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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	**1.06**	--	1.75	1.37	1	BOTTOM SLAB	5.667	**1.06**	1	BOTTOM SLAB	0.873	
		HL-93 (OPERATING)	N/A		1.37	--	1.35	1.78	1	BOTTOM SLAB	5.667	1.37	1	BOTTOM SLAB	0.873	
		HS-20 (INVENTORY)	36.000	2	**1.10**	39.60	1.75	1.43	1	BOTTOM SLAB	5.667	**1.10**	1	BOTTOM SLAB	0.873	
		HS-20 (OPERATING)	36.000		1.43	51.48	1.35	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.43	19.31	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNGARBS2	20.000		1.43	28.60	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNAGRIS2	22.000		1.43	31.46	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNCOTTS3	27.250		1.43	38.97	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNAGGRS4	34.925		1.43	49.94	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNS5A	35.550		1.43	50.84	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNS6A	39.950		1.43	57.13	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		SNS7B	42.000		1.43	60.06	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.43	47.19	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNT4A	33.075		1.43	47.30	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNT6A	41.600		1.43	59.49	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNT7A	42.000		1.43	60.06	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNT7B	42.000		1.43	60.06	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNAGRIT4	43.000		1.43	61.49	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNAGT5A	45.000		1.43	64.35	1.40	1.85	1	BOTTOM SLAB	5.667	1.43	1	BOTTOM SLAB	0.873	
		TNAGT5B	45.000	3	**1.43**	64.35	1.40	1.85	1	BOTTOM SLAB	5.667	**1.43**	1	BOTTOM SLAB	0.873	

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.

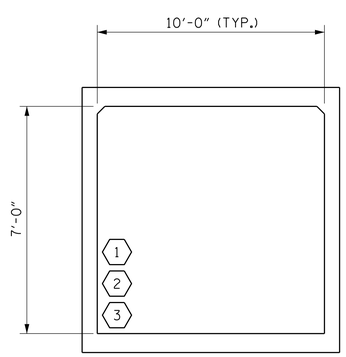
(#) CONTROLLING LOAD RATING

(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. U-5105

HENDERSON COUNTY

STATION: 21+17.00 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL KEVIN AUSTIN 027837 DocuSigned by: K. Kevin Austin 2/27/2018 2:15:00 PM EST

2/27/2018

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2
1			3			TOTAL SHEETS 7
2			4			

STD. NO. LRFR5

ASSEMBLED BY : W. B. ALLEN DATE : 2/17
CHECKED BY : Z. H. BROWN DATE : 2/17
DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11
REV. 10/1/11 MAA/GM

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