



### LRFR BRIDGE LOAD RATING SUMMARY

SECTION 1 - GENERAL BRIDGE DATA					
(8) Asset ID 04411	Route Type Secondary road	(27) Year Built 1964	(90) Date of Inspection 02/2019	(411) Date Rated 9/11/2020	
(9) Bridge Location 5 MI NW OF COLUMBIA		(7) Facility Carried S-40-2892		(6) Feature Intersected/Route Crossing I-20	
(49) Length 414 ft.	(11) Milepost 0.231	(2) District 1	(3) County RICHLAND	(22) Owner SCDOT	(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 5,7,6
(43, 44, 45, & 46) Bridge Description Simple 6 Span SS Bridge			(31) Design Load HS-15	(108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE	
Rating Program & Version BrR 6.8.4 - AASHTO Engine		Rating Program & Version N/A		Rating Method LRFR	AASHTO Reference MBE 3rd Edition, 2018
(58) Deck 5 Fair	(59) Superstructure 7 Good	(60) Substructure 6 Satisfactory	(62) Culvert N N/A (NBI)	(113) Scour Critical N Not Over Waterway	

SECTION 2 - INVENTORY AND OPERATING LOAD RATINGS					
Rating Vehicle	Rating Level	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor
HL-93 Truck + Lane	Inventory	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.223
HL-93 Truck Train + Lane (90%)	Inventory	-	-	-	-
HL-93 Tandem + Lane	Inventory	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.389
HL-93 Truck + Lane	Operating	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.589
HL-93 Truck Train + Lane (90%)	Operating	-	-	-	-
HL-93 Tandem + Lane	Operating	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.806

This LRFR Load Rating is based on:  Design Plans  Design Plans & Approved Shop Drawings  Other (Please explain in Remarks)  
 As-Built Plans

SECTION 3 - BRIDGE LOAD RATING SUMMARY		
Controlling Legal Truck	Load Posting Required? If Yes, complete Signing/Posting Form.	Controlling Legal Load Rating Factor
EV3	No	1.230

SECTION 4 - REMARKS & SIGN/SEAL		
Load Rating Engineer	Quality Control Engineer	<input type="checkbox"/> Structure is part of QA sample set. Quality Assurance Engineer
Name: Shelby Wilson	Name: Colt Wise	Name:
Company/Title: HDR	Company/Title: HDR	Company/Title:
Date: 6/16/2020	Date: 8/31/2020	Date:
<p>Remarks:</p> <ol style="list-style-type: none"> <li>As-let plans 40.565 and approved shop drawings were used for the rating.</li> <li>Traffic data was input into BrR using Directional % = 55% and Truck % = 2%.</li> <li>Condition factor of 1.00 was used based on the Inspection Report dated 02/2019.</li> <li>Utility was estimated to be 1" diameter std. wt. steel pipe. A weight of 0.002 kif was assumed for each utility.</li> <li>Overhead sign not shown in plans. Dimensions and location based on Site Assessment dated 09/23/2019. Load input into BrR as a point load and applied to first three girders as composite load. Assumed 20 psf of sign area for weight.</li> <li>Spans 1-6 are linked together under one superstructure definition in BrR. Results shown on the LRSF for Span 1 (i.e. Controlling Location 1.X) apply to all six spans.</li> <li>An additional 5% of self-load was applied to all steel girders to account for materials such as welds, bolts, etc.</li> <li>Diaphragm connection plates were not modeled because plates do not meet requirements of Std Specs Section 10.34.4.6.</li> </ol>		

The ADTT value listed below is to be used to establish Legal and Permit  $\gamma_{LL}$  factors.

SECTION 5A - LEGAL & PERMIT RATINGS - AASHTO Legal Trucks							
(30) ADT Year	(29) ADT	(109) Truck % ADT	ADTT (ADT x Truck % ADT)				
2017	8625	2	173				
Rating Vehicle	Rating Level	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
Modified AASHTO SC - Type 3	Legal	25	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.131	53
Modified AASHTO SC - Type 3S2	Legal	36.6	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.033	74
AASHTO - Type 3-3	Legal	40	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.118	84
Lane Type Loading (Neg. M only)	Legal	40	-	-	-	-	N/A
Lane Type Loading (Span > 200 ft)	Legal	40	-	-	-	-	N/A
Modified AASHTO SC - Type 3	Permit	25	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.771	69
Modified AASHTO SC - Type 3S2	Permit	36.6	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.643	96
AASHTO - Type 3-3	Permit	40	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.754	110
Lane Type Loading (Neg. M only)	Permit	40	-	-	-	-	N/A
Lane Type Loading (Span > 200 ft)	Permit	40	-	-	-	-	N/A



