

**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 (γ <sub>LL</sub> )	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	2.16	--	1.75	2.34	1	TOP SLAB	5.17	2.16	1	EXT. WALL	1.47	1	
	HL-93 (OPERATING)	N/A		2.80	--	1.35	3.04	1	TOP SLAB	5.17	2.80	1	EXT. WALL	1.47		
	HS-20 (INVENTORY)	36.000	②	2.16	77.76	1.75	2.29	1	TOP SLAB	5.17	2.16	1	EXT. WALL	1.47		
	HS-20 (OPERATING)	36.000		2.80	100.80	1.35	2.96	1	TOP SLAB	5.17	2.80	1	EXT. WALL	1.47		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.46	33.21	1.40	6.47	1	EXT. WALL	6.71	2.46	1	EXT. WALL	1.47	
		SNGARBS2	20,000		2.34	46.80	1.40	5.38	1	TOP SLAB	5.17	2.34	1	EXT. WALL	1.47	
		SNAGRIS2	22,000		2.34	51.48	1.40	4.89	1	TOP SLAB	5.17	2.34	1	EXT. WALL	1.47	
		SNCOTTS3	27,250		2.70	73.58	1.40	2.87	1	TOP SLAB	5.17	2.70	1	EXT. WALL	1.47	
		SNAGGRS4	34,925		2.45	85.57	1.40	2.63	1	TOP SLAB	5.17	2.45	1	TOP SLAB	1.43	
		SNS5A	35,550		2.58	91.72	1.40	2.58	1	TOP SLAB	5.17	2.53	1	TOP SLAB	1.43	
		SNS6A	39,950		2.26	90.29	1.40	2.32	1	TOP SLAB	5.17	2.26	1	TOP SLAB	1.43	
	SNS7B	42,000		2.22	93.24	1.40	2.32	1	TOP SLAB	5.17	2.22	1	TOP SLAB	1.43		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.66	87.78	1.40	2.66	1	TOP SLAB	5.17	2.70	1	EXT. WALL	1.47	
		TNT4A	33,075		2.69	88.97	1.40	2.69	1	TOP SLAB	5.17	2.70	1	TOP SLAB	1.43	
		TNT6A	41,600		2.27	94.43	1.40	2.35	1	TOP SLAB	5.17	2.27	1	TOP SLAB	1.43	
		TNT7A	42,000		2.25	94.50	1.40	2.37	1	TOP SLAB	5.17	2.25	1	TOP SLAB	1.43	
		TNT7B	42,000		2.40	100.80	1.40	2.53	1	TOP SLAB	5.17	2.40	1	TOP SLAB	1.43	
		TNAGRIT4	43,000		2.17	93.31	1.40	2.24	1	TOP SLAB	5.17	2.17	1	TOP SLAB	1.43	
TNAGR5A		45,000		2.37	106.65	1.40	2.44	1	TOP SLAB	5.17	2.37	1	TOP SLAB	1.43		
TNAGR5B	45,000		③	2.02	90.90	1.40	2.48	1	TOP SLAB	5.17	2.02	1	TOP SLAB	1.43		

