

## 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	1.20	--	1.75	1.20	1	BOTTOM SLAB	5.50	1.44	1	BOTTOM SLAB	5.50		
	HL-93 (OPERATING)	N/A		1.56	--	1.35	1.56	1	BOTTOM SLAB	5.50	1.87	1	BOTTOM SLAB	5.50		
	HS-20 (INVENTORY)	36.000	②	1.22	43.92	1.75	1.22	1	BOTTOM SLAB	5.50	1.44	1	BOTTOM SLAB	5.50		
	HS-20 (OPERATING)	36.000		1.59	57.24	1.35	1.59	1	BOTTOM SLAB	5.50	1.87	1	BOTTOM SLAB	5.50		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	③	1.80	24.30	1.40	1.91	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNGARBS2	20.000		1.75	35.00	1.40	1.75	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNAGRIS2	22.000		1.70	37.40	1.40	1.70	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNCOTTS3	27.250		1.50	40.88	1.40	1.50	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNAGGRS4	34.925		1.63	56.93	1.40	1.63	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNS5A	35.550		1.79	63.63	1.40	1.79	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNS6A	39.950		1.74	69.51	1.40	1.74	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		SNS7B	42.000		1.58	66.36	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.64	54.12	1.40	1.64	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		TNT4A	33.075		1.58	52.26	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		TNT6A	41.600		1.58	65.73	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		TNT7A	42.000		1.58	66.36	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		TNT7B	42.000		1.58	66.36	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
		TNAGRIT4	43.000		1.58	67.94	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50	
TNAGT5A	45.000		1.58	71.10	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50			
TNAGT5B	45.000		1.58	71.10	1.40	1.58	1	BOTTOM SLAB	5.50	1.80	1	BOTTOM SLAB	5.50			

**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.

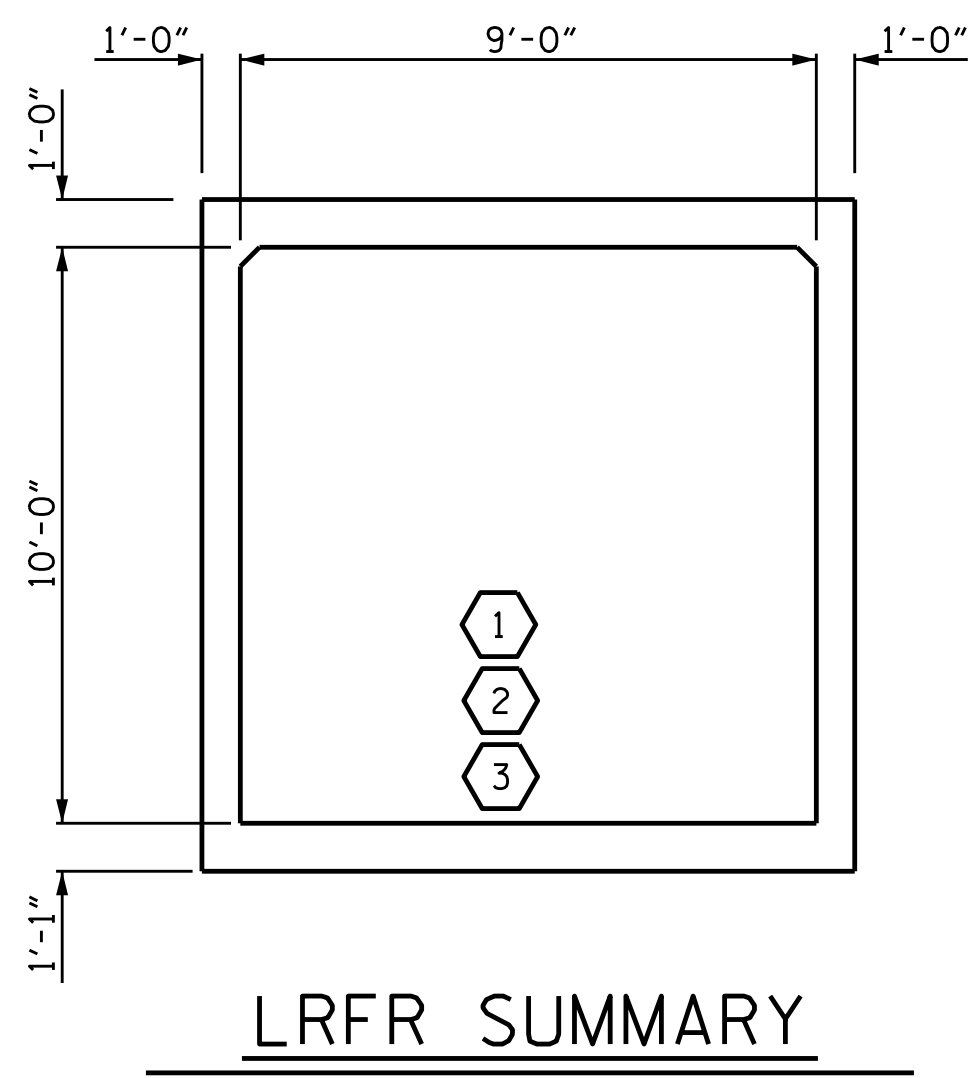
# CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE



PROJECT NO. B-5825  
YADKIN/FORSYTH COUNTY  
 STATION: 19+90.69 -Y2-

SHEET 2 OF 6

4/14/2020

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C2-2
2			4			TOTAL SHEETS 13

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

ASSEMBLED BY : STM	DATE : 10/19
CHECKED BY : MGC	DATE : 10/19
DRAWN BY : WMC	7/11
CHECKED BY : GM	7/11
REV. 10/1/11	MAA/GM
REV. 12/17	MAA/THC