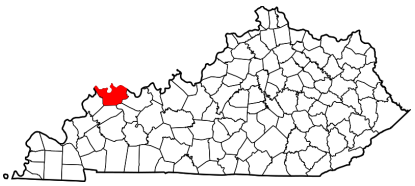
Data Needs Analysis

Scoping Study



US 60 Spottsville Bridge (051B00015N) over Green River

Henderson County

Item No. **02 - 1080.00**

Prepared by

KYTC District 2 Planning

August 2013

KENTUCKY TRANSPORTATION CABINET

100 KENTUCKY transportation CABINET kytc 1912-2012

I. PRELIMINARY PROJECT INFORMATION

County: Henderson **Item No.:** 2-1080.00
Route Number(s): US 60 **Road Name:** US 60
Program No.: 8675901D **UPN:** FD52 051 0060 019-020
Federal Project No.: BRO 5053(026) **Type of Work:** Bridge Replacement

2012 **Highway Plan Project Description:**

Replace Bridge on US 60 over Green River at intersection with KY 1078 (SR39) 051B00015N (12CCR)

Beginning MP: 19.236 **Ending MP:** 19.444 **Project Length:** 0.208

Functional Class.: ☐ Urban ☑ Rural — Arterial
State Class.: ☐ Primary ☑ Secondary
Route is on: ☐ NHS ☑ NN ☐ Ext Wt
MPO Area: Evansville/Henderson
Truck Class.: AAA
In TIP: ☑ Yes ☐ No
% Trucks: 5.70%
ADT (current): 3240 (2012)
Terrain: Rolling
Access Control: ☐ None ☐ Permit ☑ Fully Controlled ☐ Partial Spacing:
Median Type: ☑ Undivided ☐ Divided (Type):
Existing Bike Accommodation: Shared Lane **Ped:** ☐ Sidewalk
Posted Speed: ☐ 35 mph ☑ 45 mph ☐ 55 mph ☐ Other (Specify):
KYTC Guidelines Preliminarily Based on : 45 **MPH Proposed Design Speed**

Roadway Data:	**EXISTING**	**COMMON GEOMETRIC PRACTICES***
No. of Lanes	2	2
Lane Width	9 ft	12 ft
Shoulder Width	0.3 ft	8 ft
Max. Superelevation**		
Minimum Radius**		600 ft
Maximum Grade		6%
Minimum Sight Dist.		60 ft
Sidewalk Width(urban)		
Clear-zone***		

Existing Rdwy. Plans available? ☑ Yes ☐ No — Year of Plans: 1931
☐ Traffic Forecast Requested — Date Requested: 5/23/2013
☐ Mapping/Survey Requested — Date Requested:
Type:

Project Notes/Design Exceptions?:

*Based on proposed Design Speed, **AASHTO's A Policy on Geometric Design of Highways and Streets, ***AASHTO's Roadside Design Guide

Bridge No. 051B00015	(Bridge #1)	(Bridge #2)
Sufficiency Rating	38.9	
Total Length	1103 ft	
Width, curb to curb	19.8 ft	
Span Lengths	359.9 ft max	
Year Built	1930	
Posted Weight Limit	33T	
Structurally Deficient?	Yes	
Functionally Obsolete?	Yes	

Existing Geotech data available? ☑ Yes ☐ No

Detour Length(s): 10.0 miles

*If more than two bridges are located on the project, include additions sheets.

Existing Bridge Type: Steel truss w concrete deck

II. PROJECT PURPOSE AND NEED

A. Legislation

Item # 2-1080.00 on the 2012 Highway Plan.

Funding	*Phase*	*Year*	*Amount*
BRO	D	2013	$1,500,000
BRO	R	2014	$250,000
BRO	U	2014	$250,000
BRO	C	2015	$25,000,000

B. Project Status

This project was UPL# 2 051 B0060 50.00. It was first requested by EUTS(EMPO) in 2004. Design funds in the amount of $900,000 were authorized on March 4th, 2013.

