Oklahoma Dept. of Transportation - Bridge Inspection Report

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	
04085	0902 0000 X	-1	5.00	SD

IDENTIFICATION

Bridge Description:
38-100ft. PONY TRUSS & 2-36ft. I-BM. SPANS(BRIDGEPORT BR.)

1. State: Oklahoma
2. Division: Division 4
3. County: CANADIAN
4. City: Unknown
Admin Area: L/T Truss
5a. On/Under: Route On Structure
5b. Kind of Hwy: U.S. Hwy
5c. Lvl of Srvc: Mainline
5d. Route No.: 00281
5e. Dir. Sufx: N/A (NBI)
7. Facility Carried : U.S. 281
6. Feat. Intersect: S. CANADIAN RIVER
9. Location: CADDO CANADIAN CL
11. Mile Post: NA
13. LRS Inv. / Sub Rte: 0902 0000 / 01
16. Latitude: 35° 32' 25.00"
17. Longitude: 098° 19' 22.00"
98. Border Brdg: Unknown (P)
% Responsible: 0.00
99. Border Brdg #: Unknown

INSPECTION

Type	Insp. Req.	Insp. Done	Freq.	Insp. Date	Next Insp.
NBI:		1	12 months	10/16/2019	10/16/2020
FC:	Y	1	12 months	10/16/2019	10/16/2020
UW:	N	0		NA	NA
OS:	Y	0	12 months	4/6/2019	4/16/2020

CLASSIFICATION

12.Base Hwy Net.: On Base Network
20. Toll Facility: On free road
21. Custodian: State
22. Owner: State
26. Function Class: 06 Rural Minor Arteria
37. Historical Sig.: Br eligible for NRHP
100. Def. Hwy: Not a STRAHNET hwy
101. Parallel Str.: No || bridge exists
102. Traffic Dir.: 2-way traffic
103. Temp. Str.: Not Applicable (P)
104. Hwy System: Not on NHS
105. Fed Land Hwy: N/A (NBI)
110. Defense Hwy: Not a STRAHNET hwy
112. NBIS Length: Long Enough

STRUCTURE TYPE AND MATERIALS

43a/b. Main Span: Steel / Truss-Thru
44a/b. Appr. Span: Steel / Stringer/Girder
45. # of Main Spans: 38
46. # of Appr. Spans: 2
107. Deck Type: Concrete-Cast-in-Place
108a. Wearing Surface: Bituminous
108b. Membrane: Unknown
108c. Deck protection: Unknown

CONDITION

58.Deck: 4 Poor
59.Sup.: 4 Poor
60.Sub: 5 Fair
62.Culvert: N/A (NBI)
61.Chan./Chan. Prot.: 5 Bank Prot Eroded

Flowline Notes

OCT-2019: 27.3' TOC at west L4, span 6. Channel now in span 6.
OCT-2018: Flow too high to measure. Channel now in span 11.

AGE AND SERVICE

19. Detour Length: 11.8 mi
27. Year Built: 1933
28a/b. Lanes on/und: 2 / 0
29. ADT: 1,100
30. Year of ADT: 2017
42a/b. Type of Svc on/und: Highway / Waterway
106. Year Reconst.:
109. Truck ADT: 16%

LOAD RATING AND POSTING

31. Design Load: M 13.5 (H 15)
41. Post. Status: P Posted for load
70. Posting: 2 20.0-29.9%below
Date Rated: 03/25/2019
63.Op / 65.Inv. Rating Meth.: 1 LF Load Factor / 1 LF Load Factor

	H	HS	3-3	EV3	SHV
64. Operating Rating (tons):	9.00	9.10	9.00	9.00	9.00
66. Inventory Rating (tons):	8.00	8.10	8.00	8.00	

GEOMETRIC DATA

10. Vert. Clearance: 99.99 ft
32. Appr Rwy Width: 30.00 ft
33. Median: No median
34. Skew: 0.00°
35. Struct. Flared: No flare
47Horizontal Clr: 24.00 ft
48. Length Max Span: 100.07 ft
49. Struct. Length: 3,937.01 ft
50a. Curb/Sdwlk Width L: 1.00 ft
50b. Curb/Sdwlk Width R: 1.00 ft
51. Width Curb to Curb: 24.00 ft
52. Width Out to Out: 26.00 ft
Deck Area: 102,364.79 sq. ft
53. Min.Vert.Cl.Ovr Brg: 99.99 ft
54a.Min.Vt.Undclr.Ref.: N Feature not hwy c
54b. Min. Vert. Undclr.: 0.00 ft
55a. Min.Lat.Undclr.Ref: N Feature not hwy
55. Min.Lat.Underclr. R: 99.90 ft
56. Min.Lat.Underclr. L: 99.90 ft

