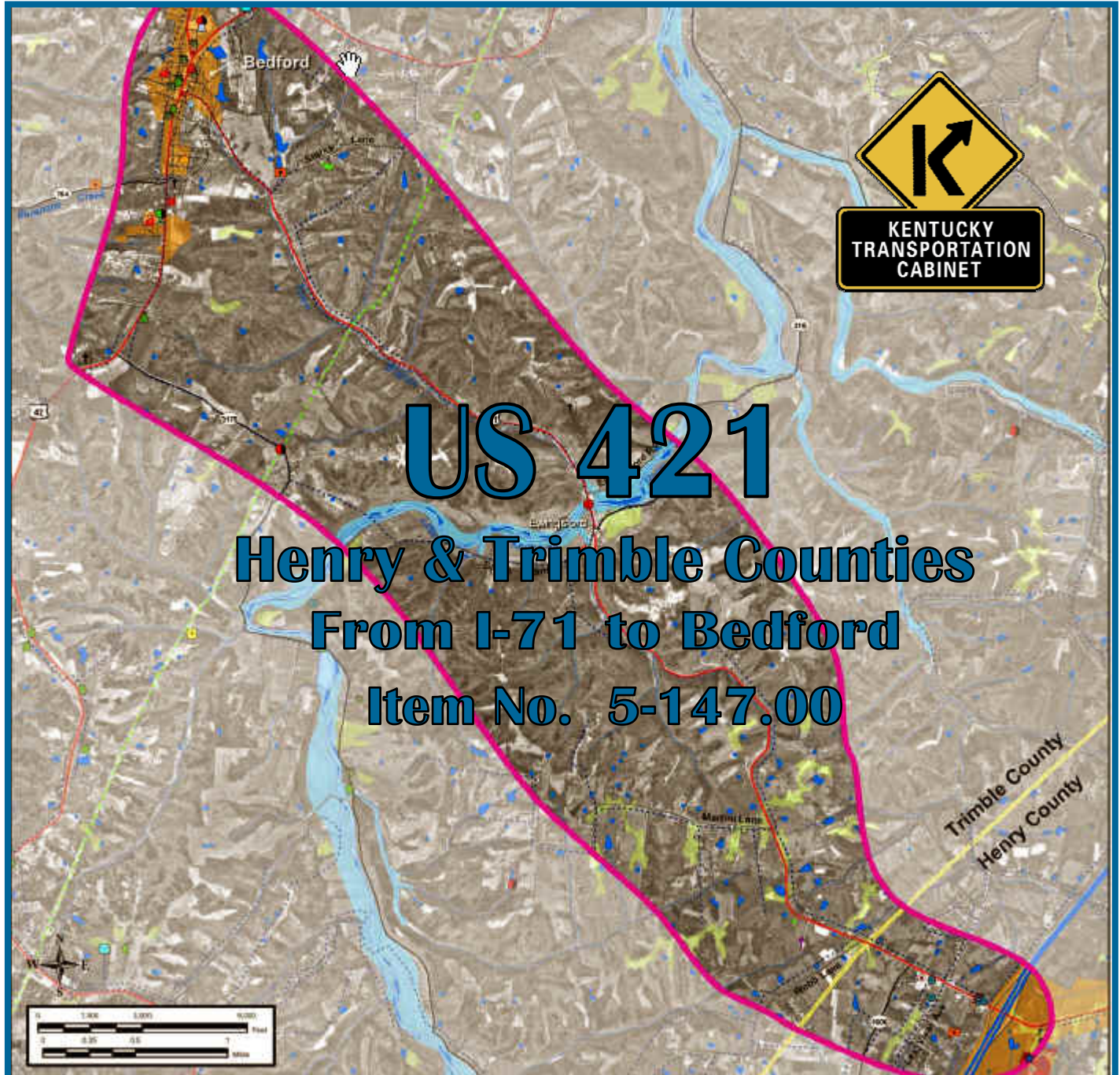


*FINAL REPORT*

# Alternatives Study



*Prepared by the  
Kentucky Transportation Cabinet  
Division of Planning  
April 2009*

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## 1.0 INTRODUCTION

### 1.1 Project Background

This project was noted as being the number 2 priority for the Kentuckiana Regional Planning and Development Agency (KIPDA) in 2003. Local officials initiated this project to promote access from Bedford to I-71, hoping to attract jobs to the county. Although the Milton/ Madison Bridge, north of the project, is in the current 2006 Six-Year Highway Plan (FY 2007-2012), it may have taken priority. The local officials have stated that traffic near the bridge has been steadily increasing due to industrial and factory-type movement across state lines.

