

DNA Study



Kentucky Transportation Cabinet District 6 Planning Corrin Gulick, PE

Bracken County

06-1074.00 - KY 8 Bridge over Snag Creek

Kentucky Transportation
Cabinet Department of
Highways District 6

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6/2/2011

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I. INTRODUCTION

Kentucky's FY2010-FY2012 Enacted Biennial Highway Plan, as approved by the May 2010 General Assembly, provides a list of projects for the Kentucky Transportation Cabinet from fiscal year 2010 to fiscal year 2012. The plan includes a bridge replacement project on KY 8 in Bracken County over Snag Creek.

A. Study Purpose

The National Environmental Policy Act of 1969 (NEPA) established a policy for federally funded agencies to consider environmental impacts in the decision making process. A fundamental part of the NEPA process is to develop a Purpose and Need Statement in order to prevent future complications with NEPA documentation. This DNA will develop a draft Purpose and Need Statement as well as define the project scope, possible alternatives, planning-level cost estimates for alternates, an identification of potential environmental impacts, and other information pertinent to the Project Development phase of these projects.

B. Location

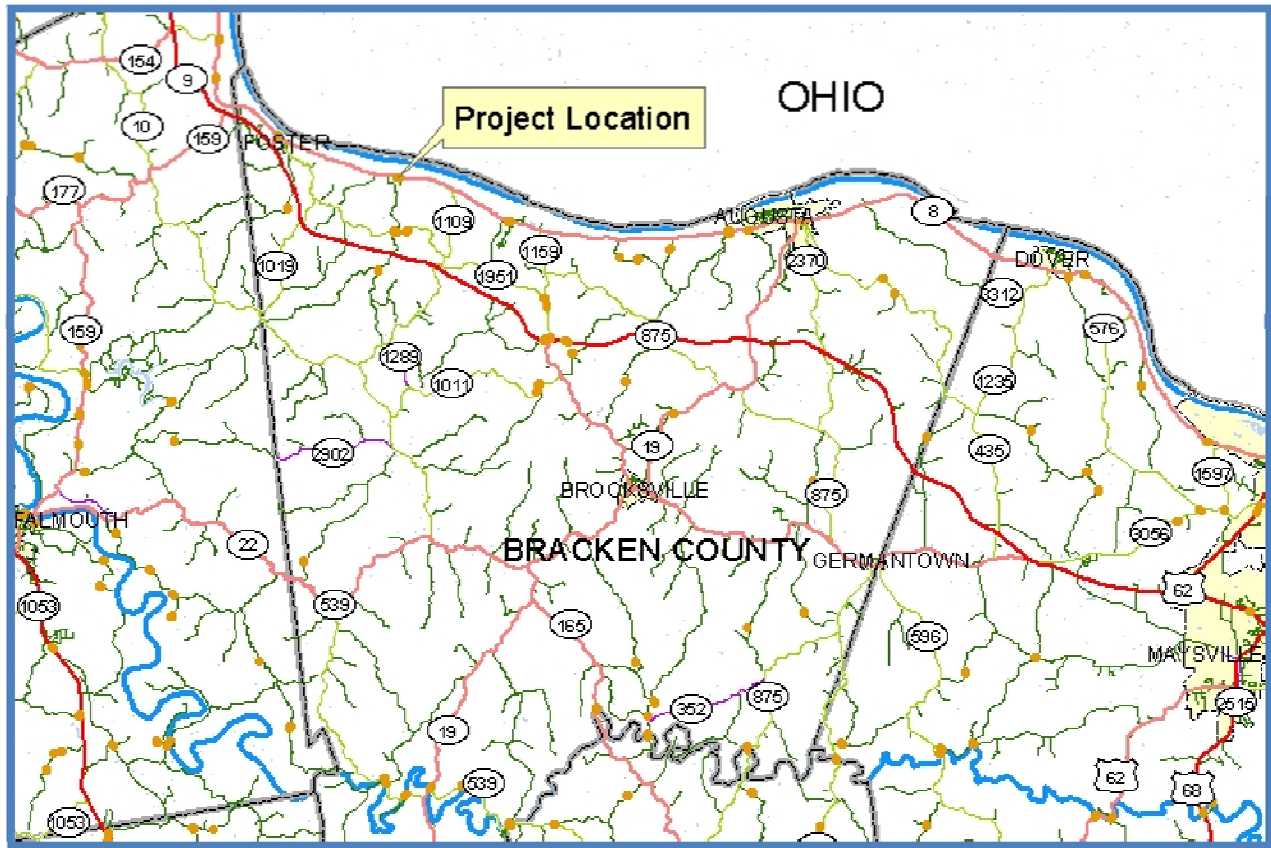


Figure 1 - Location Map

Bracken County, Kentucky is located in Northern Kentucky to the east of Pendleton County and to the west of Mason County. The Ohio River runs along the northern border of the county. The 2010 Census measured the population of Bracken County, Kentucky at 8,488 people. The population has increased 2.5% since the 2000 Census, which measured a population of 8,279. Bracken County is served by KY 9 (AA Highway), a State Primary Road, which runs east/west through the county. Figure 1 shows a location map for the proposed project.

