

**LOAD AND RESISTANCE FACTOR RATING (LRFR)  
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS**

LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (γ <sub>L</sub> )	MOMENT				SHEAR					
							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	1.34	--	1.75	2.03	2	TOP SLAB	4.0	1.34	2	TOP SLAB	0.1		
	HL-93 (OPERATING)	N/A		1.74	--	1.35	2.63	2	TOP SLAB	4.0	1.74	2	TOP SLAB	0.1		
	HS-20 (INVENTORY)	36,000	②	1.52	54.72	1.75	1.89	2	TOP SLAB	4.0	1.52	2	TOP SLAB	0.1		
	HS-20 (OPERATING)	36,000		1.97	70.92	1.35	2.45	2	TOP SLAB	4.0	1.97	2	TOP SLAB	0.1		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		3.95	53.32	1.40	5.01	1	TOP SLAB	4.0	3.95	1	TOP SLAB	8.0	
		SNGARBS2	20,000		3.70	74.00	1.40	4.69	1	TOP SLAB	4.0	3.70	1	TOP SLAB	8.0	
		SNAGRIS2	22,000		3.95	86.90	1.40	4.99	1	BOT. SLAB	8.0	3.95	1	TOP SLAB	8.0	
		SNCOTTS3	27,250		2.39	65.13	1.40	3.02	1	TOP SLAB	4.0	2.39	2	TOP SLAB	0.1	
		SNAGGRS4	34,925		2.96	103.38	1.40	3.64	2	BOT. SLAB	0.1	2.96	2	TOP SLAB	0.1	
		SNS5A	35,550		2.77	98.47	1.40	3.76	2	BOT. SLAB	0.1	2.77	2	TOP SLAB	0.1	
		SNS6A	39,950		2.69	107.46	1.40	3.39	2	BOT. SLAB	0.1	2.69	2	TOP SLAB	0.1	
		SNS7B	42,000		2.69	112.98	1.40	3.39	2	BOT. SLAB	0.1	2.69	2	TOP SLAB	0.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		3.61	119.13	1.40	4.95	2	BOT. SLAB	0.1	3.61	2	TOP SLAB	0.1	
		TNT4A	33,075		2.77	91.62	1.40	3.90	2	BOT. SLAB	0.1	2.77	2	TOP SLAB	0.1	
		TNT6A	41,600		2.76	114.82	1.40	3.83	2	BOT. SLAB	0.1	2.76	2	TOP SLAB	0.1	
		TNT7A	42,000		2.77	116.34	1.40	3.87	2	BOT. SLAB	0.1	2.77	2	TOP SLAB	0.1	
		TNT7B	42,000		2.70	113.40	1.40	3.64	2	BOT. SLAB	0.1	2.70	2	TOP SLAB	0.1	
		TNAGRIT4	43,000		2.69	115.67	1.40	3.38	2	BOT. SLAB	0.1	2.69	2	TOP SLAB	0.1	
EMERGENCY VEHICLE (EV)	EV2	28,750		2.61	75.03	1.30	3.25	2	TOP SLAB	4.0	2.61	2	TOP SLAB	0.1		
	EV3	43,000	③	1.95	83.85	1.30	2.94	2	TOP SLAB	4.0	1.95	2	TOP SLAB	0.1		