### 1.2 Corridor Issues

US 421 is Bedford's most direct connection to the interstate and the most pressing problem on this section of roadway is improving its overall connection. The current roadway alignment has narrow lanes and shoulders as shown in the picture to the right. The most frequent crash type in the project area was a vehicle running off the road. Other issues with the existing route are curves and grades that do not meet current guidelines or provide adequate sight distance for on-coming vehicles or vehicles pulling into traffic from side roads. An improved route may decrease the travel time between Bedford and I-71 and promote new industry in the region.



### 1.3 Purpose of the Study

The purpose of this Alternatives Study is to evaluate US 421 from I-71 to Bedford and determine possible alternatives to improve safety and traffic flow. This study is intended to help define the location and purpose of the project and better meet federal requirements regarding consideration of environmental issues as defined in the National Environmental Policy Act (NEPA). Items involved with this study include:

- Define project goals;
- Identify the beginning and ending points of the project as well as potential project locations and design concepts;
- Discuss project needs and issues with public officials, government agencies and other groups with a special interest in the project;
- Evaluate roadway improvements;
- Provide input for the statewide transportation plan;
- Prioritize projects for future programming documents;
- Identify known environmental concerns; and
- Listen to and share information with the public.



The first step in the process was the collection of technical data, resource agency input and public input concerning this project. This was accomplished by:

- Establishing a project team to provide direction and review for this study. The team included representation from various entities including the Kentucky Transportation Cabinet's (KYTC) District 5 office, KIPDA, and representatives from KYTC's Central Office, Division of Planning.
- Initiating early coordination with resource agencies and local officials.
- Compiling information from existing data and reports.

The second step in the process was the evaluation of the collected input to accomplish the following:

- Address the geometrics, capacity, crashes, and other issues that are influencing the project.
- Document known environmental concerns.
- Develop and evaluate project alternatives based on project goals; and
- Make recommendations.

#### **1.4 Programming and Schedule**

This study was funded in the 2002 Six-Year Highway Plan (FY2003-2008) as "Scoping Study for US-421 from I-71 to Bedford" with Item Number 5-147.00. No future project phases between I-71 and Bedford are defined or scheduled at this time.

## **2.0 EXISTING CONDITIONS**

### **2.1 Project Location**

This project is in the northern part of Kentucky in both Henry and Trimble counties. This project starts at the intersection of I-71 and US 421 on the north side of the I-71 ramps in Henry County, milepoint (MP) 24.284 and then heads northwestward on US 421, crossing into Trimble County, to the city of Bedford ending at milepoint 6.704 which is the intersection of US 421 and US 42 (Main Street). The corridor winds through a typical rural Kentucky agricultural and residential area that contains a minimal amount of service-oriented commercial businesses. See the project alignment shown in Exhibit 1 in Appendix A.

### **2.2 Roadway Characteristics**

Data for existing roadway characteristics along US 421 was taken from the Division of Planning's Highway Information System (HIS) database. This two-lane undivided highway has ten-foot wide lanes and four-foot wide combination shoulders throughout the study area. The posted speed limit is 55 mph from I-71 to the Bedford city limits, approximately the MP 6.400. From this point to the end of the project at the intersection of US 421 and US 42 (Main Street, Bedford) at MP 6.704 the speed limit is posted as 35 mph because this section of road is in the city limits and because of the roadway

geometry. Sections of the road in this project were last re-surfaced in 1998-1999. Table 1 lists the General Information that describes this project. This data was checked, verified, and/or updated through field surveys, as needed.