APPRAISAL

36a. Brdg Rail: 0 Substandard
36b. Transition: 0 Substandard
36c. Appr. Rail: 0 Substandard
36d. Appr.Rail Ends: 0 Substandard
67. Str Evaluation: 2 Intolerable - Repl
68. Deck Geom.: 4 Tolerable
69. Vert./Horiz. Undclr: Not applicable (NB
71. Waterway Adeq: 5 Above Tolerable
72. Appr. Alignment: 6 Equal Min Criteria
113. Scour Critical: 7 Countermeasures

PROPOSED IMPROVEMENTS

94. Bridge Cost: $6,781,689
95. Roadway Cost: $4,500,000
96. Total Cost: $11,920,275
97. Yr.of Cost Est.: 2015
75. Type of Work: 31 Repl-Load Capacity
76. Lngth of Improvement: 3,937.0 ft
114. Future ADT: 1,760
115. Yr.of Future ADT: 2037

NAVIGATION DATA

38. Nav. Control: Permit Not Required
39. Vert. Clearance: 0.0 ft
40. Horiz. Clearance: 0.0 ft
111. Pier Protect.: 1 Not Required
116. Lift Bridge Vert. Clr.: 0.0 ft

OKLAHOMA ITEMS

200c. Temperature: 75
200d. Weather: Clear
201. Struc.Stl. ASTM Desig.: -1 / -1
202. Waterprf.Membrane: -1
Date Installed: 01/01/1901
203. Type Exp. Device: Sliding Plate
Open Joint-No Device _
204. Type of Railing: Metal Railing (other)
205. Material Quantity: 10.00
208a. Type of Abutment: Pedestal
b. Type of Found.: Bears on Natural Found.
209. Type of Pier/Found.: 2 / Yes
No Piling/Drilled Shaft
210. Foundation Elev.: -1.00 -1.00 -1.00 -1.00 -1.00
211. Wear.Surf.Prot.Sys: None
Date Installed: 01/01/1901
213. Utilities Attached: Communication

214a. Posted Weight Limit: 090909
b. Posted Speed Limit:
c. Narrow/1way Brdg Sign: NA
d. Vertical Clr. Sign: No
Adv. Warning Sign: No
e. Navigation Lights?: No
Working/Not Working: No
215. Overpass: U.S. HIGHWAY
221. Substr.Cond.(U/W):
222. Fill Over RCB:
223. Appr.Slab/Rwy Cond.: 3
225. Paint Type/Ovrct: Red Lead 3 Coat System
N/A
226. Date Painted: 1933
227. Paint Color: Silver
233. Deck Forming: Conventional Forming
238. School Bus Rte.: Current & Desired route
240. Appr. Rwy Type.: Concrete
243. Grdr Spacing/No.: /

244. Span Lengths:
245. Girder Depth: 48.00
246a. Type of Ovelay: AC Overlay
b. Overlay Thickness: 3.00
c. Overlay Date: 12/04/2003
d. Ovly Depth Changed >1": _
247. Protective Systems:
248. # Field Splices w/ Corrosion:
249. Scour Crit. POA Exists?: _
250. Headwall:
254. Thru Truss Type:
257a. OkiePROS Truck Routing: Yes
258. Plans w/Found.in ODOT File:
259. Scour Eval. in ODOT File:
263. Interchange at Intersection: No
264. Interstate Milepoint:

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04085	0902 0000 X	-1	5.00	SD

Inspection Date: 10/16/19 Mike Kronander

Invoice No.: 877392 Inspected With: -1

BRIDGE NOTES:

(38) 100-foot long riveted pony trusses with (2) 36-foot long steel beam approach spans. The bridge was posted for a 9-ton load restriction at the time of the inspection. The posting was lowered to 9 tons after cracks were discovered in the east U4 inboard gusset plates of spans 32 and 37 during the inspection. It was also discovered that the latest load rating report, dated March 25, 2014, used 8 rivets per gusset plate for the U1L0 and U4L3 panel points where only 6 exist.
OS Inspection Items: See Appendix tables in 2018-10-14 FC report for list of the following: Inspect cracks in stringer web copes, stringer connection angles, floor beams web copes, lower chord gusset plates above bearings for growth, stringer connections at end floor beams for additional loss or broken rivets; pier beams and supplemental pier beams at piers 1 and 39 for distress; misalignment of W U1U2 sp 37; floor beam section loss; gusset plate cracks at east U4 spans 32 and 37; scour from stream in spans 10 and 11; areas of collision damage on deck to steel trusses; east bearing at pier 3 for any undermining.

