

7/11/2017 3:30:17 PM I:\Projects\4016617\4016617_000\50_Deliverables & Submittals\U-4751\Structures\Culverts\CU #3\410_003_U4751_SML_CU_002_640003.dgn

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 (%LL)	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (±)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (±)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.130	--	1.75	1.13	1 & 2	TOP SLAB	4.69'	1.14	1 & 2	BOTTOM SLAB	10.10'		
	HL-93 (OPERATING)	N/A		1.460	--	1.35	1.46	1 & 2	TOP SLAB	4.69'	1.48	1 & 2	BOTTOM SLAB	10.10'		
	HS-20 (INVENTORY)	36.000	②	1.250	45.000	1.75	1.29	1 & 2	TOP SLAB	4.69'	1.25	1 & 2	TOP SLAB	10.16'		
	HS-20 (OPERATING)	36.000		1.620	58.320	1.35	1.68	1 & 2	TOP SLAB	4.69'	1.62	1 & 2	TOP SLAB	10.16'		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		1.910	25.785	1.40	2.36	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'		
		SNGARBS2	20.000		1.900	38.000	1.40	2.20	1 & 2	TOP SLAB	4.69'	1.90	1 & 2	EXTERIOR WALL	1.53'	
		SNAGRIS2	22.000		1.910	42.020	1.40	2.36	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'	
		SNCOTTS3	27.250	③	1.720	46.870	1.40	1.72	1 & 2	TOP SLAB	4.69'	1.89	1 & 2	EXTERIOR WALL	1.53'	
		SNAGGRS4	34.925		1.880	65.659	1.40	2.27	1 & 2	TOP SLAB	4.69'	1.88	1 & 2	EXTERIOR WALL	1.53'	
		SNS5A	35.550		1.900	67.545	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.90	1 & 2	EXTERIOR WALL	1.53'	
		SNS6A	39.950		1.900	75.905	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.90	1 & 2	EXTERIOR WALL	1.53'	
		SNS7B	42.000		1.900	79.800	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.90	1 & 2	EXTERIOR WALL	1.53'	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.900	62.700	1.40	2.36	1 & 2	TOP SLAB	4.69'	1.90	1 & 2	EXTERIOR WALL	1.53'	
		TNT4A	33.075		1.910	63.173	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'	
		TNT6A	41.600		1.910	79.456	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'	
		TNT7A	42.000		1.910	80.220	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'	
		TNT7B	42.000		1.910	80.220	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.91	1 & 2	EXTERIOR WALL	1.53'	
		TNAGRIT4	43.000		1.880	80.840	1.40	1.96	1 & 2	TOP SLAB	4.69'	1.88	1 & 2	EXTERIOR WALL	1.53'	
TNACT5A	45.000		1.890	85.050	1.40	1.96	1 & 2	TOP SLAB	4.69'	1.89	1 & 2	EXTERIOR WALL	1.53'			
TNACT5B	45.000		1.890	85.050	1.40	2.05	1 & 2	TOP SLAB	4.69'	1.89	1 & 2	EXTERIOR WALL	1.53'			

