



2011

Pre-Design Scoping Study

Data

Needs

Analysis



KY 841/Stonestreet Road
Interchange

Mile Points:

BMP 2.7 to EMP 3.5

Item Number:

05-284.00

Prepared By:

Kentucky Transportation Cabinet

Department of Highways District 5

Division of Planning

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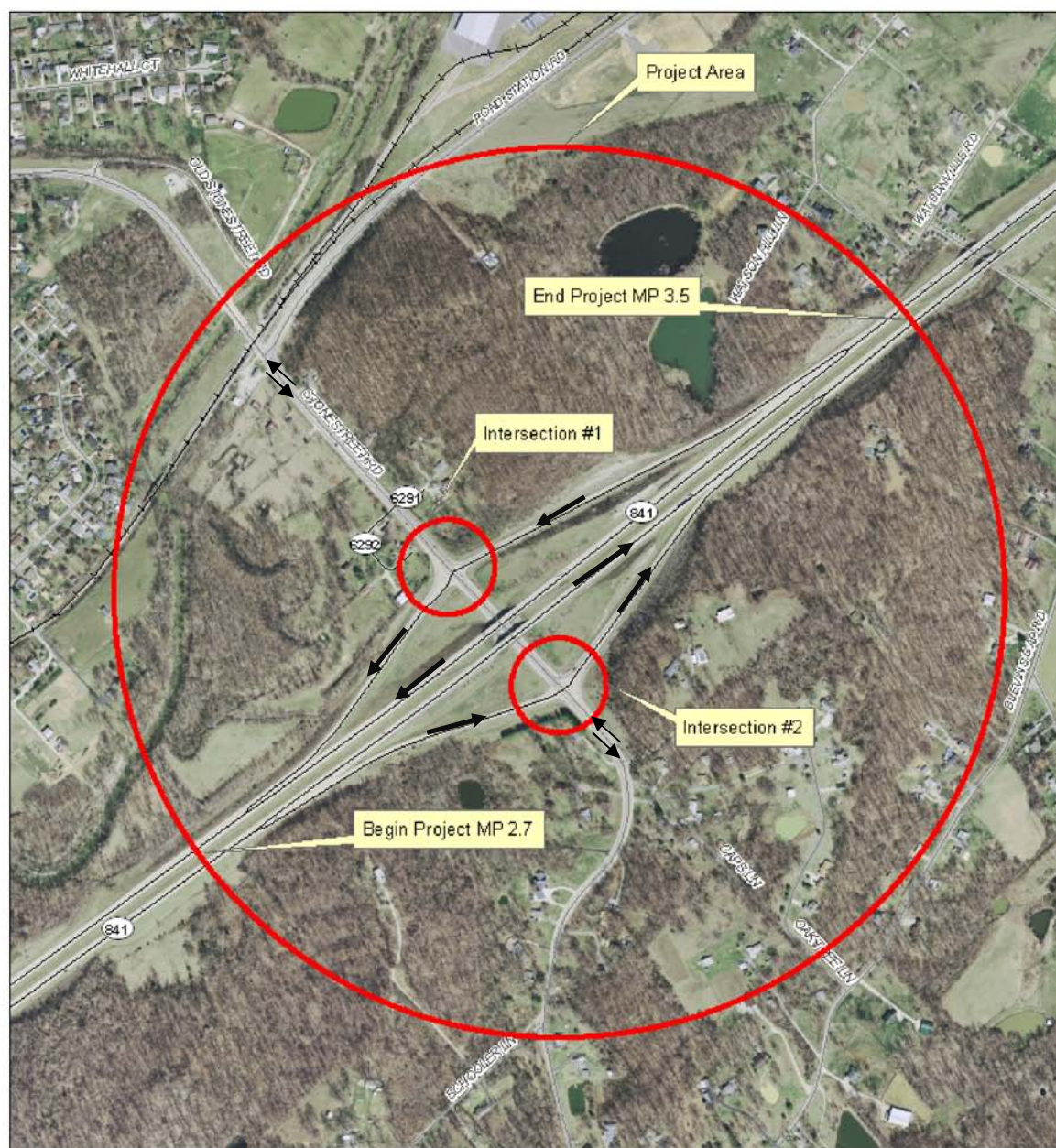
I. INTRODUCTION

A. Study Purpose

The purpose of the Data Needs Analysis (DNA) is to address the nine elements of Purpose and Need as defined by the National Environmental Policy Act (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 for the alternatives, an identification of possible environmental impacts, and other information that will be beneficial in the Project Development phase of this project.

B. Location

The project is located within the area between beginning mile point (BMP) 2.7 and ending mile point (EMP) 3.5 on KY 841 in southwestern Jefferson County. Stonestreet Road is located underneath KY 841 and runs to the north and south of KY 841. The interchange is located approximately between BMP 2.2 and EMP 2.7 on Stonestreet Road. There are ramps located to the north and south of KY 841 that connect KY 841 and Stone Street Road. A map detailing the project area can be seen below in Figure 1. Maps of the project area, including topographic and orthographic can be found in Appendix A.



KY 841/Stonestreet Road Interchange
Project Location



Jefferson County



0 235 470 940 1,410 Feet

Figure 1: Project Area

II. PROJECT PURPOSE AND NEED

A. Legislation

The following is a description of the project as it is listed in the Six Year Highway Plan:

• Item #05-284.00			
<u>Phase</u>	<u>Fund</u>	<u>Year</u>	<u>Estimate</u>
C:	STP	2010	360,000
Total:			360,000
IMPROVE KY 841/STONESTREET ROAD INTERCHANGE AS RECOMMENDED BY KIPDA'S INTERCHANGE STUDY			

Refer to Appendix B for the complete listing of the project in the Six Year Highway Plan. In addition, the project is listed in Kentuckiana Regional Planning and Development Agency's (KIPDA) Transportation Improvement Program (TIP). KIPDA is the local Metropolitan Planning Organization (MPO) for the area. The listing of the project in the TIP is contained in Appendix C.

B. Project Status

In 2005 the KIPDA Interchanges Study recommended that improvements be made to the KY 841/Stonestreet Road interchange. Furthermore, the project was added to the current long-range transportation plan in 2006 with an estimated completion date of 2012. This project is currently listed in 2010 Recommended Highway Plan and is listed as active on the Unscheduled Projects List (UPL). The Project Identification Form (PIF) for this project is located in Appendix D.

Other projects in the area that are currently on the Unscheduled Projects List (UPL) include:

- Widen KY 907 (Valley Station Road/3rd Street Road) from 2 to 5 lanes (5th lane will be a center turn lane) from US 31W (Dixie Highway) to KY 1865 (New Cut Road). To include accommodations for bicycle and pedestrian modes

C. System Linkage

The KY 841/Dixie Highway interchange is located approximately 3 miles to the west, and the KY 841/New Cut Road interchange is approximately 3 miles to the east of the KY 841/Stonestreet Road interchange (see Figure 2). The Stonestreet Road interchange provides an access point to the interstate system between the two other interchanges that are located in the area. The area to the north of KY 841 near the interchange contains Jewish Hospital Medical Center Southwest, Jefferson Community and Technical College

The map displays the project area in Jefferson County, Alabama, situated near the intersection of I-65 and I-264. A yellow rectangular area is labeled "Project Area", and a red circle is labeled "Interchange". The map includes major roads such as I-65, I-264, I-205, US-90, and US-123. It also shows the boundaries of Jefferson County and Bullitt County, and the locations of various creeks and runs, including Mill Creek, Back Pond Creek, Bear Creek, Sugar Creek, Knob Creek, and others. The map is oriented with North at the top.