## LRFR BRIDGE LOAD RATING SUMMARY

Version 1.0

Page 2 of 2

SECTION 1 (PAGE 2) - GENERAL BRIDGE DATA								
(8) Asset ID 04411		(2) Route Type Secondary road		(27) Year Built 1964		(90) Date of Inspection 02/2019		(411) Date Rated 9/11/2020
(9) Bridge Location 5 MI NW OF COLUMBIA			(7) Facility Carried S-40-2892			(6) Feature Intersected/Route Crossing I-20		
(49) Length 414 ft.	(11) Milepost 0.231	(2) District 1	(3) County RICHLAND	(22) Owner SCDOT		(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 5,7,6		
(43, 44, 45, & 46) Bridge Description Simple 6 Span SS Bridge				(31) Design Load HS-15		(108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE		
Rating Program & Version BrR 6.8.4 - AASHTO Engine			Rating Program & Version N/A			Rating Method LRFR		AASHTO Reference MBE 3rd Edition, 2018
(58) Deck 5 Fair		(59) Superstructure 7 Good		(60) Substructure 6 Satisfactory		(62) Culvert N N/A (NBI)		(113) Scour Critical N Not Over Waterway

SECTION 5B - LEGAL RATINGS - SC Specialized Hauling Vehicles (SHV) - Legal on Non-Interstate Only (Permit on Interstate)							
Rating Vehicle	Rating Level	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Legal	32.5	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.544	50
SC-SHV1B	Legal	35	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.458	51
SC-SHV2A	Legal	33	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.548	51
SC-SHV2B	Legal	40	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.316	52
SC-SHV3A	Legal	42.5	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.686	71
SC-SHV3B	Legal	45	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.594	71

  

SECTION 5C - LEGAL RATINGS - Two Miscellaneous SHV & AASHTO SHV							
Rating Vehicle	Rating Level	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC Representative School Bus	Legal	17.525	G1&G5	1.5	SERVICE-II Steel Flexure Stress	3.186	55
SC-SU2	Legal	20	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.707	54
SU4	Legal	27	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.915	51
SU5	Legal	31	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.736	53
SU6	Legal	34.75	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.556	54
SU7	Legal	38.75	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.425	55

  

SECTION 5D - LEGAL RATINGS - Emergency Vehicles (EV)							
Rating Vehicle	Rating Level	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
EV2	Legal	28.75	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.880	54
EV3	Legal	43	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.230	52

SECTION 6 - PERMIT RATINGS - Specialized Hauling Vehicles (SHV), Standard Permit Vehicles & Typical Cranes							
Rating Vehicle	Rating Level	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Permit	32.5	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.008	65
SC-SHV1B	Permit	35	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.895	66
SC-SHV2A	Permit	33	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.012	66
SC-SHV2B	Permit	40	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.711	68
SC-SHV3A	Permit	42.5	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.192	93
SC-SHV3B	Permit	45	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.072	93
SC Representative School Bus	Permit	17.525	G1&G5	1.5	SERVICE-II Steel Flexure Stress	4.142	72
SC-SU2	Permit	20	G1&G5	1.5	SERVICE-II Steel Flexure Stress	3.519	70
SU4	Permit	27	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.489	67
SU5	Permit	31	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.257	69
SU6	Permit	34.75	G1&G5	1.5	SERVICE-II Steel Flexure Stress	2.022	70
SU7	Permit	38.75	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.852	71
SC - 100k	Permit	50	G1&G5	1.4	SERVICE-II Steel Flexure Stress	1.998	99
SC - 120k	Permit	60	G1&G5	1.4	SERVICE-II Steel Flexure Stress	1.675	100
SC - 130k	Permit	65	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.583	102
SC Crane #544726	Permit	80	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.299	103
SC Crane #527568	Permit	88.85	G1&G5	1.5	SERVICE-II Steel Flexure Stress	1.196	106

### Remarks:

9. Taper lengths of the cover plates were not considered.
10. Sacrificial wearing surface = 0" per LRGD section 11.2.1.1.
11. To account for the diaphragm connection plate damage on Girder G1 noted in the Inspection Report dated 02/2019, the middle diaphragm in Bay 1 was not modeled and a point load was instead applied to G1 at the diaphragm location in the deteriorated structure model.
12. Structure is on a curved alignment with chorded girders. Actual beam spacing varies along length. The bridge was modeled as a straight bridge with girders spaced at 7'-3.25" (max. girder spacing). The bridge supports were modeled using a consistent skew of 4.8 deg. (max. skew at any support).
13. The maximum overhang at the 1/3 or 2/3 point of the span was used in the BrR model. The maximum overhang was conservatively placed on the left side of the bridge to apply to G1 along with the overhead sign.