Kentucky
UNBRIDLED SPIRIT

2011

Pre-Design Scoping Study

Data
Needs
Analysis

KY 54, Daviess County
From US 60 to Whitesville
Item No. 2-8300.00

Prepared by the KYTC
Division of Planning and
KYTC District 2

September 2011

KENTUCKY
TRANSPORTATION
CABINET

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I. INTRODUCTION

This study is a Data Needs Analysis (DNA) of a roadway project for the KY 54 corridor in Daviess County, Item Number 2-8300.00.

A. Study Purpose

The purpose of the DNA is to address the nine elements of Purpose and Need as defined by NEPA in order to develop a draft Purpose and Need Statement for the project. This study will also provide a more defined project scope, possible alternatives, planning-level cost estimates, an identification of potential environmental impacts, and other information that will be of assistance in future phases of the Project Development Phase of this project.

B. Location

This project is located on KY 54 in Daviess County east of Owensboro. The project limits extend from US 60, formerly the Bypass (MP 2.62), to the Jack Hinton Road intersection (MP 8.0). For the purposes of this study, it is divided into three sections. See ***Figure 1*** and Exhibit 1 in **Appendix A**. A topographic map of the study area, Exhibit 2, can also be viewed in **Appendix A**.

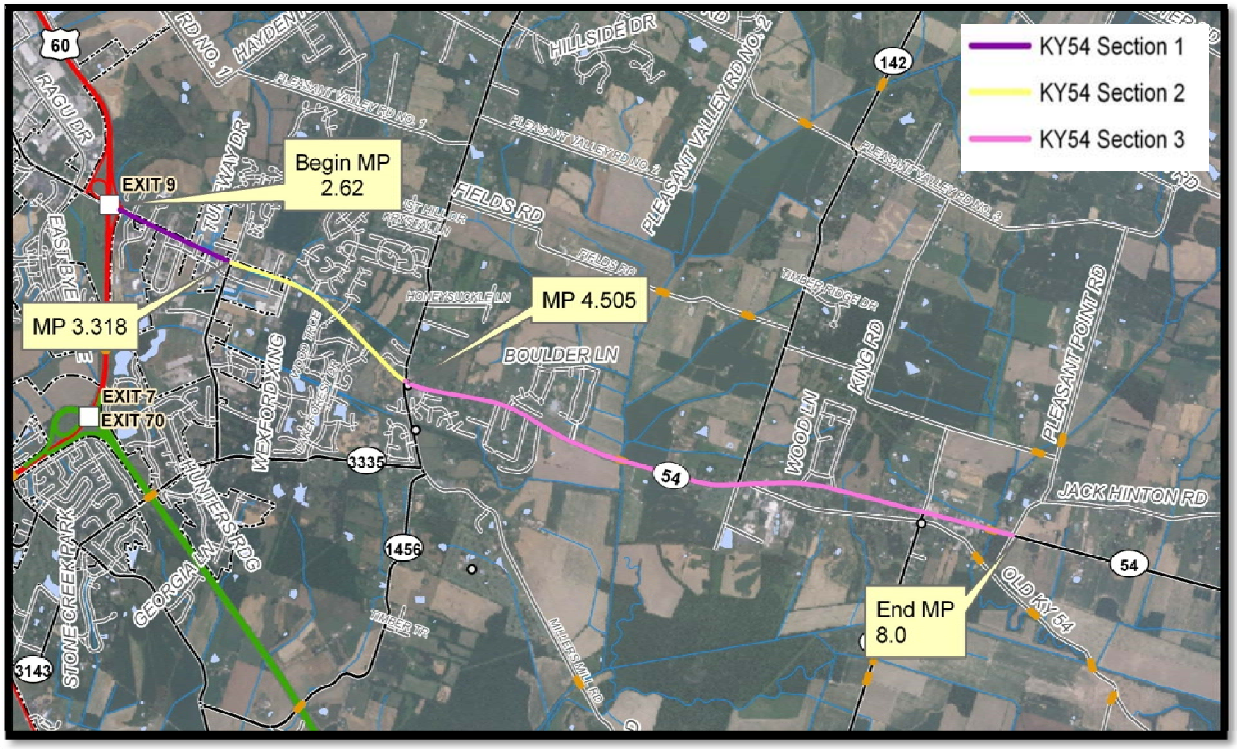

Figure 1: Project Location Map

II. PROJECT PURPOSE AND NEED

A. Legislation

The following is a description of the project as it is listed in the 2010 General Assembly's Enacted Highway Plan.

- **Item #2-8300.00, Daviess County**

Funding	Phase	Year	Amount
SPP	D	2010	$2,820,000
SP	R	2011	$7,700,000
SP	U	2012	$17,040,000

WIDENING KY-54 FROM THE US-60 BYPASS TO WHITESVILLE FROM MILEPOST 4.51 TO MILEPOST 8.0. (06CCN)(10CCR)
Purpose and Need: RELIABILITY/ MAJOR WIDENING (O)

The construction phase did not make it into the current Biennial Highway Plan. However, the estimate in the recommended plan for construction was $35,540,000.

B. Project Status

Design funds for this project have been authorized. The Highway Plan Design year is listed as 2010. There is currently a construction project for the extension of US 60 north of this project and plans to modify the ramps of the US 60/KY 54 Interchange. A few years ago, KY 54 was widened from two lanes to five lanes from the US 60 interchange to MP 4.505.

There is currently a project on the Unscheduled Projects List (UPL) that calls for major widening to 5 lanes from Thruston-Dermont Road to Jack Hinton Road southeast of Owensboro. The Project Identification Form (PIF) for the project (#02 030 D0054 18.00) can be viewed in **Appendix B**. According to the PIF, the regional goal of this project is to eliminate congestion and improve safety along KY 54. The Metropolitan Planning Organization (MPO) for the City of Owensboro has included a similar project in their Transportation Improvement Plan (TIP), ID #GR-02-0012.