C. System Linkage

US 60 is a Rural Minor Arterial linking several small communities to the city of Henderson to the west and to the city of Owensboro to the east. This project will not change the functional classification.

D. Modal Interrelationships

This bridge interacts with barge traffic on the Green River. River traffic has collided with the bridge in the past resulting in the bridge being closed for repairs. This segment of US 60 carries 5.7% truck traffic (2010). The bridge is posted with a 33T weight limit currently. The route is designated as a truck route and is inclusive of a US bike trail.

E. Social Demands & Economic Development

This section of US 60 runs from the north end of Henderson to the north end of Owensboro and is one of only 2 bridges that cross the Green River between the 2 cities. US 60 also connects several other smaller towns in the area including Spottsville, Reed, and Stanley. This segment of US 60 is on the Scenic Byway system- Blues to Bluegrass- W. C. Handy Blues Trail. J. J. Audubon State Park is located between the bridge and Henderson. Ben Hawes State Park is located between the bridge and Owensboro.

F. Transportation Demand

The average daily traffic across this bridge was 3240 in 2012 with approximately 6% truck traffic. A 2005 MPO freight survey identified this bridge as an impediment to freight mobility.

II. PROJECT PURPOSE AND NEED (cont.)

G. Capacity

This project will not affect capacity.

H. Safety

The existing bridge over Green River at Spottsville is substandard. The bridge is a narrow two-lane bridge that does not adequately handle the truck traffic on this road. 6 collisions were reported on the bridge in the 3 yr period between 1/1/2010 and 1/1/2013. One was an animal collision and the remaining 5 were side swipe collisions involving 2 vehicles moving in opposite directions.

I. Roadway Deficiencies

19.8 ft curb-to-curb is narrow for the large volume of truck traffic using this bridge. KYTC's Common Geometric Practices recommends 24 ft pavement width and 8 ft shoulders for a rural arterial roadway.

Draft Purpose and Need Statement:

Need: Bridge replacement. (051B00015N) over Green River is a narrow 2 lane bridge which is structurally deficient. It has a sufficiency rating of 38.9. Multiple collisions have been reported on this bridge.

Purpose: Improve safety, increase mobility, and address structural and roadway deficiencies on the bridge.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Project is in: ☑ Attainment area ☐ Nonattainment or Maintenance Area ☐ PM 2.5 County

STIP Pg.#: 50 **TIP Pg.#:**

B. Archeology/Historic Resources

☑ Known Archeological or Historic Resources are present

Historic: Bridge is steel truss built in 1930. A Memorandum of Agreement (MOA) with documentation will likely be necessary. Archaeology: dependent upon widening of approaches or choice of a new alignment.

C. Threatened and Endangered Species

Due to the wetlands present and the Green River an extensive Mammal and Mussel Biological Assessment will likely be required.

D. Hazardous Materials

☐ Potentially Contaminated Sites are present ☑ Potential Bridge or Structure Demolition

Bridge must be inspected by DEA Bridge Inspectors for lead-based paint and asbestos.

E. Permitting

Check all that may apply: ☐ Waters of the US ☐ MS4 area ☑ Floodplain Impacts ☑ Navigable Waters of the US Impacts

Are 401/404 Permits likely to be required? ☑ Yes ☐ No Impacts to: ☑ Wetlands ☐ Stream/Lake/Pond

☐ ACE LON ☑ ACE NW ☐ ACE IP ☐ DOW IWQC ☐ Special Use Waters

USFWS National Wetlands present as well as the Green River.

F. Noise

Are existing or planned noise sensitive receptors adjacent to the proposed project? ☑ Yes ☐ No

Is this considered a "Type I Project" according to the KYTC Noise Analysis and Abatement Policy? ☐ Yes ☐ No

Dependent on whether a new alignment is chosen.