**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	--

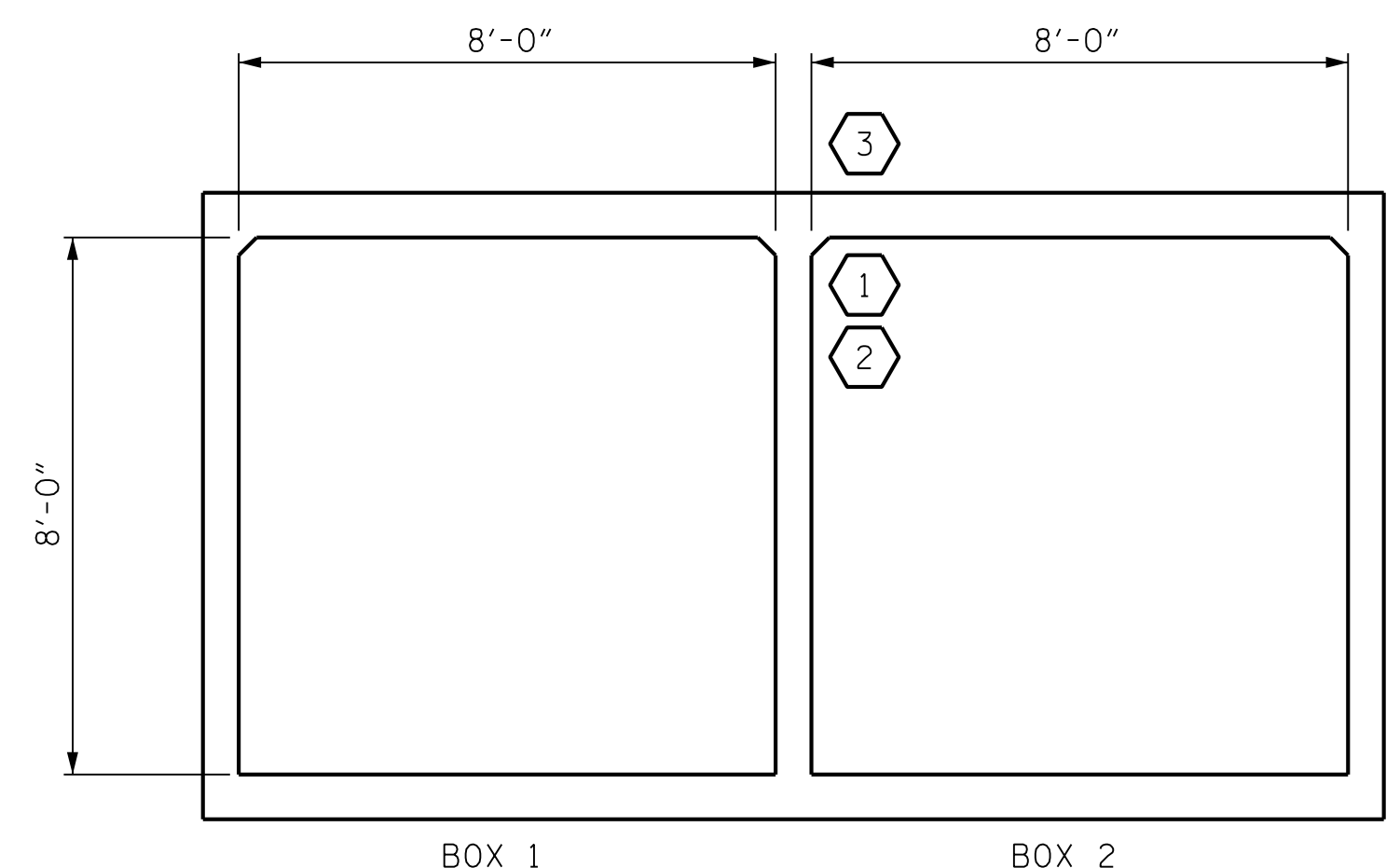
**NOTE:**

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

**COMMENTS:**

1. MINIMUM FILL CONTROLS.
- 2.
- 3.
- 4.

#	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-5861  
CHEROKEE COUNTY  
STATION: 71+92.10 -L-

SHEET 2 OF 15

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

LRFR SUMMARY FOR  
REINFORCED CONCRETE  
BOX CULVERT  
LEFT AND RIGHT EXTENSION  
(NON-INTERSTATE TRAFFIC)

CULVERT NO. 06

8/31/2023

**RK&K**  
P: (919) 878-9560  
8601 Six Forks Road, Forum 1 Suite 700  
Raleigh, North Carolina 27615 | NC License No. F-0112  
www.rkk.com  
Engineers | Construction Managers | Planners | Scientists  
Responsive People | Creative Solutions

REVISIONS				SHEET NO.			
NO.	BY:	DATE:	NO.	BY:	DATE:	CU-6-2	
1			3			TOTAL SHEETS	
2			4			15	

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

8/31/2023 R:\Structures\Culverts\Culvert 6 - CobbCreek\DGN\Final\R-5861\_CU\_6-2\_190003.dgn

DRAWN BY : A. J. WOLCOTT DATE : JUL 2023  
CHECKED BY : R. V. KEITH DATE : JUL 2023  
DESIGN ENGINEER OF RECORD : R. V. KEITH DATE : JUL 2023