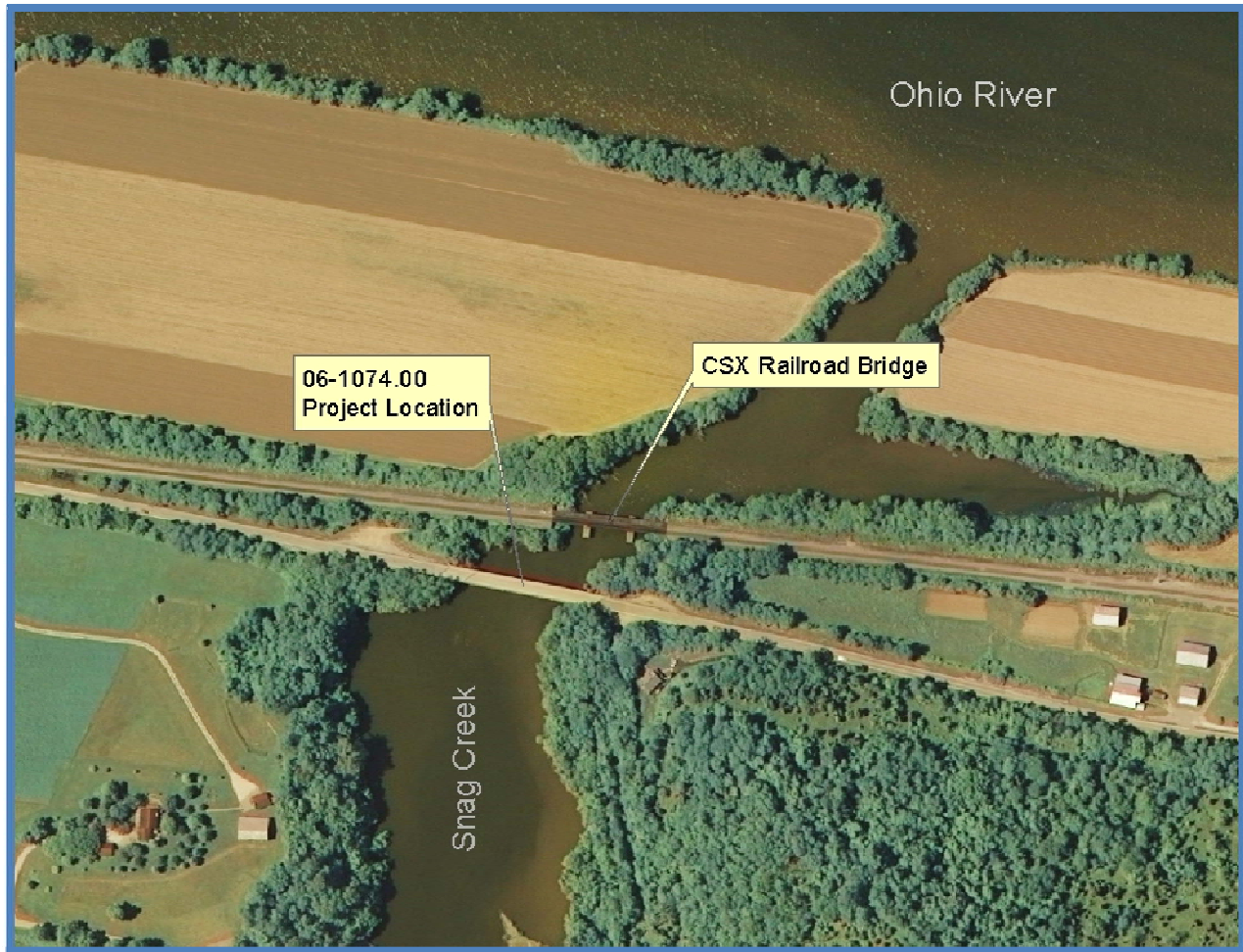


Figure 2 – Aerial of Project Location.

The bridge replacement project studied in this report is located on KY 8 (Mary Ingles Highway), a State Secondary Road located north of KY 9 (AA Highway). KY 8 is a rural, two-lane road that runs parallel to the Ohio River and the CSX Railroad. The bridge is located approximately one mile west of KY 1109 and crosses Snag Creek, a tributary to the Ohio River. This portion of Snag Creek is combined with the backwater from the Ohio River on a year round basis. Figure 2 shows an aerial photograph of the existing KY 8 and CSX Bridges over Snag Creek.

II. PROJECT PURPOSE AND NEED

A. Legislation

The bridge replacement project is included in Kentucky's FY2010-FY2012 Enacted Biennial Highway Plan, as approved by the May 2010 General Assembly. A description of the project as listed in the plan is as follows:

County	Item #	Route	Funding	Phase	Year	Amount
Bracken	06-1074.00	KY 8	BRO	D	2012	\$320,000

Table 1 – Project Description

06-1074.00: REPLACE BRIDGE ON KY-8 (MP4.221) OVER SNAG CREEK; 1 MI W OF JCT KY 1109; (STRUCTURALLY DEFICIENT, SR=48.3) 012B00005N

B. Project Status

Design funds for the Bridge Over Snag Creek have been authorized at this time.

C. System Linkage

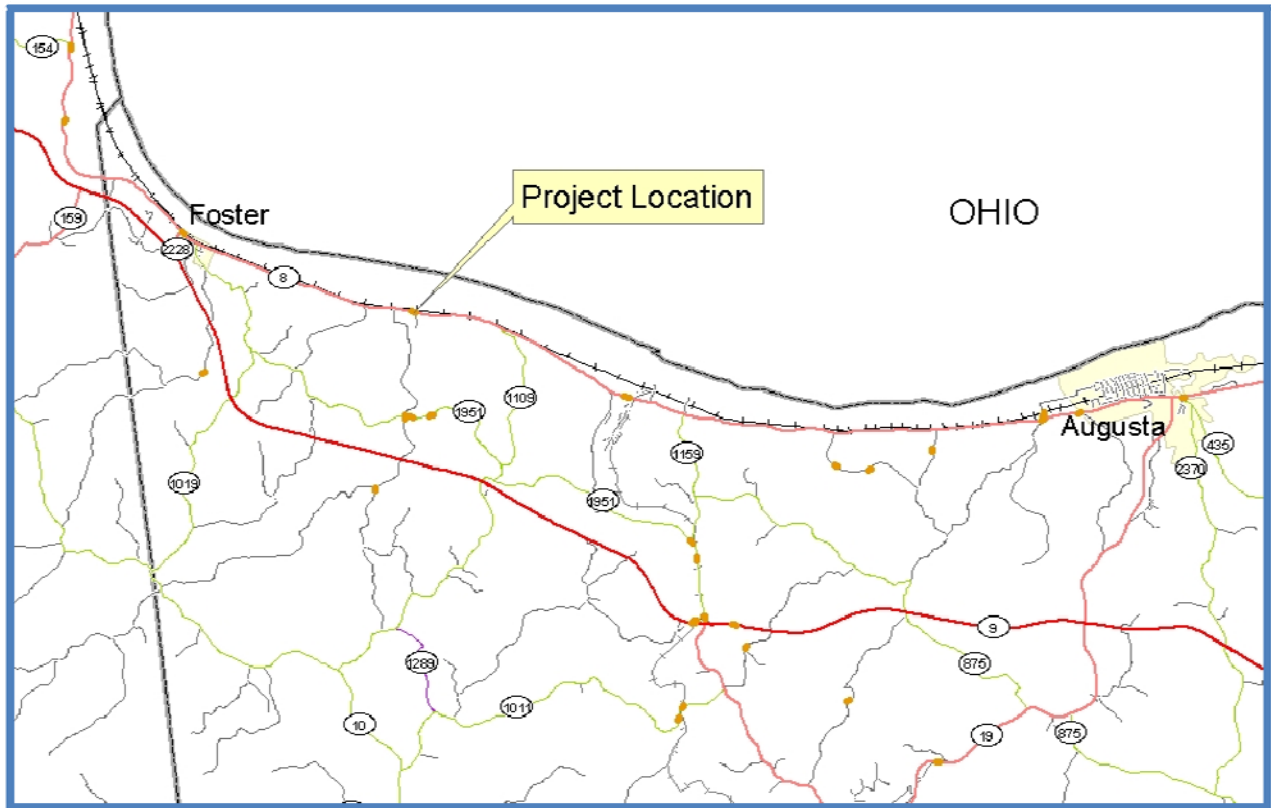


Figure 3 – System Linkage Map

The KY 8 Bridge over Snag Creek is located on a rural, two-lane road between the City of Foster and the City of Augusta. KY 8 is a State Secondary Road, classified as a Rural Major Collector. Historical data shows the average daily traffic (ADT) on KY 8 reduced from 1,940 in 1989 to 878 by 1995. This is about half of the traffic that was using KY 8 in 1989. The reduction in traffic can be attributed to the AA Highway that was constructed around this time. The AA Highway now serves as the primary east/west connection for traffic in Bracken County.

