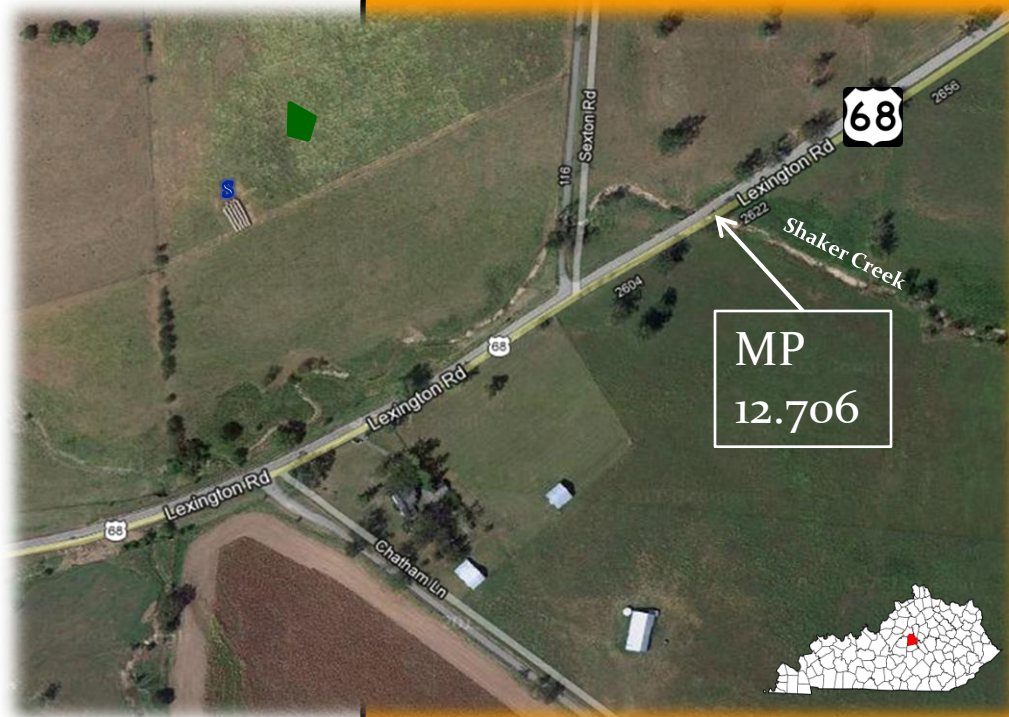


Data Needs Analysis



Mercer County
Bridge Replacement
US 68 over Shaker Creek
Item No. 7-1128

Prepared by
KYTC District 7 Planning

October 9, 2012



I. PRELIMINARY PROJECT INFORMATION

County: Mercer Item No.: 7-1128.00
Route Number(s): US 68 Road Name: Lexington Road
Program No.: BRO 2682(012) UPN: FD52 084 0068 012-013
Federal Project No.: 86751 Type of Work: Bridge Replacement

2012 Highway Plan Project Description:

Replace bridge on US 68 over Shaker Creek (MP 12.706) 0.061 miles E of Sexton Road (CR-1007).

Beginning MP: 12.686 Ending MP: 12.726 Project Length: 0.04 miles

Functional Class.: ☐ Urban ☒ Rural State Class.: ☒ Primary ☐ Secondary

Arterial ▼

Route is on: ☐ NHS ☒ NN ☐ Ext Wt

MPO Area: Not Applicable ▼

Truck Class.: AAA ▼

In TIP: ☐ Yes ☐ No

% Trucks: 9.7

ADT (current): 2,178 (2009)

Terrain: Rolling ▼

Access Control: ☐ None ☒ Permit ☐ Fully Controlled ☐ Partial Spacing: ▼

Median Type: ☒ Undivided ☐ Divided (Type):

Existing Bike Accommodations: Shared Lane ▼

Ped: ☐ Sidewalk

Posted Speed: ☐ 35 mph ☐ 45 mph ☒ 55 mph ☐ Other (Specify):

KYTC Guidelines Preliminarily Based on : 55 MPH Proposed Design Speed

COMMON GEOMETRIC

Roadway Data:

EXISTING

PRACTICES*

No. of Lanes	2	2
Lane Width	10 ft	12 ft
Shoulder Width	2 ft	8 ft
Max. Superelevation**		8%
Minimum Radius**		960 ft
Maximum Grade		5%
Minimum Sight Dist.		495 ft
Sidewalk Width(urban)		
Clear-zone***		