INSPECTION NOTES: **10/16/19**

PX – Reinforce/replace the damaged concrete bridge railing in spans 1 and 40. Consider installing approach railing with transitions and terminations compliant with current standards in both approach roadways.
PX – Seal cracks in the asphalt in both the bridge and approach wearing surfaces. Consider removing the asphalt wearing surface on the bridge and the built-up elastomeric concrete header to remove dead load and prevent damage to structure from drainage trapped in the wearing surface.
PX – Remove loose elastomeric concrete and patch the joint headers as necessary to provide a smooth riding surface across the bridge.
PX – Reseal the poured seal expansion joints. Consider replacing the deteriorated joints and joint headers due to deteriorated concrete adjacent to the joint opening.
PX – Install elastomeric pads or steel shims at missing locations on the supplemental pier beams over piers 1 and 39.
PX – During future inspections compare lengths of cracks in stringer and floor beam webs with Appendix A table values. Drill crack tips that grow significantly.
PX – Repair cracks in stringer connection angles noted in Appendix B by adding seat brackets below the stringer.
PX – Repair section loss in stringer and floor beam webs where corrosion holes and/or heavy section loss exists with welded plates and/or angles.
PX – Remove broken rivets for the stringer connections at the locations noted in Appendix C and replace with bolts.
PX – Replace sheared rivets in the vertical connection upper chord and end post with bolts at west U1 in spans 31 and 37.
PX – Remove pack rust and apply caulking and paint along the edges of the gusset plates at L0 and L5. Consider strengthening gusset plates where bowing is occurring.
PX – Clean and paint the stringer ends and floor beams adjacent to the joints above the piers and the lower chord panel points including the splice locations.
PX – Add rip rap around piers near the current channel to protect against scour.
PX – Repave the south approach near the bridge to provide a smooth transition.
PX – Install full depth pressure relief joints in both approaches to mitigate ongoing effects of pavement pressure.

FX – Monitor:
Cracks in the inboard gusset plates at east U4 spans 32 and 37 and at west U1 span 37 for growth.
The channel for further movement.
Beam connections to the original pier beams at piers 1 and 39 for further cracking.
Notches and cuts in inboard flange and gusset plate at west U1L2 span 31 for cracks or signs of distress. Consider strengthening member if further distress is noted.
Collision damage to west U1L2 in span 6 west U1L0 in spans 7 and 37 and east U1L0 in spans 14 and 39 for distress.
Pack rust and section loss in truss web members and end posts at railing connections.
Spalls and corroding reinforcing steel in soffit for further deterioration.
Lower chord gusset plates over the bearings for the development of horizontal cracks.
Cracks at floor beam copes for growth and further deterioration.
Horizontal cracks in the web of the end floor beams at span 6 in floor beam 0 span 11 in floor beam 5 and span 20 in floor beam 0.
Fatigue prone stitch welds of angle strengthening at floor beam 0 span 2 for cracking.
Corrosion holes through the floor bracing system gusset plates for the development of cracks.
1/4-inch bow in west U1U2 due to collision damage for further distress and development of cracks.
Bowed gusset plates near bearings for distress.
Section loss of the inboard lower chord at the floor system bracing connections spliceS and adjacent to stay/batten plates.
Bullet strike damage to east truss span 4 members/gusset plates for crack development.
Cracking/spall of the east column capital pier 3 for conditions which would undermine the bearing.
Expansion bearing pins for signs of additional wear or distress.

ELEMENT CONDITION STATE DATA

Elem. / Env	Description	Unit	Total Qty	% 1	Qty. 1	% 2	Qty. 2	% 3	Qty. 3	% 4	Qty. 4
12 / 1	Re Concrete Deck	sq.ft	94,488.00	0%	0.00	0%	0.00	100%	94,488.00	0%	0.00

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	SD
04085	0902 0000 X	-1	5.00	

The deck appears to be growing from the center of each truss span as evidenced by the distress in the floor system at the end floor beams (cracking and web rotation of the floor beams, cracks in the stringer connection angles, and broken rivet heads at the stringer connection angles). These conditions were observed in nearly all of the truss spans.
Evidence of significant approach pavement growth was noted at the deck/abutment backwall interface. The deck at the abutment seats has pushed towards the channel up to 3 1/4 inches.
Deterioration of the curbs and edges of the deck are typical throughout the bridge. These conditions are promoted by deck drainage held against the concrete by the porous asphalt wearing surface. Spalls in the curb have been patched at isolated locations throughout the deck.