Since KY 8 is an access by permit facility, access points are intermittent throughout the roadway. Connectivity to the north of KY 8 is limited by the Ohio River and the CSX Railroad. As shown in Figure 3, several state and county routes in Bracken County connect KY 8 to the AA Highway.

D. Modal Interrelationships

KY 8 in the project area is part of the Ramblin' River Bicycle Tour. However, existing conditions on KY 8 are not ideal for bicycle traffic. The design of the new bridge should consider bicycle traffic.

Truck traffic should be considered in the project area. Existing Planning data does not provide sufficient data on truck traffic across the subject bridge. However, several truck traffic generators are located along KY 8 in the project area. One of the largest of these truck traffic generators is anticipated to be the Carmeuse Mine. The Carmeuse Mine has a facility in Pendleton County, Kentucky and Maysville, Kentucky. KY 8 connects both locations.

Another significant truck traffic generator to consider would be Inland Container in Maysville, Kentucky. Coordination with these industries as well as other possible truck traffic generators will be necessary, if a closure of KY 8 is considered.

E. Social Demands and Economic Development

The KY 8 project area is comprised of a mix of farm, residential and industrial land uses. The existing weight limit on the bridge poses an obstacle for the existing truck traffic on the roadway. Although the alternate route on KY 9 is not far, it should increase the economic vitality of the region to provide for heavy truck traffic across the KY 8 Bridge over Snag Creek.

F. Transportation Demand

The average daily traffic (ADT) of KY 8 was measured in 2010. Given a 2.5% growth rate determined by the Census Bureau, the approximate ADT of KY 8 in 2011 should be approximately 970 vehicles per day. Although no specific truck volume have been measured in this location, 15% truck traffic was assumed in this report. This value was interpolated from the existing data.

G. Capacity

The proposed bridge replacement project will not add or reduce the capacity on KY 8. Since there are no future plans at this time to widen KY 8 in Bracken County, only two lane bridges are considered in this report.

H. Safety

Needs for the replacement of the KY 8 Bridge over Snag Creek arise from roadway deficiencies. The deficiencies of the Bridge over Snag Creek pose a safety issue to the traveling public.

I. Roadway Deficiencies

A sufficiency rating of a bridge is based on structural value, functionality and detour length. The sufficiency rating can be as high as 100. However, once this number drops below 50, a bridge is eligible for federal bridge replacement funding. The KY 8 Bridge over Snag Creek has a sufficiency rating of 48.30 and is classified as structurally deficient. As a result, there is currently a weight limit on the bridge and it qualifies for BRO funding.

The inspection report from January 10, 2011 noted several issues with the structural members of the bridge. A summary of these issues are listed below:

- The superstructure of the bridge is in fair condition and was given a score of 5 out of 9 (bridges are typically considered for closure once this number drops below a 3).
- Seepage through the expansion joints, spalling, cracking, and minor section loss were evident in the superstructure.
- The substructure of the bridge is in poor condition and was given a score of 4 out of 9 (bridges are typically considered for closure once this number drops below a 3).
- Advanced section loss, scouring, spalling and deterioration were evident in the structural elements of the substructure.
- Seepage through the expansion joints and general weathering conditions has created issues with the piers, pier caps, abutments and rockers.
- Settlement and heavy amounts of rusting of the moveable bearings has caused vertical and horizontal misalignment throughout the structure.
- There is an existing weight limit on the bridge:
 - Type I – 20 tons
 - Type II – 32 tons
 - Type II – 33 tons
 - Type IV – 40 tons

A full replacement of the bridge including the substructure is desirable. The Structural, Inventory, and Appraisal Sheet and the Inspection Report are located in Appendix B and Appendix C respectively.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

The United States Environmental Protection Agency has designated Bracken County as an area in attainment for all specified air pollutants, pursuant to the Clean Air Act Amendments of 1990. The KY 8 Bridge replacement project over Snag Creek is not anticipated to increase capacity or negatively impact air quality.

B. Archaeology

Due to the proximity of the project to Snag Creek and the Ohio River, an archeology survey should be completed during phase one design for this project.

C. Threatened and Endangered Species

The United States Fish and Wildlife Service has identified Bracken County as a potential habitat for several endangered species. These species include eight different types of clams, the Indiana Bat and the Running Buffalo Clover. All of the species on this list could be impacted by the Snag Creek Bridge Project. A full list of species and their scientific names can be found in Appendix D.

D. Hazardous Materials

Due to the close proximity of the CSX Railroad to the KY 8 Bridge over Snag Creek, the project area should be surveyed for hazardous materials during phase one design.

E. Historic Property

Potential impacts to historic property should be determined from the archeological survey. Specific locations are not known at this time.

F. Permitting

This project will likely disturb more than one acre of land during construction. Therefore, the Kentucky Pollutant Discharge System (KPDES) KYR10 Permit Notice of Intent (NOI) shall be submitted to the Kentucky Division of Water.