C. System Linkage

This segment of KY 54 connects the city of Owensboro to the community of Whitesville and other communities southeast of Owensboro (See ***Figure 2*** and Exhibit 3 in **Appendix A**).

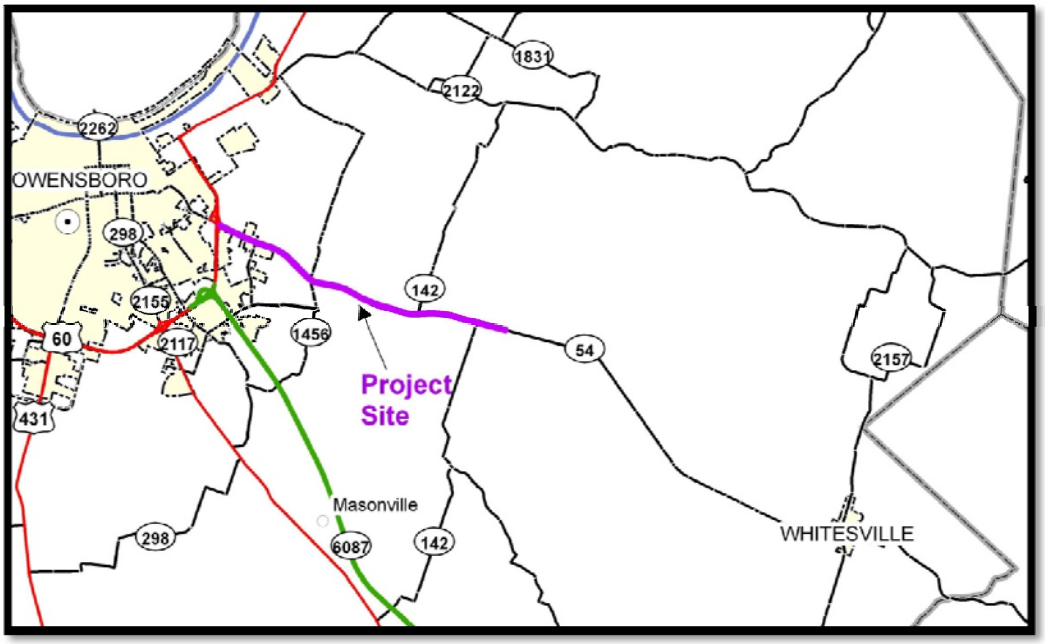

Figure 2: System Linkage Map

KY 54 has the following roadway classifications:

	Sections 1 & 2	Section 3
Functional Classification	Urban Principal Arterial	Urban Minor Arterial
State System	State Primary	State Secondary
National Truck Network	No	No
Truck Weight Class	AAA	AAA
Type of Access	By Permit	By Permit

D. Modal Interrelationships

Sections of KY 54 are included as part of bike routes in Kentucky. Section 1 of KY 54 is part of the Ramblin' River Tour, and Sections 1 and 2 are part of the Underground Railroad Tour. In addition, the Owensboro Transit System has a route on Section 1 of KY 54. Refer to Figure 1 for KY 54 section locations.

E. Social Demands & Economic Development

Most of the recent growth in Owensboro has been on this corridor. Section 1 has seen significant growth with several commercial and retail developments. It is expected that

development in the study area will continue. There are also two elementary schools along this route, and a new hospital is under construction north of the route near the US 60 extension which may attract additional traffic.

F. Transportation Demand

KY 54 within the project limits contains four different traffic counting sections. The first is Section 1 from MP 2.62 to MP 3.318. The second is Section 2 from MP 3.318 to MP 4.505. The third traffic counting section is part of Section 3 from MP 4.505 to MP 6.447, and is referred to as Section 3a on the ***Figure 3*** below. The last section is from MP 6.447 to MP 11.591, and is referred to as Section 3b on the ***Figure 3*** below. ***Figure 3*** displays historic traffic counts for each of these sections.

