

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	1.13	--	1.75	1.28	3	TOP SLAB	38.67	1.13	3	TOP SLAB	38.67		
	HL-93 (OPERATING)	N/A		1.47	--	1.35	1.66	3	TOP SLAB	38.67	1.47	3	TOP SLAB	38.67		
	HS-20 (INVENTORY)	36.000	②	1.19	42.84	1.75	1.19	3	TOP SLAB	38.67	1.49	3	TOP SLAB	38.67		
	HS-20 (OPERATING)	36.000		1.55	55.80	1.35	1.55	3	TOP SLAB	38.67	1.93	3	TOP SLAB	38.67		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.93	39.56	1.40	2.93	3	TOP SLAB	38.67	3.61	3	TOP SLAB	38.67	
		SNGARBS2	20,000		2.27	45.40	1.40	2.27	3	TOP SLAB	38.67	3.10	3	TOP SLAB	38.67	
		SNAGRIS2	22,000		2.17	47.74	1.40	2.17	3	TOP SLAB	38.67	3.27	3	TOP SLAB	38.67	
		SNCOTTS3	27,250		1.39	37.88	1.40	1.52	3	TOP SLAB	38.67	1.39	3	TOP SLAB	38.67	
		SNAGGRS4	34,925		1.50	52.39	1.40	1.50	3	TOP SLAB	38.67	1.61	3	TOP SLAB	38.67	
		SNS5A	35,550		1.55	55.10	1.40	1.59	3	TOP SLAB	38.67	1.55	3	TOP SLAB	38.67	
		SNS6A	39,950		1.51	60.32	1.40	1.51	3	TOP SLAB	38.67	1.57	3	TOP SLAB	38.67	
		SNS7B	42,000		1.51	63.42	1.40	1.51	3	TOP SLAB	38.67	1.54	3	TOP SLAB	38.67	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.96	64.68	1.40	1.96	2	TOP SLAB	13.33	2.44	3	TOP SLAB	38.67	
		TNT4A	33,075		1.58	52.26	1.40	1.58	3	TOP SLAB	38.67	1.73	3	TOP SLAB	38.67	
		TNT6A	41,600		1.45	60.32	1.40	1.45	3	TOP SLAB	38.67	1.49	3	TOP SLAB	38.67	
		TNT7A	42,000		1.45	60.90	1.40	1.45	3	TOP SLAB	38.67	1.57	3	TOP SLAB	38.67	
		TNT7B	42,000		1.62	68.04	1.40	1.62	3	TOP SLAB	38.67	1.62	3	TOP SLAB	38.67	
		TNAGRIT4	43,000		1.38	59.34	1.40	1.38	3	TOP SLAB	38.67	1.59	3	TOP SLAB	38.67	
TNAGT5A	45,000		1.39	62.55	1.40	1.39	3	TOP SLAB	38.67	1.57	3	TOP SLAB	38.67			
TNAGT5B	45,000		③	1.21	54.45	1.40	1.21	3	TOP SLAB	38.67	1.54	3	TOP SLAB	38.67		

LOAD 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.
CULVERT WAS DESIGNED AS SINGLE BOX FOR PHASE I CONSTRUCTION, WITH FINAL RATING BASED ON TRIPLE BARREL CONFIGURATION.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

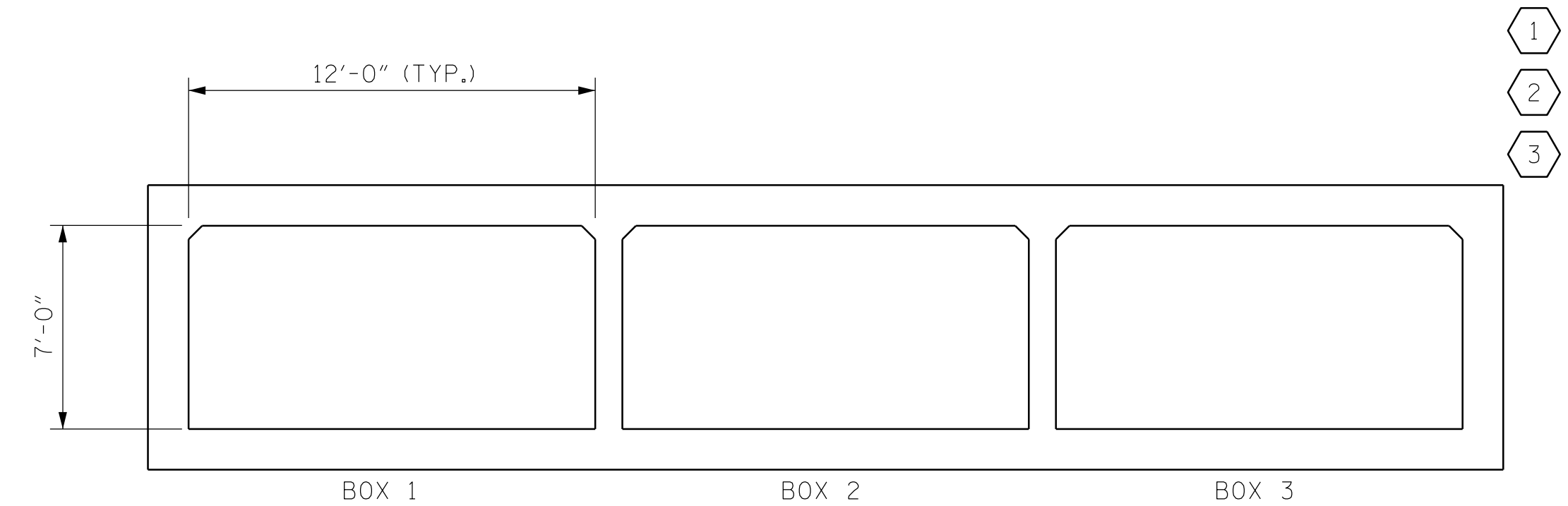
③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

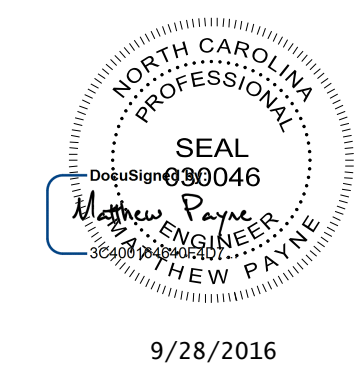
③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. 17BP.3.R.28
NEW HANOVER COUNTY
STATION: 14+60.69 -L-



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)

DRAWN BY : C. DESROCHERS DATE : MAY 2014
CHECKED BY : M. PAYNE DATE : MAY 2014

28-SEP-2016 14:26
*****DCN*****
PAYN5628 AT LUS290333

ATKINS

1616 E. MILLBROOK ROAD, SUITE #310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEEs #F-0326

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			11