Jefferson County

KY 841/Stonestreet Interchange
System Linkage Map



0 3,375 6,750 13,500 20,250 Feet

Figure 2: System Linkage

KY 841 in this section can be summarized by the following roadway classifications:

- Functional Classification – Urban Freeways and Expressways
- State System – State Primary
- Truck Weight Classification – AAA
- Is on the National Highway System
- Is on the National Truck Network
- Not a designated Bike Route

Stonestreet Road in this section can be summarized by the following roadway classifications:

- Functional Classification – Urban Minor Arterial Street

D. Modal Interrelationships

To the west of the interchange on KY 841 the traffic is composed of 0.6% single trucks and 5.5% combination trucks (tractor trailers). To the east of the interchange on KY 841 the traffic is composed of 0.6% single trucks and 5.2% combination trucks (tractor trailers). Truck percentage data is not available for Stonestreet Road since it is a county road. However, judging by the truck percentage on KY 841, the amount of trucks on Stonestreet Road is likely minimal. In addition, there is a railroad located approximately 0.3 miles north of the interchange. This railroad has an at-grade crossing on Stonestreet Road. Traffic can back up to the interchange and ramps when the railroad crossing is being used by a train. This appears to be an issue to the operation of the interchange since the railroad crossing is sometimes used by trains during peak vehicular travel times.

Furthermore, there is a sidewalk located directly to the north of the interchange. Due to the lack of development to the south of the interchange it is unlikely that any pedestrian facilities would need to run south past the interchange. Bicycle facilities could potentially be placed to the north or south of the interchange. However, currently no bicycle facilities exist. Furthermore, the closest public transportation runs on KY 907 (3rd Street Road) which is approximately a mile north of the interchange.

E. Social Demands and Economic Development

The majority of the land near the interchange that is flat has already been developed. The topography to the south of the interchange and in the vicinity of the interchange is hilly and should limit future development. In addition, Jefferson Memorial Forest is located to the south of the interchange. The majority of the traffic at the interchange is generated from the north where numerous residential areas, commercial businesses, three schools, a community and technical college, and a hospital medical center are located. This area is already developed, but future developments could occur in the vicinity.

F. Transportation Demand

Traffic count data is contained in Appendix E. The last actual traffic count for KY 841 to the west of the project was 32,000 vehicles in 2007. For east of the project the last actual traffic count was 47,100 vehicles also in 2007. Figure 3 contains traffic count data for KY 841 to the west and east of the project. As can be seen from the figure below traffic has continued to increase on KY 841 on both sections. The trend line suggests that traffic will continue to increase on this stretch of KY 841. In addition, it appears that there are more vehicles on KY 841 to the east of the project. This indicates that more vehicles are taking the Stonestreet Road exit from the east on KY 841 (westbound exit), and more vehicles are heading eastbound on KY 841 from Stonestreet Road.

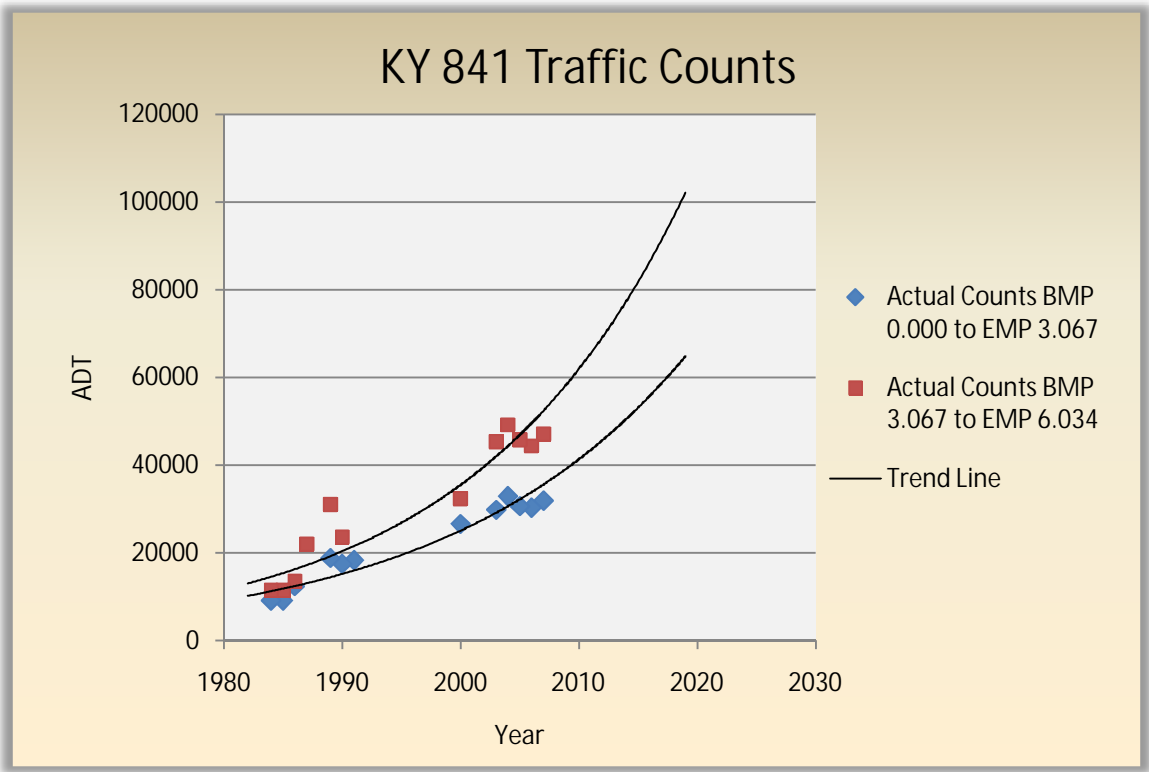


Figure 3: Traffic Count Data for KY 841

The last actual count for Stonestreet Road to the north of the project was 17,800 vehicles in 2009. For south of the project the last actual traffic count was 2,100 vehicles in 2008. Figure 4 contains traffic count data for Stonestreet Road to the north and south of the project. There is limited data available for Stonestreet Road, but it appears that traffic has increased drastically to the north of the KY 841 interchange. Traffic has stayed fairly consistent with a small increase to the south of the KY 841 interchange. The trend line suggests that this trend will continue in

the future. It is clear that the majority of the traffic traveling to and from KY 841 originates and ends to the north of the interchange.