[Existing Rdwy. Plans available?](#)

☐ Yes ☒ No

Year of Plans:

☒ [Traffic Forecast Requested](#)

Date Received: 9/4/2012

☐ 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.*: 084B00001N

Sufficiency Rating 36.20

Total Length 22.97 ft

Width, curb to curb 20.00 ft

Span Lengths 20.00 ft

Year Built 1922

Posted Weight Limit 40 tons

Structurally Deficient? No

Functionally Obsolete? Yes

[Existing Geotech data available?](#)

☐ Yes ☒ No

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

II. PROJECT PURPOSE AND NEED

A. Legislation

The project is listed in the 2012 Highway Plan with federal bridge funds.

<i>Funding</i>	<i>Phase</i>	<i>Year</i>	<i>Amount</i>
BRO	D	2013	\$300,000
BRO	R	2014	\$60,000
BRO	U	2014	\$70,000
BRO	C	2015	\$650,000
			\$1,080,000

B. Project Status

Federal funding was approved on July 19, 2012.

C. System Linkage

US 68, a 2-lane rural minor arterial, runs in a generally curving path along a southwest to northeast route through Mercer County that links the city of Harrodsburg and historic Shaker Village of Pleasant Hill with the city of Lexington, crossing the Kentucky River and passing through Jessamine County along the way. The 2.4 mile stretch of road centered on Shakertown that contains this bridge is designated a scenic highway named the US 68 Heritage Corridor.

D. Modal Interrelationships

The project will not interface with nor complement any airports, rail/port facilities or transit services. Mercer County Schools operates a school bus along this route and across this bridge during the school year. There are currently no bike lanes along this route, but it is the route of an annual Bike Trek to Shakertown (in its 27th year as of September 2012).

E. Social Demands & Economic Development

The project will not foster any new employment, nor benefit schools, land use plans, or recreation facilities. There are no additional developments in this area at this time for future development. The current and future land use along US 68 is agricultural/open space, recreational/resort and planned as a Shakertown scenic overlay (Appendix A).

F. Transportation Demand

From Traffic Forecast Report (8/31/12):

2012 ADT = 2,200 | 2035 ADT = 2,600

2012 DHV = 260 | 2035 DHV = 300

2012 %T (ADT) = 10.9% | 2035 %T (ADT) = 14.0%

2012 %T (DHV) = 10.9% | 2035 %T (DHV) = 9.1%

20 Year ESALs = 1.100.000

II. PROJECT PURPOSE AND NEED (cont.)

G. Capacity

The Volume to Service Flow ratio (V/SF), according to the 2010 Adequacy Rating Data for this section of US 68, is currently 0.52. The current roadway provides adequate service to existing traffic demands and should continue to do so in the future. No additional lanes should be needed for this project.

H. Safety

According to the Kentucky State Police collision database for the 3-year period running from 1/1/2009 through 12/31/2011, there have been 6 accidents with no injuries or fatalities on this section of roadway containing the bridge. Additionally, this section of roadway has a Critical Rate Factor (CRF) of 1.044, which is considered statistically significant for roadway geometrics contributing to higher crashes than average.

I. Roadway Deficiencies

A bridge inspection was completed in August 2011 (Appendix B). Based on the report, this 22.97ft structure has a sufficiency rating of 36.20 and is functionally obsolete. From a reconnaissance survey in August 2012, there appeared to be moderate deterioration and vertical & horizontal cracking in abutments, as well as cracked pavement along the bridge (Appendix C).

Draft Purpose and Need Statement:

Need: The existing bridge is around 90 years of age, has experienced deterioration throughout the structure and is functionally obsolete with a sufficiency rating of only 36.20. The bridge is part of the main corridor that services Shakertown from the southwest.

Purpose: To improve and provide a functionally sound crossing for US 68 (Lexington Road) over Shaker Creek.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Project is in: ☒ Attainment area ☐ Nonattainment or Maintenance Area ☐ PM 2.5 County
STIP Pg. #: 94 of 127 (DRAFT FY 13-1) TIP Pg. #:

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

B. Archeology/Historic Resources

☒ Known Archeological or Historic Resources are present

A historic checklist or study will be needed. Built in 1922, the bridge is historic. Additionally, there are drystone elements/fences on three sides of the bridge in various conditions. 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. Coordination of findings with the SHPO is required.