TABLE 1

### General Information

<b>Counties:</b>	Henry and Trimble		
<b>Route:</b>	US 421	Beg MP:	24.284 End MP: 6.704
<b>Item No:</b>	5-147.00	<b>Length:</b>	7.393 miles
<b>Description:</b>	Alternatives study for US-421 from I-71 to Bedford.		
<b>Area Development District (ADD):</b>	Kentuckiana Regional Planning and Development Agency (KIPDA)		
<b>Average Right of Way:</b>	Varies from 50-130 feet		
<b>Lane Width:</b>	Varies 10-11 feet		
<b>Shoulder Width:</b>	Varies from 2-8 feet		
<b>Speed Limits:</b>	Varies from 35-55 mph		
<b>Traffic Volumes:</b>	Varies 2100-4460 ADT (2007)		
<b>% Trucks:</b>	12.7%		
<b>Bike Route:</b>	No		
<b>Coal Haul Route:</b>	No		
<b>Defense Highway Network:</b>	Yes		
<b>District:</b>	5		
<b>Extended Weight:</b>	No		
<b>Functional Classification:</b>	Rural Minor Arterial		
<b>National Truck Network:</b>	No		
<b>National Highway System (NHS):</b>	No		
<b>Number of Bridges:</b>	4, Two over 100 feet in length		
<b>Pavement type:</b>	Henry- High Flexible Trimble- Composite; Flex. over Rigid		
<b>Scenic Byway:</b>	No		
<b>State System:</b>	State Primary		
<b>Truck Weight Class:</b>	AAA (80,000 lb. Gross Load Limit)		
<b>Type Road:</b>	Undivided Highway		
<b>Type of Terrain:</b>	Rolling		

## 2.3 Traffic & Level of Service

The average daily traffic volume (ADT) in the year 2007 varied from 2,100 to 4,460 vehicles per day (vpd) along the project route with the highest traffic

being near I-71. The projected ADT for the year 2030 is 7,800. This nearly doubles the current maximum value of 4,460 vpd. (See Table 2 for details.)

Level of Service (LOS) is used to describe traffic conditions and includes consideration of speeds, travel time, freedom to maneuver, traffic interruptions, comfort and convenience. There are six levels of service to describe a roadway with given letter designations of A to F. Similar to school grades, LOS A is the best condition whereas LOS F is the worst condition. Currently, US 421 has a LOS C rating as seen in Table 2. The LOS drops to as low as LOS D with projected 2030 traffic volumes if no improvements occur. See Exhibits 2 & 3 in Appendix A for a visual representation.

*Level of Service (LOS) is a qualitative measure of highway traffic conditions described in the 2000 Highway Capacity Manual.*

Table 2

Level of Service Calculations											
Begin *MP	End *MP	2007 ADT	Annual Growth Rate	2030 ADT	% Trucks	Lane Width (Feet)	Shoulder Width (Feet)	2007 LOS	2030 LOS No Improv.	2030 LOS with	
										4- Lane	Improv. 2- lane
24.113	24.170	4,460	2.4%	8700	12.7%	10	8	C	D	B	D
24.170	24.973	3,270	2.4%	6400	12.7%	10	2	C	D	A	C
0.000	3.206	2,100	2.4%	4100	12.7%	10	4	C	C	A	C
3.206	6.704	2,270	2.4%	4400	12.7%	10	4	C	C	A	C

\*MP = milepoint

Note: The gray portion is not in the scope of study. US 421 MPs for the underpass.

*MP	Descriptions
24.113	I-71 Overpass
24.710	KY1606
24.973 / 0.000	Henry/Trimble Co. Line
3.206	KY 316 & Smiths Lane
6.704	US 42 (Main Street)

## 2.4 Crash Analysis

Crash Data from *Collision Reports Analysis for Safer Highways* (CRASH) collected by the Kentucky State Police was used to find the Critical Rate Factor (CRF) for this the project. High crash locations are shown in Tables 3 and 4. Between January 1, 2003 and December 31, 2006, there were two segments that had a CRF greater than one. Also, there were five specific spots that had been reported as validated crashes with a greater than one CRF. The intersection of US 421 and I-71 (MP 24.113) had a total of eight crashes, of which three were angle collisions