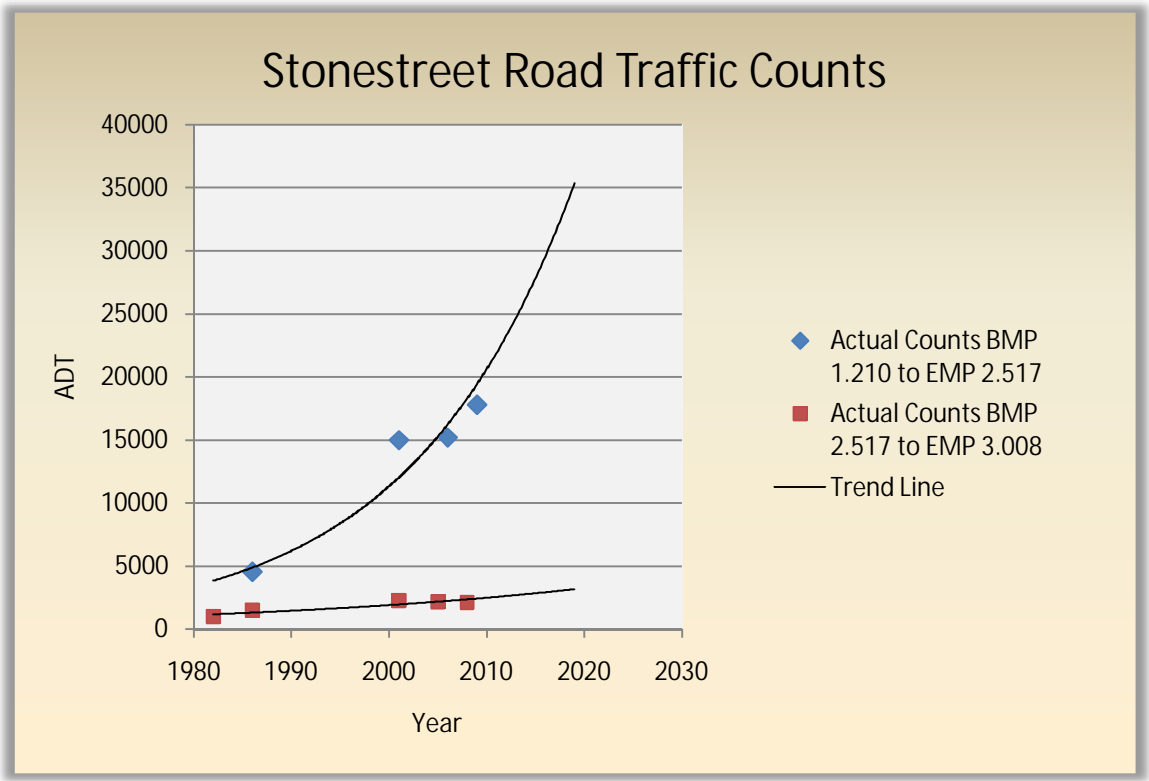


Figure 4: Traffic Count Data for Stonestreet Road

G. Capacity

The Volume/Service Flow ratio (V/SF) for KY 841 from BMP 0.000 to EMP 3.067 is 0.52. This portion of KY 841 is slightly worse than the average V/SF for the state but falls in the average for Jefferson County. The V/SF for KY 841 from BMP 3.067 to EMP 6.034 is 0.76. This portion of KY 841 is worse than the average for the state of Kentucky and slightly worse than the average for Jefferson County. Both sections of KY 841 could need additional lanes in the future if traffic continues to increase. This data was not available for Stonestreet Road since it is a county road.

H. Safety

Collision data was obtained from the KY State Police database of collisions from a time period of June 1, 2010 to June 1, 2011 for KY 841. In total there were 25 collisions that occurred on KY 841 between BMP 2.0 and EMP 4.5. These 25 collisions resulted in 1 fatality and 3 injuries. The critical rate factor for KY 841 from BMP 0.000 to EMP 3.067 is 0.385. The critical rate factor for KY 841 from BMP 3.067 to EMP 6.034 is 0.247. Both of these critical rate factors are on the low end. However, there does appear to be a higher frequency of collisions on KY 841 near the interchange ramps. This is due to traffic that is merging out onto KY 841 from the interchange and also traffic that is entering the interchange. There doesn't appear to be any safety improvements that can be made to the KY 841 part of the interchange. The suggested alternatives brought up by the KIPDA Interchanges Study and this study will have a greater impact on the safety of Stonestreet Road rather than KY 841.

On Stonestreet Road 35 collisions occurred within the three year time period of June 1, 2008 to June 1, 2011 between BMP 1.5 and EMP 3.0. A longer time period was analyzed for Stonestreet Road due to the smaller amount of vehicles that use the road as opposed to KY 841. These 35 collisions resulted in no fatalities and 20 injuries. The critical rate factor is not known for Stonestreet Road since it is a county road. Based on the data the highest frequency of collisions in the interchange area occurs near the KY 841 westbound ramps. This is likely due to the large number of vehicles that turn right onto Stonestreet Road from the KY 841 westbound to Stonestreet Road ramp. Figure 5 and Table 1 contains spot analysis data for this location. Detailed collision data for KY 841 and Stonestreet Road can be found in Appendix F.



Figure 5: Spot Analysis on Stonestreet Road for the KY 841 Westbound to Stonestreet Road Ramp

Table 1: Spot Analysis on Stonestreet Road for the KY 841 Westbound to Stonestreet Road Ramp

MILEPOINT DERIVED	MOTOR VEHICLES INVOLVED	INJURED	WEATHER	ROADWAY CONDITION	DIRECTIONAL ANALYSIS	MANNER OF COLLISION	ROADWAY CHARACTER	LIGHT CONDITION
2.289	2	0	CLEAR	DRY	REAR END IN TRAFFIC LANES BOTH VEHICLES MOVING	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.309	2	0	CLOUDY	DRY	OTHER ROADWAY OR MID-BLOCK COLLISION	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.328	2	0	CLEAR	DRY	REAR END IN TRAFFIC LANES BOTH VEHICLES MOVING	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.341	2	0	CLEAR	DRY	REAR END - ONE VEHICLE TURNING RIGHT	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.366	2	0	CLEAR	DRY	REAR END IN TRAFFIC LANES BOTH VEHICLES MOVING	REAR END	STRAIGHT & GRADE	DAYLIGHT
2.372	2	0	CLEAR	DRY	REAR END - OTHER	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.372	2	0	CLEAR	DRY	REAR END - OTHER	REAR END	STRAIGHT & LEVEL	DAYLIGHT
2.377	2	0	RAINING	WET	REAR END IN TRAFFIC LANES BOTH VEHICLES MOVING	REAR END	STRAIGHT & GRADE	DAYLIGHT
2.398	2	0	CLEAR	DRY	REAR END IN TRAFFIC LANES BOTH VEHICLES MOVING	REAR END	STRAIGHT & LEVEL	DAYLIGHT

I. Roadway/Interchange Deficiencies

The KY 841/Stonestreet Road interchange is a simple diamond without traffic signals. There are four ramps:

- KY 841 westbound to Stonestreet Road (Intersection 1)
- Stonestreet Road to KY 841 westbound (Intersection 1)
- KY 841 eastbound to Stonestreet Road (Intersection 2)
- Stonestreet Road to KY 841 eastbound (Intersection 2)