C. Threatened and Endangered Species

Gray bat, Indiana bat, fanshell, northern riffleshell, ring pink, clubshell, rough pigtoe & running buffalo clover are listed as federally endangered in Mercer Co. During a site visit in September 2012, potential foraging and roosting habitat was observed for the bat species in the project area along with potential mussel habitat; 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 September 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.

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 Division of Water. A downstream section of Shaker Creek in Mercer Co. is listed as an Outstanding State Resource Water, which may warrant consideration during design phase.

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 or rock walls are 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

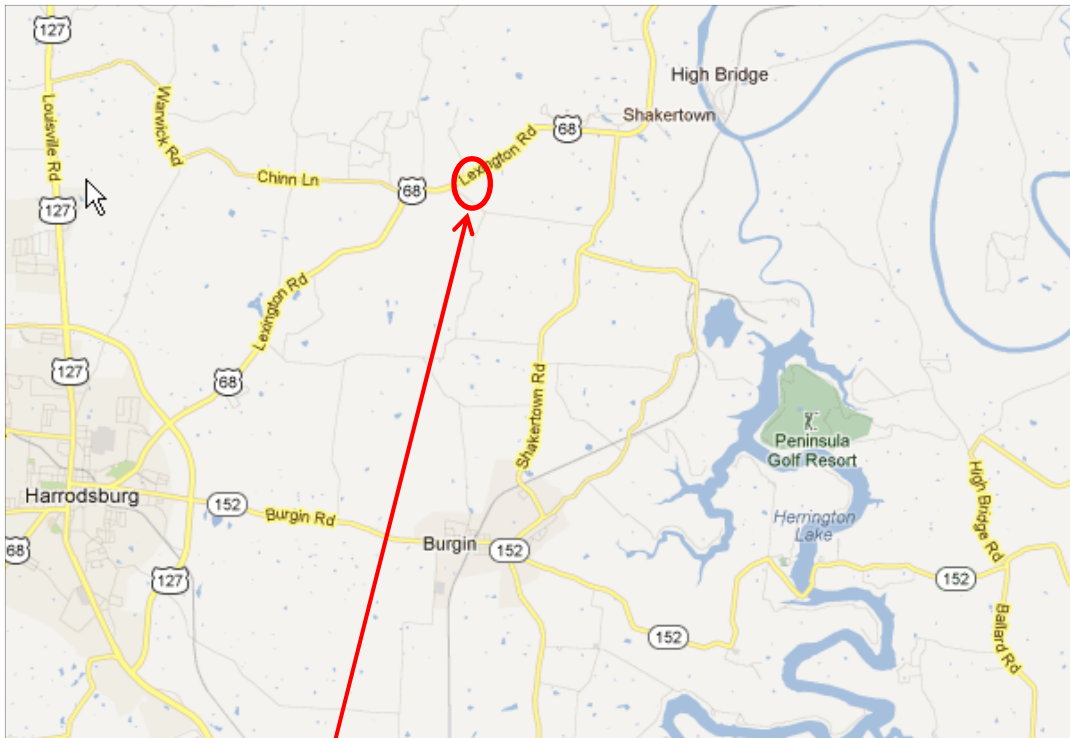
A. No Build

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.