*Critical Rate Factor (CRF) is numeric for spot and segment areas. If greater than 1.00 then crashes at that location may not be occurring randomly.*

involving vehicles turning left. Martini Lane, located at MP 0.924, had five crashes at that intersection. Two were rear end collisions. Between MP 2.200 to 2.300 is a sharp horizontal curve in Trimble County; 2.2 miles from the Henry County Line that had a total of seven crashes, of which three involved a single vehicle running off the road. A church access between MP 2.500-2.600 reported five crashes with two involving the vehicle running off the road. Finally, MP 6.704, at the intersection of US 421 and US 42 in Bedford, had 14 total crashes, of which seven were rear end collisions.

See Exhibits 4 & 5 in Appendix A for visual representations.

Table 3

Crash Analysis (Segment)										
Seg. #	County	Begin MP	End MP	Length (Miles)	Avg. Daily Traffic (ADT)	Crashes				Critical Rate Factor *(CRF)
						Fatal	Injury	Property Damage Only	Total	
January 1, 2003 to December 31, 2006 HIS Data										
1	Henry	24.113	24.284	0.171	4460	0	3	5	8	1.106
2	Henry	24.284	24.973	0.689	3270	0	1	10	11	0.731
3	Trimble	0.000	3.206	3.206	2100	0	19	34	53	1.530
4	Trimble	3.206	6.704	3.498	2270	0	7	18	25	0.632
Total		24.284	6.704	7.564	2339	0	30	67	97	0.779

\*CRF highlighted in RED indicate Critical Rate Factor > 1.00

Table 4

Crash Analysis (Spot @ Tenth Points)										
Pt. #	County	Begin MP	End MP	Length (Miles)	Avg. Daily Traffic (ADT)	Crashes				Critical Rate Factor *(CRF)
						Fatal	Injury	Property Damage Only	Total	
January 1, 2003 to December 31, 2006 HIS Data										
1	Henry	24.2	24.3	0.100	4460	0	3	5	8	1.55
2	Trimble	0.9	1.0	0.100	2100	0	2	3	5	1.48
3	Trimble	2.2	2.3	0.100	2100	0	1	6	7	2.08
4	Trimble	2.5	2.6	0.100	2100	0	1	4	5	1.48
5	Trimble	6.7	6.8	0.100	2270	0	3	11	14	3.99

\*CRF highlighted in RED indicate Critical Rate Factor > 1.00

## 2.5 Environmental and Socioeconomic Overview

Wilbur Smith Associates (WSA) prepared an Environmental Footprint for this project per contract with the Division of Planning. The map on the next page can be seen with greater details in Appendix A, Exhibit 6. Included in the report was environmental resource data portrayed on both United States Geological Survey (USGS) topographic and Kentucky Orthographic