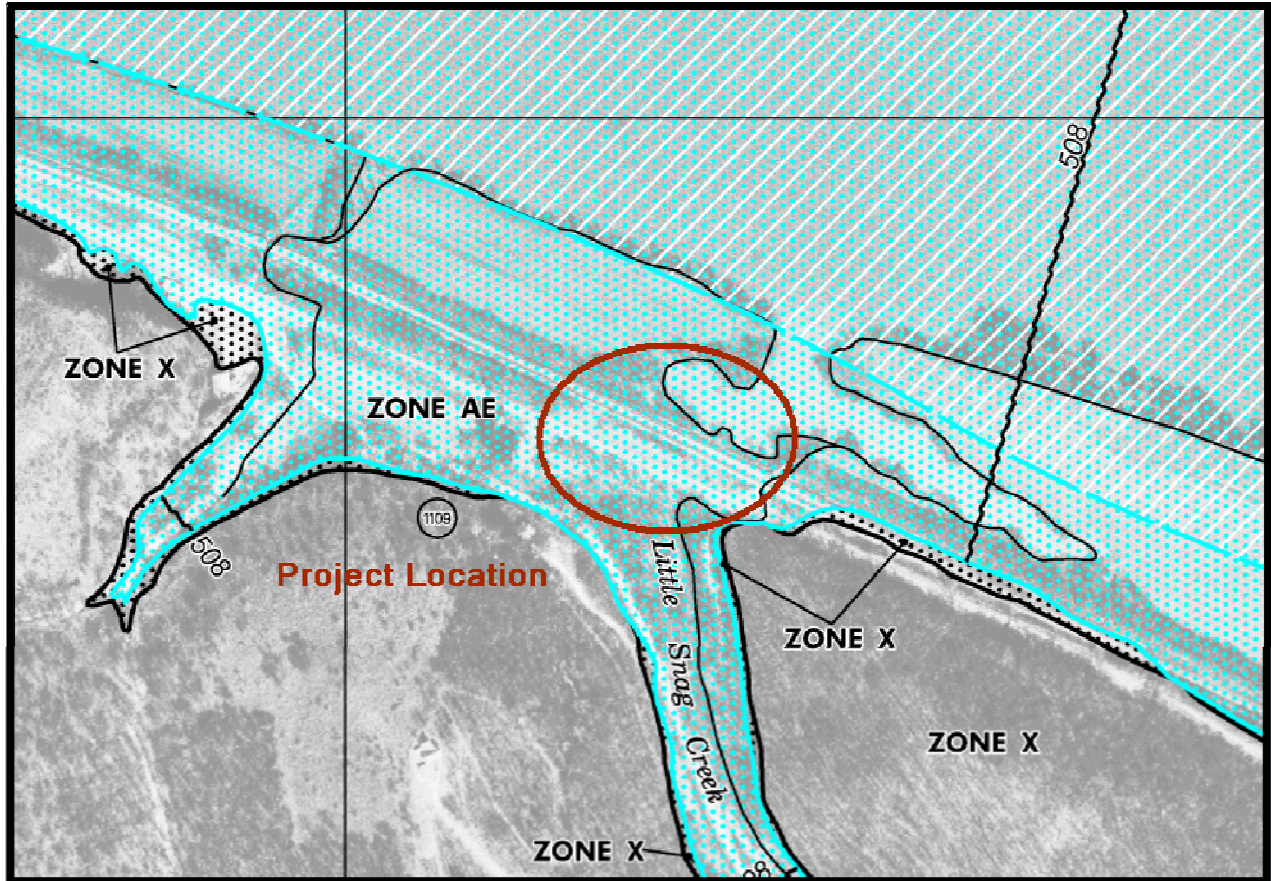


Figure 4 - FEMA FIRM Map Number 21023C0017E

The Flood Insurance Rate Map (FIRM), shown in Figure 4, published by the Federal Emergency Management Agency (FEMA) shows that the project is located in a special flood hazard area. This area is subject to inundation by a 100 year flood event. A 100 year flood event means that there is a 1% chance of flooding in this area annually. The map also shows that a base flood elevation has been determined for the project area.

The amount of work done below the base flood elevation and the linear amount of impacts to Snag Creek will determine the need for the Army Corps of Engineers 404 permit and the Kentucky Division of Water 401 permit. The linear amount of stream impacts on this project is below the threshold that requires a permit. An existing pier stays submerged in Snag Creek. This pier will need to be replaced with the project. As a result it is likely the 404 and the 401 permit will be required for this permit.

G. Noise

Permanent noise impacts are not anticipated with the project.

H. Socioeconomic

According to the 2011 Census, there are four block groups affected by the proposed project. These block groups include 1012, 1011, 1001, and 1012. Only one block group had people living in the area out of the four potentially affected. This block group contained 9 people. None of the nine people were a minority.

The poverty rate for Bracken County as a whole was studied in this report. 12.8% of people living in Bracken County are living in poverty. As a result, socioeconomic impacts are not anticipated for this project.

I. Section 4(F)

The Snag Creek area has traditionally had unspecified historic resources. This area should be surveyed for historic impacts.

J. Section 6(F)

No publicly financed outdoor recreational facilities are identified within the project areas.

IV. PRELIMINARY PROJECT INFORMATION

A. Existing Conditions

KY 8 Bridge Over Snag Creek	
Year Built	1957
Milepoint	4.18
Design	Continuous Tee Beam
Lanes	2
Lane Width	10 feet
Spans	3
Length of Longest Span	100 feet
Skew	45°
Shoulder width	1.3 feet
Deck Type	Concrete Cast in Place
Weight Limit	Yes
Utilities on Bridge	No
Sufficiency Rating	48.3

Table 2 – Existing Conditions

Pictures of the existing KY 8 Bridge over Snag Creek can be found in Appendix A. In order to design the substructure of the bridge, KYTC Project Development Branch will require an underwater geotechnical investigation.

Furthermore, the bridge is located in the backwaters of the Ohio River. As a result, there is a potential for the need of a hydraulic survey of Snag Creek if determined by the project team.

B. Utilities

Overhead utilities were observed to the north of the KY 8 Bridge, and underground water is suspected in the project area. However, utilities that will be affected by this project will need to be identified and located. The following utility companies may be present in the project area:

- Bracken County Water District
- Bluegrass Energy Power Cooperative
- Columbia Gas
- Kentucky Alltel
- Limestone Cable

V. PROJECT PURPOSE AND NEED STATEMENT

The existing KY 8 Bridge over Snag Creek is classified as structurally deficient, creating an unsafe condition for the traveling public. The purpose of the bridge projects is to improve public safety by providing a dependable crossing of Snag Creek.

VI. POSSIBLE ALTERNATIVES

A. No Build

The no-build alternate consists of not implementing the proposed project improvements described in the following alternates. A no-build alternate would require the bridge to close and eventually be removed. This does not fulfill the purpose and need of the project.

B. Alternate 1: Replace Superstructure Only

The substructure of the KY 8 Bridge over Snag Creek is in poor condition. Consequently, it would not be practical to salvage the substructure of the bridge and replace the superstructure only. The bridge would still require closure due to structural deficiencies. This alternative does not fulfill the purpose and need of the project.

C. Alternate 2: Replace Bridge on Existing Alignment

Alternate 1 proposes constructing a new Bridge over Snag Creek along the existing alignment. The existing bridge would need to be completely replaced, including the superstructure and the substructure.

The existing bridge is 313 feet in length. If determined by the project team, a hydraulic study could be done to evaluate if the opening for the new bridge would be the same length. Minimal work on approaches will be necessary. For the purposes of this report a Pre-Cast and Pre-Stressed (PCPS) I-Beam design is assumed. However, a structural analysis and design will provide more accurate details of proposed bridge design and alternatives.



Figure 5 - Proposed Detour Route for KY 8 Closure

This alternate would require KY 8 to be closed during the demolition of the existing bridge and the construction of the bridge. As shown in Figure 5, traffic could be detoured from KY 8 to KY 2228 to KY 9 to KY 1109 to KY 8. This is a total detour of approximately 8 miles. Table 3 shows possible impacts to capacity based on these closures.

Route	Existing Level of Service	Level of Service During KY 8 Closure
KY 8	B	n/a
KY 2228	C	C
KY 9	A	A
KY 1109	C	C

Table 3 - Level of Service for Detour Routes

As shown in Table 3, the capacity of the roadways utilized for the detour can handle the additional traffic during a KY 8 road closure. The connectivity of KY 8 to the south and the proximity of KY 9 further indicate that a closure in this area could be handled by the existing system.

The Hydroelectric Dam Project on the Ohio River is located to the west of the project area. A majority of the materials and equipment is transported to the site via KY 2228 to KY 8 from the west. Connectivity to the Hydroelectric Dam project site should not be impacted by a closure of KY 8 at the Snag Creek Bridge.