The KY 841 westbound to Stonestreet Road ramp has a total length of approximately 2000 feet or 0.4 miles and is 15 feet wide. The ramp is one lane until approximately the last 600 feet which splits into a right and left turn lane for traveling northbound or southbound on Stonestreet Road. 300 feet of this length is used a transition from a width of 15 feet to 24 feet. The last 300 feet contains 2 lanes and is 24 feet wide. The ramp flares at Stonestreet Road. Also this ramp contains a downgrade of 3.785%. Based on AASHTO guidelines and using a 65 mile per hour speed with a 3-4% downgrade the required deceleration lane length is approximately 700 feet. The ramp length meets the requirement and allows for some storage of vehicles on the ramp if needed (this is needed at times). Furthermore, the intersection is unsignalized. Both the right and left turns have a stop sign. Vehicles are

restricted from entering the Stonestreet Road to KY 841 westbound ramp. The majority of the traffic turns right at this intersection based on data from the 2005 KIPDA Interchanges Study (Appendix G). It is important to note that this study was done in 2005 and will need to be verified with current data before the project moves along. According to the study in the peak PM period the ramp exceeded the available storage due to the right turn movement and had a level of service (LOS) of F. The majority of the development in this area exists to the north of the interchange, so it makes sense that the right turn lane exceeds the available storage. The left turn movement had a minimal traffic volume, but a delay does exist due to waiting for a gap in the Stonestreet Road through traffic. This is due to the large volume of vehicles traveling past this intersection to make the left turn onto the KY 841 eastbound ramp.

Directly across from the KY 841 westbound to Stonestreet Road ramp is the Stonestreet Road to KY 841 westbound ramp. The total length of this ramp is approximately 1300 feet or 0.25 miles and is 15 feet wide. The beginning of the ramp is flared at Stonestreet Road. The first 600 feet of the ramp tapers down from a lane of 17 feet carrying the right turn movement and a lane of 18 feet carrying the left turn movement down to a single lane that is 15 feet wide. In addition, there is approximately 800 feet of taper length on KY 841 past the ramp. Also this ramp contains an upgrade of 3.8157%. Based on AASHTO guidelines and using a 65 mile per hour speed with a 3-4% upgrade the required acceleration lane length is approximately 2000 feet. The ramp length plus the taper length on KY 841 meets this requirement. Furthermore, there is a left turn lane on Stonestreet Road for traffic coming from the south to enter the ramp. This lane is approximately 175 feet long but a flush median occurs on this section of roadway allowing a longer queue length if needed. According to data from the 2005 KIPDA Interchanges Study the traffic volume turning both right and left on this ramp is minimal. There does not appear to be any problems with the operation of this ramp. See Figure 6 below for a detailed view of the 1st intersection.

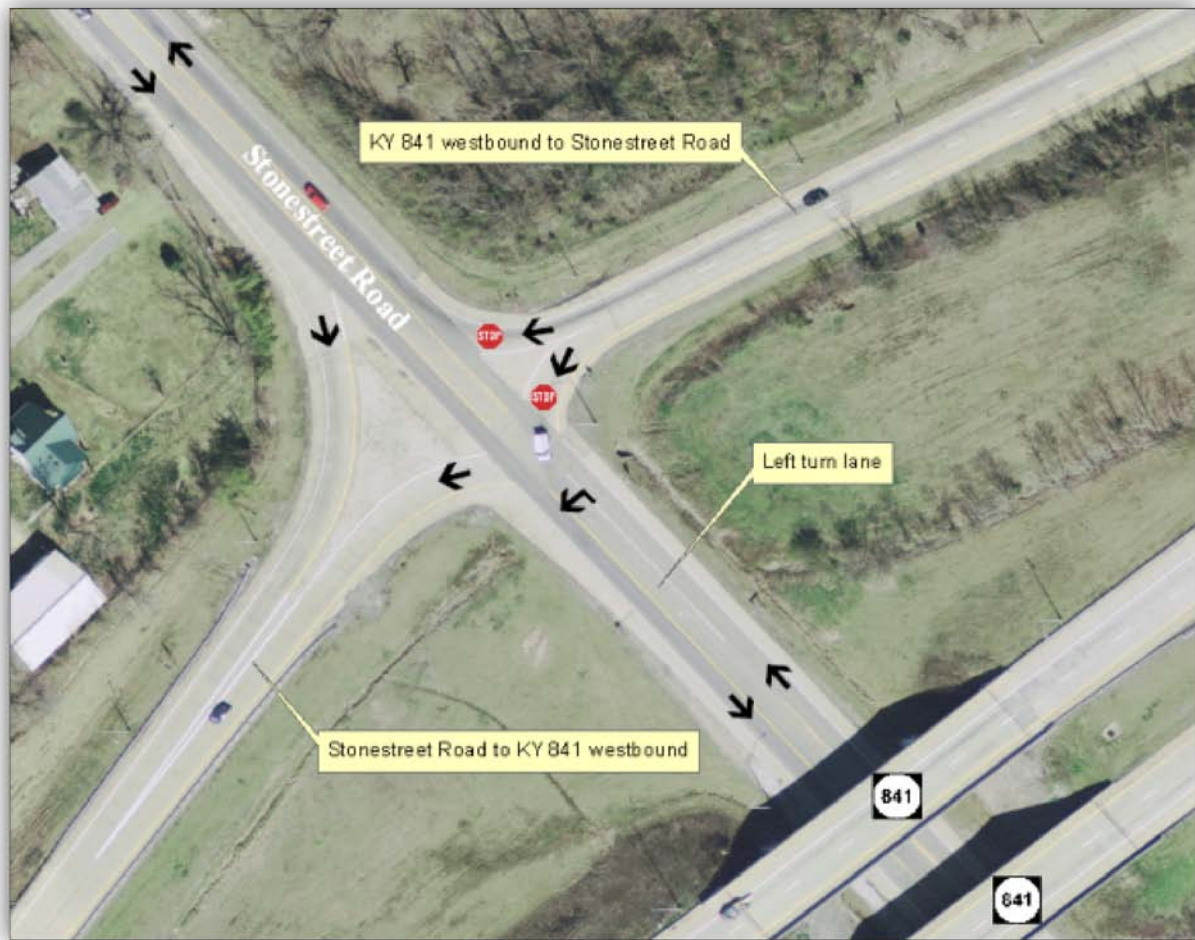


Figure 6: KY 841 Westbound Ramps (1st Intersection)

The KY 841 eastbound to Stonestreet Road ramp has a total length of approximately 1500 feet or 0.3 miles and is 15 feet wide. The ramp is one lane until approximately the last 300 feet which transitions from a width of 15 feet to 24 feet. The end of the ramp is flared at Stonestreet Road and contains room for a left and right turning vehicle. Also this ramp contains a grade of less than 2%. Based on AASHTO guidelines and using a 65 mile per hour speed with a grade of less than 2% the required deceleration lane length is approximately 600 feet. The 1500 feet is more than adequate and allows for some storage of vehicles on the ramp if needed. Furthermore, the intersection is unsignalized. Both the right and left turns have a stop sign. Vehicles are restricted from entering the Stonestreet Road to KY 841 eastbound ramp. According to data from the 2005 KIPDA Interchanges Study this ramp has the lowest traffic volumes out of the four ramps in this interchange. However, the level of service (LOS) was F for the left turn movement. This does not appear to be a major problem since no significant queues were noticed at the intersection during the study. This is likely

due to the low amount of vehicles using the ramp. There does not appear to be any other problems with the operation of this ramp.