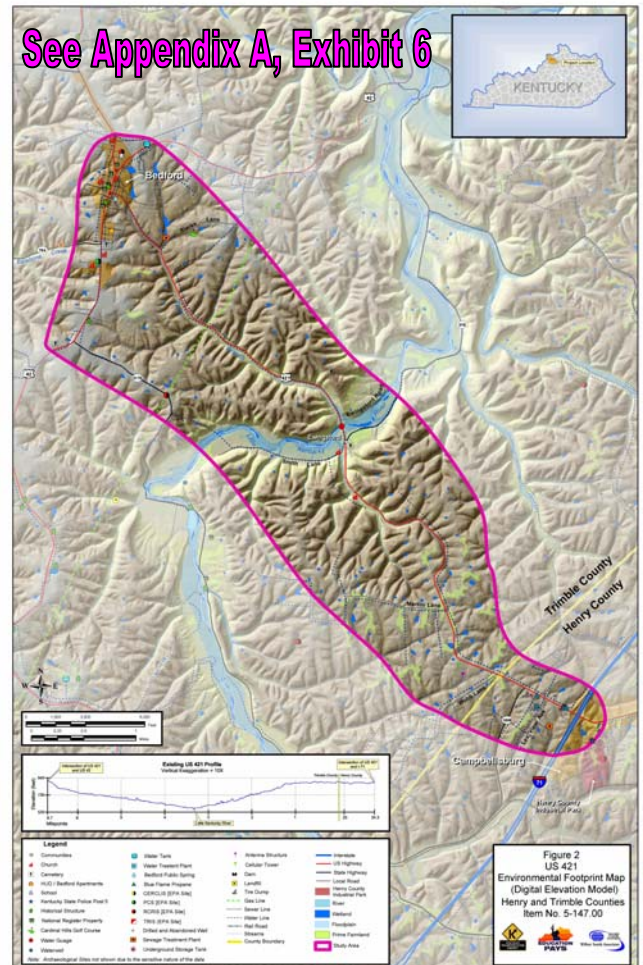


Geographic Information Systems (KYOGIS) orthographic base maps. Issues considered in the preliminary environmental analysis were listed as:

1. Natural and Manmade Features
2. Biotic Communities
3. Social, Economic and Environmental Justice Concerns
4. Historic and Archaeological Sites
5. Prime and Unique Farmland
6. UST/HazMat, Oil and Gas Sites
7. Additional Concerns such as Noise and Air Quality

Identified issues to be considered in subsequent project development phases include:

- Erosion concerns which will affect the water quality related to the Little Kentucky River, Town Branch, Barebone Creek and the associated tributaries may occur during future construction phases for project area.
- Several wetlands are scattered throughout the study area and will need further inspection if disruption by construction is warranted.
- Numerous public and private water sources could be affected as well as groundwater may be impacted. It is recommended that erosion control methods be used to decrease non-point source pollutions and minimize disruption of service.
- The study area is within a large forest block. Avoiding forest fragmentation is mandatory for large forest blocks.
- Possible endangered, endangered with partial status, threatened and special concern species have been identified in or close to the study area. Therefore further investigation will be necessary for future project phases.
- Many community sensitive locations such as churches, schools, cemeteries and public housing projects are in the project area in Bedford. There are a few others scattered throughout the corridor. All will require future evaluation for cultural significance.
- Limiting the net loss of 150 acres of prime farmland in the study area.
- A number of underground storage tanks, sewage treatment plants and Environmental Protection Agency (EPA) monitored sites are in the subject area that potentially will impact transportation decisions in future phases



- Air and noise impact analysis should be considered in the upcoming project phases.
- There are six structures on the National Register of Historic Places in the project area, all of which are in Bedford. Three are shown below and the other three are; Trimble (TMB) 7 – Unnamed House on Main St., TMB 29 – Coleman House on Main Street and the Old Kentucky Tavern on US 42. Several remaining structures are currently pending eligibility. Several archaeological sites are also in the area. A review of the cultural sites will be needed as the project advances to future phases.



The complete Environmental Footprint Report is included in Appendix B.

## 2.6 Environmental Justice and Community Impacts

The Kentuckiana Regional Planning and Development Agency (KIPDA) conducted a review of the 2000 Census data for the purpose of identifying environmental justice and community impact issues in Trimble and Henry Counties. Four Block Groups make up the study area.

The purpose of an environmental justice review is to identify areas containing disproportionately high concentrations of minority, low-income or elderly households. *Environmental Justice Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (signed February 16, 1994), directed federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations.

KIPDA reports that there is a significantly lower percentage of minorities in the project area than in the overall state. Age group 0-17 is slightly higher than state averages. Percentages for persons 62 and older are slightly lower than the state average. There are no major concentrations or communities that share religious, cultural, ethnic or other backgrounds along the corridor of US 421. In addition to KIPDA's report, consideration of impacts on smaller businesses in the Bedford area and the need for additional housing are potential effects from the possible improvements to US 421. Any proposed roadway updates will only improve the safety and economic development of the region.

For more details on the Environmental Justice Report see Appendix C.

## **2.7 Geotechnical Overview**

The KYTC Division of Structural Design, Geotechnical Branch and the University of Kentucky Geological Survey both submitted separate reports from their respective agencies and these reports are included in Appendix F. The Geotechnical Branch indicated that the proposed corridor may encounter Alluvium, Glacial Drift, Calloway Creek Limestone, Grant Lake Limestone, Bull Fork and Drakes Formation.