Planning Level Cost Estimate

Design	\$350,000
Utilities	\$50,000
Right-of-Way	\$50,000
Construction	\$1,300,000
Total	\$1,750,000

D. Alternate 3: Replace Bridge on an Alternate Alignment

Figure 6 – Preliminary Alignment of Alternate 1

It is unlikely that the KY 8 Bridge over Snag Creek could be constructed along the existing alignment without a temporary closure of KY 8. Alternate 1 proposes constructing a new alignment for KY 8. The existing bridge could be utilized during construction, eliminating the need for a full closure of KY 8.

In order to avoid impacts to the CSX Railroad, this alternative shows the new KY 8 alignment to the south of the existing KY 8. The approaches shown in Figure 6 add approximately 0.5 miles of roadwork to the project. However, the actual length of the approaches would be determined during the design process.

Since Snag creek is wider to the south than the existing location of the bridge, the new bridge will need to be longer. The existing bridge is 313 feet in length. If determined by the project team, a hydraulic study could be done to evaluate if the opening for the new bridge would be the same length. The bridge shown in Figure 6 is approximately 550 feet in length.

PCPS concrete I-Beams are assumed for the purposes of this report. However, a structural analysis will determine the details of the proposed bridge design.

Additional right-of-way and easements will need to be purchased to construct Alternate 3, affecting several property owners.

Planning Level Cost Estimate

Design	\$350,000
Utility	\$75,000
Right-of-Way	\$75,000
Construction	\$3,200,000
Total	\$3,700,000

VII. SUMMARY

Project 06-1074 provides BRO funding for the design phase of the KY 8 Bridge over Snag Creek in Bracken County. The following key points were discussed in the report:

❖ General Information

- Truck traffic and bicycle traffic should be evaluated by the project team.
- The project area will need to be evaluated for endangered species.
- The project will likely need a KPDES NOI, a 401 and a 404 permit from the Division of Water.
- The project area should be surveyed for historic, archeological, and hazardous material areas.
- The bridge is classified as structurally deficient. Furthermore, the existing superstructure of the bridge is in fair condition and substructure of the bridge is in poor condition.
- An underwater geotechnical investigation will be necessary.
- The project team might deem a hydraulic survey necessary.

❖ Alternates

- No Build
 - Does not fulfill the purpose and need of the project.
- Alternative 1 – Replace the superstructure only of the bridge
 - Does not fulfill the purpose and need of the project.
- Alternative 2 – Replace bridge along the existing alignment
 - Although a closure of KY 8 would be required, possible impacts to the capacity of the detour routes, truck traffic, and the material delivery of the Hydroelectric Dam project could be mitigated.
 - The planning level cost estimate of Alternative 2 is approximately \$1,750,000

- Alternative 3 – Replace bridge along a new alignment
 - The new alignment should be shifted south to avoid the CSX railroad
 - The new Snag Creek Crossing would require a structure approximately 235 feet longer than the existing bridge.
 - The planning level cost estimate of Alternate 3 is approximately \$3,700,000.

APPENDIX A:

KY 8 Bridge Over Snag Creek - Pictures



KY 8 Looking East



North Side of Bridge Looking West



Rockers Under East End of the Bridge



Profile of Bridge Looking South



Rockers at East end of the Bridge



Steel Sliding Plate Expansion Joint



Under Bridge Looking West During High Water Event



Railing on South Side of Bridge

APPENDIX B

*KY 8 BRIDGE OVER SNAG CREEK
STRUCTURAL INVENTORY AND
APPRAISAL SHEETS*

KENTUCKY TRANSPORTATION CABINET

Division Of Operations

STRUCTURAL, INVENTORY, AND APPRAISAL SHEET

8. PROJECT NUMBER 06-MP-012-0008-B00005		1. STATE CODE 214 (KY)		2. HIGHWAY DISTRICT 06		3. COUNTY 012		4. PLACE CODE CITY/TOWN	
5. INVENTORY ROUTE ON 1 8 0 UNDER		6. FEATURES INTERSECTED SNAG CREEK		7. FACILITY NAME					
9. LOCATION 1 MI W OF JCT KY 1109		10. INVENTORY ROUTE - MIN. VERTICAL CLEARANCE 10 FT. LANE ON _____ FT. IN. UNDER _____ FT. IN.		11. MILEPOINT ON 4.18 UNDER					
16. LATITUDE 38 47 18		17. LONGITUDE 84 9 54		19. BYPASS, DETOUR LENGTH 3		20. TOLL 3		21. MAINTENANCE RESPONSIBILITY 01	
22. OWNER 01		26. FUNCTIONAL CLASSIFICATION ON 07 UNDER		27. YEAR BUILT 1957		28. LANES ON STRUCTURE 2		29. APPROACH ROADWAY PAVEMENT 19	
29. AVERAGE DAILY TRAFFIC ON 1098 UNDER		30. A.D.T. YEAR ON 2004 UNDER		31. DESIGN LOAD 2		32. APPROACH ROADWAY WIDTH W / SHOULDER 23		33. NAVIGATION VERTICAL CLEARANCE 0	
33. BRIDGE MEDIAN 0		34. SKEW 45		35. STRUCTURE FLARED 0		36. TRAFFIC SAFETY FEATURES 0 1 1 1		37. HISTORICAL SIGNIFICANCE 5	
40. NAVIGATIONAL HORIZONTAL CLEARANCE 0		41. STRUCTURE OPEN, POSTED, CLOSED P		42. TYPE SERVICE ON OVER 5		43. STRUCTURE TYPE MAIN 2		44. STRUCTURE TYPE APPROACH 1 04	
NO. OF SPANS 45. MAIN 3 46. APPROACH 1		47. TOTAL HORIZONTAL CLEARANCE ON 24.2 FT. UNDER 0 FT.		48. LENGTH OF MAXIMUM SPAN 100 FT.		49. STRUCTURE LENGTH 313 FT.		50. CURB - SIDEWALK WIDTHS LEFT 1.3 FT. RIGHT 1.3 FT.	
50. CURB - SIDEWALK WIDTHS LEFT 1.3 FT. RIGHT 1.3 FT.		51. BRIDGE WIDTH, CURB TO CURB 24.2 FT.		52. DECK WIDTH OUT-TO-OUT 28.3 FT.		53. MIN. VERTICAL CLEARANCE OVER DECK 99 FT. 99 IN.		54. MIN. VERTICAL UNDERCLEARANCE REFERENCE FEATURE N 0 FT. 0 IN.	
54. MIN. VERTICAL UNDERCLEARANCE REFERENCE FEATURE N 0 FT. 0 IN.		55. MIN. LATERAL RIGHT UNDERCLEARANCE REFERENCE FEATURE 0 FT.		56. MIN. LATERAL LEFT UNDERCLEARANCE 0 FT.		57. MIN. LATERAL RIGHT UNDERCLEARANCE REFERENCE FEATURE 0 FT.		58. MIN. LATERAL LEFT UNDERCLEARANCE 0 FT.	
100. DEFENSE HIGHWAY ON 0 UNDER		101. PARALLEL STRUCTURE N		102. TRAFFIC DIRECTIO 2		103. TEMPORARY STRUCTURE OVER		104. HIGHWAY SYSTEM ON 0 OVER	
105. YEAR RECONSTRUCTED 0		106. YEAR RECONSTRUCTED 0		107. YEAR RECONSTRUCTED 0		108. YEAR RECONSTRUCTED 0		109. YEAR RECONSTRUCTED 0	
BRIDGE DESCRIPTION									
1-51.5 RCDG/2-77-4-100' CONT RCDG SPNS									
107. DECK TYPE 1		108. WEARING SURFACE / PROTECTIVE SYSTEM SURFACE 3 MEMBRANE 0		109. PROTECTION 0		110. ROAD NAME MARY INGLES HWY (NEWPORT-MAYSVILLE)		111. ROAD NAME MARY INGLES HWY (NEWPORT-MAYSVILLE)	
ASPHALT THICKNESS INCHES 07		ROAD CLASS 07		APPROACH SIGHT DISTANCE AND SPEED LENGTH 1 999 2 999 SPEED 1 55 2 55		112. ROAD NAME MARY INGLES HWY (NEWPORT-MAYSVILLE)		113. ROAD NAME MARY INGLES HWY (NEWPORT-MAYSVILLE)	