G. Socioeconomic

Check all that may apply: ☐ Low Income/Minority Populations affected ☑ Relocations ☑ Local Land Use Plan available

A possible new alignment and approaches have been mentioned. This would possibly cause relocations and increased noise for existing residents.

H. Section 4(f) or 6(f) Resources

The following are present on the project: ☐ Section 4(f) Resources ☐ Section 6(f) Resources

None known at this time.

Anticipated Environmental Document: CE Level 2

IV. PROJECT SCOPING

This project is to replace a narrow 2 lane bridge with a suffiency rating of 38.9. The new bridge will remain 2 lanes. However, it has not been determined if it will be on existing or new alignment. If a new alignment is chosen, additional utility funds may be needed. This project will improve safety, mobility, and address structural and roadway deficiencies.

Current Estimate	
Phase	Estimate
Planning	
Design	1,500,000
R/W	250,000
Utilities	250,000
Const	25,000,000
Total	**27,000,000**

IV. PROJECT SCOPING (cont.)

V. Summary

US 60 is the northern connection between Henderson and Owensboro. This project is to replace the narrow, structurally deficient bridge that crosses the Green River. If the design is on new alignment, an additional $250,000 may be needed for Utilities.

VI. Tables and Exhibits

After Bridge (WB on 60)

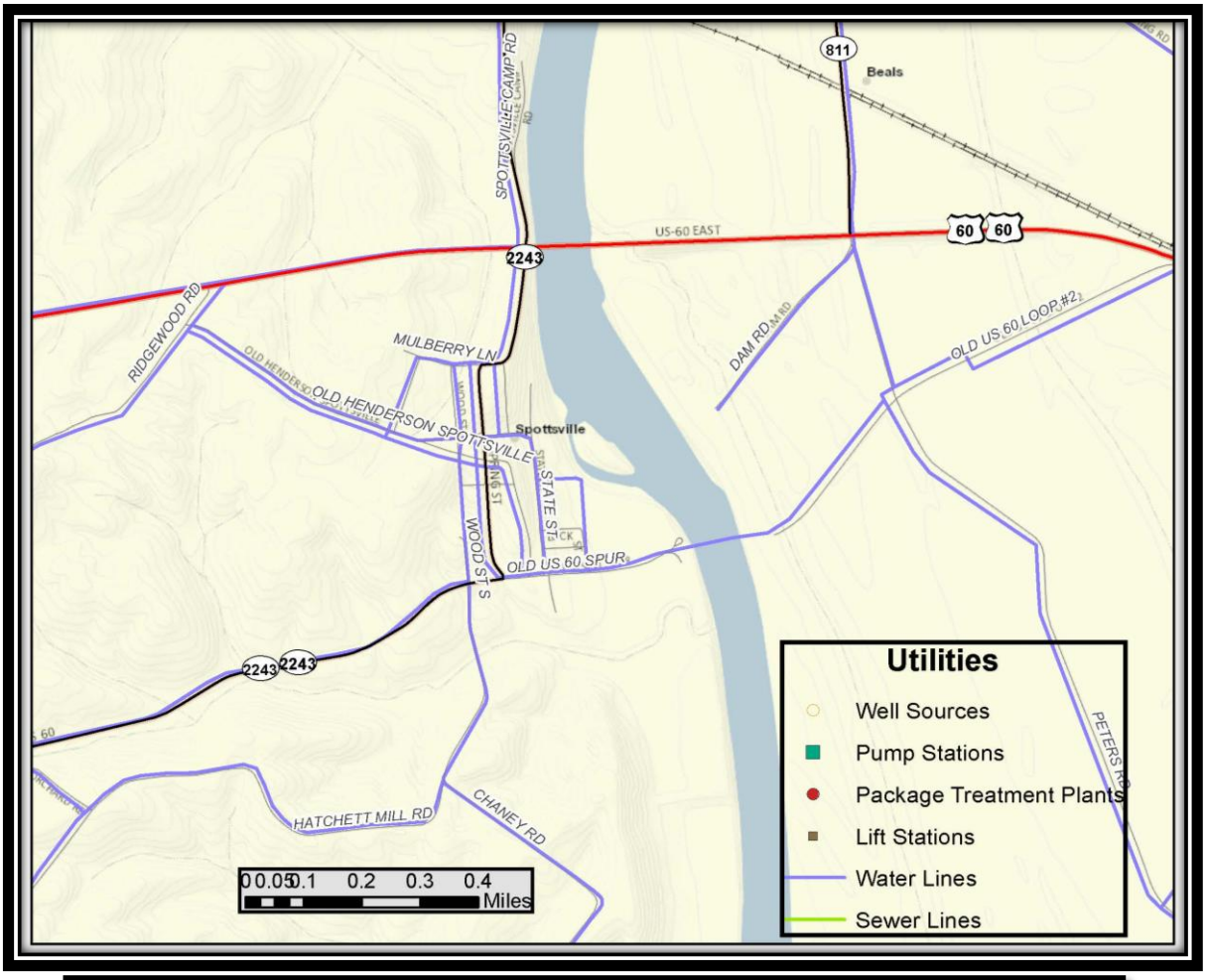
After Bridge (EB on 60)