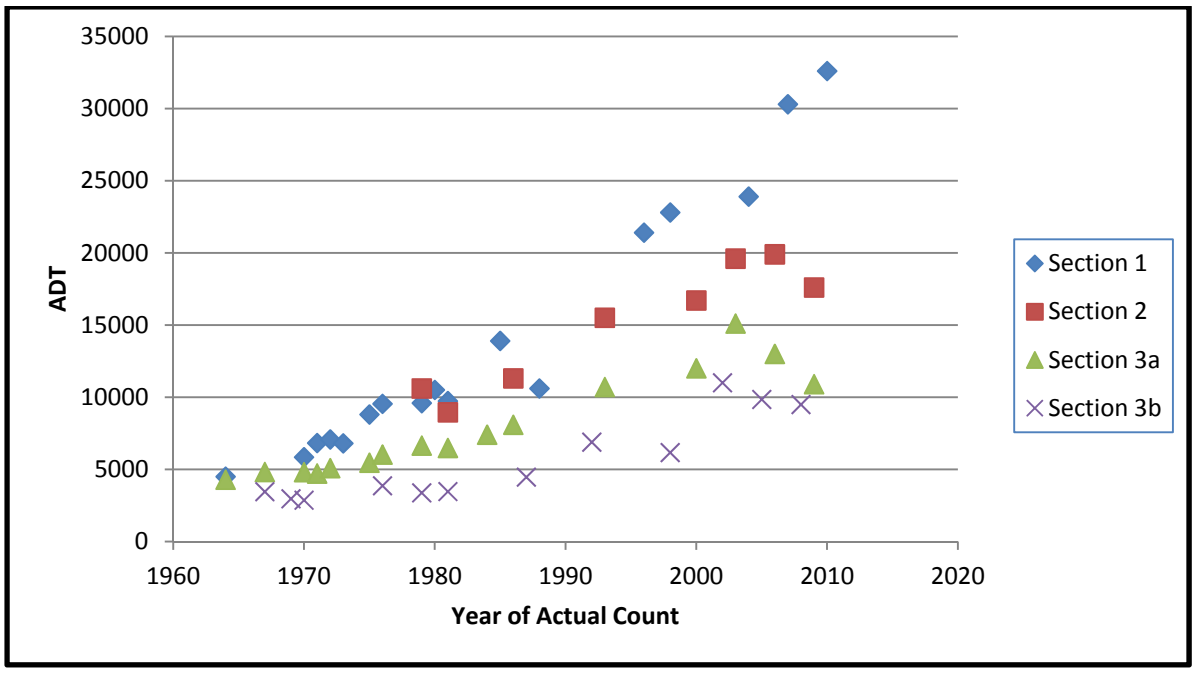

Figure 3: Historic Traffic Counts on KY 54

The last actual traffic counts for these sections are:

- Section 1 – 32,600 in 2010
- Section 2 – 17,600 in 2009
- Section 3a – 10,900 in 2009
- Section 3b – 9,490 in 2008

It can be seen in ***Figure 3*** that traffic has declined in the past few years for all the sections except Section 1 which has experienced a noticeable increase. There was a drop in ADT for what is referenced as Section 2 which also has a 5-lane typical section. This decrease in ADT may be due to the opening of a back way into Wal-Mart for local residents. Sections 3a and 3b have also experienced a recent decline in ADT.

G. Capacity

There is congestion in the area of the five-lane section of KY 54 near the bypass especially near Highland Elementary School. When school is in session, the traffic back-up from the school reduces the roadway to one through lane. In the past, the ramp backed up to US 60 (formerly US 60 Bypass) during school time. A traffic detecting loop was put in place to give added green time to the signal in the afternoons to eliminate back-ups onto US 60.

Given the recent traffic counts, the capacity of the existing two-lane roadway, Section 3, may become an issue in the future. The potential for development on KY 54 could impact the capacity of the roadway.

H. Safety

Collision data was obtained from the Kentucky State Police database for a three year period from January 1, 2008 to December 31, 2010 for the project limits on KY 54. ***Figure 4*** displays the location of the collisions along the 5-lane segment (Sections 1 & 2) and their manner of collision.

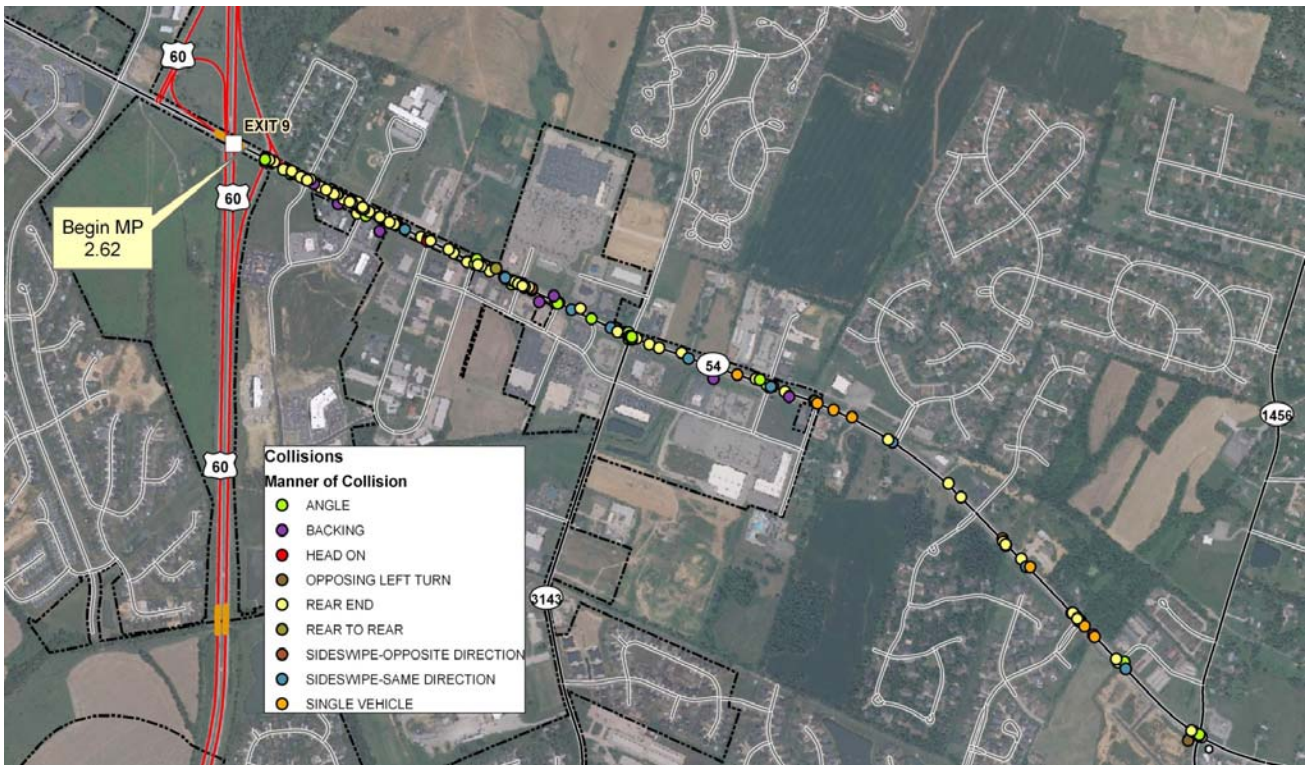

Figure 4: Collision Locations Sections 1 & 2

The following is a summary of the collisions for Sections 1 & 2 during the analysis period:

- 1 fatality
- 35 Injury collisions
- 244 Total collisions
- Section 1 CRF = 1.10
- Section 2 CRF = 0.54

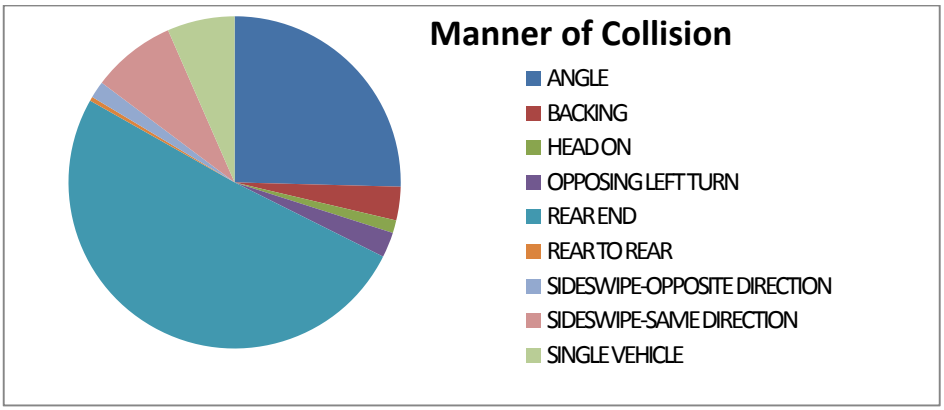

Figure 5: Manner of Collisions, Sections 1 & 2

Approximately half of the reported collisions were rear ends, and one-fourth were angle collision with the majority occurring at the more congested, western end of the project.

Figure 6 displays the location of the collisions along the 2-lane segment (Section 3) and their manner.

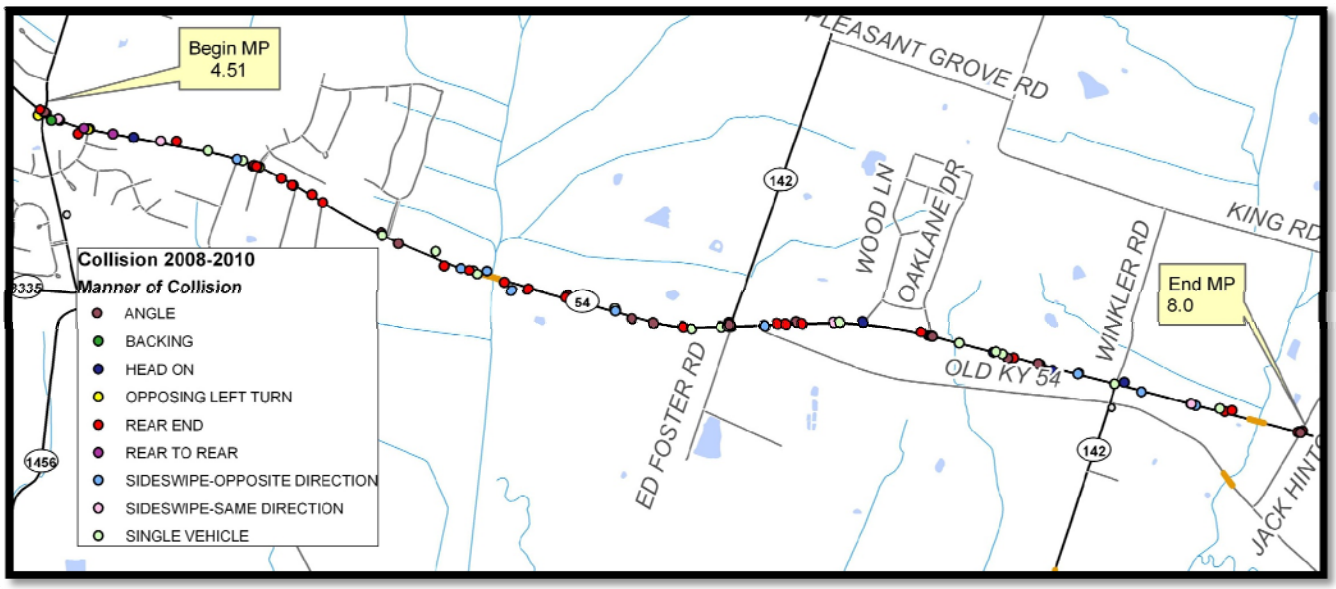

Figure 6: Collision Locations Section 3

The following is a summary of the collisions for Section 3 during the analysis period:

- 0 fatalities
- 29 Injury collisions
- 96 Total collisions
- Section CRF = 0.55

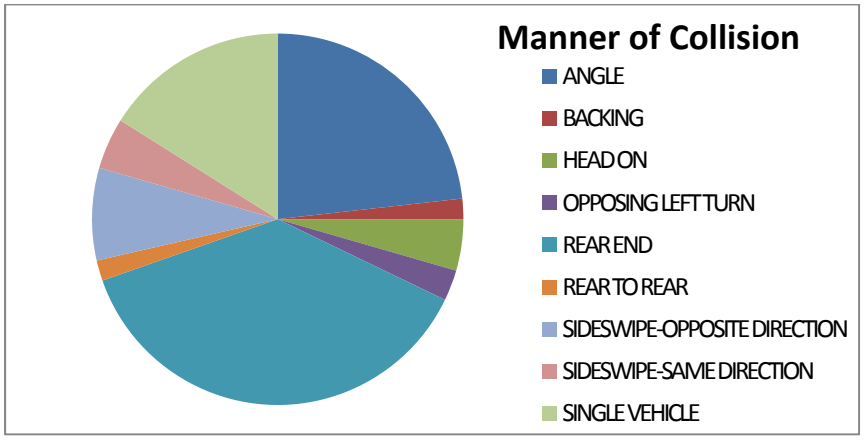

Figure 7: Manner of Collisions, Section 3

Although there was some clustering of the collisions in the location of intersections, the collisions on Section 3 were scattered throughout the corridor. No night/day or weather pattern could be determined. Most of the collisions were rear ends, single vehicle, and angle collisions.

