

# Data Needs Analysis



Madison County  
Bridge Replacement  
KY 3376 over Hays Fork Creek  
Item No. 7-1126

Prepared by  
KYTC District 7 Planning

October 9, 2012



I. PRELIMINARY PROJECT INFORMATION										
County:	Madison		Item No.:	7-1126.00						
Route Number(s):	KY 3376		Road Name:	Old US 25 N						
Program No.:	86750		UPN:	FD52	076	3376	004-005			
Federal Project No.:	BRO 0703 (310)		Type of Work:	bridge replacement						
2012 Highway Plan Project Description:										
Replace bridge on KY 3376 over Hays Fork 0.048 miles south of US 421.										
Beginning MP:			4.586		Ending MP:		4.626		Project Length: 0.04 (211')	
Functional Class.:			<input type="checkbox"/> Urban <input checked="" type="checkbox"/> Rural Local <input type="button" value="▼"/>		State Class.: <input type="checkbox"/> Primary <input checked="" type="checkbox"/> Secondary Route is on: <input type="checkbox"/> NHS <input type="checkbox"/> NN <input type="checkbox"/> Ext Wt Truck Class.: A <input type="button" value="▼"/> % Trucks: 10.4 Terrain: Rolling <input type="button" value="▼"/>					
MPO Area:			Not Applicable <input type="button" value="▼"/>							
In TIP:			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							
ADT (current):			700 2012							
Access Control:			<input type="checkbox"/> None <input checked="" type="checkbox"/> Permit <input type="checkbox"/> Fully Controlled		<input type="checkbox"/> Partial Spacing: <input type="button" value="▼"/>					
Median Type:			<input checked="" type="checkbox"/> Undivided <input type="checkbox"/> Divided (Type):							
Existing Bike Accommodations:			Shared Lane <input type="button" value="▼"/>		Ped: <input type="checkbox"/> Sidewalk					
Posted Speed:			<input type="checkbox"/> 35 mph <input type="checkbox"/> 45 mph <input checked="" type="checkbox"/> 55 mph <input type="checkbox"/> Other (Specify):							
KYTC Guidelines Preliminarily Based on :			55 MPH Proposed Design Speed							
COMMON GEOMETRIC										
Roadway Data:			EXISTING		PRACTICES*					
No. of Lanes	2		2				<a href="#">Existing Rdwy. Plans available?</a> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Year of Plans:			
Lane Width	9 ft		11 ft				<input checked="" type="checkbox"/> <a href="#">Traffic Forecast Requested</a> Date Received: 8/17/12			
Shoulder Width	3 ft *		5 ft				<input type="checkbox"/> Mapping/Survey Requested Date Requested:			
Max. Superelevation**			8%				Type: <input type="button" value="▼"/>			
Minimum Radius**			960 ft							
Maximum Grade			7%							
Minimum Sight Dist.			495 ft							
Sidewalk Width(urban)										
Clear-zone***										
Project Notes/Design Exceptions?:			* 1 ft paved							
<small>*Based on proposed Design Speed, **AASHTO's A Policy on Geometric Design of Highways and Streets, ***AASHTO's Roadside Design Guide</small>										
Bridge No.*:			076B00086N		<a href="#">Existing Geotech data available?</a> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Sufficiency Rating	23.1									
Total Length	45.9 ft									
Width, curb to curb	18.0 ft									
Span Lengths	22.0 ft									
Year Built	1922									
Posted Weight Limit										
Structurally Deficient?	yes									
Functionally Obsolete?										

## II. PROJECT PURPOSE AND NEED

### A. Legislation

The project is listed in the 2012 Highway Plan with federal bridge replacement (on system) funding source.	<i>Funding</i>	<i>Phase</i>	<i>Year</i>	<i>Amount</i>
	BRO	D	2013	\$300,000
	BRO	R	2014	\$80,000
	BRO	U	2014	\$90,000
	BRO	C	2015	\$550,000
				\$1,020,000

### B. Project Status

The federal funding was approved on July 19, 2012 for \$300,000 for the design phase.

### C. System Linkage

Old US 25 N (KY 3376) is classified as a rural local route. The route is located northeast of Berea in southern Madison County linking US 421 near Kingston to KY 1016 just inside the Berea city limits.