BRIDGE CONDITION RATINGS			
58. DECK	MATERIAL	CONDITION	RATING
59. SUPERSTRUCTURE			5
60. SUBSTRUCTURE			5
61. CHANNEL AND CHANNEL PROTECTION			6
62. CULVERTS - WINGWALLS			7
64. OPERATING RATING	66. INVENTORY RATING	BRIDGE APPRAISAL RATINGS	
2	2	DEFICIENCIES	RATING
90. INSPECTION DATE	91. DESIGNATED INSPECTION FREQUENCY	67. STRUCTURAL EVALUATION	6
01-FEB-06	12	68. DECK GEOMETRY	2
SIGNATURE		69. UNDERCLEARANCES, VERT. & HORIZ.	N
TITLE		70. BRIDGE POSTING	3
92. CRITICAL FEATURE		71. WATERWAY ADEQUACY	8
A. N		72. APPROACH ROADWAY ALIGNMENT	8
B. Y		75. TYPE OF WORK	
C. N		76. LENGTH OF STRUCTURE IMPROVEMENT	0
94. BRIDGE IMPROVEMENT COSTS	95. ROADWAY IMPROVEMENT COSTS	96. TOTAL PROJECT COSTS	97. YEAR OF ESTIMATE
0	0	0	
98. BORDER A. BRIDGE	99. BORDER BRIDGE NUMBER	109. AVERAGE DAILY TRUCK TRAFFIC %	110. NATIONAL NETWORK
		7	ON 0 UNDER 0
112. NBIS BRIDGE LENGTH	113. SCOUR CRITICAL BRIDGES	114. FUTURE A.D.T.	115. A.D.T. YR.
Y	8	1018	2019
DRAWING NUMBER	KY. ROAD SYSTEM	PAINT DATE	CONDITION
12095	04		4
REMARKS		INDEPTH INSPECTION - DAT	
SIGN @ABV WGT LMTS		FT.	
* COMPLETED BY CENTRAL OFFICE STAFF			

KENTUCKY TRANSPORTATION CABINET

APPENDIX C

KY 8 BRIDGE OVER SNAG CREEK

INSPECTION REPORT

012B00005N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 12/27/2010
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Inspector Signature: 

District Review Date: 1/10/2011

District Reviewer: BSEITER (55)

IDENTIFICATION

Bridge ID (8):	012B00005N	MAP BRIDGE	District Number:	6
Route Carried (7):	KY-8		County (3):	23 Bracken
Mile Point:	4.22		Feature Intersected (6):	SNAG CREEK
Location (9):	1 MI W OF JCT KY 1109		Road Name:	MARY INGLES HWY W
Structure Description:	312.99 Foot - 3 Span Concrete continuous Tee Beam			

NBI CONDITION		SCHEDULE TAB				
Deck (58):	5	Schedule:	Required (Y/N)	Last Date	Frequency	Next Date
Superstructure (59):	4	NBI (90):		12/27/2010	(91): 12 mos	12/27/2011
Substructure (60):	4	Fracture Critical (92A):	N	(93A): 1/1/1901	(92A): mos	1/1/1901
Culverts (62):	N	Underwater (92B):	N	(93B): 1/1/1901	(92B): mos	1/1/1901
Channel/Protection (61):	7	Other Special (92C):	N	(93C): 1/1/1901	(92C): mos	1/1/1901
		Elemental:	NA		12 mos	12/27/2011

Load Rating and Posting						WATERWAY	
Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross	Scour Critical (113):	8
Recomm. Posting:	20	32	33	40		Observed 113 Rating:	U
Field Posting:	20	32	33	40	-1	Waterway Adeq. (71):	8
Posting Status (41):	P Posted for load						
Signs Posted:	Cardinal:	Y	Non-Cardinal:	Y			

DECK/WEARING SURFACE

Deck Type (107):	1 Concrete-Cast-In-Place						
Wearing Surface/Protective System (108):	Type:	3	Membrane:	0	Protection:	0	
Traffic Safety Features (36):	Bridge Rail:	0	Transition:	0	Appr. Rail:	0	Rail Ends: . 0
Overlay:	Y						
Overlay Type:	Latex						
Overlay Thickness:	2.01						

Vertical Clearances

Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	

Sufficiency Ratings

SR:	48.30	SD/FO:	1 Structurally Deficient
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Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
110/1	R/Conc Open Girder	LF	1,252.00	0.99	1,222.00	29.01	0.00	0.00
18/1	P Conc Deck/Thin Ovl	SF	8,842.25	0.00	8,842.25	0.00	0.00	0.00
205/1	R/Conc Column	EA	9.00	0.00	9.00	0.00	0.00	0.00

012B00005N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 12/27/2010
 Inspector: GCOCHRAN (23)
 Primary Type: Substandard (12 Months)

Types of Inspections Performed:

National Bridge Inventory: Y
 Element: Y
 Fracture Critical: N
 Underwater: N
 Other Special: N

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
210/1	R/Conc Pier Wall	LF	90.00	0.00	90.00	0.00	0.00	0.00
215/1	R/Conc Abutment	LF	126.00	0.00	106.00	20.00	0.00	0.00
234/1	R/Conc Cap	LF	105.00	63.00	12.00	30.00	0.00	0.00
300/1	Strip Seal Exp Joint	LF	37.00	0.00	37.00	0.00	0.00	0.00
304/1	Open Expansion Joint	LF	37.00	0.00	0.00	37.00	0.00	0.00
311/1	Moveable Bearing	EA	12.00	0.00	8.00	4.00	0.00	0.00
312/1	Enclosed Bearing	EA	8.00	8.00	0.00	0.00	0.00	0.00
313/1	Fixed Bearing	EA	4.00	4.00	0.00	0.00	0.00	0.00
331/1	Conc Bridge Railing	LF	627.00	0.00	596.95	0.00	30.05	0.00
357/1	Pack Rust Smart Flag	EA	1.00	0.00	1.00	0.00	0.00	0.00
359/1	Soffit Smart Flag	EA	1.00	0.00	1.00	0.00	0.00	0.00
360/1	Settlement SmFlag	EA	1.00	1.00	0.00	0.00	0.00	0.00
361/1	Scour Smart Flag	EA	1.00	0.00	1.00	0.00	0.00	0.00
503/1	RC Curb	LF	627.00	602.00	10.00	15.00	0.00	0.00
602/1	Vibrati/Oscillation	EA	1.00	0.00	1.00	0.00	0.00	0.00
605/1	Transitions	EA	1.00	1.00	0.00	0.00	0.00	0.00