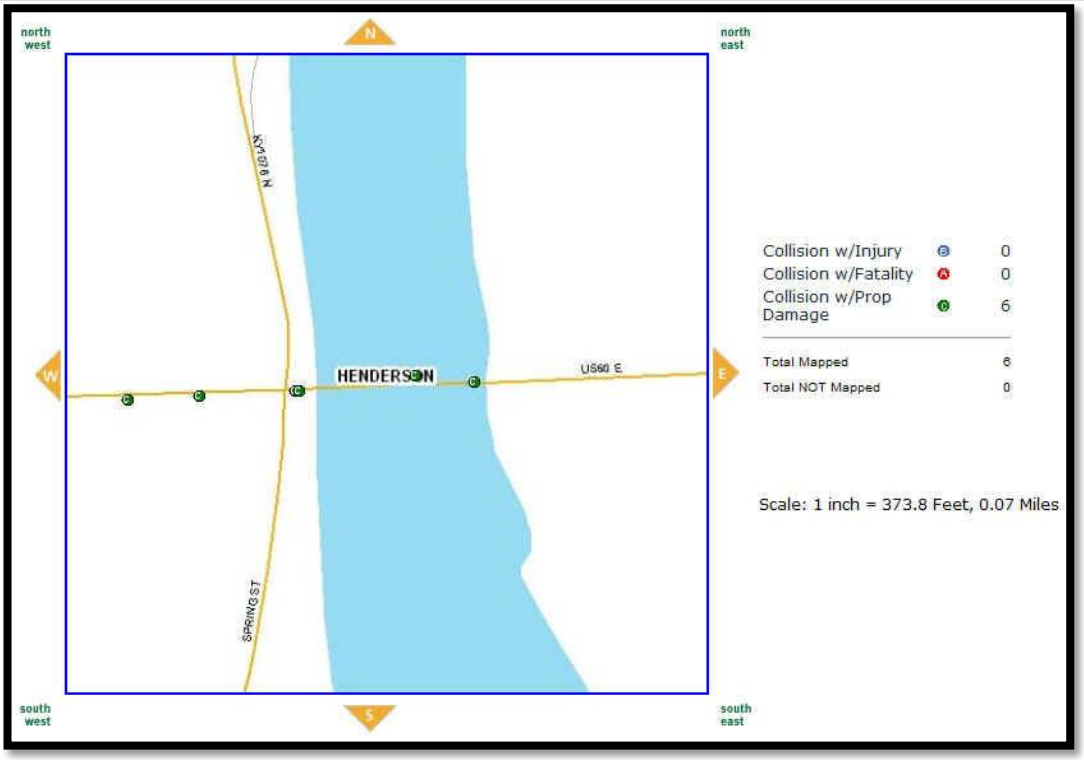
Just Before Bridge (WB on 60)