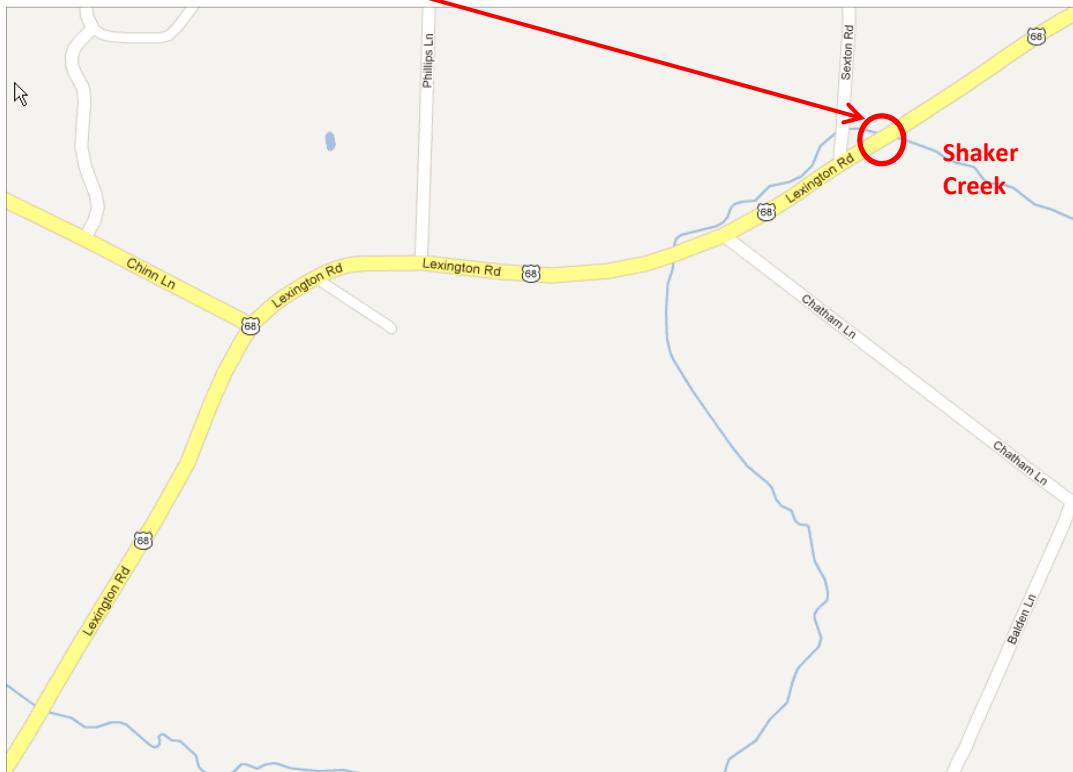
B. Basis for Highway Plan Cost Estimate

The cost estimate is based on replacing the existing 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. 55 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 US 68 using routes KY 33 and KY 152 (approx. 7-10 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 Location Maps



Project Location



VI. Appendix

a. Appendix of the DNA Planning Study

- A Mercer County Land Use Map
- B 2011 Bridge Inspection Report
- C Bridge Photos