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	110/1	R/Conc Open Girder	<p>Beams- Beam elements throughout this structure are of Tee Beam design. Exterior beam ends in several locations throughout pier seat areas were found to be discolored and have minor to moderate concrete deterioration, fascia cracking, spalling, crumbling of concrete material and efflorescence. Deterioration in these areas is located at or near bearing areas. Random beams were found to have varying degrees of fascia cracking with dark damp staining, efflorescence and spalling.</p> <p>Beam ends located at the forward abutment were found to have random spalling at or around sole plate of bearing devices with a large amount of fascia cracking and dark staining. Right most exterior beam at the forward abutment was found to have the largest area of spalling at this time.</p> <p>Interior face of exterior beam elements were found to have dark staining, with minor concrete deterioration at all drain outlet scupper locations.</p> <p>Vertical misalignment issue were noted in span #2, with span #1 having minor transverse misalignment.</p> <p>Beam element #1 in span #3 was found to have a vertical crack near the rear most haunched section (approximately 1.5' ahead of haunch), which extends through beam from exterior to interior. This crack was found to have dark staining at this time and should remain closely watched for further changes.</p> <p>(See Photos)</p>
1	18/1	P Conc Deck/Thin Ovl	<p>Deck- Topside surface of deck overlay was found to have a moderate loss of texture and scaling typical throughout, with stone aggregates becoming exposed and highly polished.</p> <p>Potholes were found forming in random locations throughout deck wearing surface along sliding plate expansion joint over pier #2.</p> <p>Potholes noted in span #1 during the past inspection report have since been patch repaired using concrete material. Patched/Repaired areas was found to be performing as designed at this time.</p> <p>Deck end located at the rear approach roadway transition was found to be breaking down, crumbling and cracking. Patched Duracal concrete placed in 2009 now covers a large amount of deck end width in this area.</p> <p>Transverse and longitudinal cracking, large areas of delamination and surface scaling was all found in random areas typical throughout deck surface. Transverse cracking was noted in deck surface throughout spans #2, #3 and #4 at approximately 1.0 foot spacing's.</p> <p>Surface spalling and scaling was noted at or near the forward expansion joint device.</p> <p>Note that all deck surface failures have and continue to allowing seepage through deck and accelerate issues throughout deck soffit area.</p> <p>(See Photos)</p>

012B00005N

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Element Condition State Data

Str	Unit	Elm/Env	Description	Description
1	205/1	R/Conc Column		<p>Pier Columns-</p> <p>Pier column elements were found to have varying degrees of concrete fascia deterioration typical throughout, due to ongoing failure noted in expansion joint device over pier #2, general age and weathering conditions.</p> <p>Pier #2 was found to be in the worst condition at this time, due to failure of expansion joint device above allowing ongoing seepage to structural elements below.</p> <p>Center column of pier #2 was found to have random cracking noted typical throughout fascia.</p> <p>(See Photos)</p> <p>Note that scouring conditions and probe review using inspection skiff were attempted at all pier column locations during time of this inspection, but note that channel was deep in depth along several areas (backwaters of the Ohio River). Recorded conditions are as followed:</p> <p>Pier #2, back side, could fell channel bed (silt, sand, etc.), no footing detected.</p> <p>Pier #2, ahead side, channel was too deep in depth at this time.</p> <p>Pier #3, back and ahead side, channel was too deep in depth at time.</p> <p>Pier #4, back side, channel was too deep in depth at time.</p> <p>Pier #4, ahead side, could fell channel bed (silt, sand, etc.), no footing detected.</p> <p>An underwater dive inspection of all areas of pier elements should be considered soon for a thorough review of scouring conditions.</p> <p>Channel is backwaters of the Ohio River (depth of pool remains to deep to enter year round).</p>
1	210/1	R/Conc Pier Wall		<p>Pier Walls-</p> <p>Pier wall elements were found to be performing as designed at this time.</p>
1	215/1	R/Conc Abutment		<p>Abutments-</p> <p>Both the rear and forward abutment elements were found to have dark staining typical throughout fascias, due to seepage from approach roadway transition joints above.</p> <p>Forward abutment #5 beam seat continues to be exposed to a heavy amount of leakage at this time.</p> <p>Both abutments have a few vertical hairline cracks noted throughout fascias.</p> <p>Backwall of the forward abutment was found to have moderate to heavy concrete deterioration in random areas typical throughout fascia, which is allowing spalled concrete material debris to accumulate around bearing devices on beam seats.</p> <p>Note that it appears as if the right end of rear abutment has settled slightly.</p> <p>Also note that movement/displacement was found in the forward abutment as well (rotation), which should be closely watched for further conditions and or changes.</p> <p>(See Photos)</p>
1	234/1	R/Conc Cap		<p>Pier Caps-</p> <p>Note that pier cap #2 appears to be in the worst condition at this time (same location of vertical/horizontal misalignment in span #2, rear). Exterior ends of pier cap #2 were found to have heavy concrete deterioration, crumbling of concrete material, spalling and exposed rusting reinforcing steel. Pier cap shear key was found to be broken at downstream corner. 45 degree crack runs from lower corner up and in toward center.</p> <p>Continuing concrete deterioration throughout pier cap #2 is approach closer and closer to bearing devices each inspection.</p> <p>Pier cap repairs are needed.</p> <p>(See Photos)</p>
1	300/1	Strip Seal Exp Joint		<p>Strip Seal Expansion Joint-</p> <p>Expansion joint device located at the forward abutment is of Strip Seal design.</p> <p>Strip seal material throughout this expansion joint was found failing at this time, which has and continues to allowing varying degrees of seepage to random structural elements below (abutment, tee beam ends, bearing devices, etc.).</p> <p>Replacement/Repairs are needed.</p> <p>(See Photos)</p>
1	304/1	Open Expansion Joint		<p>Open Expansion Joint-</p> <p>Note that open expansion joint device is of Steel Sliding Plate design, which is located over pier element #2.</p> <p>Sliding plate expansion device at pier #2 was found to be out of plane and raised in elevation approximately 1.5 inches in east bound lane. Attempts have been performed in the past for repair by cutting vertical extension plate at approximately a 45 degree slope. Cutting plate at this location has removed stitch weld from front edge of plate and has allowed movement and flexure to break back edge of this plate on right side, which is now loose with end weld holding plate in place.</p> <p>(The following note is from past inspection report: Topside vertical extension plate of this joint device has a joint weld located approximately 1.5 feet right from center line in the eastbound lane that has broken and is making a loud banging sound under traffic flow. This location of broken weld needs to be rewelded/repared as soon as possible.)</p> <p>Note that weld at center line has been rewelded since the past inspections, but movement continues throughout plate of joint under traffic flow, which could soon crack weld again.</p> <p>Failure conditions throughout is expansion joint device has and continues to allow a heavy to severe amount of seepage to structural elements below (beam ends, bearing devices, pier cap, pier columns, etc.).</p> <p>Note that bearing design under location of this expansion device as well as problem issues with bearing devices appear to be why sliding plate remains out of horizontal plane. (Span #1 ahead is of Tee beam design with concrete diaphragm bearing area and span #2 back is of Tee beam design with Rocker bearing design.) Severe pack rust conditions between rocker shoes and masonry plates at location appear to be causing vertical misalignment in span #2, raising span.</p> <p>Repairs throughout this expansion joint device are needed as soon as possible.</p> <p>(See Photos)</p>