Before Bridge (WB on 60)

On Bridge (EB on 60)

VI. Tables and Exhibits (cont.)





Structure Inventory and Appraisal Sheet (English Units)

Bridge Key: 6001 Agency ID: 051B00015N SR: 38.9 SD/FO: SD

IDENTIFICATION

State 1:	21 Kentucky	Struc Num 8:	051B00015N
Facility Carried 7:	US-60	Location 9:	.01 MI EAST OF JCT KY1078
Rte.(On/Under)5A:	Route On Structure	Rte. Signing Prefix 5B:	2 U.S. Numbered Hwy
Level of Service 5C:	1 Mainline	Rte. Number 5D:	00060
Directional Suffix 5E:	0 N/A (NBI)	% Responsibility :	Unknown
SHD District 2:	District 2	County Code 3:	Henderson (051)
Place Code 4:	FIPS 0000	Mile Post 11:	19.340 mi
Feature Intersected 6:	GREEN RIVER		
Latitude 16:	37d 51' 45"	Longitude 17:	087d 24' 41"
Border Bridge Code 98:	Unknown (P)		
Border Bridge Number 99:			

STRUCTURE TYPE AND MATERIALS

Number of Approach Spans 46: 6 Number of Spans Main Unit 45: 2

Main Span Material/Design 43A/B:

3 Steel 10 Truss-Thru

Approach Span Material/Design 44A/B:

3 Steel 09 Truss-Deck

Deck Type 107:	1 Concrete-Cast-in-Place
Wearing Surface 108A:	4 Low Slump Concrete
Membrane 108B:	0 None
Deck Protection 108C:	None

AGE AND SERVICE

Year Built 27:	1930	Year Reconstructed 106:	0		
Type of Service on 42A:	1 Highway				
Type of Service under 42B:	5 Waterway				
Lanes on 28A:	2	Lanes Under 28B:	0	Detour Length 19:	10.0 mi
ADT 29:	3,240	Truck ADT 109:	6 %	Year of ADT 30:	2012

GEOMETRIC DATA

Length Max Span 48:	359.9 ft	Structure Length 49:	1,103.0 ft
Curb/Sdwlk Width L 50A:	0.3 ft	Curb/Sidewalk Width R 50B:	0.3 ft
Width Curb to Curb 51:	19.8 ft	Width Out to Out 52:	24.2 ft
Approach Roadway Width 32: (w/ shoulders)	22.0 ft	Median 33:	0 No median
Deck Area:	26,648.9 sq. ft		
Skew 34:	0.00 °	Structure Flared 35:	0 No flare
Vertical Clearance 10:	15.32 ft	Horiz. Clearance 47:	19.83 ft

Minimum Vertical Clearance Over Bridge 53: 15.3 ft

Minimum Vertical Underclearance Reference 54A: N Feature not hwy or RR

Minimum Vertical Underclearance 54B: 0.0 ft

Minimum Lateral Underclearance Reference R 55A: N Feature not hwy or RR

Minimum Lateral Underclearance R 55: 0.0 ft

Minimum Lateral Underclearance L 56: 0.0 ft

INSPECTION

Frequency 91:	12 months	Inspection Date 90:	3/28/2013	Next Inspection:	03/28/2014
FC Frequency 92A:	24 months	FC Inspection Date 93A:	10/4/2011	Next FC Inspection:	10/4/2013
UW Frequency 92B:	60 months	UW Inspection Date 93B:	5/25/2006	Next UW Inspection:	5/25/2011
SI Frequency 92C:	NA	SI Date 93C:	NA	Next SI:	NA
Element Frequency:	12 months	Element Inspection Date:	03/28/2013	Next Elem. Insp. Due:	03/28/2014