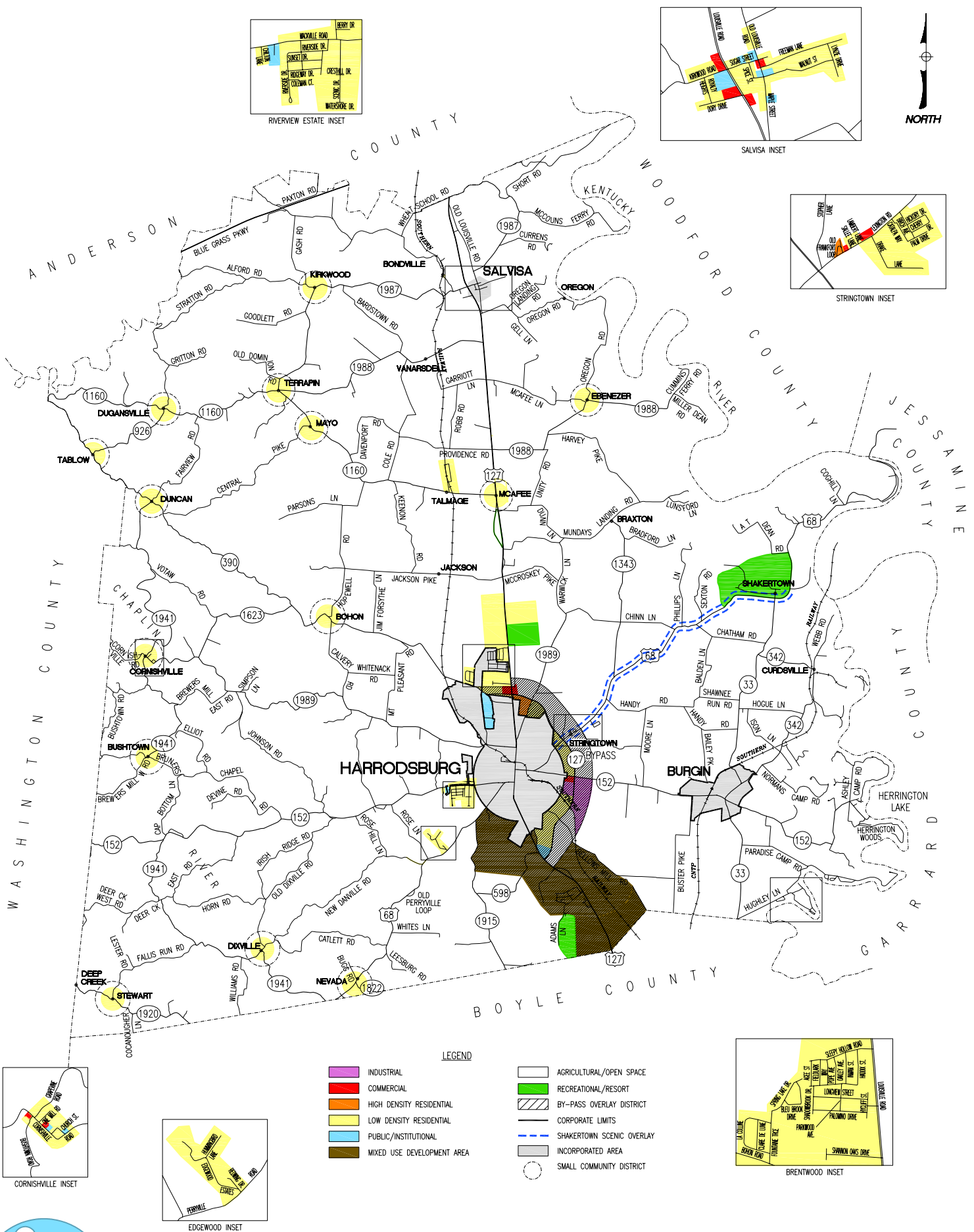


EXHIBIT I
FUTURE LAND USE MAP
MERCER COUNTY, KENTUCKY



Summary:

Inspection Date: 8/1/2011
 Inspector: JHOOD (210)
 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: 8/15/2011

District Reviewer: JWHEELER (124)

JRW

IDENTIFICATION

Bridge ID (8): 084B00001N MAP BRIDGE District Number: 7
 Route Carried (7): US-68 County (3): 84 Mercer
 Mile Point: 12.462 Feature Intersected (6): SHAKER CREEK
 Location (9): 2.0 MI WEST OF JCT KY 33 Road Name: LEXINGTON RD
 Structure Description: 22.97 Foot - Single Span Concrete Slab

NBI CONDITION

SCHEDULE TAB

Deck (58):	7	Schedule:	Required (Y/N)	Last Date	Frequency	Next Date
Superstructure (59):	5	NBI (90):		8/1/2011	(91): 12 mos	8/1/2012
Substructure (60):	5	Fracture Critical (92A):	N	(93A): 1/1/1901	(92A): mos	1/1/1901
Culverts (62):	N	Underwater (92B):	N	(93B): 1/1/1900	(92B): mos	1/1/1901
Channel/Protection (61):	6	Other Special (92C):	N	(93C): 1/1/1901	(92C): mos	1/1/1901
		Elemental:	NA		12 mos	8/1/2012

Load Rating and Posting

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross	WATERWAY
Recomm. Posting:	20	21	22	40		Scour Critical (113): 8
Field Posting:	20	28	37	40	-1	Observed 113 Rating: 8
Posting Status (41):	B Open, posting rec-cot legally implemented					Waterway Adeq. (71): 7
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:	7.99				

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: 36.20 SD/FO: 2 Functionally Obsolete

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	100.00	0.00	100.00	0.00	0.00	0.00
334/1	Metal Rail Coated	LF	46.00	46.00	0.00	0.00	0.00	0.00
359/1	Soffit Smart Flag	EA	1.00	1.00	0.00	0.00	0.00	0.00

Summary:

Inspection Date: 8/1/2011

Inspector: JHOOD (210)

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
39/1	Unp Conc Slab/AC Ovl	SF	460.00	460.00	0.00	0.00	0.00	0.00
503/1	RC Curb	LF	46.00	0.00	46.00	0.00	0.00	0.00

Element Condition State Data

Str	Unit	Elm/Env	Description	Description
1		215/1	R/Conc Abutment	MODERATE DETERIORATION AND VERTICAL AND HORIZONTAL CRACKING IN ABUTMENTS.
1		334/1	Metal Rail Coated	< none >
1		359/1	Soffit Smart Flag	EXTERIOR PORTION OF SLAB IS DETERIORATING. MODERATE CRACKING AND EFFLORESCENCE IN BOTTOM OF SLAB.
1		39/1	Unp Conc Slab/AC Ovl	< none >
1		503/1	RC Curb	MODERATE CRACKING IN CURBS.

BRIDGE.Notes

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended
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