Directly across from the KY 841 eastbound to Stonestreet Road ramp is the Stonestreet Road to KY 841 eastbound ramp. The total length of this ramp is approximately 1300 feet or 0.25 miles and is 15 feet wide. The beginning of the ramp is flared at Stonestreet Road. The first 600 feet of the ramp tapers down from a lane of 17 feet carrying the right turn movement and a lane of 18 feet carrying the left turn movement down to a single lane that is 15 feet wide. In addition, there is approximately 800 feet of taper length on KY 841 past the ramp. Also this ramp contains a grade of less than 2%. Based on AASHTO guidelines and using a 65 mile per hour speed with a grade less than 2% the required acceleration lane length is approximately 1400 feet. The ramp length plus the taper length on KY 841 meets this requirement. Furthermore, there is a left turn lane on Stonestreet Road for traffic coming from the north to enter the ramp. This lane is approximately 175 feet long but a flush median occurs on this section of roadway allowing a longer queue length if needed. According to data from the 2005 KIPDA Interchanges Study a large number of vehicles turn left onto the ramp and a small number turns right. Since there are few vehicles traveling through on Stonestreet Road to the south of the interchange, the vehicles turning left at the intersection do not appear to experience long delays or queues. There does not appear to be any problems with the operation of this ramp. See Figure 7 below for a detailed view of the 2nd intersection.



Figure 7: KY 841 Eastbound Ramps (2nd Intersection)

Within the project area KY 841 has 12 ft lanes, 7 ft (inner) and 10 ft (outer) shoulders, a 0.5-2.4 % grade, a posted speed limit of 65 MPH, and an Adequacy Rating of 80th – 90th percentile. AASHTO's minimum guidelines for freeways (see Appendix H) recommends 12 ft lanes, 4 ft (inner) and 10 ft (outer) shoulders, and a 50 MPH design speed. KY 841 meets these requirements.

Within the project area Stonestreet Road has 12 ft lanes, 8-9 ft shoulders in most areas (2 ft curb and gutter to the north of the interchange), a flush median (14 ft), and a posted speed limit of 35 MPH.

Both of the bridges that carry KY 841 traffic over Stonestreet Road are adequate. Bridge #056B00354R has a sufficiency rating of 98.4 and Bridge #056B00354L also has a sufficiency rating of 98.4. There does not appear to be any problems with the bridges.

A Flood Insurance Rate Map (FIRM) of the project area can be found in Appendix I. Flooding does not appear to be a problem in the interchange area.

III. DRAFT PROJECT PURPOSE AND NEED STATEMENT

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:

The purpose of this project is to improve traffic flow on the KY 841/Stonestreet Road interchange during peak travel times. This interchange provides an important link to the interstate system for residents of southwest Jefferson County.

IV. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Jefferson County is currently designated as a Nonattainment Area for the fine particulate ($PM_{2.5}$) standard and a Maintenance Area for the 8 hour-ozone standard. Improving this interchange should not further deteriorate the air quality in the area. In fact improving the interchange should help to maintain or improve the air quality in the area.

B. Archaeology

There are no known archaeological sites that would be affected by this project. An archaeology Phase I survey will need to be completed in order to rule out any impacts to archaeological sites.

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 Jefferson County, which can be viewed below in Table 2. In addition, Threatened and Endangered Species reports from the Kentucky Department of Fish and Wildlife Resources (KDFWR) and the Kentucky State Nature Preserves Commission (KSNPC) can be found in Appendix J.

Table 2: USFWS Threatened and Endangered Species in Jefferson County

Group	Species	Common name	Legal*	Known** Potential
Mammals	<i>Myotis grisescens</i>	gray bat	E	K
	<i>Myotis sodalis</i>	Indiana bat	E	K
Mussels	<i>Pleurobema clava</i>	clubshell	E	K
	<i>Cyprogenia stegaria</i>	fanshell	E	K
	<i>Potamilus capax</i>	fat pocketbook	E	K
	<i>Plethobasus cooperianus</i>	orangefoot pimpleback	E	K
	<i>Obovaria retusa</i>	ring pink	E	K
	<i>Lampsilis abrupta</i>	pink mucket	E	K
	<i>Plethobasus cyphyus</i>	sheepnose	C	P
	<i>Pleurobema plenum</i>	rough pigtoe	E	P
Plants	<i>Trifolium stoloniferum</i>	running buffalo clover	E	K
Birds	<i>Sterna antillarum</i>	interior least tern	E	K
Insects	<i>Nicrophorus americanus</i>	American burying beetle	E	historic
	<i>Pseudanopthalmus troglodytes</i>	Louisville cave beetle	C	K
* 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.				

D. Hazardous Materials

No properties appear to have a high probability for hazardous materials.

E. Historic Resources

A map detailing the historic resources in the area along with other environmental sites is included below in Figure 8. There does not appear to be any historic resources that would be affected by this project.