CLASSIFICATION

Defense Highway 100:	0 Not a STRAHNET hwy	Parallel Structure 101:	No || bridge exists
Direction of Traffic 102:	2 2-way traffic	Temporary Structure 103:	Not Applicable (P)
Highway System 104:	0 Not on NHS	NBIS Length 112:	Long Enough
Toll Facility 20:	3 On free road	Functional Class 26:	06 Rural Minor Arterial
Defense Hwy 110:	0 Not a STRAHNET hwy	Historical Significance 37:	5 Not eligible for NRHP
Owner 22:	01 State Highway Agency		
Custodian 21:	01 State Highway Agency		

CONDITION

Deck 58:	6 Satisfactory	Super 59:	4 Poor	Sub 60:	5 Fair
Culvert 62:	N N/A (NBI)	Channel/Channel Protection 61:		7 Minor Damage	

LOAD RATING AND POSTING

Inventory Rating Method 65:	1 LF Load Factor	Operating Rating Method 63:	1 LF Load Factor
Inventory Rating 66:	HS14.5	Operating Rating 64:	HS24.3
Design Load 31:	2 M 13.5 (H 15)	Posting 70:	5 At/Above Legal Loads
Posting status 41:	P Posted for load		

APPRAISAL

Bridge Rail 36A:	0 Substandard	Approach Rail 36C:	1 Meets Standards
Transition 36B:	0 Substandard	Approach Rail Ends 36D:	1 Meets Standards
Str. Evaluation 67:	4	Deck Geometry 68:	2 Intolerable - Replace
Underclearance, Vertical and Horizontal 69:	N Not applicable (NBI)		
Waterway Adequacy 71:	8 Equal Desirable	Approach Alignment 72:	8 Equal Desirable Crit
Scour Critical 113:	8 Stable Above Footing		

PROPOSED IMPROVEMENTS

Bridge Cost 94:	$ 3,640,000	Type of Work 75:	31 Repl-Load Capacity
Roadway Cost 95:	$ 100,000	Length of Improvement 76:	110.2 ft
Total Cost 96:	$ 3,739,000	Future ADT 114:	4,827
Year of Cost Estimate 97:	1999	Year of Future ADT 115:	2032

NAVIGATION DATA

Navigation Control 38:	1 Permit Required		
Vertical Clearance 39:	79.4 ft	Horizontal Clearance 40:	350.0 ft
Pier Protection 111:	5 None, Re-Evaluate	Lift Bridge Vertical Clearance 116:	0.0 ft

ELEMENT CONDITION STATE DATA

Str Unit	Elm/Env	Description	Units	Total Qty	% in 1	Qty. St. 1	% in 2	Qty. St. 2	% in 3	Qty. St. 3	% in 4	Qty. St. 4	% in 5	Qty. St. 5
1	22/1	P Conc Deck/Rigid Ov	(SF)	21,912	0 %	0	100 %	21,912	0 %	0	0 %	0	0 %	0
1	110/1	R/Conc Open Girder	(LF)	432	0 %	0	98 %	422	2 %	10	0 %	0	0 %	0
1	113/1	Paint Stl Stringer	(LF)	4,041	0 %	0	89 %	3,601	10 %	400	1 %	40	0 %	0
1	121/1	P/Stl Thru Truss/Bot	(LF)	1,050	0 %	0	90 %	950	0 %	0	10 %	100	0 %	0
1	126/1	P/Stl Thru Truss/Top	(LF)	1,050	0 %	0	97 %	1,023	0 %	1	2 %	26	0 %	0
1	131/1	Paint Stl Deck Truss	(LF)	944	0 %	0	92 %	870	6 %	54	2 %	20	0 %	0

Structure Inventory and Appraisal Sheet (English Units)