Glacial Drift may be encountered around the town of Bedford. The material is considered to be highly erosive and therefore will require flatter cut and fill slopes.

Both reports indicate that no major geotechnical issues would be expected. Although the reports differ in their opinion of the quality of limestone that could be used for suitable construction material, future borings and testing will give more information on the suitability of the limestone in the project area.

## **3.0 INITIAL CABINET, AGENCY & PUBLIC INPUT**

In efforts throughout the course of the US 421 Alternatives Study, the local citizens, public officials and representatives of government resource agencies were given the opportunity to provide input for this study. This chapter describes the first KYTC project team meeting along with the first public involvement that includes agency input. At that stage, the collection of all prior information was introduced and the gathering of input from these involved groups contributed to the process of this study.

### **3.1 First Project Team Meeting**

The US 421 project team met three times during the course of study. The first meetings were documented with minutes that are included in Appendix D. A brief summary of the major topics discussed at the first meeting as follows:

April 23, 2003, at KYTC District 5 was the date and location initial Project Team meeting. This was the kick-off meeting where team members were introduced, the type of study discussed and the study's scope and schedule reviewed. Major topics discussed included: the available data, the existing problems with the roadway, benefits of a proposed project, additional information needed, and regional agency coordination. Initial project goals were constructed: provide corridor and system connectivity, improve safety by correcting horizontal and vertical alignments, and provide lane and shoulder widths that meet current standards, and enhance the regional and local network by providing improved access to areas of regional importance.

### **3.2 First Local Officials Meeting**

As part of the public involvement process, there were two Local Officials meetings held on separate occasions. Below is a brief summary of the first meeting.

The first meeting was held with the local officials on June 17, 2003. The purpose of this meeting was to inform this group about the project, discuss any potential project issues and concerns, and solicit input. Some of the major concerns for this group were; the speed limit, the curves and steep grades, sight distances at some entrances and the lack of adequate shoulders. Places to avoid were; the golf course, churches, the U-Haul business, a produce stand and the Little Kentucky River floodplain. There was no known opposition to this project. More details are included in the Local Officials Meeting Minutes and can be seen in Appendix D.

### **3.3 Stakeholders Meetings**

This meeting was held the same day as, and subsequent to, the 1<sup>st</sup> Local Officials meeting (June 17, 2003). Stakeholder representation included; Trimble County local officials, the Trimble County Superintendent, the Kentucky State Police, a private business owner, the local Emergency Medical Services (EMS) & Tourism, The Bedford Loan & Deposit Bank and a concerned citizen. Concerns were similar to those of the Local Officials, but the most disturbing was the crashes occurring in spotted areas along the corridor especially near MP 2.000. There was no known opposition to this project at this meeting. Minutes of the Stakeholders Meeting are included in Appendix D.

### **3.4 First Public Meeting**

Another facet of public involvement is inviting the public to convene. The first public meeting was held November 18, 2004 at Bedford Elementary School. This initial meeting was designed to inform the public about the study and solicit questions and comments regarding local issues and potential alternatives and/or suggestions for US 421. In addition to the information presented in this chapter, material related to this meeting is included in a notebook on file with the KYTC Divisions of Highway Design and Planning: *November 18, 2004 Public Information Meeting Record*.



The Minutes to this first public meeting can be found in Appendix D.

General project information such as project location, traffic volumes, crash information and the environmental footprint was presented at the meeting for review and comments. A short PowerPoint presentation explaining the overall project, its preliminary goals and future steps toward improving US 421 was presented. Attendees were given the opportunity to view maps on Exhibit boards with information pertaining to the project. Also, they were able to identify with markers on the Exhibits areas to avoid and areas where they thought there were safety concerns or other issues. Comments could be recorded on a large flip chart where attendees could write their thoughts, concerns and suggestions. Some comments made were as follows:



- Construct a bypass around the intersection of US 421 and US 42 in Bedford beginning north of the schools and continuing south along the east side of US 421 and rejoining US 421 south of the existing intersection of US 421 and US 42. [The attendee drew the proposed bypass location on one of the exhibit displays.]
- Recent paving of US 421 was several inches thick and much higher than my driveway.
- Near the I-71 interchange, where US 421 has full shoulders, trucks park on the shoulder in front of the gas station creating a visual obstruction to drivers trying to pull out of the gas station onto US 421.

