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 $\gamma_{(LL)}$	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	1.22	--	1.75	**1.22**	1	BOTTOM SLAB	**13.71**	1.35	1	BOTTOM SLAB	12.81	
		HL-93 (OPERATING)	N/A		1.58	--	1.35	1.58	1	BOTTOM SLAB	13.71	1.74	1	BOTTOM SLAB	12.81	
		HS-20 (INVENTORY)	36.000	2	1.22	43.98	1.75	**1.22**	1	BOTTOM SLAB	**13.71**	1.35	1	BOTTOM SLAB	12.81	
		HS-20 (OPERATING)	36.000		1.58	57.01	1.35	1.58	1	BOTTOM SLAB	13.71	1.74	1	BOTTOM SLAB	12.81	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.24	30.20	1.40	2.24	1	EXTERIOR WALL	7.75	3.32	1	EXTERIOR WALL	13.15	
		SNGARBS2	20.000		2.15	43.06	1.40	2.15	1	BOT CNR WALL	0.34	3.00	1	BOTTOM SLAB	12.81	
		SNAGRIS2	22.000		2.08	45.79	1.40	2.08	1	BOT CNR WALL	0.34	2.76	1	BOTTOM SLAB	12.81	
		SNCOTTS3	27.250		1.70	46.20	1.40	1.70	1	TOP SLAB	5.83	2.00	1	TOP SLAB	12.31	
		SNAGGRS4	34.925		1.56	54.45	1.40	1.56	1	BOTTOM SLAB	13.71	1.74	1	BOTTOM SLAB	12.81	
		SNS5A	35.550		1.53	54.29	1.40	1.53	1	BOTTOM SLAB	13.71	1.71	1	BOTTOM SLAB	12.81	
		SNS6A	39.950		1.37	54.56	1.40	1.37	1	BOTTOM SLAB	13.71	1.52	1	BOTTOM SLAB	12.81	
		SNS7B	42.000		1.31	54.83	1.40	1.31	1	BOTTOM SLAB	13.71	1.45	1	BOTTOM SLAB	12.81	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.69	55.69	1.40	1.69	1	BOTTOM SLAB	13.71	1.84	1	BOTTOM SLAB	12.81	
		TNT4A	33.075		1.65	54.58	1.40	1.65	1	BOTTOM SLAB	13.71	1.84	1	BOTTOM SLAB	12.81	
		TNT6A	41.600		1.32	55.04	1.40	1.32	1	BOTTOM SLAB	13.71	1.47	1	BOTTOM SLAB	12.81	
		TNT7A	42.000		1.31	55.20	1.40	1.31	1	BOTTOM SLAB	13.71	1.46	1	BOTTOM SLAB	12.81	
		TNT7B	42.000		1.31	55.08	1.40	1.31	1	BOTTOM SLAB	13.71	1.46	1	BOTTOM SLAB	12.81	
		TNAGRIT4	43.000		1.29	55.29	1.40	1.29	1	BOTTOM SLAB	13.71	1.41	1	BOTTOM SLAB	12.81	
		TNAGT5A	45.000	3	1.23	55.35	1.40	**1.23**	1	BOTTOM SLAB	**13.71**	1.36	1	BOTTOM SLAB	12.81	
		TNAGT5B	45.000		1.24	55.69	1.40	1.24	1	BOTTOM SLAB	13.71	1.36	1	BOTTOM SLAB	12.81	

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.

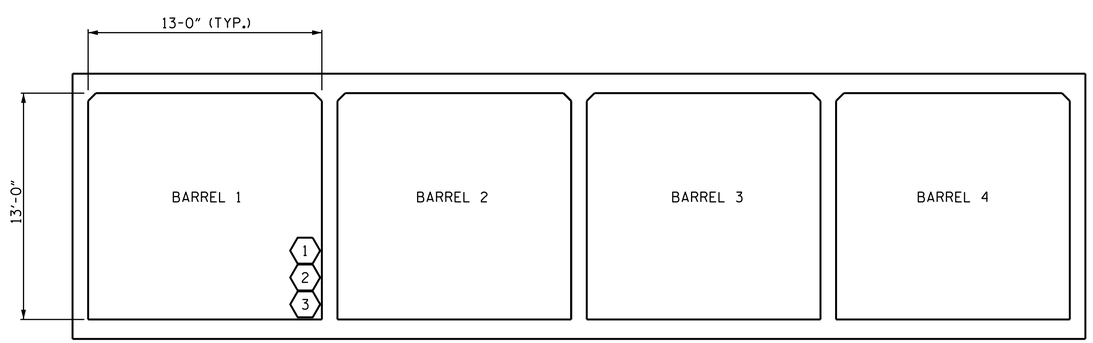
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-5127

HOKE COUNTY

STATION: 14+00.00 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 16301 ENGINEER TING HSIUNG FANG

DocuSigned by: Ting H. Fang
E72084000977435...
12/19/2014

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			8

STD. NO. LRFR5

ASSEMBLED BY :	E. I. OMILE	DATE :	4/13
CHECKED BY :	S.L. WANCE	DATE :	4/13
DESIGN ENGINEER OF RECORD:	E. I. OMILE	DATE :	11/5/14
DRAWN BY : WMC	7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM	7/11		

19-DEC-2014 12:24
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