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	--

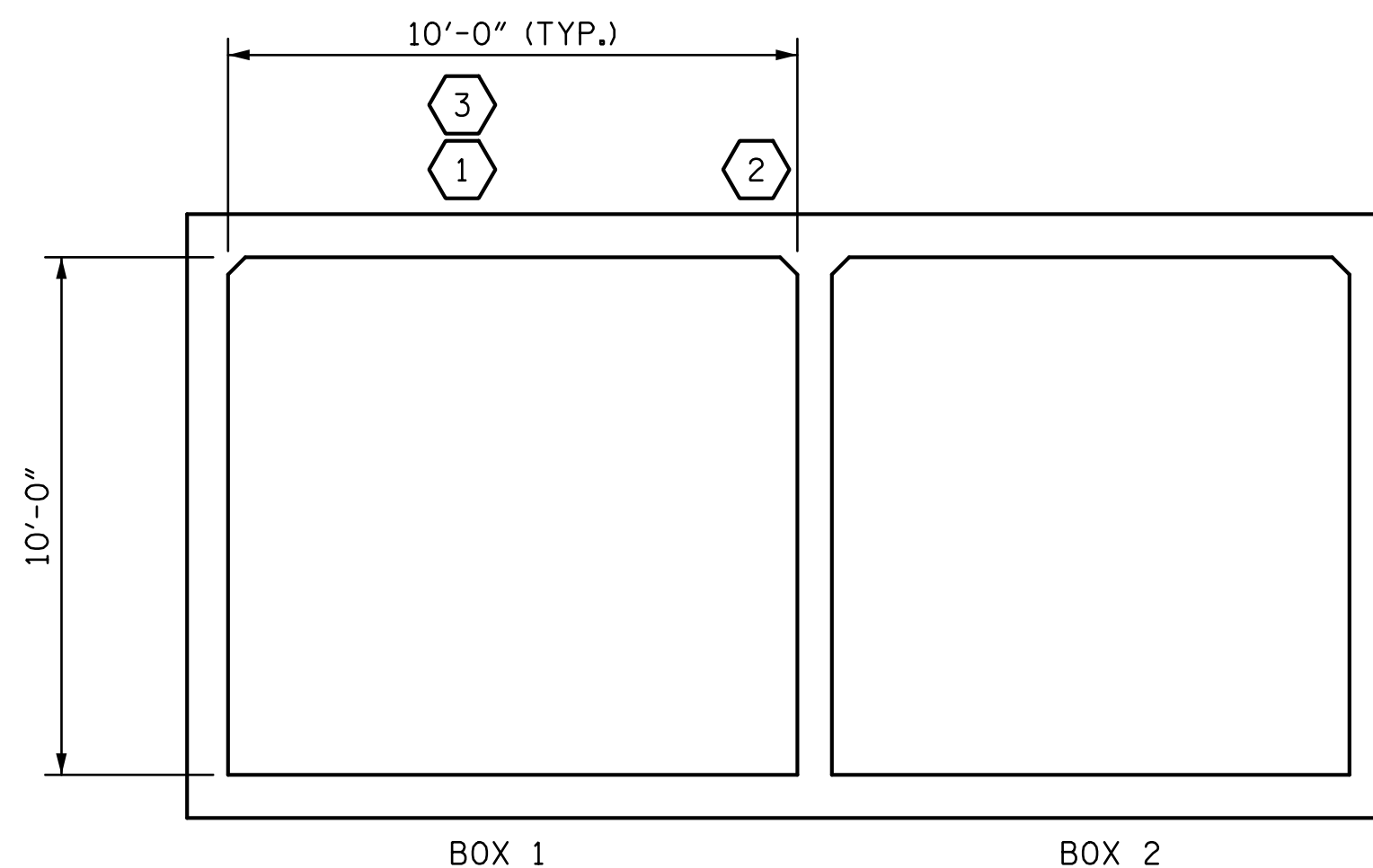
NOTE:

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-4751

NEW HANOVER COUNTY

STATION: 151+41.00 -L-

SHEET 2 OF 7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS (NON-INTERSTATE TRAFFIC)																		
		REVISIONS	SHEET NO. C3-2																	
	STV ENGINEERS, INC. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-5991	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>BY:</th> <th>DATE:</th> <th>NO.</th> <th>BY:</th> <th>DATE:</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </tbody> </table>	NO.	BY:	DATE:	NO.	BY:	DATE:	1			3			2			4		
NO.	BY:	DATE:	NO.	BY:	DATE:															
1			3																	
2			4																	

DRAWN BY : BMC DATE : 5-17 DESIGN ENGINEER OF RECORD: B. CURRY DATE : 5-17
 CHECKED BY : JWJ DATE : 5-17