	2.35	1	TOP SLAB	10.60	
		SNAGRIS2	22.00		2.33	51.26	1.40	2.33	1	TOP SLAB	5.25	2.51	1	TOP SLAB	10.60	
		SNCOTTS3	27.25	③	1.37	37.31	1.40	1.37	1	TOP SLAB	4.96	1.42	1	TOP SLAB	10.60	
		SNAGGRS4	34.93		1.71	59.65	1.40	1.71	1	TOP SLAB	5.25	1.75	1	TOP SLAB	10.60	
		SNS5A	35.55		1.58	56.10	1.40	1.59	1	TOP SLAB	5.25	1.58	1	TOP SLAB	10.60	
		SNS6A	39.95		1.55	62.11	1.40	1.59	1	TOP SLAB	5.25	1.55	1	TOP SLAB	10.60	
		SNS7B	42.00		1.52	63.92	1.40	1.65	1	TOP SLAB	4.96	1.52	1	TOP SLAB	10.60	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.00		2.22	73.37	1.40	2.33	1	TOP SLAB	5.25	2.22	1	TOP SLAB	10.60	
		TNT4A	33.08		1.63	54.05	1.40	1.63	1	TOP SLAB	4.96	1.69	1	TOP SLAB	10.60	
		TNT6A	41.60		1.55	64.49	1.40	1.68	1	TOP SLAB	4.96	1.55	1	TOP SLAB	10.60	
		TNT7A	42.00		1.57	66.14	1.40	1.74	1	TOP SLAB	4.96	1.57	1	TOP SLAB	10.60	
		TNT7B	42.00		1.61	67.80	1.40	1.61	1	TOP SLAB	5.25	1.64	1	TOP SLAB	10.60	
		TNAGRIT4	43.00		1.56	67.03	1.40	1.56	1	TOP SLAB	4.96	1.61	1	TOP SLAB	10.60	
		TNAGT5A	45.00		1.57	70.57	1.40	1.59	1	TOP SLAB	5.25	1.57	1	TOP SLAB	10.60	
		TNAGT5B	45.00		1.51	67.82	1.40	1.63	1	TOP SLAB	4.96	1.51	1	TOP SLAB	10.60	

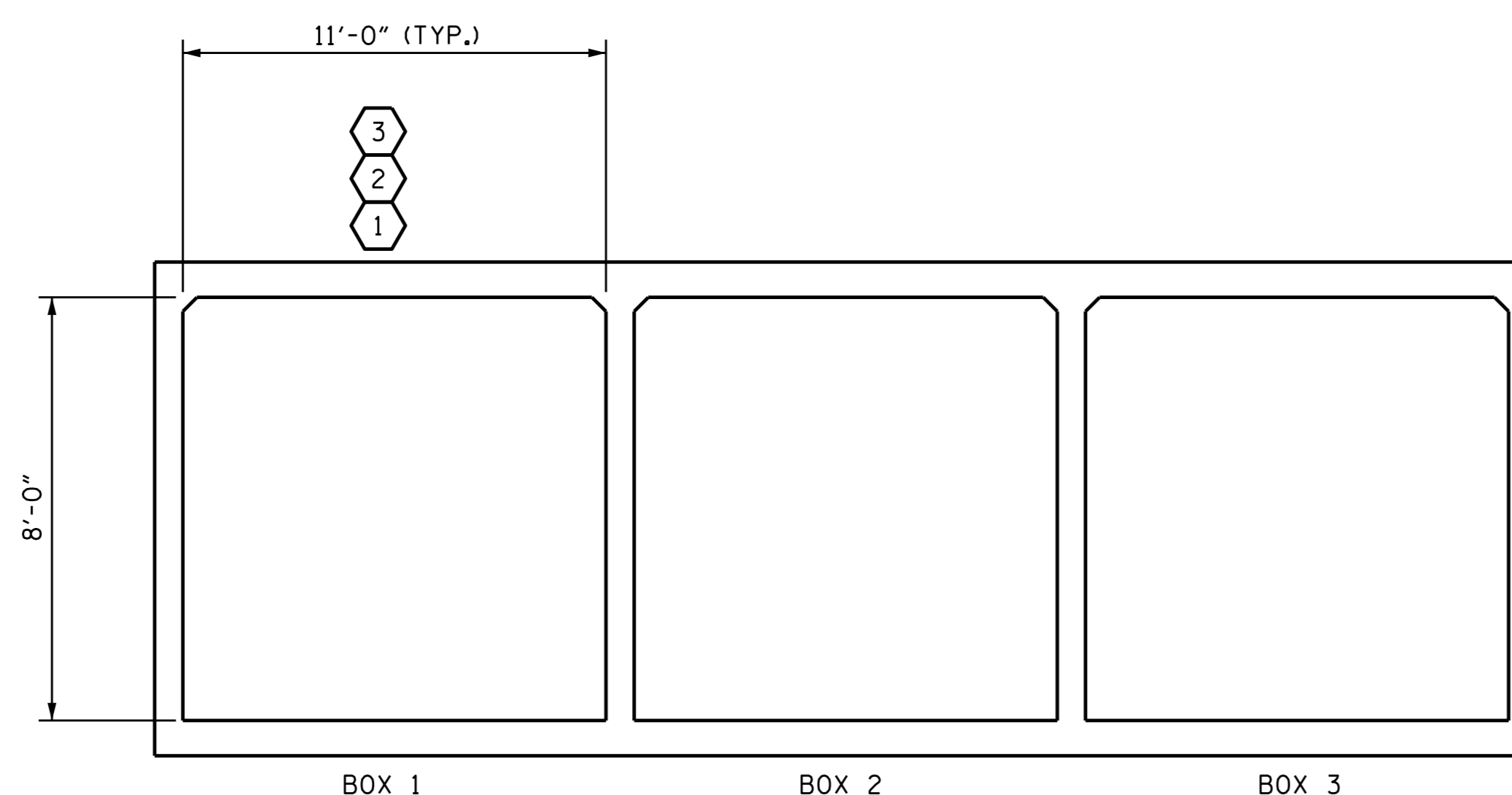
### LOAD FACTORS:

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	0.00
WA	1.00	0.00

### 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	

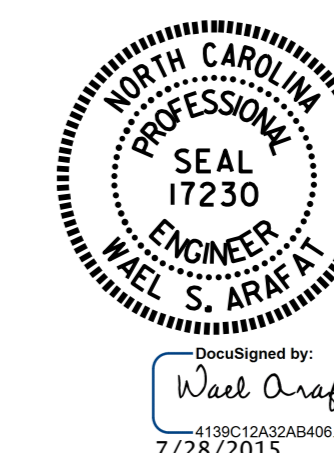


### LRFR SUMMARY (LOOKING DOWNSTREAM)

PROJECT NO. R-2915A  
WATAUGA/ASHE COUNTY  
 STATION: 9+89.00-LPC- /  
9+99.00-RPC-

SHEET 6 OF 6

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



REVISIONS						SHEET NO. C-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 20
2			4			

DRAWN BY: H. T. BARBOUR DATE: 3-19-15  
 CHECKED BY: M. K. BEARD DATE: 3-20-15  
 DESIGN ENGINEER OF RECORD: J. P. McCARTHA DATE: 4-15