**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	--

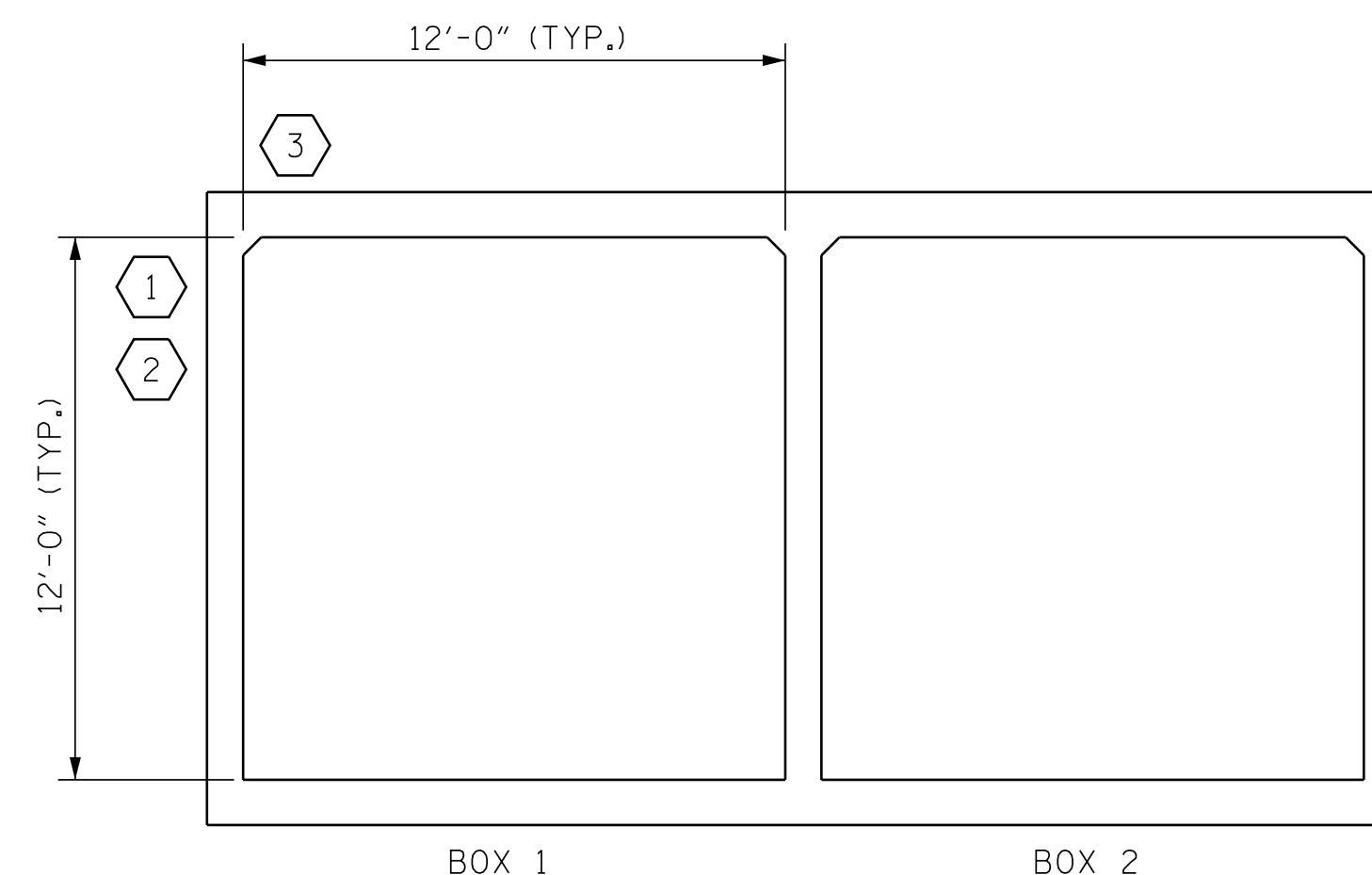
**NOTE:**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS:**

- ALL MEASUREMENTS ARE TAKEN FROM THE CENTER OF WALL AND CENTER OF SLAB OF THE BOX NUMBER INDICATED. WALL MEASUREMENTS TAKEN FROM THE CENTER OF BOTTOM SLAB.

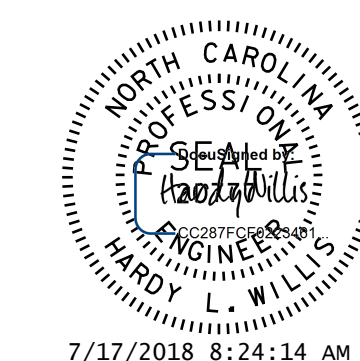
①	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



**LRFR SUMMARY**  
(LOOKING DOWNSTREAM)

PROJECT NO. R-3825B  
JOHNSTON COUNTY  
 STATION: 167+03.00 -L-

SHEET 10 OF 10



DOCUMENT NOT CONSIDERED  
FINAL UNLESS ALL  
SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**LRFR SUMMARY FOR  
REINFORCED CONCRETE  
BOX CULVERTS**  
(NON-INTERSTATE TRAFFIC)

**V&M**  
Vaughn & Melton  
Consulting Engineers

Asheville,  
North Carolina  
828-253-2796

Boone, NC 828-355-9933  
Tri-Cities, TN 423-467-8401  
Knoxville, TN 865-546-5800  
Spartanburg, SC 864-574-4375  
Charleston, SC 843-974-5650  
Middlesboro, KY 606-248-6600  
Raleigh, NC 919-977-9455  
Charlotte, NC 704-357-0488  
Atlanta, GA 770-627-3590

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DSG. ENG. OF RECORD.: CDB		REVISIONS				SHEET NO.
DWN. BY: MAF	DATE: 12/17	NO.	BY:	DATE:		C1-10
CHKD. BY: HLW	DATE: 12/17	1				TOTAL SHEETS
		2				10