

## LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ <sub>LL</sub> )	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.17	--	1.75	--	1.17	G	4	79.79	--	1.22	E	4	8.03	1.30	--	1.66	G	4	79.79	--	
	HL-93 (OPERATING)	N/A		1.52	--	1.35	--	1.52	G	4	79.79	--	1.58	E	4	8.03	1.00	--	2.16	G	4	79.79	--	
	HS-20 (INVENTORY)	36.000	②	1.83	65.88	1.75	--	1.96	E	4	68.31	--	1.83	G	3	177.44	1.30	--	2.81	E	4	68.31	--	
	HS-20 (OPERATING)	36.000		2.37	85.40	1.35	--	2.54	E	4	68.31	--	2.37	G	3	177.44	1.00	--	3.65	E	4	68.31	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		4.16	52.00	1.40	--	4.16	F	4	189.85	--	5.74	G	3	177.44	1.30	--	5.30	E	4	150.80	--
		S3C	21.500		2.92	62.78	1.40	--	2.92	F	4	189.85	--	3.36	G	3	177.44	1.30	--	3.66	E	4	150.80	--
		S3A	22.750		2.80	63.70	1.40	--	2.80	F	4	189.85	--	3.21	G	3	177.44	1.30	--	3.51	E	4	150.80	--
		S4A	26.750		2.52	67.41	1.40	--	2.52	F	4	189.85	--	2.83	G	3	177.44	1.30	--	3.14	E	4	150.80	--
		S5A	30.500		2.31	70.46	1.40	--	2.31	F	4	189.85	--	2.63	G	3	177.44	1.30	--	2.87	E	4	150.80	--
	TRUCK TRACTOR SEMI-TRAILER (TTS)	S6A	34.500		2.13	73.49	1.40	--	2.13	F	4	189.85	--	2.40	G	3	177.44	1.30	--	2.63	E	4	150.80	--
		S7B	38.500		1.98	76.23	1.40	--	1.98	F	4	189.85	--	2.28	G	3	177.44	1.30	--	2.44	E	4	150.80	--
		S7A	40.000	③	1.96	78.40	1.40	--	1.96	F	4	189.85	--	2.27	E	4	8.03	1.30	--	2.41	E	4	150.80	--
		T4A	28.250		2.46	69.50	1.40	--	2.46	F	4	189.85	--	2.80	G	3	177.44	1.30	--	3.06	E	4	150.80	--
		T5B	32.000		2.26	72.32	1.40	--	2.26	F	4	189.85	--	2.72	G	3	177.44	1.30	--	2.80	E	4	150.80	--
FATIGUE	T6A	36.000		2.10	75.60	1.40	--	2.10	F	4	189.85	--	2.48	E	4	8.03	1.30	--	2.59	E	4	150.80	--	
	T7A	40.000	③	1.96	78.40	1.40	--	1.96	F	4	189.85	--	2.27	E	4	8.03	1.30	--	2.42	E	4	150.80	--	
	T7B	40.000		1.97	78.80	1.40	--	1.97	F	4	189.85	--	2.18	G	3	177.44	1.30	--	2.43	E	4	150.80	--	
	HL-93 (INVENTORY)	γ <sub>LL</sub> =0.75		--																				

### LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ <sub>DC</sub>	γ <sub>DW</sub>
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

**NOTES:**  
 MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.  
 ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

**COMMENTS:**

- THE ORIGINAL DESIGN AND RATING OF THIS BRIDGE WAS BASED ON AN INFLUENCE SURFACE ANALYSIS. LIVE LOAD DISTRIBUTION FACTORS WERE NOT USED AND ARE NOT PROVIDED.
- DISTANCE FROM LEFT END OF SPAN IS GIVEN WITH RESPECT TO CENTERLINE OF BEARING AND IS MEASURED ALONG THE CONTROLLING GIRDER.
- FATIGUE RATING IS NOT REQUIRED OR REPORTED SINCE GIRDER DESIGN DOES NOT INCLUDE FATIGUE-PRONE DETAILS.
- LARSA 4D VERSION 8.00 r8101 WAS USED FOR INFLUENCE SURFACE ANALYSIS.
- AS APPLICABLE FOR THIS UNIT, LEGAL LOAD RATING INCLUDES CONSIDERATION OF THE FOLLOWING (PER AASHTO MANUAL FOR BRIDGE EVALUATION, 3RD ED., 2018, 6A.4.4.2.1a):
  - 100% OF ONE LEGAL LOAD VEHICLE WITH NO LANE LOAD
  - 75% OF ONE LEGAL LOAD VEHICLE WITH 0.200 KLF LANE LOAD
  - 75% OF TWO LEGAL LOAD VEHICLES SEPARATED BY 30 FEET WITH 0.200 KLF LANE LOAD (NEGATIVE MOMENT ONLY)

③ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

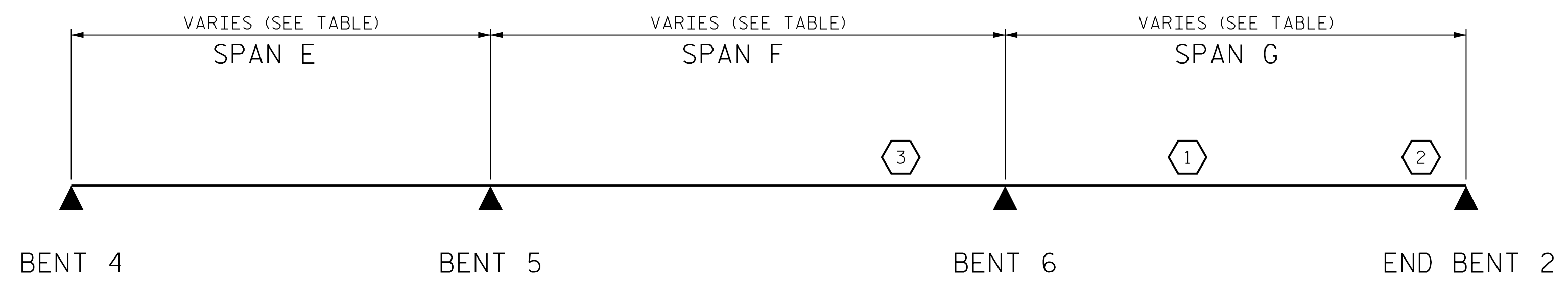
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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GIRDER LOCATION

GIRDER LOCATION IS PROVIDED USING GIRDER NUMBER, WHERE GIRDER 1 IS THE EXTERIOR GIRDER TO THE LEFT OF -Y15FLYBD-



C BRG - C BRG SPAN LENGTHS			
GIRDER	SPAN E	SPAN F	SPAN G
1	166'-10 <sup>1</sup> / <sub>16</sub> "	207'-0 <sup>7</sup> / <sub>16</sub> "	182'-6 <sup>3</sup> / <sub>16</sub> "
2	168'-1 <sup>7</sup> / <sub>8</sub> "	208'-7 <sup>7</sup> / <sub>8</sub> "	183'-11 <sup>3</sup> / <sub>16</sub> "
3	169'-5 <sup>5</sup> / <sub>8</sub> "	210'-3 <sup>1</sup> / <sub>4</sub> "	185'-4 <sup>7</sup> / <sub>8</sub> "
4	170'-9 <sup>7</sup> / <sub>16</sub> "	211'-10 <sup>5</sup> / <sub>8</sub> "	186'-10 <sup>1</sup> / <sub>4</sub> "

### LRFR SUMMARY

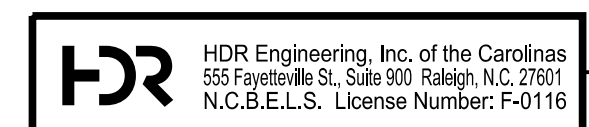
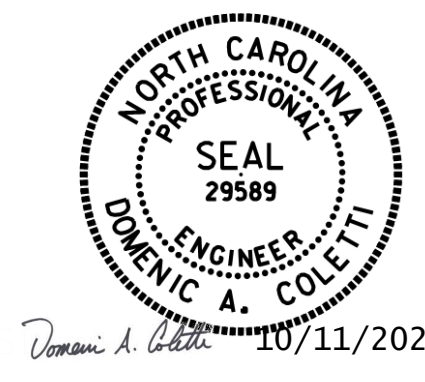
PROJECT NO. U-2579AB  
FORSYTH COUNTY  
 STATION: 47+63.62 -Y15FLYBD-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

LRFR SUMMARY FOR  
 STEEL GIRDERS  
 (INTERSTATE TRAFFIC)  
 (UNIT 2)

REVISIONS						SHEET NO. S05-011
NO.	BY:	DATE:	NO.	BY:	DATE:	
1	--	--	3	--	--	TOTAL SHEETS 116
2	--	--	4	--	--	



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 FILE: ...LRFR S

DES BY: A. MILLER DATE: 10/19 DWG BY: M. SELLS DATE: 10/19  
 DES CHK: M. NEIHEISEL DATE: 10/19 CHK BY: G. SCHMITZ DATE: 10/19