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 × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	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)	1.01	--	1.75	1.35	1	BOTTOM SLAB	8.02	1.01	1	BOTTOM SLAB	7.79	
		HL-93 (OPERATING)	N/A		1.31	--	1.35	1.75	1	BOTTOM SLAB	8.02	1.31	1	BOTTOM SLAB	7.79	
		HS-20 (INVENTORY)	36.000	(2)	1.01	36.25	1.75	1.35	1	BOTTOM SLAB	8.02	1.01	1	BOTTOM SLAB	7.79	
		HS-20 (OPERATING)	36.000		1.31	46.98	1.35	1.75	1	BOTTOM SLAB	8.02	1.31	1	BOTTOM SLAB	7.79	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.07	27.89	1.40	3.60	1	TOP SLAB	3.68	2.07	1	TOP SLAB	7.79	
		SNGARBS2	20.000		1.93	38.65	1.40	2.64	1	BOTTOM SLAB	8.02	1.93	1	TOP SLAB	7.79	
		SNAGRIS2	22.000		1.83	40.30	1.40	2.45	1	BOTTOM SLAB	8.02	1.83	1	BOTTOM SLAB	7.79	
		SNCOTTS3	27.250		1.31	35.60	1.40	1.86	1	BOTTOM SLAB	8.02	1.31	1	TOP SLAB	7.79	
		SNAGGRS4	34.925		1.47	51.41	1.40	1.90	1	BOTTOM SLAB	8.02	1.47	1	BOTTOM SLAB	7.79	
		SNS5A	35.550		1.29	45.79	1.40	1.79	1	BOTTOM SLAB	8.02	1.29	1	BOTTOM SLAB	7.79	
		SNS6A	39.950		1.25	49.90	1.40	1.67	1	BOTTOM SLAB	8.02	1.25	1	BOTTOM SLAB	7.79	
		SNS7B	42.000		1.27	53.26	1.40	1.67	1	BOTTOM SLAB	8.02	1.27	1	BOTTOM SLAB	7.79	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.81	59.79	1.40	2.43	1	BOTTOM SLAB	8.02	1.81	1	BOTTOM SLAB	7.79	
		TNT4A	33.075		1.48	48.91	1.40	1.89	1	BOTTOM SLAB	8.02	1.48	1	BOTTOM SLAB	7.79	
		TNT6A	41.600		1.52	63.20	1.40	1.93	1	BOTTOM SLAB	8.02	1.52	1	TOP SLAB	7.79	
		TNT7A	42.000		1.51	63.24	1.40	2.06	1	BOTTOM SLAB	8.02	1.51	1	BOTTOM SLAB	7.79	
		TNT7B	42.000		1.36	57.23	1.40	1.76	1	BOTTOM SLAB	8.02	1.36	1	BOTTOM SLAB	7.79	
		TNAGRIT4	43.000		1.23	53.10	1.40	1.60	1	BOTTOM SLAB	8.02	1.23	1	BOTTOM SLAB	7.79	
		TNAGT5A	45.000		1.25	56.42	1.40	1.63	1	BOTTOM SLAB	8.02	1.25	1	BOTTOM SLAB	7.79	
		TNAGT5B	45.000	(3)	1.23	55.16	1.40	1.65	1	BOTTOM SLAB	8.02	1.23	1	BOTTOM SLAB	7.79	

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.
2.
3.
4.

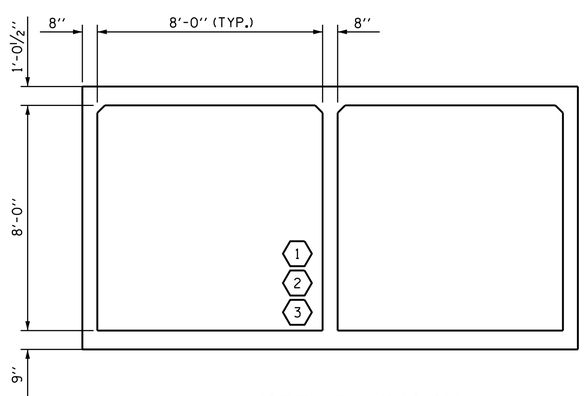
(#) CONTROLLING LOAD RATING

(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-2519B

MITCHELL COUNTY

STATION: 323+58.66 -L-

SHEET 11 OF 11

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHECK, JR.

9/2/2014 Marshall C. Check, Jr.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-64
1			3			TOTAL SHEETS
2			4			87

STR. #11 STD. NO. LRFR5

ASSEMBLED BY : M. POOLE DATE : 10/13
CHECKED BY : D. HODGE DATE : 10/13
DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11
REV. 10/1/11 MAA/GM

$$$$$$SYSTIME$$$$$
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$$$$USERNAME$$$$