Str Unit	Elm/Env	Description	Units	Total Qty	% in 1	Qty. St. 1	% in 2	Qty. St. 2	% in 3	Qty. St. 3	% in 4	Qty. St. 4	% in 5	Qty. St. 5
1	152/1	Paint Stl Floor Beam	(LF)	1,288	0 %	0	71 %	920	29 %	368	0 %	0	0 %	0
1	205/1	R/Conc Column	(EA)	14	100 %	14	0 %	0	0 %	0	0 %	0	0 %	0
1	215/1	R/Conc Abutment	(LF)	108	0 %	0	100 %	108	0 %	0	0 %	0	0 %	0
1	234/1	R/Conc Cap	(LF)	210	2 %	4	90 %	190	5 %	10	3 %	6	0 %	0
1	300/1	Strip Seal Exp Joint	(LF)	24	100 %	24	0 %	0	0 %	0	0 %	0	0 %	0
1	301/1	Pourable Joint Seal	(LF)	96	100 %	96	0 %	0	0 %	0	0 %	0	0 %	0
1	302/1	Compressn Joint Seal	(LF)	120	50 %	60	50 %	60	0 %	0	0 %	0	0 %	0
1	310/1	Elastomeric Bearing	(EA)	6	100 %	6	0 %	0	0 %	0	0 %	0	0 %	0
1	311/1	Moveable Bearing	(EA)	6	67 %	4	33 %	2	0 %	0	0 %	0	0 %	0
1	313/1	Fixed Bearing	(EA)	12	0 %	0	100 %	12	0 %	0	0 %	0	0 %	0
1	331/1	Conc Bridge Railing	(LF)	1,134	1 %	10	44 %	497	46 %	527	9 %	100	0 %	0
1	334/1	Metal Rail Coated	(LF)	1,156	0 %	0	100 %	1,156	0 %	0	0 %	0	0 %	0
1	358/1	Deck Cracking SmFlag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
1	359/1	Soffit Smart Flag	(EA)	1	0 %	0	0 %	0	100 %	1	0 %	0	0 %	0
1	363/1	Section Loss SmFlag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
1	503/1	Curbs	(LF)	2,210	0 %	0	93 %	2,055	5 %	100	2 %	55	0 %	0
1	601/1	MisAlign/ot of plane	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
1	604/1	2nd Elem Dist	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
1	606/1	Drains	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0