510 / 1	Wearing Surfaces	sq.ft	94,488.00	79%	74,488.00	11%	10,000.00	11%	10,000.00	0%	0.00

PX – The asphalt wearing surface has unsealed longitudinal and transverse cracks throughout the spans. Raveling and patching of the asphalt pavement exists along the outside wheel lines at isolated locations and along the roadway centerline. The aging wearing surface does not effectively shed drainage, allowing the drainage to infiltrate cracks in the deck.

107 / 1	Steel Opn Girder/Beam	ft	259.00	67%	174.00	33%	85.00	0%	0.00	0%	0.00

Surface corrosion exists along the top flanges of exterior beams.

113 / 1	Steel Stringer	ft	9,501.00	0%	0.00	63%	6,001.00	37%	3,500.00	0%	0.00

Section loss of the top flange is typical in the exterior stringers. Pack rust is lifting the deck from the exterior stringers.

120 / 1	Steel Truss	ft	7,600.00	0%	0.00	64%	4,840.00	36%	2,760.00	0%	0.00

Truss Upper Chord
PX/FX – Member Alignment – Vehicular collision damage was observed at numerous locations in the upper chord.
Truss Lower Chord
PX – Corrosion of the lower chord is common at the floor beam/floor system bracing gusset plate connection. The corrosion has caused section loss of less than 1/4-inch to the inboard channel top flange. Corrosion also occurs around the inboard splice plates at L2 and L3 under the floor beams. The corrosion and resulting section loss is due to deck drainage passing through the deck joints above the interior floor beams and expansion joints. Several areas of the lower chord have corrosion holes through the inboard bottom flange of the channels. Corrosion is typically heavier at the east truss.
PX – Corrosion is common around the inboard splice plates at L2 and L3 and appears to be the result of deck drainage splashing over the edge of the deck. Pack rust is developing at the bottom flange splice; however, no significant distress was observed in the web splice plates. Pack rust and corrosion are significantly less on the west truss.
FX – Horizontal cracks were observed in the inboard truss gusset plate between the bearing pin and the end floor beam (see Appendix H for locations and sizes of cracks).
FX – Lower chord gusset plates are typically bowed at L0 and L5 due to pack rust. The inboard gusset plate is bowed up to 1 inch between the end post and the lower chord with the outboard gusset plates typically bowed less than the inboard. The end of the end post is in contact or near contact with the top of the lower chord making the likelihood of a buckling failure remote. Section loss of the gusset plate is up to 50% of the plate thickness (gusset plate is 3/8 inch thick) and occurs at multiple locations.
Truss Web Members
PX/FX – Member Alignment – Vehicular collision damage was observed at numerous locations on the above deck truss members.
FX – Pack rust developing under the corner of the upper chord gusset plates has caused cracks to develop in the edge of the gusset plate at east U4 in spans 32 and 37. The cracks exist near the first row of rivets, reducing the capacity of the gusset plate for U4L3.
FX – Bullet strike damage exists at the outboard gusset plate between east U2L3 and L2U3 in span 4 and the outboard flange of east U2L3 in span 3.
Truss End Posts
PX – Pack rust is common at the end post connection to the inboard gusset plate at the lower chord connection (photo 66). Deck drainage which splashes over the curb travels down the end post promoting corrosion.
FX – Pack rust is forming at many of the bridge railing to inboard end post channel connections. Up to 3/4-inch section loss was noted along the full height of the inboard channel webs.
FX – Vehicular collision damage exists at numerous locations to the end posts.

515 / 1	Steel Protective Coating	sq.ft	406,533.00	0%	0.00	0%	0.00	100%	406,533.00	0%	0.00

PX – Corrosion and significant section loss are occurring at many locations on the lower chord; floor beams and stringers due to deck drainage passing through joints. Widespread section loss and corrosion holes exist in the exterior stringers and end floor beams.
Minor to moderate pack rust and minor section loss at the gusset plate seams are common on the above deck truss members with weathered and chalking paint throughout.

152 / 1	Steel Floor Beam	ft	6,155.00	0%	0.00	59%	3,655.00	41%	2,500.00	0%	0.00

PX – Section loss with corrosion holes is common in the end floor beams and floor beams at the east truss connection (57 locations - See Appendix F).
FX – Horizontal cracks in the end floor beams between the top flange and connection angle range between 5/8 inch to 9 3/16 inches (71 locations - See Appendix G)

162 / 1	Stl Gus Plate	each	1,672.00	0%	0.00	45%	757.00	55%	915.00	0%	0.00

PX- Horizontal cracks in the inboard truss gusset plates above the bearings range in length between 6 3/4 inches to 17 5/8 inches long (10 locations - See Appendix H); Noted cracks have been strengthened; Numerous locations where paint cracks exists at this location suggesting eminent development of cracks.
FX- Cracks in edge of E U4 in spans 32 and 37 due to pack rust (NEW 2018) and W U1 span 37 due to collision damage; LC inboard gusset plates typically bowed at L0 and L5 due to pack rust; West U1 span 31 has tears (1 7/8 inch and 1 inch) in edge of inboard gusset plate Bullet strike damage to E M2.5 span 4.

