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
							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	1.27	--	1.75	1.27	1	TOP CORNER WALL	0.85	1.80	1	EXTERIOR WALL	10.09	
		HL-93 (OPERATING)	N/A		1.65	--	1.35	1.65	1	TOP CORNER WALL	0.85	2.33	1	EXTERIOR WALL	10.09	
		HS-20 (INVENTORY)	36.000	2	1.50	53.89	1.75	1.50	1	TOP CORNER WALL	0.85	1.80	1	EXTERIOR WALL	10.09	
		HS-20 (OPERATING)	36.000		1.94	69.85	1.35	1.94	1	TOP CORNER WALL	0.85	2.33	1	EXTERIOR WALL	10.09	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.12	28.67	1.40	2.12	1	TOP CORNER WALL	0.85	2.34	1	EXTERIOR WALL	10.09	
		SNGARBS2	20.000		2.07	41.42	1.40	2.07	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		SNAGRIS2	22.000		2.12	46.72	1.40	2.12	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		SNCOTTS3	27.250		1.58	43.12	1.40	1.58	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		SNAGGRS4	34.925		1.58	55.27	1.40	1.58	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	
		SNS5A	35.550		1.55	55.22	1.40	1.55	1	TOP CORNER WALL	0.85	2.28	1	EXTERIOR WALL	10.09	
		SNS6A	39.950	3	1.54	61.48	1.40	1.54	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	
		SNS7B	42.000		1.55	65.24	1.40	1.55	1	TOP CORNER WALL	0.85	2.28	1	EXTERIOR WALL	10.09	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.80	59.52	1.40	1.80	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		TNT4A	33.075		1.69	56.04	1.40	1.69	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		TNT6A	41.600		1.66	69.09	1.40	1.66	1	TOP CORNER WALL	0.85	2.28	1	EXTERIOR WALL	10.09	
		TNT7A	42.000		1.78	74.95	1.40	1.78	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	
		TNT7B	42.000		1.60	67.10	1.40	1.60	1	TOP CORNER WALL	0.85	2.29	1	EXTERIOR WALL	10.09	
		TNAGRIT4	43.000		1.66	71.42	1.40	1.66	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	
		TNAGT5A	45.000		1.68	75.49	1.40	1.68	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	
		TNAGT5B	45.000		1.69	76.25	1.40	1.69	1	TOP CORNER WALL	0.85	2.24	1	EXTERIOR WALL	10.09	

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	0.50 OR 0.90
ES	1.35	0.50 OR 0.90
LS	1.75	0.00
WA	1.00	0.00

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1. THIS LRFR RATING APPLIES TO THE LEFT EXTENSION ONLY.
2.
3.
4.

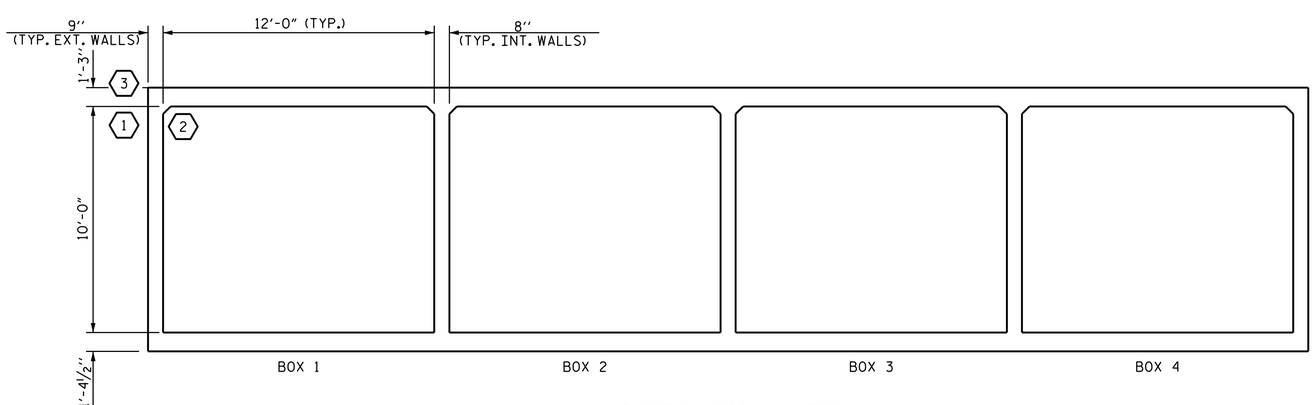
(#) CONTROLLING LOAD RATING

(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

YANCEY COUNTY

STATION: 44+11.92 -L-

SHEET 10 OF 17

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)
(LEFT EXTENSION)

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

8/27/2014 Marshall A. Check, Jr.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			87

STR. #7 STD. NO. LRFR5

ASSEMBLED BY : D. HODGE DATE : 9/13
CHECKED BY : D. A. GLADDEN DATE : 10/13
DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11
REV. 10/1/11 MAA/GM

$$$$$$$SYSTIME$$$$$
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