Str Unit	Elm/Env	Description	Element Notes
1	22/1	Concrete Deck - Protected w/ Rigid	The deck is worn.
1	110/1	Reinforced Conc Open Girder/Beam	The RCDG beams are worn and weathered. The left exterior beam in span 1 is cracking and spalling. The exterior ends at bearing are scaling and spalling. The right exterior beam in the last span is cracking and spalling on the bottom exposing steel near the pier
1	113/1	Painted Steel Stringer	The steel stringers at the floor beam connection at the joints are rusting and scaling with section loss of the stringer ends and connection plates. Some of the top flanges of the stringers where they are in connection with the concrete deck are rusting and scaling.
1	121/1	Painted Steel Bottom Chord Thru T	There are areas of section loss and pack rust in the batton plates on the lower chords. There are several areas of section loss and pack rust of some of the lower chord splice plates and gusset plates.
1	126/1	Painted Steel Thru Truss (excl. bot	Impact damage has occurred to U1-L1 and U1-L2 on the north side of the smaller truss. Misalignment is sever on the compression member. There is also a crack in one of the flanges from the edge of the flange to the web. The tension member is twisted and out of alignment.. There is also some misalignment to a vertical on the right side of the larger truss. All the top lateral bracing on the truss has been impacted causing some misalignment.
1	131/1	Painted Steel Deck Truss	The horizontal bracing under the replaced sliding plate expansions are rusting and scaling with some small areas with 100% section loss in the flanges. The gusset and splice plates have some minor pack rust and some small areas of rusting and scaling with some section loss. The lower chords have some small areas of heavy rusting and scaling. In span 8 left at 3/4 point the lower chord has 90% section loss of the flanges of the channel beams and 30-40% section loss in the main web. This is the worst of the areas but there are several other areas similar.
1	152/1	Painted Steel Floor Beam	The floor beams under the joint and previous joints in the main trusses and deck trusses are rusting and scaling with some moderate section loss.
1	205/1	Reinforced Conc Column or Pile E	< none >
1	215/1	Reinforced Conc Abutment	The abutments are worn and weathered with some minor deterioration.
1	234/1	Reinforced Conc Cap	The ends of pier caps 2 & 7 are deteriorating exposing reinforcing steel Pier cap 2 has about 2' of the end of the cap gone. Pier 6 cap has been rehabbed.
1	300/1	Strip Seal Expansion Joint	< none >
1	301/1	Pourable Joint Seal	< none >
1	302/1	Compression Joint Seal	The neoprene seals are beginning to deteriorate slightly and moving downward in the joints.
1	310/1	Elastomeric Bearing	< none >
1	311/1	Moveable Bearing (roller, sliding, e	The rockers are beginning to rust on the 2 main truss sections. The rockers were replace on the deck truss section with a thick neoprene pad.
1	313/1	Fixed Bearing	The fixed bearing are beginning to rust.
1	331/1	Reinforced Conc Bridge Railing	The concrete handrails have been rehabbed. Several of the post and rails have been replace. The remaining older rails and post are worn and weathered with some cracking.
1	334/1	Metal Bridge Railing - Coated	There are several areas of minor vehicular damage to the steel handrail on the truss. Surface rust is forming on the painted surface of the steel rail on the truss.
1	358/1	Deck Cracking	Unsealed transverse cracks exist in the deck.
1	359/1	Soffit of Concrete Deck or Slab	The bottom of the deck is cracking and spalling exposing some rusty reinforcing steel in various places. There are areas of map cracking and transverse cracking with some efflorescence present in some of the cracks.
1	363/1	Section Loss	See above discussions.
1	503/1	Reinforced Concrete Curbs and Tir	The concrete curbs are badly deteriorated in numerous places with rusting reinforcing steel exposed. Some of the areas have been patched at.

Structure Inventory and Appraisal Sheet (English Units)

Str Unit	Elm/Env	Description	Element Notes
1	601/1	Alignment, Out-of-Plane	Span 8 (RCDG) has moved 2" westward.
1	604/1	Second Element Distress	The concrete diaphragms of the RCDG are cracking and spalling around the exposed edges.
1	606/1	Drains	50% of the drains are blocked.

BRIDGE NOTES

Fracture critical Member location in General Media

PAST INSPECTION

Inspection Date: 03/28/2013 Type: 3 Substandard (12 months)

Inspector: DLARKIN Pontis User Key: DLARKIN - Denny

Scope:

NBI: ☒ Other: ☐ Element: ☒

Underwater: ☐ Fracture Critical: ☐

INSPECTION NOTES

Fracture Critical inspection was done on October 4 2011, deck truss was inspected by snooper, thru truss was inspected by climb team.

Deck truss was inspected with snooper, by Jonathon Beasley and Harry Greer.
The east deck truss, second pier from east abutment has moderate to heavy rusting on bottom of gussett plate.
The lower chord batten plates have moderate to heavy deterioration with rust, scaling, packrust and deformation present, along with section loss in several areas.
There is heavy rust at the vertical bearing on the east end of decktruss.
Lower chord downstream plating repairs have sloppy welds.
Backend connection on lower chord downstream has mod to heavy deterioration and minor deformation. (see pics)

PAST INSPECTION

Inspection Date: 03/21/2012 Type: 3 Substandard (12 months)

Inspector: DLARKIN Pontis User Key: DLARKIN - Denny

Scope:

NBI: ☒ Other: ☐ Element: ☒

Underwater: ☐ Fracture Critical: ☐

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