205 / 1	Re Conc Column	each	78.00	0%	0.00	99%	77.00	1%	1.00	0%	0.00

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	SD
04085	0902 0000 X	-1	5.00	

FX – A 7/8-inch wide crack exists in the capital of the east column of pier 3 which is emanating from the span 3 bearing anchor bolt. The crack has led to a large portion of the column capital shifting to the south approximately 1 1/4 inches (previously 1-inch). The truss bearing appears to be adequately supported and brackets have been added to stabilize the capital. A definitive cause of the crack could not be determined during the inspection.
FX – The top one to five feet of the pier column foundation are exposed at many piers, generally in the floodplain north of the river and on some piers in the south floodplain. This may be indicative of general scour of the sandy soils and/or may be an as-built condition.
Map cracking with efflorescence and delaminations are common throughout many of the piers. It could not be determined if the cracks in the pier columns are the result of Alkali-Silica Reactivity.
Vertical and horizontal cracks which mirror the reinforcing steel exist in the web walls at several locations. Spalls exposing reinforcing steel exist in the face and corners of the web walls due to inadequate cover. The cracks and spalls are most prevalent on the south face of the piers and do not affect the load carrying capacity.
Shallow spalls due to gunshot damage are typical on the columns and web walls of piers 1 through 8.

215 / 1	Re Conc Abutment	ft	49.20	50%	24.60	50%	24.60	0%	0.00	0%	0.00

No significant deficiencies were noted in the abutments, except for moderate debris on the bearing seats of both abutments and map cracking exposing a few reinforcing bars at the ends of the south abutment.

301 / 1	Pourable Joint Seal	ft	495.00	0%	0.00	0%	0.00	25%	123.75	75%	371.25

PX – Joint headers consisting of elastomeric concrete were installed to maintain a joint opening with the asphalt wearing surface. These headers are only as deep as the asphalt wearing surface and exhibit past patching using asphalt, concrete and elastomeric concrete. Spalling of the headers was observed along the joints at piers 1; 2; 13; 27; 33; 35; and 39. Several of these spalls have occurred since the 2016 inspection when the joint headers were patched with asphalt concrete.
PX – The poured seal joints typically are deteriorated or missing and show evidence of leaking. The poured seal was never installed at many of the repaired header locations, leaving only the form board to fill the joint. Spalling of the underside of the deck at the expansion joints is common and a direct result of the leaking joints.
The joints are typically closed near the ends of the bridge as a result of approach pavement growth. The joints above the expansion bearings further from the ends of the bridge are not closed, though many of the truss expansion bearings are at or near their limits of movement.

310 / 1	Elastomeric Bearing	each	14.00	50%	7.00	0%	0.00	14%	2.00	36%	5.00

PX – Elastomeric pads are missing at the supplemental pier beams under beams 1 through 4 at pier 1 and at beams 2 and 3 at pier 39 with heavy pack rust forming at beam 5; pier 1. The bearing pads appear to be walking from beneath the beams at pier 1 under beam 5 and pier 39 under beams 4 and 5. This condition limits the supplemental pier beams to act only as a catcher beam; available to carry the beams should the original pier beam fail.

311 / 1	Moveable Bearing	each	86.00	0%	0.00	67%	58.00	33%	28.00	0%	0.00

FX – Wear causing grooving in the expansion bearing pins and enlarging of the pin hole in the connecting gusset plates are common throughout the spans. The wear is a result of bearing rotation under live loads. This condition is most severe at L0 span 38 over pier 37; which has 3/16-inch total wear to the pin and gusset plate.
Heavy pack rust with minor associated pitting is widespread on and between the bearing components; more so at the expansion bearings. Much of this deterioration is caused by debris accumulating on and around the bearing seats.
Expansion bearings are rotated up to 3/4-inch towards the joint with pack rust filling the gap between the masonry plate and sole plate. The expansion bearings are generally centered on the masonry plate with no signs of recent movement observed; though many are in or near full expansion. The bronze sliding plate has slid slightly towards the center of the truss span and is fractured into pieces at a few locations. One bronze sliding plate has slid to the north 3 inches under the west truss at pier 5 in span 6. It is speculated that the bearings became frozen; and then rotated in expansion during warm weather; allowing pack rust to incrementally fill the gap between the plates.
Approximately 25-percent of the anchor bolts are broken or have corroded through within the slotted holes of the truss expansion bearing assemblies. This condition is more common at the expansion bearings. The remaining anchor bolts should be capable of resisting lateral forces on the truss spans. The anchor bolts are failing due to a combination of shear; pack rust-induced tension; and corrosion.