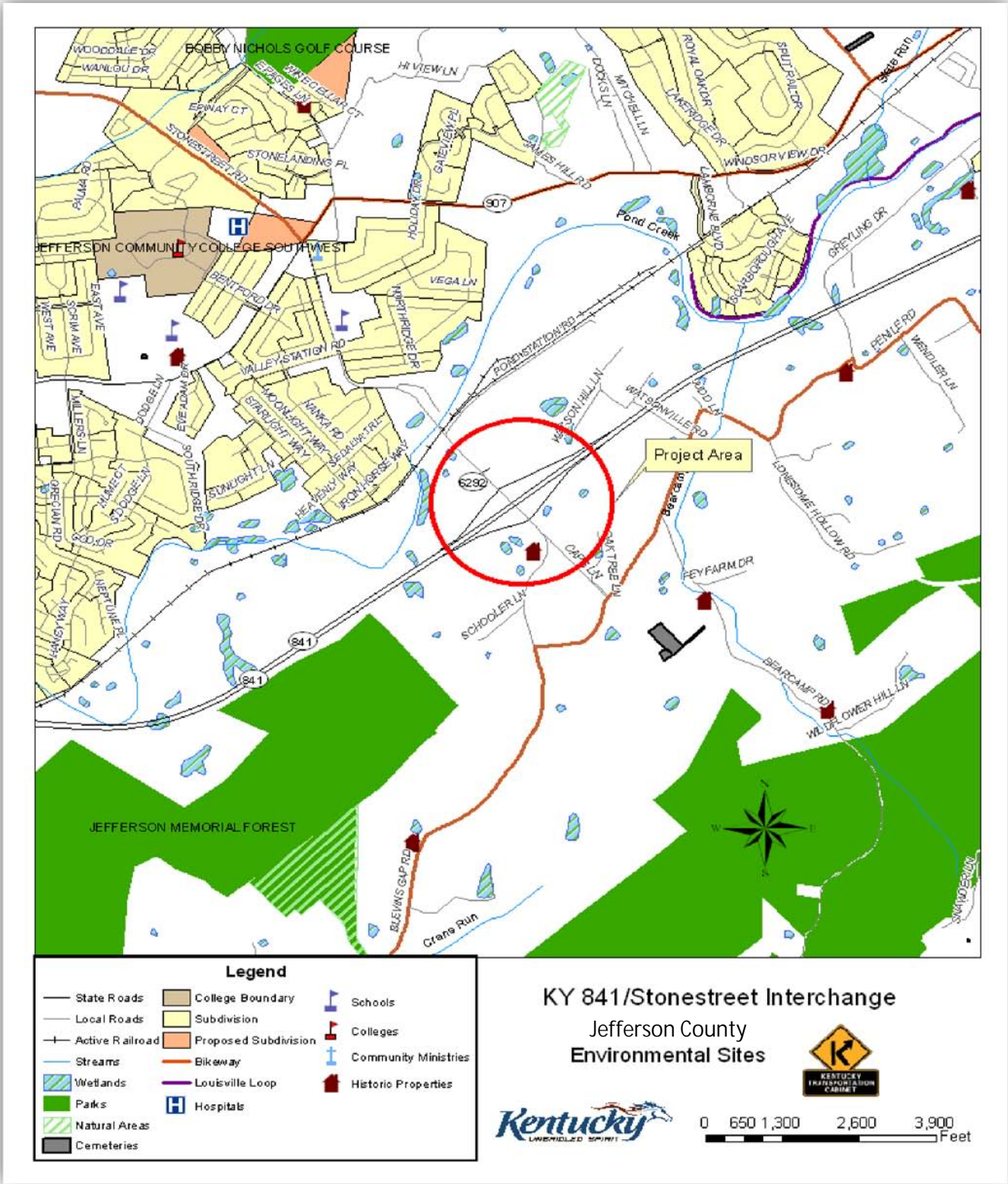


Figure 8: Environmental Sites

F. Permitting

While there are streams in the area, no streams should be affected by this project. If any impact below the ordinary high water mark does occur than a USACE 404 permit and potentially a Water Quality Certification from the Division of Water will be needed. Any permits will need to meet the general requirements since none of the streams in the area are considered special use.

G. Noise

The scope of the project should not require additional noise analysis. However, if additional lanes are added to the ramps or Stonestreet Road further noise analysis may need to be done. Noise due to construction and demolition will be temporary.

H. Socioeconomic

There should be no socioeconomic impacts associated with this project since any interchange improvements will improve access for all individuals equally. According to Census Data from 2000 three census tracts (120.03, 121.06, and 122.03) make up the project area. Figures 9 and 10 contain detailed information of the census tracts including minority population, population below the poverty line, and population over 65 years old. Based on the data for the three census tracts the minority population and population living below the poverty line are below the state and national averages. Census tract 122.03 has a slightly higher than average population over 65 years old compared to the state and national averages. The other two tracts are below the state and national averages for population over 65 years old.

Subject	Census Tract 120.03, Jefferson County, Kentucky		Census Tract 121.06, Jefferson County, Kentucky		Census Tract 122.03, Jefferson County, Kentucky	
	Number	Percent	Number	Percent	Number	Percent
Total population	4,190	100.0	6,526	100.0	5,748	100.0
SEX AND AGE						
Median age (years)	34.8	(X)	35.6	(X)	40.5	(X)
18 years and over	3,042	72.6	4,846	74.3	4,429	77.1
62 years and over	491	11.7	942	14.4	982	17.1
65 years and over	392	9.4	800	12.3	825	14.4
RACE						
One race	4,151	99.1	6,460	99.0	5,705	99.3
White	4,058	96.8	6,250	95.8	5,436	94.6
Black or African American	45	1.1	132	2.0	189	3.3
American Indian and Alaska Native	15	0.4	20	0.3	12	0.2
Asian	20	0.5	33	0.5	28	0.5
Native Hawaiian and Other Pacific Islander	0	0.0	2	0.0	10	0.2
Some other race	13	0.3	23	0.4	30	0.5
Two or more races	39	0.9	66	1.0	43	0.7
HISPANIC OR LATINO AND RACE						
Total population	4,190	100.0	6,526	100.0	5,748	100.0
Hispanic or Latino (of any race)	24	0.6	54	0.8	52	0.9

Figure 9: Census Information - Age and Race

Subject	Census Tract 120.03, Jefferson County, Kentucky		Census Tract 121.06, Jefferson County, Kentucky		Census Tract 122.03, Jefferson County, Kentucky	
	Number	Percent	Number	Percent	Number	Percent
POVERTY STATUS IN 1999 (below poverty level)						
Families	99	(X)	71	(X)	47	(X)
Percent below poverty level	(X)	8.4	(X)	3.8	(X)	2.8
Individuals	564	(X)	391	(X)	212	(X)
Percent below poverty level	(X)	13.6	(X)	6.0	(X)	3.8

Figure 10: Census Information - Poverty Level

I. Section 4(f) Resources

If residences or structures located nearby are ruled as eligible for the National Register of Historic Places they could also be afforded protection under Section 4(f). The Kentucky Transportation Cabinet (KYTC) has options to mitigate and avoid impacts to section 4(f) resources including a programmatic agreement for mitigating historic structures, or using 'de minimus' guidance for minor strip takings.

J. Section 6(f) Resources

Jefferson Memorial Forest is located near the project area and is likely protected under Section 6(f) of the Land Water Conservation Fund. However, none of these lands should be affected by any of the alternatives that are suggested in this study.

V. PRELIMINARY PROJECT INFORMATION

A. Existing Conditions/Roadway Data

Table 3: Existing Conditions and Data Summary			
County:	Jefferson	Route Number:	KY 841
Road Name:	Gene Snyder Freeway	Item No.:	05-284.00
BMP:	2.7	EMP:	3.5
Project Length:	0.8 miles	State Class:	Primary
Functional Class:	Urban Freeways and Expressways	Access Control:	Full
Truck Class:	AAA	Median Type:	Depressed
ADT(current):	32,000-47,100	Posted Speed:	65 MPH
Terrain:	Rolling	Funding Type:	STP
Roadway Data			
	<u>Existing Conditions</u>	<u>Design Criteria</u>	
No. of Lanes:	4	4	
Lane Width:	12 ft	12 ft	
Shoulder Width:	7 ft (inner) and 10 ft (outer)	4 ft (inner) and 10 ft (outer)	
Minimum Radius:	-	750 ft	
Maximum Grade:	-	5 %	
Adequacy Rating:	80 th – 90 th	-	
Bridge Data			
	<u>056B00354R</u>	<u>056B00354L</u>	
Type:	Stringer/Girder	Stringer/Girder	
Year Built:	1984	1984	
Skew:	4 degrees	4 degrees	
Max. Span Length:	101 ft (Stonestreet Road Under)	101 ft (Stonestreet Road Under)	
Length:	187 ft	187 ft	
Width, out to out:	43 ft	43 ft	
Width, curb to curb:	40 ft	40 ft	
Sufficiency Rating:	98.4	98.4	

Table 4: Existing Conditions – Stonestreet Road	
Route Number:	CR-1003L
Road Name:	Stonestreet Road
Functional Class:	Urban Minor Arterial Street
Median Type:	Left Turn Lane (14 ft)
ADT(current):	2,100-17,800
Posted Speed:	35 MPH
Terrain:	Rolling
No. of Lanes:	2
Lane Width:	12 ft
Shoulder Width:	8-9 ft (2 ft curb and gutter to the north of the interchange)

B. Right of Way

Figure 11 shows the 100 properties that are located closest to the interchange according to the Jefferson County Property Value Administrator (PVA). Plans for KY 841 and Stonestreet Road that contain right of way lines can be found in Appendix K. A limited amount of right of way if any should be purchased for this project to remain within budget.