### D. Modal Interrelationships

Madison County Schools operate a school bus along this route and across this bridge during the school year. The school bus operates in the morning and afternoon for students from Kingston Elementary, Faristown Middle, and Madison Southern High. There are currently no bike lanes along this route but it is part of the Bluegrass Bike Tour route (Appendix A).

### E. Social Demands & Economic Development

The current and future land use along KY 3376 is agriculture and single family residential.

### F. Transportation Demand

Based on the Transportation Cabinet's HIS (Highway Information System) database, the historic traffic volume trends along KY 3376 indicate that this route is a low volume road that carries around 700 vehicles per day. The future ADT is projected to be 1,100 in year 2035 while the truck percentage is projected to increase to 13.0% by year 2035.

## II. PROJECT PURPOSE AND NEED (cont.)

### G. Capacity

Based on the low volume traffic trends and the fact that the roadway is currently two lanes, it is apparent that no additional capacity is necessary.

### H. Safety

A collision data report was generated over a three year period from August 1, 2009 to July 31, 2012 using the Kentucky State Police collision records database. Only one collision record was identified with property damage near the US 421 intersection approx. 250 feet north of the bridge. No crashes were reported at the bridge location or its approaches.

### I. Roadway Deficiencies

The bridge structure is located on a rural local route, KY 3376, over Hays Fork Creek. It was constructed in 1922 and is now 90 years of age. The bridge inspection report was completed in April 2012 (Appendix B). The current bridge sufficiency rating is 23.10 indicating that the bridge structure is structurally deficient. The report identified girder deterioration and cracking, spalling, and exposed reinforcement. The bridge has a narrow width of 18 feet curb to curb. Due to the close proximity of the concrete railing to the traffic lane, major damage has been created to it from traffic impacts which has become functionless. It was recommended a high priority in the inspection report to replace existing concrete railing. See bridge photos (Appendix C).

### Draft Purpose and Need Statement

**Need:** The existing bridge is around 90 years of age and has experienced much girder deterioration and cracking. The bridge width is narrow at only 18 feet from curb to curb putting the concrete railing close to the traffic lanes. The current sufficiency rating is 23.10 with the structure being recognized as functionally deficient.

**Purpose:** To improve the structural deficiency of the bridge structure on KY 3376 over Hays Fork Creek.

### III. PRELIMINARY ENVIRONMENTAL OVERVIEW

#### A. Air Quality

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

STIP Pg. #: DRAFT FY13-16

TIP Pg. #:

Madison Co. is in attainment for all monitored air pollutants.

#### B. Archeology/Historic Resources

☒ Known Archeological or Historic Resources are present

The bridge is historic. It was built by Thomas Company Engineers and Contractors in 1922. An Archaeology Checklist or Phase I survey will need to be completed in order to rule out any impacts to archaeological sites. This may be done in house or contracted out, depending on time and available resources. Optimum time for a survey would be during a winter draw-down when more of the shoreline is exposed.

#### C. Threatened and Endangered Species

Gray bat and running buffalo clover are listed as federally endangered in Madison Co. During a site visit in August 2012 potential foraging habitat was observed for the bat species in the project area; however a Habitat Assessment will need to be conducted to examine the habitat potential more closely. A Biological Assessment may also be needed. Habitat for RBC should be assessed in May during bloom time since the location/setting is historic. A HA will be needed, however, the shading and disturbance regime needed for RBC did not appear present. Any impacts to threatened and endangered species must be mitigated for through coordination with USFWS.

#### D. Hazardous Materials

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

During a site visit in August 2012, no properties were observed that would have a high probability of hazardous materials. However, due to the age of the bridge, it should be tested for asbestos prior to demolition and/or lead based paint.

#### 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

Any impacts below the ordinary high water mark within the stream will need a USACE 404 Permit (likely LON or NW depending on length of impact) and potentially a Water Quality Certification from the Division of Water.

#### 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

The scope of the project may require noise analyses if additional lanes of traffic planned for this project. The noise associated with construction and demolition will be temporary.

#### G. Socioeconomic

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

There will likely be no socioeconomic impacts associated with this project.

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

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

If the bridge is ruled as eligible for the National Register of Historic Places it could also be afforded protection under Section 4(f). The KYTC has options to mitigate and avoid impacts to Section 4(f) resources including a programmatic agreement for mitigating historic bridges and using "de minimis" guidance for minor strip takings.

