2019 FRACTURE CRITICAL ELEMENT LEVEL
BRIDGE INSPECTION FIELD REPORT

Structure File Number: 1801325 Inventory Bridge Number: CUY 00010 08.690 Bridge Type: 3 - STEEL/5 - ARCH/3 - DECK

Sufficiency Rating: 77.6 Date Built: 7/1/1935

District: 12 Place Code (FIPS): FAIRVIEW PARK SR 10 over VALLEY PKWY/ROCKY RIVER Type of Service on: HIGHWAY-PEDESTRIAN

APPROACH ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c1. Approach Wearing Surface (EA)	2	0	2	0	0	2.00
c2. Approach Slabs (SF)	2583.9	2338.9	110	135	0	1.70
c3. Relief Joint (LF)						
c4. Embankment (EA) d	4	4	0	0	0	1.00
c5. Guardrail (EA)	4	2	2	0	0	1.60

N36. Safety Features: Tr, Gr, Tm — 36)B 1 36)C 0 36)D 1

c6. Approach Summary (9-0) 5

DECK ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c7.1 Floor/Slab (SF)	74578	65118	9404	56	0	1.19
c7.2 Edge of Floor/Slab (LF)	2406	325	1311	770	0	3.00
c8. Wearing Surface (SF)	63823	59971	3845	7	0	1.09
c9. Curb/Sidewalk/Walkway (LF)	2455	1379	1043	33	0	1.67
c10. Median (LF)		0				
c11. Railing (LF)	2455	206	1745	389	115	2.89

N36. Safety Features: Rail — 36)A 1

c12. Drainage (EA) d	58	0		49	9	3.00
c13. Expansion Joint (LF) d	434	0	168		266	3.00

N58. Deck Summary (9-0) 6

SUPERSTRUCTURE ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c14. Alignment (EA) d	9	9	0	0	0	1.00
c15.1 Beams/Girders (LF)	2828	2569	232	27	0	1.26
c15.2 Slab (SF)						
c16. Diaphragm/X-Frames (EA)	94	94	0	0	0	1.00
c17. Stringers (LF)	10839	10610	215	14	0	1.05
c18. Floorbeams (LF)	2898	2852	5	41	0	1.23
c19. Truss Verticals (EA)						
c20. Truss Diagonals (EA)						
c21. Truss Upper Chord (EA)						
c22. Truss Lower Chord (EA)						
c23. Truss Gusset Plate (EA) d						
c24. Lateral Bracing (EA)	46	34	12	0	0	1.35
c25. Sway Bracing (EA)		0				
c26. Bearing Devices (EA) d	140	121	19		0	1.19
c27. Arch (LF)	1971	1774	195	2	0	1.16
c28. Arch Column/Hanger (EA)	92	19	19	54	0	3.00
c29. Arch Spandrel Walls (LF)						
c30. Prot. Coating System (LF) d	19044	1	15534	2460	1049	2.93
c31. Pins/Hangers/Hinges (EA) d	16	16	0	0	0	1.00
c32. Fatigue (LF) d	18790	18700	86	4	0	1.01

N59. Superstructure Summary (9-0) 6

SUBSTRUCTURE ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c33. Abutment Walls (LF)	128	125	3	0	0	1.03
c34. Abutment Caps (LF)	64	58	6			1.13
c35. Abut. Columns/Bents (EA)		0				
c36. Pier Walls (LF)	281.3	227.3	43	11	0	1.67
c37. Pier Caps (LF)	507.6	501.6	6	0	0	1.02
c38. Pier Columns/Bents (EA)	16	6	7	3	0	2.48
c39. Backwalls (LF)	128	128	0	0	0	1.00
c40. Wingwalls (EA)	4	4	0	0	0	1.00
c42. Scour (EA) d	10	10	0	0	0	1.00
c43. Slope Protection (EA) d	2	1	0	1	0	3.00

N60. Substructure Summary (9-0) 6

CULVERT ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c44. General (LF)						
c45. Alignment (LF) d						
c46. Shape (LF) d						
c47. Seams (LF) d						
c48. Headwall/Endwall (LF)						
c49. Scour (LF) d						
c50. Abutments (LF)						