313 / 1	Fixed Bearing	each	84.00	0%	0.00	75%	63.00	25%	21.00	0%	0.00

Exterior beams at both abutments have sheared anchor bolts at the bearings (the interior beam anchor bolts do not extend into the abutment seat concrete). This most likely is a result of pavement pressure from the approach roadway pushing the bridge deck; up to 3 1/3 inches (previously 2 inches) of movement to the north was noted at the south abutment. The beam bearings at the north abutment are pushed to the south up to 4 inches; also due to pavement pressure.

330 / 1	Metal Bridge Railing	ft	7,600.00	0%	0.00	95%	7,220.00	5%	380.00	0%	0.00

Pack rust is typical between the metal bridge railing and the truss end posts and web members. No significant section loss was noted to the railing.
Small cracks exist in the railing where the flange and web have been coped around the end post. Collision damage has caused minor bends in the steel railing at numerous locations. These conditions have not significantly affected the strength of the railing.

331 / 1	Re Conc Bridge Railing	ft	144.00	50%	72.00	25%	36.00	25%	36.00	0%	0.00

PX – Collision damage exists to the concrete railing in spans 1 and 40. One section of the east bottom rail has been severed in span 1. The concrete post at the north abutment for the east rail is spalled and is severed from the base. The adjacent post has spalling with exposed reinforcing steel. Four of the concrete posts for the west rail in span 40 are leaning outward and the deck is cracked on the outside edge of the posts.

859 / 1	Soffit	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	SD
04085	0902 0000 X	-1	5.00	

FX – Spalls exposing corroded reinforcing steel are common in the underside of the deck along the edge of the deck and floor beams. The spalls appear to be the result of deck drainage leaking through cracks in the deck.
The deck is lifting from the exterior stringers and end floor beams due to pack rust on the top flange. A transverse crack is common in the underside of the deck between 4 and 6 feet from the expansion joints because of the lifting deck. This lifting of the deck is beginning to produce a ramping effect for traffic over each floor beam.
The deck soffit exhibits transverse cracks with light efflorescence and discolored concrete. Full depth patches exist adjacent to many of the joints and along the east curb at isolated locations. At a few locations, the timber formwork remains in place. A deck repair utilizing timber boards occurs on the south face of floor beam 3 between stringers 4 and 5 in span 34.

863 / 1	Steel Pier Beam	(LF)	104.00	50%	52.00	0%	0.00	50%	52.00	0%	0.00

PX – Member Alignment – The pier beams at piers 1 and 39 have been retrofitted with a supplemental pier beam due to severe sweep and rotation as a result of approach pavement growth. Longitudinal forces act through the deck to distort the pier beam. Most of the elastomeric pads between the supplemental pier beam and the beam bottom flange are missing; allowing the original pier beam to still carry the beam reactions. The supplemental pier beam currently acts as a catcher beam to support the beams should the original pier beam fail. No signs of distress from vehicular live loads were observed in either the original pier beam or the supplemental pier beam.
The lower portion of the supplemental pier beam at pier 1 is rolled approximately 3 degrees to the south; and upper section is rolled approximately 1 degree south. Pier beam 39 is rolled approximately 1 degree over the lower portion of the web. This is likely an as-built condition and does not significantly affect the load carrying capacity of the supplemental pier beam.
The bottom flange of the original pier beam at pier 1 is in contact with the stiff leg at pier 1. During higher temperatures they are in contact with each other; resulting in 1/16-inch wear on the north face of the original pier beam.

865 / 1	St.Open Gird End(5Ft	(LF)	100.00	0%	0.00	80%	80.00	20%	20.00	0%	0.00

FX – The connection angles for the beams to pier beam 39 are deformed due to the apparent approach pavement growth and pier beam rotation and sweep. The beams are still supported by the original pier beams at piers 1 and 39; however; the added pier beam will support the beams should the connection angles fail.

877 / 1	St. Stringer End(5Ft)	(LF)	9,501.00	0%	0.00	47%	4,501.00	53%	5,000.00	0%	0.00

PX - Significant loss including corrosion holes through exterior stringer webs at end floor beams (59 locations - See Appendix D); Cracks in the web at the top flange cope range from 1/8 inch to 2 1/2 inches long (98 locations - See Appendix A); Cracks in the stringer connection angles at the end floor beams range from 1 1/4 inches to 7 inches long (61 locations - See Appendix B); Broken rivets at the stringer connections to the end floor beams (121 rivets at 92 locations - See Appendix C).