Anticipated Environmental Document:

CE Level 1



#### IV. Project Scoping

##### A. No Build

Due to the age of the existing bridge structure and the low sufficiency rating with apparent structural deficiencies, the "No Build" alternative should not be recommended. If no improvements are made, the structure will continue to be structurally deficient which could become a hazard to motorists and other users of the road.

##### B. Basis for Highway Plan Cost Estimate

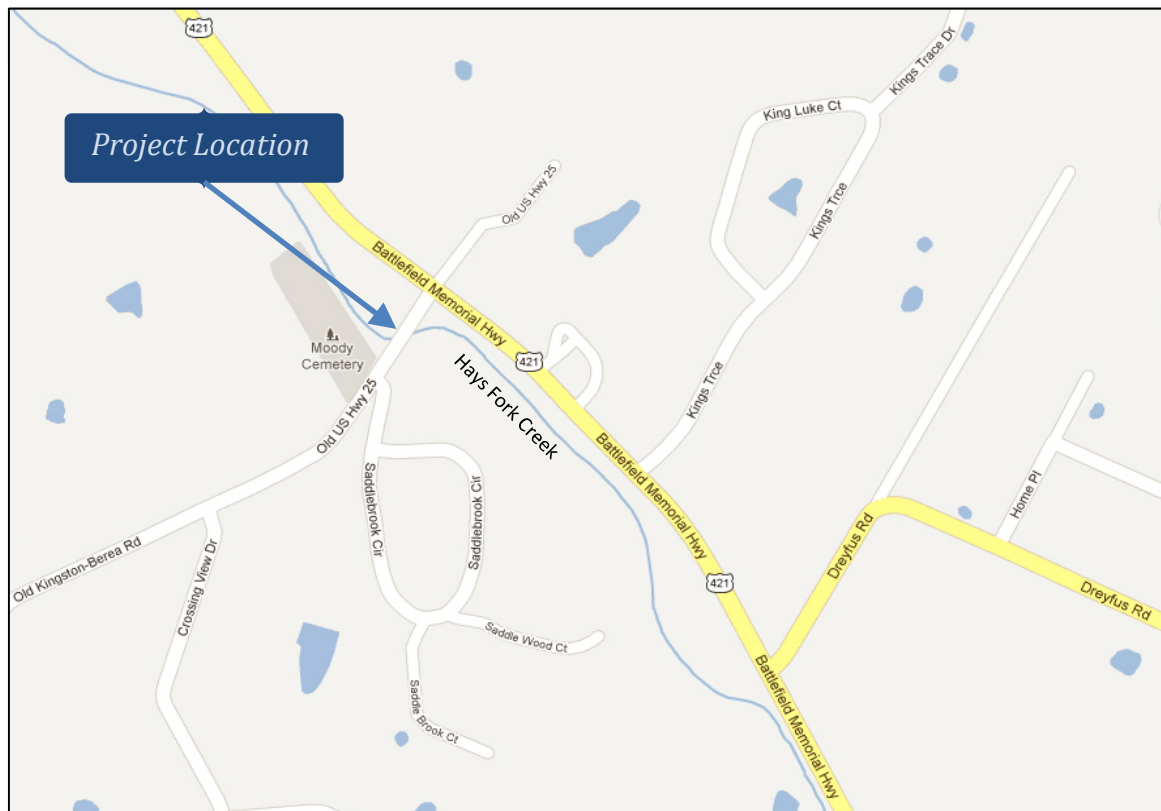
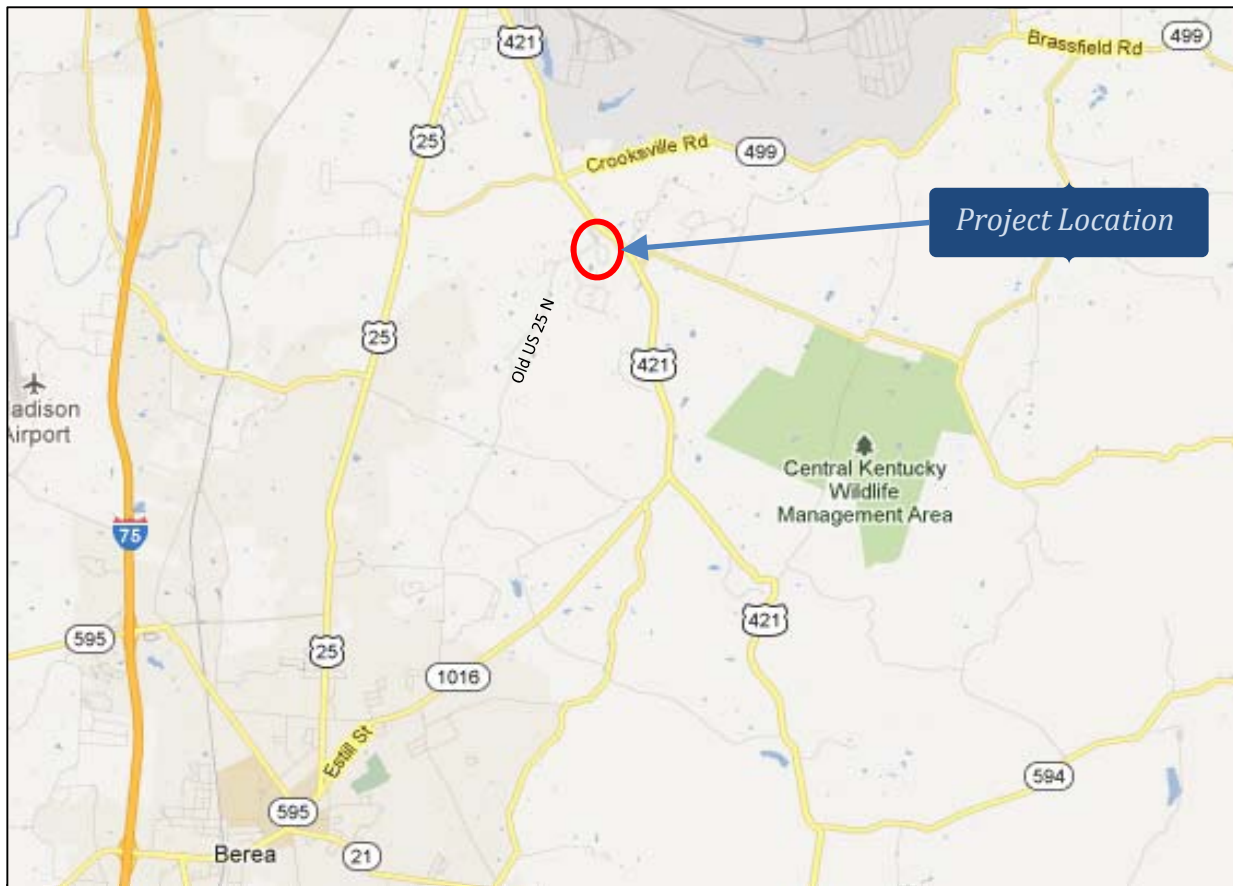
The cost estimate is based on replacing the existing two-span bridge with a single-span bridge in the same location with no alignment shift. The proposed clear bridge width includes two 11 foot lanes with two foot minimum shoulder widths (26 feet curb to curb). The approach length would be approx. 110 feet on each side of the bridge for pavement tapers. It may be possible to close the road to through traffic during construction with a detour being signed to the east of KY 3376 using routes KY 1016 and US 421 (approx. 10 miles). Temporary easements for construction would most likely need to be acquired around the bridge for removing existing structure and other construction activities as well as allowing room for materials.