N62. Culvert Summary (9-0) N

CHANNEL ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c51. Alignment (LF) d	200	200	0	0	0	1.00
c52. Protection (LF) d	200.0	200	0	0	0	1.00
c53. Hydraulic Opening (EA) d	9	9	0	0	0	1.00
c54. Navigation Lights (EA) d						

N61. Channel Summary (9-0) 7

SIGN/UTILITY ITEMS

	QTY.	condition state 1	2	3	4	cr TR
c55. Signs (EA) d	2	0	0	0	2	3.00
c56. Sign Supports (EA) d	2	2				1.00
c57. Utilities (LF) d	3609	3589	0	20	0	1.09

General Appraisal (9-0) 6

N41. Operating Status A

Inspector Name Foye, Ian

Inspection Date/Type 09/12/2019 In-Depth and Fracture Critical

PE Number 82900

Reviewer Name Lawler, Matthew

Review Date 12/30/2019

PE Number 60508

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Key: "Qty" = Quantity for Element Level inspection; "(LF)" = Linear Feet; "(SF)" = Square Feet; "(EA)" = Each or count; "CR" = 1-4 Condition Rating or average of worst span unless Summary item 9-0, then the average of entire bridge influenced by the bold boxes; "TR" = Transition Rating or weighted average of condition states; "d" = dedicated or specific chart and guidance, all others use Material specific chart/guidance; "c" = condition prefix; "N" = NBIS rating

Inspection Procedures

Snooper with lane closures used to inspect bottom of deck, stringers, floorbeams, and portions of the towers and arch columns that could not be reached by the manlift. Manlift used to inspect arches, and portions of the towers and arch columns that could not be reached by the snooper. Rope climbing used to access Tower 8.

Comments

APPROACH

c1. Approach Wearing Surface

Transverse cracks (some sealed), ruts, asphalt patching, and small potholes (mainly at joints with the rear backwall and and the forward approach slab).

c2. Approach Slabs

Filled pothole on rear approach slab in eastbound curb lane is cracking.
Large asphalt filled (asphalt is sinking) pothole at east end of the forward approach slab in eastbound curb lane. Map cracking along backwall in rear approach.

c4. Embankment

Minor bare soil and rutting.

c5. Guardrail

Two posts on north guardrail, east approach, are missing spacer blocks. Impact on north guardrail of east approach near end. South guardrail, west approach, has collision damage and broken end post.

DECK

c7.1 Floor/Slab

There are some minor pop-outs, up to 3" in diameter, at random locations. Minor spalls at the interfaces with the stringers. A 48"x12" spall with exposed reinforcing exists between Stringers 9 & 10 in Span 5. Multiple spalls exposing rebar in Span 8. The deck floor in Span 9 has full-length longitudinal cracks with efflorescence. Transverse cracking prevalent in all spans.

c7.2 Edge of Floor/Slab

Portions of the edges of the deck over the park trails had some loose concrete removed by inspectors. The south deck edge in Span 8 has several old large spalls with exposed rebar. Spans 1-4 on the south edge have multiple spalls at the top corner of the edge behind the railing.

c8. Wearing Surface

Arch Spans 5-8 have random longitudinal and transverse hairline cracks throughout. Span 8 has had some isolated patching. There are some small (< 3 sq. ft. each) spalls and delaminations along the expansion joints and curb gutters.

c9. Curb/Sidewalk/Walkway

Sidewalk is in good-to-fair condition with cracking in isolated areas. Multiple sections

of sidewalk have been repaired. Older sidewalk sections have scaling. The north and south sidewalks at the west approach shows signs of heaving, with offsets up to 1-1/2 inches on the north sidewalk.

c11. Railing

The tubular decorative railing is retaining water and corroding from the inside out. There are several locations where rails have rust holes (a few on south railing, but mainly on north railing). The concrete bases of the railing posts are spalling in some locations, exposing the railing anchors. Railing tube splices showing heavy corrosion

c12. Drainage

Deck inlet grates along curbs are typically clogged with vegetation and debris. The clogged downspout at the north column of Pier 3 has blown out. Clean out cover in Span 6, north side, missing 7 out of 8 bolts. There are many large corrosion holes in the downspouts throughout the bridge (a large amount in Spans 6 and 7).

c13. Expansion Joint

Joint seal has been removed in 2/3 of the bridge, remaining joint membrane is impacted. Sidewalk sliding plates are perforated at the abutments, and at Pier 6 and 7 joints. Sidewalk cover plate 1/2" gap at Pier 6 joint, south side. Rusting bolt heads throughout.