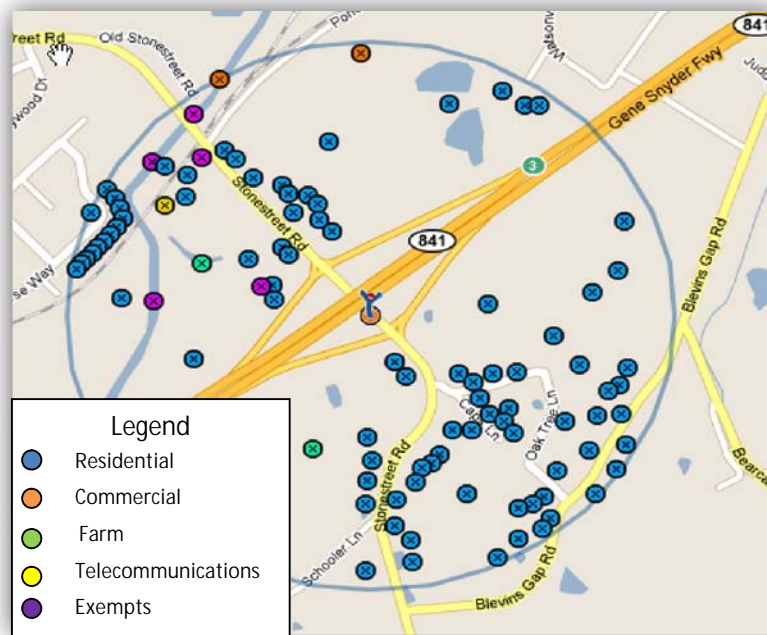


Figure 11: Jefferson County PVA Map

C. Utilities

A request has been sent out to the utility companies in the area to determine what utilities are located within the project area. A list of the contacts for the utility companies in Jefferson County can be found in Appendix L. A more in depth assessment of utilities in the area will need to be done as the project moves further along.

D. Agency Coordination

At this time the project team has not held an official meeting to discuss this project.

VI. POSSIBLE ALTERNATIVES

The following is a description of several of the alternatives (see Figures 12 and 13) analyzed and discussed during the development of this study and the 2005 KIPDA Interchanges Study. Table 5 contains preliminary cost estimates.

A. Alternative #1 – No Build

Before considering this option the design team will need to reevaluate the traffic data. The last data provided for the interchange was from the 2005 KIPDA Interchanges Study. That study will need to be verified and brought up to date with the current traffic levels at the interchange. If it is determined that the interchange is sufficient than the no build alternative is a feasible option.

B. Alternative #2 – Install a Traffic Signal at the KY 841 Westbound Intersection (1st Intersection)

The major issue at this intersection is the right turn movement (northbound on Stonestreet Road) from the KY 841 westbound to Stonestreet Road ramp. There is also a large amount of vehicles traveling through the intersection to reach the KY 841 eastbound ramp. Installing a traffic signal at this intersection would help alleviate some of the delays that occur and increase the level of service for those vehicles turning onto Stonestreet Road. However, it is more than likely that long queue lengths would still exist at this ramp. According to the signal warrant analysis from the 2005 KIPDA Interchanges Study a signal at this intersection would be warranted. Furthermore, installing the traffic signal will cause minimal impact to the surrounding area.

C. Alternative #3 – Install a Traffic Signal at the KY 841 Eastbound Intersection (2nd Intersection)

The majority of traffic at this intersection makes a left turn from Stonestreet Road to the KY 841 eastbound ramp. The traffic volume using the other ramps or traveling through the intersection is minor. However, vehicles turning left onto Stonestreet Road from the KY 841 eastbound ramp experiences delays. Installing a traffic signal at this intersection would help alleviate some of the delay that occurs and increase the level of service for those vehicles turning left onto Stonestreet Road. However, it is more than likely that the signal would increase the overall intersection delay. According to the signal warrant analysis from the 2005 KIPDA Interchanges Study a signal at this intersection would not be warranted. Furthermore, installing the traffic signal will cause minimal impact to the surrounding area.

D. Alternative #4 – Extend the Turn Lanes on the KY 841 Westbound to Stonestreet Road Ramp

This alternative directly addresses the issue with the KY 841 westbound to Stonestreet Road congestion. While this option would add additional queue length to the ramp it is unlikely to address the delay associated with this intersection. However, for those vehicles turning left it could decrease the delay since the queue for the right turn movement currently surpasses the available length. The additional length of the lanes could address this problem. For those vehicles turning right the delay would likely remain the same. There should not be any right of way required for this alternative.

E. Alternative #5 – Extend the Turn Lanes on the KY 841 Eastbound to Stonestreet Road Ramp

This alternative would add separate right and left turn lanes to allow for a longer queue for those vehicles turning left onto Stonestreet Road from this ramp. According to the 2005 KIPDA Interchanges Study the level of service for the left turn movement was F. While this could potentially help the vehicles turning right, few queues were observed and this would not address the delay associated with the left turn movement. There should not be any right of way required for this alternative.

F. Alternative #6 – Add an Auxiliary Lane for Vehicles Turning Right onto Stonestreet Road from the KY 841 Westbound to Stonestreet Road Ramp

This alternative directly addresses the issue with the KY 841 westbound to Stonestreet Road congestion. The right turn movement at this ramp carries a large amount of the traffic volume. Adding an auxiliary lane for vehicles headed northbound on Stonestreet Road shortens the delay associated with the right turn movement from the KY 841 westbound to

Stonestreet Road ramp. In addition, due to this the queue lengths should shorten allowing for the vehicles turning left at the intersection to do so without being held up by the vehicles turning right. The approximate length of the auxiliary lane is 600 ft. Existing right of way is limited along Stonestreet Road, but the majority of the auxiliary lane will need to be fit into the existing right of way to limit the amount of right of way needed for purchase.

G. Alternative #7 – Install a Warning Signal on KY 841 to Inform Traffic When the Railroad Crossing is Being Used by a Train

One of the issues with the operation of the interchange is the at-grade railroad crossing that is located approximately 0.3 miles to the north of interchange. It appears that this railroad crossing is sometimes used by trains during peak vehicular travel times. This results in traffic backing up to the interchange and ramps. Installing a warning device for traffic on KY 841 would deter vehicles from using this interchange if a train is using the railroad crossing. Traffic could instead use the KY 841/Dixie Highway Interchange, which is approximately 3 miles to the west. While this is still an inconvenience to vehicles needing to access the KY 841/Stonestreet Road Interchange, this alternative would likely reduce the travel time of many vehicles that could use alternate routes when the railroad crossing is being used by a train. The impact of this railroad on the interchange will need to be studied more in depth in the future to determine how much of an issue the railroad is to the operation of the interchange.