#### V. PROJECT CONCERNS

- Utility poles near the bridge on the north side may be impacted if a wider structure is to be considered.
- Existing abutments and pier skews are not ideal for allowing the stream water to flow efficiently through it.
- The existing center pier catches debris causing additional maintenance.



## VI. Project Location Maps

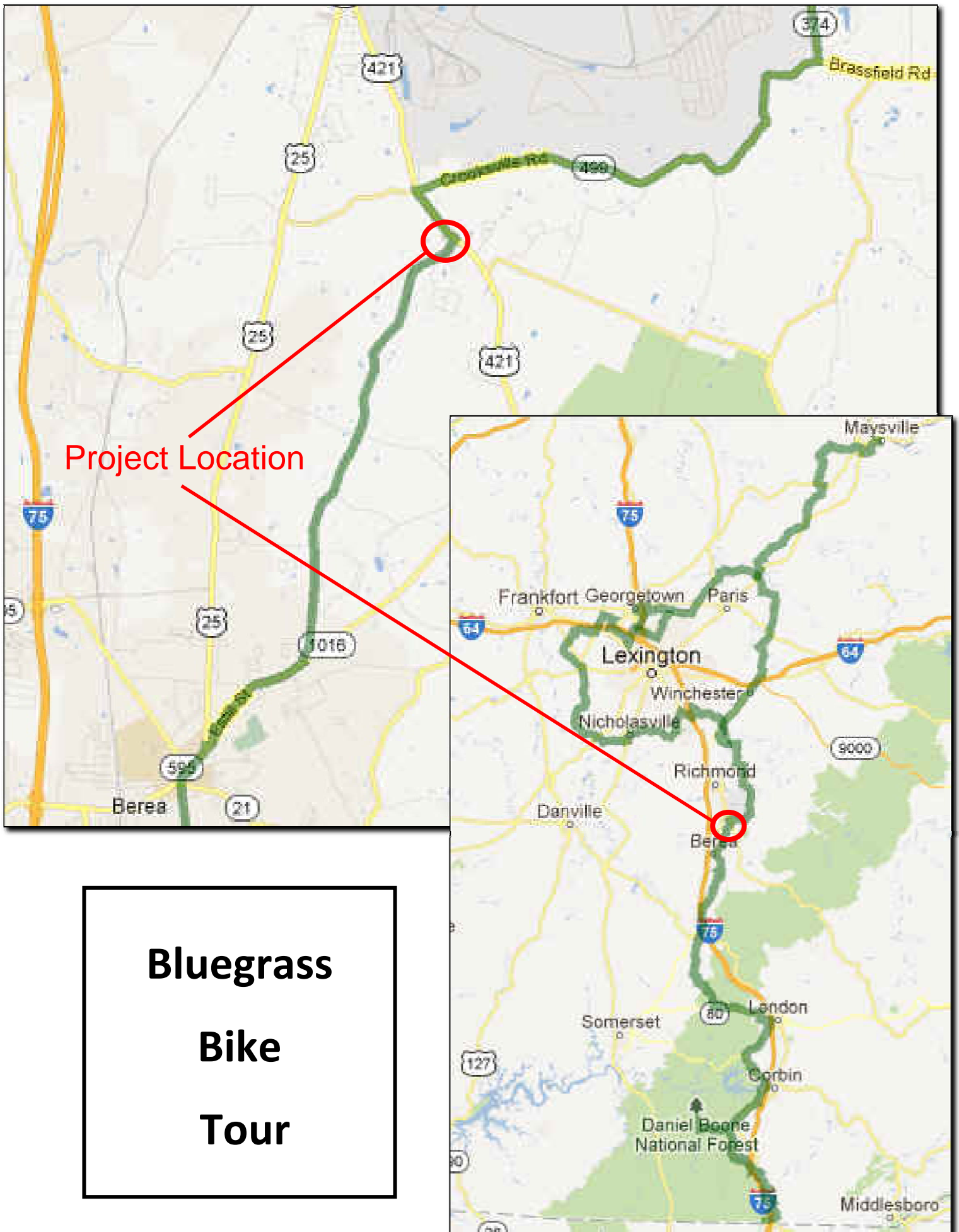


## **VII. Appendix**

### **A. Appendix of the DNA Planning Study**

- A Bluegrass Bike Tour Route
- B Bridge Inspection Report
- C Existing Bridge Photos





076B00086N

## KYTC Bridge Inspection Report

## Summary:

Inspection Date: 4/16/2012  
 Inspector: JHOOD (210)  
 Primary Type: Standard (24 Months)

## Types of Inspections Performed:

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

District Review Date: 4/24/2012

Inspector Signature: \_\_\_\_\_

District Reviewer: JWHEELER (124) *JRW*

## IDENTIFICATION

Bridge ID (8):	076B00086N	MAP BRIDGE	District Number:	7
Route Carried (7):	KY-3376		County (3):	76 Madison
Mile Point:	4.606		Feature Intersected (6):	HAYS FORK
Location (9):	200' SW OF JCT US 421		Road Name:	OLD US 25 N
Structure Description:	45.93 Foot - 2 Span Concrete Tee Beam			