SUPERSTRUCTURE

c14. Alignment

All spans show proper alignment.

c15.1 Beams/Girders

Beams in approach Spans 1-4 and 9 are in good condition with minor surface rust through the PCS.

c16. Diaphragm/Cross Frames

Diaphragms between beams are in good condition.

c17. Stringers

Old section loss on bottom flange past the bearing support of Stringers 3 and 9 at Tower 7 and Stringer 4 at Tower 8. One missing bolt on the bottom flange of Stringer 8 in Span 8 at Tower 7. One anchor bolt missing for Stringer 4 at Tower 7. Old bends (construction?) in bottom flange of Stringer 3 (over North Arch) in Span 5 between columns 5 & 6 and between columns 7 & 8.

c18. Floorbeams

Multiple cracks noted in the non-structural, porous tack welds on the edges of the floorbeam bottom flanges, but no cracks in the base metal.

c24. Lateral Bracing

Debris accumulates on bottom flanges of some of the struts between arches near the piers due to the angle they are at. Rust forming at weep holes on the downward face.

c26. Bearing Devices

Arch skewbacks have laminar and surface corrosion. Stringer sliding bearings at tops of towers are functioning properly. Beam bearings at abutments are working properly, but exterior bearings have corrosion. Heavy rust on some exterior sidewalk stringer bearings.

c27. Arch

The arches are in good-to-fair condition overall, with random areas of peeling paint and surface corrosion. The ends of the arch rib, at the bearing, have laminar corrosion on the fill plate and at the bearing nut. This area commonly has rivet head loss up to 30%. There are many localized areas of painted over pitting up to 1/4". Where the struts and lower columns are attached to the arch rib, the web and flange commonly had up to 1/4" pitting. Surface corrosion is common along the lower chord flange angles. There are localized areas of chalking/ faded paint on the arch rib web and pack rust between the flange angles. Span 5, North arch rib, has a large area of rust staining on the top flange that appears to be coming from Column 11. The top flange plate adjacent to the columns typically has 1/4"-1/2" pitting. The interiors have surface corrosion with localized areas of section loss. Interior side of welded shut hatches in Span 7 exhibit undercut welds and rust on the interior webs.

Possum was present in the Pier 5 base of the north arch.

There are 5 locations where there are issues with the arch access door.
In Span 5, the N access door is missing and is covered by a filter fabric. The metal ties holding it are rusting away.
In Span 5, the S access door has a broken latch, so it cannot be locked. The door also does not sit flush, which is causing the hinge to bend and fatigue. It is currently being held together by cord.
In Span 6, both the N & S access doors have broken hinges and are only held on by the lock and friction.
In Span 8, the N access door has a broken hinge and is only held on by the lock and friction.

c28. Arch Column/Hanger

Arch columns are in fair condition (The SMS Transition Rating rates the arch columns as poor. This is based on isolated areas controlling the Element Level Rating for an entire member. Using the Condition Rating criteria, a high 2-fair condition rating is more accurate for these members.)

There is minor pack rust re-activating between the plates along the full heights of the columns on both interior and exterior faces. Surface corrosion and accumulation of debris in the bottom 3' of most columns. Reactivated pack rust has cracked some of the erection tack welds, but no propagation into base metal was noted. 1/8"-1/2" pitting at the base of the columns on the high side, where water and debris sit.

c30. Protective Coating System

The paint is in fair-to-poor condition on the superstructure and on the exterior faces of the columns and towers, but there is a general failure of the paint system inside the towers and columns, with peeling paint, surface corrosion and laminating corrosion. Tower legs below joints that allow water to leak through (i.e. north leg of Tower 7) are the worst areas. Also, the exterior beam bearings at the abutments and some towers have corrosion. Wide spread rusting through the original PCS inside the arches.

c31. Pins/Hangers/Hinges

Pins at ends of arches have surface corrosion. The pin nuts have laminar corrosion with up to 1/8" pack rust.

c32. Fatigue

The majority of the erection tack welds on the bottom flanges of the floorbeams and the base of the arch columns are partially to fully cracked; none of these cracks have propagated into base metal and all of the cracks are in compression areas. The welds inside the towers are in good condition, although the welded stiffeners themselves have heavy section loss in some cases. There are cracks in several welds of plates on the tower caps (next to stringer bearings), but none are propagated into the base metal.

