

**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>L</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	1.42	--	1.75	1.66	1	BOTT. SLAB	4.17	1.42	1	TOP SLAB	1.00		
	HL-93 (OPERATING)	N/A		1.84	--	1.35	2.15	1	BOTT. SLAB	4.17	1.84	1	TOP SLAB	1.00		
	HS-20 (INVENTORY)	36.000	2	1.31	47.16	1.75	1.64	1	TOP SLAB	4.17	1.31	1	TOP SLAB	1.00		
	HS-20 (OPERATING)	36.000		1.70	61.20	1.35	2.12	1	TOP SLAB	4.17	1.70	1	TOP SLAB	1.00		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		3.05	41.18	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00		
		SNGARBS2	20.000		2.77	55.40	1.40	2.98	1	TOP SLAB	4.17	2.77	1	TOP SLAB	1.00	
		SNAGRIS2	22.000		3.05	67.10	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00	
		SNCOTTS3	27.250	3	1.79	48.78	1.40	2.07	1	BOTT. SLAB	4.17	1.79	1	BOTT. SLAB	1.00	
		SNAGGRS4	34.925		2.52	88.01	1.40	2.73	1	BOTT. SLAB	4.17	2.52	1	BOTT. SLAB	1.00	
		SNS5A	35.550		2.23	79.28	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		SNS6A	39.950		2.23	89.09	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
	SNS7B	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.05	100.65	1.40	3.19	1	TOP SLAB	4.17	3.05	1	TOP SLAB	1.00	
		TNT4A	33.075		2.23	73.76	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT6A	41.600		2.23	92.77	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT7A	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNT7B	42.000		2.23	93.66	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
		TNAGRIT4	43.000		2.23	95.89	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00	
TNAGT5A		45.000		2.23	100.35	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00		
TNAGT5B	45.000		2.23	100.35	1.40	2.47	1	BOTT. SLAB	4.17	2.23	1	BOTT. SLAB	1.00			
EMERGENCY VEHICLE (EV)	EV2	28.750		1.83	52.61	1.30	2.25	1	TOP SLAB	4.17	1.83	1	TOP SLAB	1.00		
	EV3	43.000	4	1.48	63.64	1.30	1.80	1	BOTT. SLAB	4.17	1.48	1	BOTT. SLAB	1.00		

**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	--

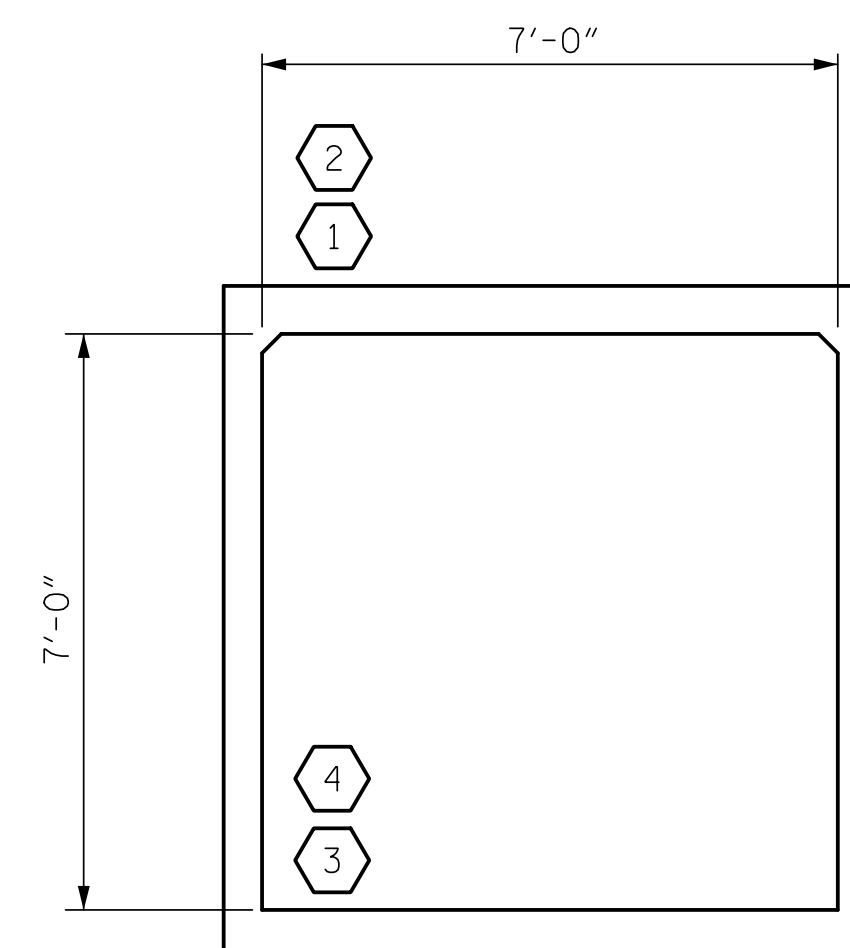
**NOTE**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS**

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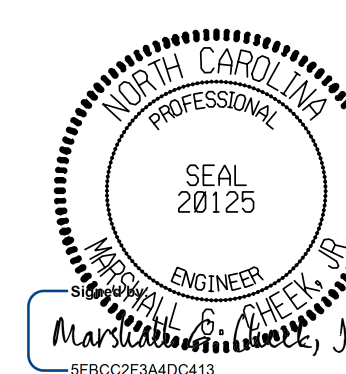
#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
4	EMERGENCY VEHICLE LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



**LRFR SUMMARY**

PROJECT NO. B-5833  
YADKIN COUNTY  
 STATION: 12+93.03 -L-

SHEET 2 OF 9



11/20/2025

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

ASSEMBLED BY : ZCS	DATE : 7/23
CHECKED BY : MGC	DATE : 7/23
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/1/11	MAA/THC
REV. 04/23	BRB/AAI

8/4/2023  
 X:\NCDOT\B-5833\Structures\Final plans\DCNs\Culvert\411.003.B-5833.CU02.982099.dgn  
 User:ZSmlth

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS  
 706 HILLSBOROUGH STREET  
 SUITE 200  
 RALEIGH, NC 27603  
 PH (919) 773-8887  
 CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS
2			4			9

STD. NO. LRFR5