909 / 1	Pourable Fix Jt.Seal	(LF)	495.40	0%	0.00	100%	495.40	0%	0.00	0%	0.00

Several of the fixed joints and the abutment joints have been paved over with a transverse crack observed over the joint.
Joints over the fixed bearings typically are closed.
The void between floor beam 5; span 20; and floor beam 0; span 21; over pier 20 has been filled with asphalt from the top of the floor beam bottom flanges to the underside of the deck. The asphalt retains moisture which accelerates corrosion and section loss on the floor beams.
Joint armor and supports at pier 1 are heavily twisted. This is caused by pavement pressure and pack rust.

916 / 1	St.Bearing Assembly	(LF)	4.00	0%	0.00	100%	4.00	0%	0.00	0%	0.00

Surface corrosion with no significant deficiencies.
Note: Bearing assemblies do not exist between beams and supplemental pier beams

956 / 1	St. Cracking/Fatigue	(SF)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

PX- Cracks in the stringer web at the top flange cope range from 1/8 inch to 2 1/2 inches long (98 locations - See Appendix A); Cracks in the stringer connection angles at the end floor beams range from 1 1/4 inches to 7 inches long (61 locations - See Appendix B).
FX- Cracks in edge of E U4 in spans 32 and 37 due to pack rust and W U1 span 37 due to collision damage; Horizontal cracks in the end floor beams between the top flange and connection angle range between 5/8 inch to 9 3/16 inches (71 locations - See Appendix G).

957 / 1	Pack Rust Smart Flag	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	SD
04085	0902 0000 X	-1	5.00	

PX – Corrosion is common around the inboard splice plates at L2 and L3 and appears to be the result of deck drainage splashing over the edge of the deck. Pack rust is developing at the bottom flange splice; however; no significant distress was observed in the web splice plates. Pack rust and corrosion are significantly less on the west truss.

PX – Pack rust is common at the end post connection to the inboard gusset plate at the lower chord connection. Deck drainage which splashes over the curb travels down the end post promoting corrosion.

FX – Pack rust is forming at many of the bridge railing to inboard end post channel connections. Up to 3/4-inch section loss was noted along the full height of the inboard channel webs.

FX – Horizontal cracks were observed in the inboard truss gusset plate between the bearing pin and the end floor beam (see Appendix H for locations and sizes of cracks). All ten locations have been strengthened with the addition of a welded steel angle on the inboard face. The distortion and cracks are a result of section loss and pack rust occurring between the gusset plate and the top edge of the lower chord channel. The crack is within the horizontal shear plane between the end post and the lower chord. Numerous locations exist where the gusset plate exhibits paint cracks indicating eminent development of cracks.

FX – Lower chord gusset plates are typically bowed at L0 and L5 due to pack rust. The inboard gusset plate is bowed up to 1 inch between the end post and the lower chord with the outboard gusset plates typically bowed less than the inboard. The end of the end post is in contact or near contact with the top of the lower chord making the likelihood of a buckling failure remote. Section loss of the gusset plate is up to 50% of the plate thickness (gusset plate is 3/8 inch thick) and occurs at multiple locations. This loss affects the horizontal shear capacity of the gusset plate.

FX – Pack rust developing under the corner of the upper chord gusset plates has caused cracks to develop in the edge of the gusset plate at east U4 in spans 32 and 37. The cracks exist near the first row of rivets; reducing the capacity of the gusset plate for U4L3.

Heavy pack rust with minor associated pitting is widespread on and between the bearing components; more so at the expansion bearings

Pack rust exists between the floor beam bottom flange and the lower lateral bracing gusset plates causing section loss to the floor beam. This loss occurs at a location of low stress and does not significantly affect the load carrying capacity of the member.

Pack rust 1/4-inch thick is common between the diagonals and the mid gusset plates with minimal section loss. Isolated locations exhibited pack rust up to 1 inch thick with 1/8-inch deep section loss. Similar conditions exist at the bridge railing connections to the truss web members.

Pack rust is typical between the metal bridge railing and the truss end posts and web members. No significant section loss was noted to the railing.

961 / 1	Scour SF	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

FX – The top one to five feet of the pier column foundation are exposed at many piers; generally in the floodplain north of the river and on some piers in the south floodplain. This may be indicative of general scour of the sandy soils and/or may be an as-built condition.