## NBI CONDITION

## SCHEDULE TAB

Deck (58):	4	Schedule:	Required (Y/N)	Last Date	Frequency	Next Date
Superstructure (59):	4	NBI (90):		4/16/2012	(91): 24 mos	4/16/2014
Substructure (60):	4	Fracture Critical (92A):	N	(93A): 1/1/1901	(92A): mos	1/1/1901
Culverts (62):	N	Underwater (92B):	N	(93B): 4/1/2004	(92B): mos	4/1/2006
Channel/Protection (61):	6	Other Special (92C):	N	(93C): 1/1/1901	(92C): mos	1/1/1901
		Elemental:	NA		24 mos	4/16/2014

## Load Rating and Posting

## WATERWAY

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross	Scour Critical (113):	8
Recomm. Posting:	20	22	22	22		Observed 113 Rating:	8
Field Posting:	-1	-1	-1	-1	-1	Waterway Adeq. (71):	7
Posting Status (41):	A Open, no restriction						
Signs Posted:	Cardinal:	N	Non-Cardinal:	N			

## DECK/WEARING SURFACE

Deck Type (107):	1 Concrete-Cast-In-Place				
Wearing Surface/Protective System (108):	Type: 6	Membrane: 0	Protection: 0		
Traffic Safety Features (36):	Bridge Rail: 0	Transition: 0	Appr. Rail: 0	Rail Ends: 0	
Overlay:	Y				
Overlay Type:	Asphalt				
Overlay Thickness:	8.00				

## Vertical Clearances

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

## Sufficiency Ratings

SR:	23.10	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	235.00	0.00	228.00	7.00	0.00	0.00
13/1	Unp Conc Deck/AC Ovl	SF	752.00	752.00	0.00	0.00	0.00	0.00
210/1	R/Conc Pier Wall	LF	20.00	0.00	20.00	0.00	0.00	0.00

076B00086N

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Primary Type: Standard (24 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
215/1	R/Conc Abutment	LF	48.00	0.00	48.00	0.00	0.00	0.00
234/1	R/Conc Cap	LF	20.00	0.00	20.00	0.00	0.00	0.00
331/1	Conc Bridge Railing	LF	92.00	0.00	0.00	52.00	40.00	0.00
359/1	Soffit Smart Flag	EA	1.00	0.00	1.00	0.00	0.00	0.00
361/1	Scour Smart Flag	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	GIRDERS DETERIORATING AT PIER JOINTS & OLD DRAIN SPOUTS.GIRDER CRACKING AND EFFLORESCENCE THRU-OUT.EXTERIOR BEAM IS SPALLING AND REINFORCEMENT IS EXPOSED. THIS STRUCTURE SHOULD BE CONSIDERED FOR REPLACEMENT.BUILT IN 1922.
1	13/1	Unp Conc Deck/AC Ovl	
1	210/1	R/Conc Pier Wall	MODERATE TO HEAVY CRACKING, IN THE PIER WALL. THE UP-STREAM AND DOWN-STREAM FACE OF THE PIER WALL, HAS HEAVY SPALLING, SCALING AND LEACHING.
1	215/1	R/Conc Abutment	MODERATE TO HEAVY CRACKING, IN BOTH ABUTMENTS, ESPECIALLY THE WINGWALLS OF ABUTMENT #3.
1	234/1	R/Conc Cap	THE ENDS OF THE CAPS HAVE MODERATE SPALLING.
1	331/1	Conc Bridge Railing	MAJOR DAMAGE TO CONCRETE RAILING DUE TO TRAFFIC IMPACT AND IT IS FUNCTIONLESS.
1	359/1	Soffit Smart Flag	MODERATE CRACKING WITH EFFLORESCENCE IN THE SOFFIT.
1	361/1	Scour Smart Flag	MINOR SCOUR AT PIER .

## BRIDGE.Notes

## Work Candidates

## Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended
REPLACE RAILING.	Approved	High	Unassigned	31	331	3/26/2008
REPLACE STRUCTURE.	Under Review	High	Unassigned	11	0	3/26/2008