Table 5: Preliminary Cost Estimates					
Alternative	Design	Right of Way	Utilities	Construction	Total
2	\$10,000	-	-	\$50,000	\$60,000
3	\$10,000	-	-	\$50,000	\$60,000
4	\$50,000	-	\$50,000	\$200,000	\$300,000
5	\$50,000	-	\$50,000	\$200,000	\$300,000
6	\$75,000	\$50,000	\$50,000	\$300,000	\$475,000
7	\$25,000	-	-	\$125,000	\$150,000

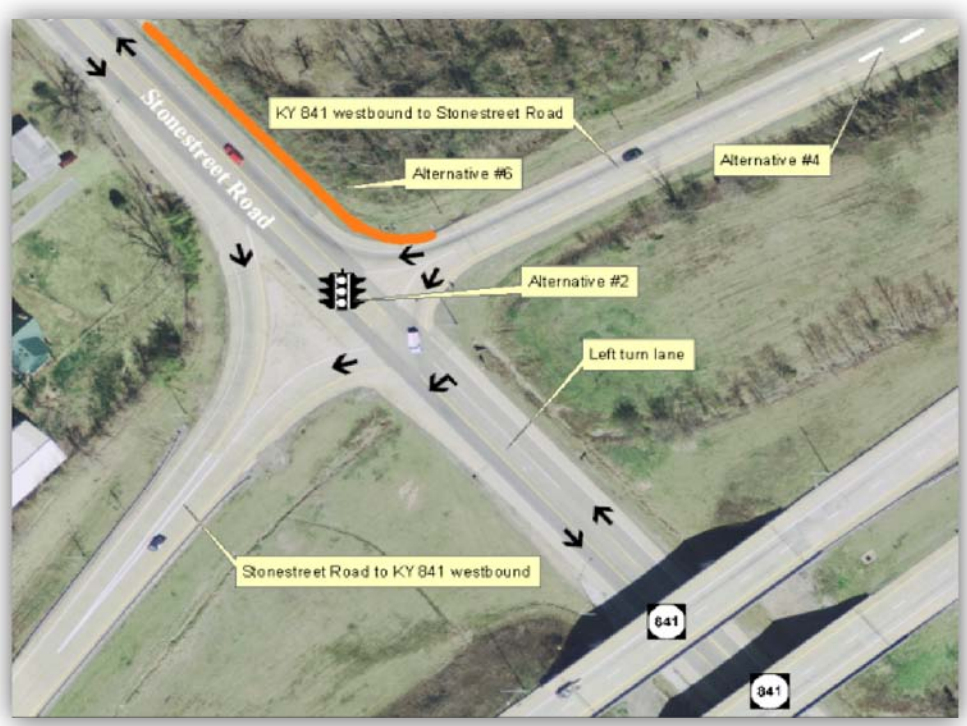


Figure 12: Alternatives on KY 841 Westbound Ramps (1st Intersection)

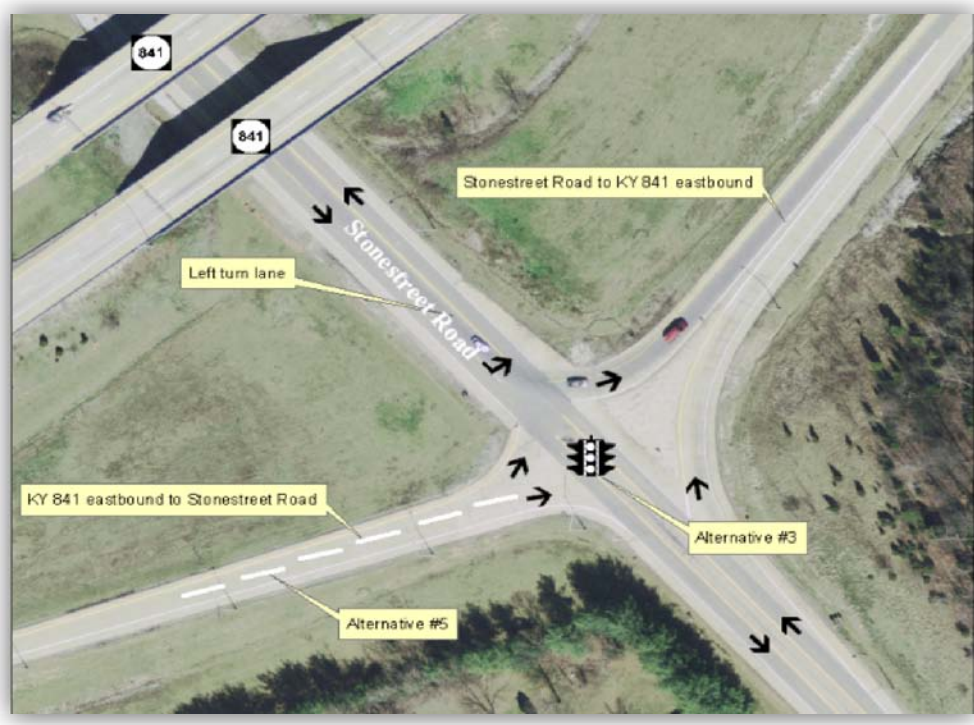


Figure 13: Alternatives on KY 841 Eastbound Ramps (2nd Intersection)

VII. SUMMARY

This study is a Data Needs Analysis (DNA) of the KY 841/Stonestreet Road interchange. The project area is located between BMP 2.7 and EMP 3.5 on KY 841 in southwestern Jefferson County. Through analysis of existing roadway geometrics, previous studies, crash data, site visits, and discussion with the project team the following needs were identified:

- Improvement of the KY 841/Stonestreet Road interchange

The purpose of this project is to improve traffic flow on the KY 841/Stonestreet Road interchange during peak travel times.

The 2005 KIPDA Interchanges Study recommended that an auxiliary lane be added for vehicles turning right onto Stonestreet Road from the KY 841 westbound ramp. Adding an auxiliary lane would be a feasible alternative to consider if it can be fit within a majority of the existing right of way. This is unless it is determined that the railroad crossing is the cause of the majority of the backups or if updated data does not determine a problem. In addition, installing a traffic signal is warranted for this intersection. However, the KIPDA study did not recommend doing this. This is likely due to the overall small amount of vehicles that use the intersection during the majority of the day. Furthermore, adding additional length to the right and left turn lanes for the KY 841 westbound to Stonestreet Road ramp could help the left turn movement by creating more storage for the right turn movement. However, this would do little to solve the delays associated with the right turn movement. This alternative is not recommended at this time. Installing a traffic signal at the other intersection (KY 841 eastbound to Stonestreet Road) is not warranted; therefore, is not recommended at this time due to the low traffic volumes. In addition, adding separate lanes for vehicles turning right or left onto Stonestreet Road is also not recommended because of the low traffic volumes.

It is recommended that an auxiliary lane for vehicles turning right onto Stonestreet Road from the KY 841 westbound ramp be built if it is verified that the interchange needs improved and that the railroad is not causing the majority of the problems. The next step that should be taken before design is to verify the data that was collected in the 2005 KIPDA Interchanges Study. Once this data is collected then it can be decided if the no build alternative, adding an auxiliary lane, or adding a warning device on KY 841 when the railroad crossing is being used by a train is the most feasible option. In addition, installing traffic signals should be reevaluated with the new data.

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