962 / 1	Super.Traffic Impact	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

PX/FX – Member Alignment – Vehicular collision damage was observed at numerous locations in the upper chord:

PX – Impact damage resulting in multiple sheared rivets for the bottom lacing bars exists at east U3U4; span 9 and west U1U2; span 31. No signs of local buckling were observed at this location.

FX – West U1U2 in span 37 is bowed globally to the east 1/4 inch. This damage does not significantly affect the load carrying capacity of the member and appears to be the result of vehicular collision. Multiple rivet heads are also sheared away on the stay plate and lacing bars along the inboard bottom flange.

Five failed lacing bars exist on the underside of east U3U4; span 9.

Impact damage exists on the inboard flanges of the upper chord at several additional locations. The damage does not significantly affect the load carrying capacity of the members.

PX/FX – Member Alignment – Vehicular collision damage was observed at numerous locations on the above deck truss members. The following are the most significant:

PX – Span 37; west U1L1 – U1L1 carries the floor beam reaction only. Two sheared rivet heads exist at the inboard gusset plate at U1. The shank still exists through the rivet hole of the gusset plate and there is no sign of movement or distress from loading.

FX – Span 4; west U1L2 – Inboard flange bent 2 inches over a 9-inch length below the bottom rail.

FX – Span 6; west U1L2 – Inboard flange bent inward 2 1/8 inch near U1.

FX – Span 20; west U1 – Inboard gusset plate has a 3/8-inch tear with adjacent impact damage to U1L2 causing the flange to bow upward.

FX – Span 31; west U1L2 – Inboard flange has a tear near U1 resulting in an approximate 50% loss of the flange. The adjacent gusset plate has two tears measuring 1 7/8 inches deep at the upper chord and 1-inch deep at connection to U1L2. The 1 7/8-inch deep tear occurs in the shear plane between the diagonals and upper chord and will affect the shear strength of the gusset plate. The 1-inch deep tear occurs near the corner of the gusset plate and does not significantly affect the capacity of the gusset plate. The gusset plate is also bowed approximately 2 inches to the west due to the collision damage. This has not changed since the previous inspection.

FX – Span 37; west U1 gusset plate – A 5/16-inch long crack exists in the bottom edge of the inboard gusset plate between U1L1 and U1L2 near U1L2.

FX – Span 37; west U1L2 – Inboard bottom flange is bent 1-inch near U1.

FX – Vehicular collision damage exists at numerous locations to the end posts. The following are the most significant:

Span 7; west L0U1 – Bent inboard channel bottom flange and edge damage to top cover plate at U1.

Span 14; east L0U1 – Top inboard flange is bent down approximately 4 inches, and 5 rivet heads are sheared off.

Span 20; west L0U1 – Inboard bottom flange bowed upward and has minor scrapes.

Span 37; west L0U1 – Three lacing bars are detached on the bottom face and the member is also bowed globally 1/4-inch to the west. The inboard bottom flange is bowed west 5/8-inch and up 2 3/4-inch and is torn 1 3/8 inches wide over 4 1/4 inches in length at top railing.

Span 39; east L0U1 – Inboard flange bent down approximately 2 inches near U1.

963 / 1	Steel Section Loss SF	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

NBI No.:	Structure No.:	Local ID:	Suff. Rating:	SD
04085	0902 0000 X	-1	5.00	

PX - Significant loss including corrosion holes through exterior stringer webs at end floor beams (59 locations - See Appendix D); Section loss with corrosion holes is common in the end floor beams and floor beams at the east truss connection (57 locations - See Appendix F).
FX- Corrosion of the lower chord has caused section loss on inboard top flange.

965 / 1	Debris SF	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

The banks are well vegetated north of pier 11 with large trees and vegetation in the floodplain. The floodplain south of pier 10 contains sparse vegetation.

969 / 1	OutOfPlane Dist./Load	(EA)	1.00	0%	0.00	100%	1.00	0%	0.00	0%	0.00

FX – Pier beams 1 and 39 have severe sweep and have been sistered.

973 / 1	Horizontal Force SF	(EA)	1.00	0%	0.00	0%	0.00	100%	1.00	0%	0.00

PX- Significant approach pavement pressure occurs at both abutments pushing inward from both ends as evidenced by the movement of the deck, and sheared rivets and cracks in stringer to floor beam connections.

975 / 1	Supplemental Support	(EA)	76.00	100%	76.00	0%	0.00	0%	0.00	0%	0.00

The stiff leg shim plate under floor beam 5; span 26 at pier 26 is rotating out from under the floor beam bottom flange. Floor beam 0; span 8 at pier 7 impacts the stiff leg under truck loads. The stiff leg repairs are intended to catch the floor beam should it fail and do not need to be in contact with the floor beam.