The Critical Rate Factor (CRF) is the ratio of the actual crash rate on a segment of highway for a given time period as compared to the average crash rate of other similar roads in Kentucky. A CRF greater than 1.00 indicates the segment of roadway may have a statistically significant number of crashes. Section 1 has a CRF slightly higher than 1.0. The CRF for Sections 2 and 3 is 0.54 and 0.55, respectively. More detailed collision data can be viewed in **Appendix C**.

I. Roadway Deficiencies

a. Mainline Geometrics

Sections 1 and 2 were recently reconstructed as an urban section with four 12-ft lanes, a center turn lane, curb and gutter, and sidewalks. These sections meet KYTC's Common Geometric Practices for Urban Arterials. There are several signalized and non-signalized intersections and access points throughout the section. A summary of existing conditions can be viewed in ***Table 1***.

Section 3 was built in the 1950s, and currently has a rural template with 11-ft lanes and 2-ft shoulders. This section is currently classified as an Urban Minor Arterial. KYTC's Common Geometric Practices for Urban Arterial Streets (see **Appendix D**) recommends 12-ft lanes with curb and gutter and sidewalk. The existing alignment is within the minimum criteria for horizontal curvature and grade. There are several access points throughout the route. A summary of existing conditions can be viewed in ***Table 2***.

None of the sections appear to have significant drainage problems. FIRM maps of the area can be viewed in **Appendix E**.

Pictures for each section can be viewed in **Appendix F**. The plan sheets for the existing roadway can be viewed in **Appendix G**.

b. Bridges

There are two bridges located within the project limits, Bridge #0310B00017N over Barnett Creek and Bridge #030B00018N over Caney Creek. Neither of these are structurally deficient with Sufficiency Ratings of 66 for each bridge. The bridges are currently only wide enough to provide two lanes of traffic with roadway widths of 25.9-ft and 27.9-ft. They are also considered functionally obsolete due to substandard bridge rails. Additional information can be viewed in the Structure Inventory and Appraisal Sheets located in **Appendix H** and in **Table 2**.

Table 1: Existing Conditions and Data Summary – Sections 1 & 2

County:	Daviess		
Route Number(s):	KY 54	Road Name:	Owensboro – Whitesville Road
Item No.:	02-8300.00		
BMP:	2.62	EMP:	4.5
Segment Length:	1.88 miles		
Rdwy. Class.:	Urban Principal Arterial	State Class.:	State Primary
Truck Class:	AAA		
ADT (current):	Sect 1-32,615, Sect 2-17,200		
Terrain:	Flat, Rolling	Access Control:	By Permit
Posted Speed:	45-55 MPH	Median Type:	TWLTL
Funding Type:	D-SPP, R-SP, U-SP		

Roadway Data:

	Existing Conditions	Design Criteria
No. of Lanes	4	Min. 2
Lane Width	12 ft	Min. 11 ft
Shoulder Width	Curbed	Curbed
Minimum Radius	1909.88 ft	1060 ft*
Maximum Grade	3%	6%
Sidewalk	4 ft	Min. 4 ft
Adequacy Rtg %:	Sect 1 - 47th Sect 2 – 84th	

** From AASHTO's Policy on Geometric Design of Highway and Street, Ex. 3-15, 55 MPH Design Speed, 6% eMax*

Table 2: Existing Conditions and Data Summary – Section 3

County:	Daviess		
Route Number(s):	KY 54	Road Name:	Owensboro – Whitesville Road
Item No.:	02-8300.00		
BMP:	4.5	EMP:	8
Project Length:	3.5 miles		
Rdwy. Class.:	Urban Minor Arterial	State Class.:	State Secondary
Truck Class:	AAA		
ADT (current):	10,200-12,100		
Terrain:	Rolling	Access Control:	By Permit
Posted Speed:	45-55 MPH	Median Type:	Undivided
Funding Type:	D-SPP, R-SP, U-SP		

Roadway Data:

	Existing Conditions	Design Criteria
No. of Lanes	2	2
Lane Width	11 ft	11 ft
Shoulder Width	2 ft	Curbed
Minimum Radius	2865 ft	960 ft*
Maximum Grade	4%	6%
		** From AASHTO's Policy on Geometric Design of Highway and Street, Ex. 3-15, 55 MPH Design Speed, 8% eMax*
Adequacy Rtg %:	95th	

Bridge Data:	030B00017N	030B00018N
Max. Span Length	29.9 ft	24.9 ft
Length	99.1 ft	84 ft
Width, out to out	31.0 ft	33.5 ft
Width, curb to curb	25.9 ft	27.9 ft
Sufficiency Rating	66	66
Year Built	1954	1960

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

Currently this project is listed as being state funded, therefore, not requiring an Environmental Document. Since there are potentially two (2) stream crossings, Burnett Creek and Caney Creek, involved the likelihood of an Army Corps of Engineers (USACE) permit exists. If a permit is required, then an environmental document will be necessary.

A. Air Quality

Daviess County is currently in attainment for all monitored air pollutants.

B. Archaeology

All additional right of way or permanent easement will require a Phase I archaeology survey.

C. Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS) has identified the known and potential presence of threatened and endangered species in Daviess County (**Table 3**). During a site visit on February 17, 2011, potential habitat was observed for the bat species and several of the mussel species. A biological assessment should be completed prior to construction to assess the potential impact to threatened and endangered species.