SUBSTRUCTURE

c33. Abutment Walls

The abutment walls are in good-to-fair condition. The West Abutment has rust stains and 3 hairline/narrow vertical cracks. The East Abutment is a cellular abutment and has a 4' long horizontal crack at the top east edge of the interior south wall.

Vagrant belongings inside cellular forward abutment.

c34. Abutment Caps

Scaling concrete around Stringer 3 Seat on East Abutment. There are a few horizontal cracks below Stringer 12 on the East Abutment.

c38. Pier Columns/Bents

The pier columns are in fair condition (The SMS Transition Rating rates pier columns as poor. This is based on isolated areas controlling the Element Level Rating for an entire member. Using the Condition Rating criteria, a high 2-fair condition rating is more accurate for these members.) The deficiencies are noted by levels, and are are numbered between internal horizontal bracings starting from 1 at the bottom of the pier column.

The interiors of the towers have section loss in multiple locations. Multiple stiffeners inside the bottom of Towers 5, 6 and 7 have 50%-100% section loss. Corrosion holes in plates of several towers from 1/8" up to 2-1/2" in diameter but not concentrated in any one plate. Pack rust is distorting the bracing angles up to 1 1/4". There is a missing rivet between Levels 2-3, 6-7, and 11-12 of Tower 5, at the top of the North leg of Tower 6, at Level 3,4,5 and 8 of the North leg of Tower 7, at Level 18 of the North leg of Tower 7, at Level 4 of the South leg of Tower 8, and at Level 7 of the North leg of Tower 8. There are two missing rivets at Levels 4, 5, 7, and 11 of the North leg of Tower 8.

The interior of the North Tower at Pier 7 has up to 1 ft deep pile of rust along the bottom of the steel tower, severe section loss on all members and limited access into cross bracing and host to 2 raccoons.

The exterior of the towers has up to 3/4" pack rust along the cover plates. The South leg of Tower 5 has 3 missing rivets. The tower strut at Tower 6 has laminar corrosion, ponding water, & pack rust on the top plate.

Up to 50% section loss on some rivet heads.

The exteriors of both columns of Piers 2 & 3 have surface corrosion. Water is infiltrating the interiors of the steel columns of Piers 1, 2, and 3 from the top. Some laminating corrosion is at the top and surface corrosion for the rest of the column

interiors.

There are broken latches (locks cannot be used) at the access doors for Pier 2 at the north leg, Tower 4 at the south leg, Tower 5 at both legs, Tower 6 at the north leg, and Tower 8 at both legs. Broken hinges on the access doors for Tower 4 at both legs, Tower 6 at both legs, Tower 7 at the north leg, and Tower 8 at the north leg. The south leg of Tower 7 does not have a lock.

Vagrant belongings inside bottom of Towers 5 and 8.

c36. Pier Walls

The web walls between the tower/arch bases have transverse cracking and map cracking. There are several areas of patching that are in good condition when sounded with hammer. There is a 5'x3'x3" spall with exposed rebar under the south skewback for Tower 8, but the exposed painted rebar is not actively corroding.

c37. Pier Caps

The caps for the steel piers and towers are in fair condition with minor rust localized near connections.

2018-Tower 6 has ponding water (3" deep) at the top. Tower 7 has ponding at top of north leg. Raccoon fur and droppings inside most of the caps. 2019 - no ponding noted.

Wire screens installed over tops of caps have failed to keep out raccoons (peeled open).

c39. Backwalls

Abutment backwalls are in good condition.

c40. Wingwalls

Wingwalls are in good condition.

c43. Slope Protection

New slope protection under spans 1 and 2 with trail project. The west slope under Span 5 has channel formed by erosion that starts just below Tower 4.

The East bank of the Rocky River consists of easily erodible shale and has sloughed up against and overtopped the concrete base of Tower 8. The slope on the west side of Tower 8 is severely eroded. The shale east embankments continue to slowly erode. A drainage swale has formed from the forward abutment down the eroding shale slope to the base of Tower 8.
The west embankments are heavily vegetated.

CHANNEL

c51. Alignment

Channel is well aligned perpendicular to structure; normal flow is only under Span 8.