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	10.77	--	1.75	**10.77**	1	**BOT CNR WALL**	**6.82**	13.06	1	EXTERIOR WALL	6.09	
		HL-93 (OPERATING)	N/A		13.96	--	1.35	13.96	1	BOT CNR WALL	6.82	16.94	1	EXTERIOR WALL	6.09	
		HS-20 (INVENTORY)	36.000	2	10.77	387.61	1.75	**10.77**	1	**BOT CNR WALL**	**6.82**	13.06	1	EXTERIOR WALL	6.09	
		HS-20 (OPERATING)	36.000		13.96	502.46	1.35	13.96	1	BOT CNR WALL	6.82	16.94	1	EXTERIOR WALL	6.09	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	3	13.46	181.69	1.40	**13.46**	1	**BOT CNR WALL**	**6.82**	16.33	1	EXTERIOR WALL	6.09	
		SNGARBS2	20.000		13.46	269.18	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNAGRIS2	22.000		13.46	296.09	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNCOTTS3	27.250		13.46	366.75	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNAGGRS4	34.925		13.46	470.05	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNS5A	35.550		13.46	478.46	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNS6A	39.950		13.46	537.68	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		SNS7B	42.000		13.46	565.27	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		13.46	444.14	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNT4A	33.075		13.46	445.15	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNT6A	41.600		13.46	559.89	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNT7A	42.000		13.46	565.27	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNT7B	42.000		13.46	565.27	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNAGRIT4	43.000		13.46	578.73	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNAGT5A	45.000		13.46	605.64	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	
		TNAGT5B	45.000		13.46	605.64	1.40	13.46	1	BOT CNR WALL	6.82	16.33	1	EXTERIOR WALL	6.09	

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	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

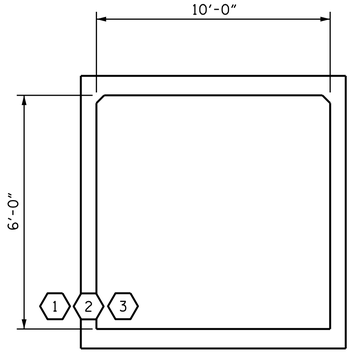
(#) CONTROLLING LOAD RATING

(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. R-0623

MONTGOMERY COUNTY

STATION: 188+02.00 -L-

SHEET 5 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WANCE

9/29/2014

DocuSigned by: Steve L. Wance 986CB74EEDF1402...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-19
1			3			TOTAL SHEETS
2			4			29

ASSEMBLED BY : C. L. YOKELEY DATE : 7-16-14
CHECKED BY : S. L. WANCE DATE : 7-23-14

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

REV. 10/1/11 MAA/GM

29-SEP-2014 11:36
K:\TIPProjects-R\R0623\Structures\Plans\FinalPlans\R0623_sd_cul3.dgn
tfang

CULVERT #3

STD. NO. LRFR5