Table 3 – USFWS listing of Threatened and Endangered Species in Daviess County

Group	Species	Common Name	Legal Status	Known Potential
Mammals	*Myotis sodalis*	Indiana bat	E	K
Mussels	*Plethobasus cooperianus*	orangefoot pimpleback	E	P
	Plethobasus cyphyus	sheepnose	E	P
	Pleurobema clava	clubshell	E	P
	Pleurobema plenum	rough pigtoe	E	P
	Potamilus capax	fat pocketbook	E	P
	Cyprogenia stegaria	fanshell	E	P
	Lampsilis abrupta	pink mucket	E	P

C. Hazardous Materials

During the February 17, 2011 site visit the presence of two (2) gasoline stations were noted on the potential project. Franey's Shell station is located at the intersection of KY 1456 & KY 54. A Kangaroo station is located near the intersection of Old KY 54 & KY 54. If any right of way or permanent easement is required from either station, then a Phase II Hazardous Material investigation would be required to rule out the possibility of any Underground Storage Tank (UST) leakage. If the two bridges are to be replaced on the project, then they should be tested for asbestos mastic prior to demolition.

E. Historic Resources

There were several homes noted on the project that were 50 years old or older. A thorough assessment of local residences would be required to gauge their eligibility for listing on the National Register of Historic Places. An example of the structures observed is noted below in ***Figure 8***.

Figure 8: Property Potentially Eligible for the National Register of Historic Places

F. Permitting

Any impacts below the ordinary highwater mark within either Burnett Creek or Caney Creek will need a USACE 404 Permit.

G. Noise

The scope of the project should not require additional noise analyses.

H. Socioeconomic

Socioeconomic impacts should not be an issue on this project.

I. Section 4(f) Resources

If either the archaeology sites or residences located nearby are ruled eligible for the National Register of Historic Places they could also be afforded protection under Section 4(f). KYTC has options to mitigate and avoid impacts to Section 4 (f) resources including a Programmatic Agreement for mitigating historic properties, using 'de minimus' guidance for minor strip takings.

J. Section 6(f) Resources

No potential Section 6(f) resources were observed on this potential project.

IV. PRELIMINARY PROJECT INFORMATION

A. Utilities

A summary of the utility contacts in the project area is below.

Big Rivers Electric Dale Rector 270-827-2561	OMU Electric Dale Harris 270-926-3200
Kentucky Utilities Terry Moore 270-383-6000	Time Warner Cable Brent Rafferty 270-222-0861
RWRA (Sewer) Dean Behnke 270-687-5450	Atmos Energy Jim Capps 270-685-8103
AT&T Larry Crabtree 270-685-7609	KDL Communications Jesse Chapman 812-759-7955
South East Daviess County Water Perry Higdon 270-685-5594	OMU water Matt Alvey 270-926-3200
City Of Whitesville Water Kevin Merritt 270-233-5666	

A preliminary sketch of the approximate location of some of the utilities in the project area can be viewed in ***Figure 9***. This information was obtained from GIS databases. The location of utilities will need to be verified as the project survey is completed in Phase I Design.

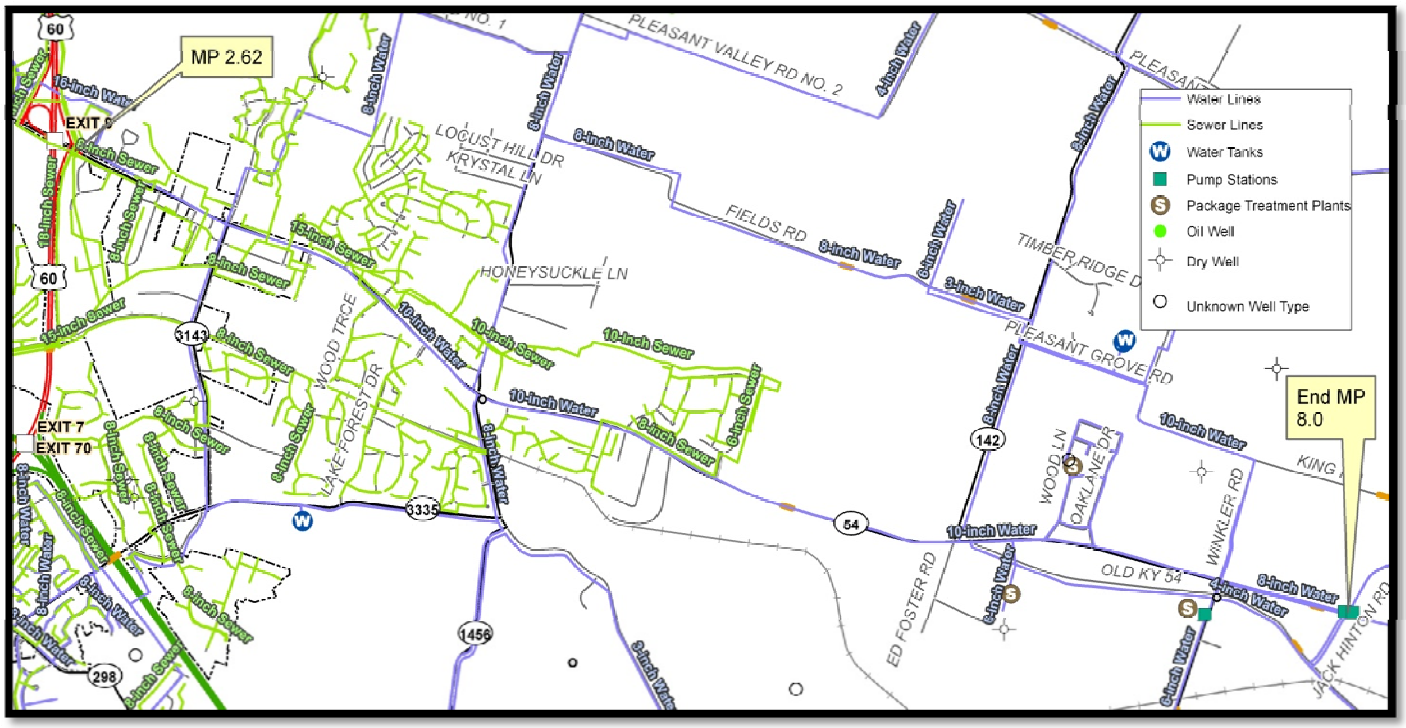

Figure 9: Utility Locations

B. Agency Coordination

The Project Team met on April 18, 2011 to review and discuss the project and the DNA study. Existing conditions information, future development, and current work on the ramps with US 60 were discussed. Some alternatives were also discussed. The minutes of this meeting can be reviewed in **Appendix I**.