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Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	311/1	Moveable Bearing	<p>Moveable Bearings- Moveable bearing devices throughout structure are of Steel Rocker design. Rocker bearing devices located on pier elements #2, #3 and abutment #5 were all found to have a minor to moderate amount of rusting conditions, due to failure of paint protective coating system and a minor amount of tilt. Rocker bearing devices at the pier #2 location, which are directly under expansion joint device appear to have a heavy amount of pack rusting conditions in between bottom shoe of devices and masonry plates. Heavy amount of pack rust appears to be raising span #2 upward, causing horizontal misalignment between spans #1 and #2. All rocker bearing devices need to be sand blasted and cleaned as soon as possible, removing all pack rust and placing a new paint protective coating system. (See Photos)</p>
1	312/1	Enclosed Bearing	<p>Enclosed Bearings- Enclosed bearings are located under concrete diaphragm bearing design, which can not be viewed for inspection.</p>
1	313/1	Fixed Bearing	<p>Fixed Bearings- Fixed bearing devices were found to have a minor amount of surface rusting typical throughout, due to failure of protective paint coating system; otherwise devices are performing as designed at this time.</p>
1	331/1	Conc Bridge Railing	<p>Bridge Railing- Minor concrete deterioration, spalling and surface scaling was found typical throughout bridge railing system, due mostly to general age and weathering conditions. Random bridge railing support post elements (post #6 and #7 on the left side of structure and #5, #6 and #7 on right side) were found to have varying degrees of concrete deterioration from moderate to heavy, with spalling, fascia cracking and exposed rusting reinforcing steel. (See Photos)</p>
1	357/1	Pack Rust Smart Flag	<p>Pack Rust- Misalignment and heavy pack rusting conditions were found typical throughout rocker bearing devices located on pier cap/seat #2 and appears to be the main cause of major vertical/horizontal misalignment noted in span #2, rear as well as sliding plate expansion device. Vertical misalignment is as much as 1.5 inches in random locations. Pack rust in between bottom shoes of rocker bearing devices and masonry plates appears to be raising span #2.</p>
1	359/1	Soffit Smart Flag	<p>Soffit- Transverse cracking was found throughout deck bottom with efflorescence. Moderate discoloration, dampness and staining from leakage with efflorescence was found at the rear abutment. All bays have minor discoloration and dampness from leakage with minor efflorescence starting to form at the right forward abutment location. Deck surface failure above have and will continue to accelerate problems throughout deck soffit. Repairs are needed. Most transverse cracking with efflorescence was found typical throughout span #3. (See Photos)</p>
1	360/1	Settlement SmFlag	<p>Settlement- Note that it appears as if the right end of rear abutment has settled slightly, with the forward abutment element showing rotation and transverse displacement.</p>
1	361/1	Scour Smart Flag	<p>Scour- Note that scouring conditions and probe review using inspection skiff were attempted at all pier column locations during time of this inspection, but note that channel was deep in depth along several areas (backwaters of the Ohio River). Recorded conditions are as followed: Pier #2, back side, could fell channel bed (silt, sand, etc.), no footing detected. Pier #2, ahead side, channel was too deep in depth at this time. Pier #3, back and ahead side, channel was too deep in depth at time. Pier #4, back side, channel was too deep in depth at time. Pier #4, ahead side, could fell channel bed (silt, sand, etc.), no footing detected. An underwater dive inspection of all areas of pier elements should be considered soon for a thorough review of scouring conditions. Channel is backwaters of the Ohio River (depth of pool remains to deep to enter year round).</p>
1	503/1	RC Curb	<p>Curbs- Concrete curb elements were found to be snow covered during time of inspection and could not be reviewed for conditions.</p>
1	602/1	Vibrati/Oscillation	<p>Vibration- Note that a minor amount of vibration was noted while structure was under light traffic load. It appears that most issues are coming from area of vertical misalignment between spans # and #2 at expansion joint device. (See Photos)</p>
1	605/1	Transitions	<p>Transitions- Minor settlement was noted in random locations throughout approach roadway transitions to structure.</p>

BRIDGE.Notes

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Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended
012 B00005N 002	Approved	High	Unassigned	33	304	3/26/2007
012-B00005N-1	Approved	High	Unassigned	33	304	12/27/2010
012-B00005N-1	Approved	High	Unassigned	41	18	2/2/2009
012-B00005N-2	Approved	High	Unassigned	31	311	2/22/2010
012-B00005N-2	Approved	High	Unassigned	9	0	12/27/2010
012-B00005N-3	Approved	High	Unassigned	31	304	2/22/2010
012-B00005N-3	Approved	High	Unassigned	60	0	12/27/2010
012-B00005N-4	Approved	High	Unassigned	31	300	2/22/2010
012-B00005N-5	Approved	High	Unassigned	60	0	2/22/2010

APPENDIX D

*THREATENED AND ENDANGERED
SPECIES FOR BRACKEN COUNTY*



U.S. Fish & Wildlife Service
Kentucky Ecological Services Field Office

U.S. Fish & Wildlife Service
330 West Broadway, Rm 265
Frankfort, KY 40601
Phone: 502-695-0468
Fax: 502-695-1024

Endangered, Threatened, & Candidate Species in _____ BRACKEN _____ County, KY					
Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	<i>Myotis sodalis</i>	Indiana bat	E	P	
Mussels	<i>Pleurobema clava</i>	clubshell	E	K	
	<i>Cyprogenia stegaria</i>	fanshell	E	K	
	<i>Plethobasus cooperianus</i>	orangefoot pimpleback	E	P	
	<i>Plethobasus cyphyus</i>	sheepnose	C	P	
	<i>Pleurobema plenum</i>	rough pigtoe	E	P	
	<i>Epioblasma torulosa rangiana</i>	Northern riffleshell	E	P	
	<i>Lampsilis abrupta</i>	pink mucket	E	P	
	<i>Obovaria retusa</i>	ring pink	E	P	
Plants	<i>Trifolium stoloniferum</i>	running buffalo clover	E	P	

NOTES:

* Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.