V. PROJECT PURPOSE AND NEED STATEMENT

A Purpose and Need Statement is the foundation for project decision-making and is needed for projects requiring NEPA documentation. Based upon the information presented in Section II of this report and discussion of the project team, the following Purpose and Need Statement was drafted for this project:

KY 54 near the interchange with US 60 is congested during peak traffic periods. Growth along this corridor is expected to continue. There are also collision patterns at intersections

with KY 54 and a high CRF on the more developed section of KY 54. KY 54 connects the communities of Whitesville and Owensboro. **The purpose of this study is to address the congestion of KY 54 during peak periods and to improve the safety, mobility, and connectivity between Owensboro and Whitesville.**

VI. POSSIBLE ALTERNATIVES

The following are the alternatives analyzed and discussed during the development of this study.

A. Alternative #1 - No Build

This alternate does not adequately address the purpose and need for the project.

B. Alternative #2 – Widen KY 54

Widen KY 54 from 5 lanes to 7 lanes from MP 2.62 to MP 3.318 (0.698 miles) using an urban template with 6 thru lanes, a middle turn lane, curb and gutter, and sidewalk to address the congestion issues in this section. Widen KY 54 from 2 lanes to 3 lanes from MP 4.505 to a logical stopping point considering the funding allocated for the project. If there is enough funding available, stopping at Countryside Drive where the school entrance is located (MP 5.485) should be considered. Past this intersection there is a significant length of roadway with no development. Also, stopping at this point would avoid the expense of widening or replacing the bridges located over Barnett Creek and Caney Creek located further down the corridor. The widening of approximately 0.98 miles would utilize an urban template with 2 thru lanes, a middle turning lane, curb and gutter and sidewalk.

Although the project was initially thought to include widening KY 54 from MP 4.505 to MP 8.0 (Section 3), it was determined that traffic volumes are decreasing on this section while increasing significantly from MP 2.62 to MP 3.318 (Section 1). Section 2 is not addressed in this alternative because the current 5-lane template adequately serves traffic volumes on this section. A sketch of the project limits for this alternative can be viewed in ***Figure 10***.

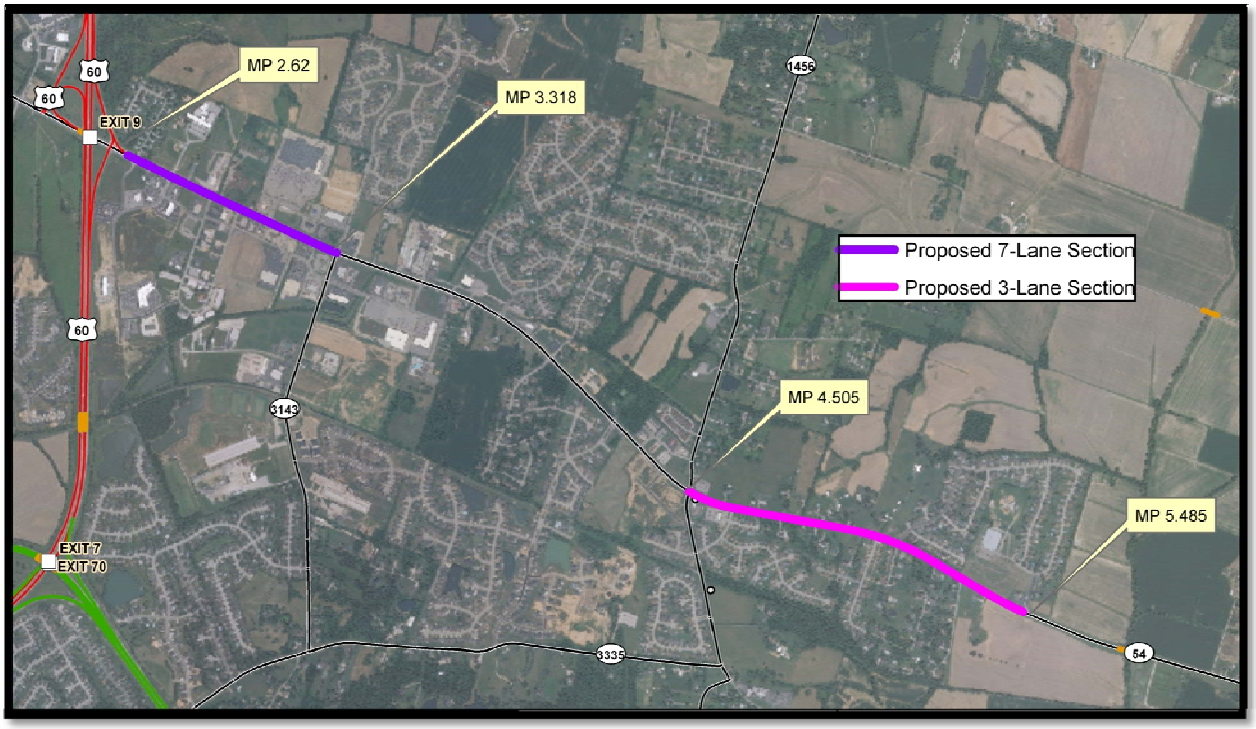

Figure 10: Alternative #2

C. Alternative #3 – Provide Turning Lanes on KY 54 for intersection with Stonegate Dr./Shell Dr. and Jack Hinton Rd.

There were clusters of collisions around some of the intersections on the 2-lane section of KY 54 that may be addressed by providing a turning lane to remove turning vehicles from mainline traffic. A left turn lane for Stonegate Drive and Jack Hinton Road could be considered. See the aerial of the intersections in ***Figures 11*** and ***12***. Jack Hinton currently has a caution light.

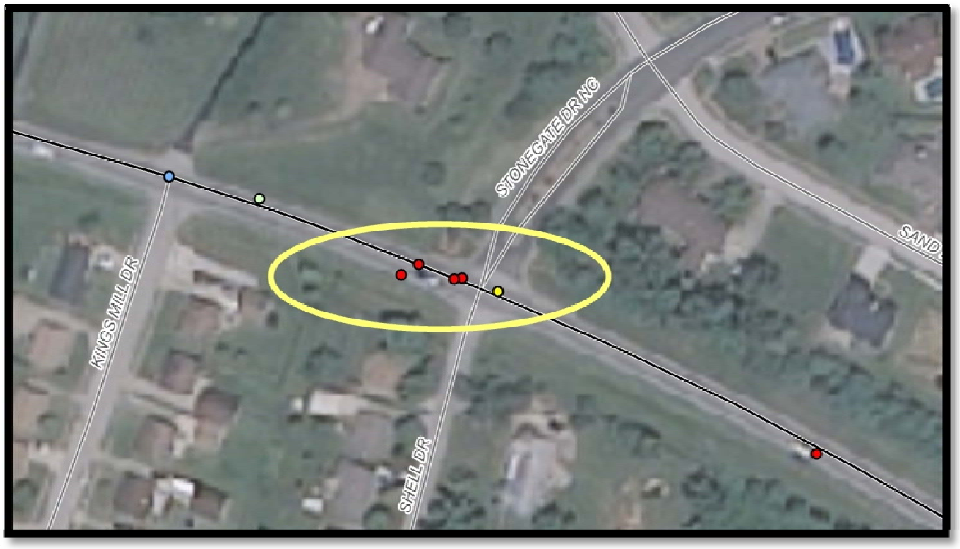

Figure 11: Possible Turning Lane Location

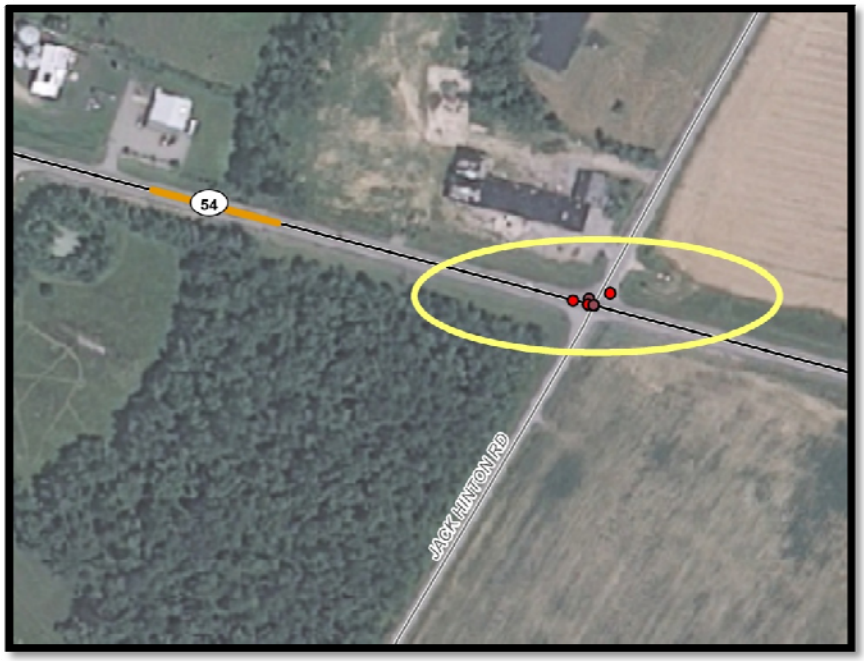

Figure 12: Possible Turning Lane Location

VII. SUMMARY

This study is a Data Needs Analysis (DNA) of a roadway project for the KY 54 corridor in Daviess County, Item Number 2-8300.00. Through analysis of the existing roadway

geometrics, crash data, site visits, and discussion with the project team, several needs were identified within the project limits. The following were identified as project needs:

- KY 54 near the interchange with US 60 is congested during peak traffic periods. Growth along this corridor is expected to continue.
- There are collision patterns at intersections with KY 54.
- KY 54 connects the communities of Whitesville and Owensboro

The purpose of this study is to address the congestion of KY 54 during peak periods and to improve the safety, mobility, and connectivity between Owensboro and Whitesville.

Included in the alternates were a no build recommendation, a widening alternative, and spot improvements for turn-lanes. After review of the data and discussion at the project team meeting it was determined that Alternative #2, widening of KY 54 from 5 to 7 lanes from MP 2.62 to MP 3.318, and from 2 to 3 lanes (urban template) from MP 4.505 to MP 5.485, would best address the purpose and need for the project. The following is the preliminary cost estimated for Alternative #2:

Phase	**Estimate**
Design	$2,820,000
Right of Way	$7,500,000
Utilities	$7,500,000
Construction	$15,990,000
Total	**$33,810,000**

This is a preliminary cost estimate and the construction estimate is based on cost per unit. The estimate is within the funding listed in the current Highway Plan (phases D, R, and U).