As a part of the public meeting handout, the KYTC supplied a survey form for all attendees. This enabled the attendees to give their feedback and provide documentation of their concerns to be considered in the decision process. Responses to the six questions are summarized below. A full in-depth summary of the comments are located in Appendix E, *Survey Results*. A total of 42 Surveys were returned.

1. The majority (35 of 42) believed that there is a need for reconstruction of US 421 from I-71 to Bedford.
2. The top two topics that concerned those surveyed were “Sharp Curves” and “Narrow Shoulders”. A multiple check list with “Check all that apply” was given and the total of 35 checks on these two topics was the majority.
3. From 42 responses, 23 indicated that they used US 421 “Daily”.
4. The primary purpose for using US 421 was “For Personal Business” with 19 responses. Second to that response were three; “To go to place of work”, “To conduct work-related business” and “To visit friends or family”, all three had 16 responses.
5. When asked about sensitive areas to avoid if a new route was considered, 20 responses indicated “Personal properties or homes”.
6. A majority of the Attendees (30 of 42) found out about the meeting because of the variable message sign placed along the road way.

### **3.5 Resource Agency Coordination**

Appropriate state and federal resource agencies were identified and contacted for their concerns associated with the US 421 improvements. The Division of Planning sent letters to 70 agencies and organizations requesting their input and comments on this Alternatives Study in order to address their concerns early in the project development process. The 20 agencies that responded to the request for input and comments are listed below, along with a brief



summary of their comments. Their complete responses are included in Appendix F.

**Kentucky Environmental and Public Protection Cabinet, Kentucky State Nature Preserves Commission, August 18, 2004**

There were no comments at the time. Although, there are likely several rare species issues that will need to be dealt with including the Indiana bat and Running buffalo clover.

**Kentucky Education Cabinet, August 19, 2004**

No comments were made upon receipt.

**University of Kentucky, Kentucky Geological Survey, August 19, 2004**

They listed items of concern below:

- Might encounter karst features.
- Would encounter sections of unconsolidated sediments near streams that would be prone to landslides.
- Might encounter resource conflicts such as prior ownership of property for quarrying or mining.
- Would encounter rock units that would be suitable as construction stone.
- Would not encounter faulted areas.
- Low potential for liquefaction or slope failure due to earthquake ground motion of 0.09 g, peak.

**Kentucky Department of Fish & Wildlife Resources, August 24, 2004**

There were no federally threatened or endangered fish and wildlife known in the Bedford and Campbellsburg using the 7.5' USGS quadrangles.

For the portions of the project crossing intermittent and perennial streams recommendations include:

1. Development/excavation during a low flow period to minimize disturbance;
2. Preservation of tree canopy overhanging the stream;
3. Sediment control plan consisting of silt barriers, diversion ditches, and immediate seeding and mulching of disturbed areas.
4. Minimize stream channel excavation for bridge pier placement;
5. Existing corridors should be used as the main stream crossing during bridge construction if possible to minimize aquatic impacts.

**Kentucky Department for Environmental Protection, Division of Air Quality, August 25, 2004**

The following Kentucky Administration Regulations apply to this project:

401KAR 63:010 Fugitive Emissions – Prevent particulate matter from becoming airborne.  
401 KAR 63:005 – Open burning prohibited.  
This project must meet conformity requirements of the Clean Air Act.

**Kentucky Aviation Department, August 26, 2004**

This project will not affect any airport in the area. However, if construction equipment exceeds 200' a permit will have to be issued by the office.

**Kentucky Justice and Public Safety Cabinet, Kentucky Vehicle Enforcement, August 31, 2004**

They anticipate no problem with widening the roadway provided it is made a designated highway. A "designated highway" will accommodate 102" wide vehicles. Captain Edmondson who is Regional Commander for this area, states it would be a much needed improvement.

**Kentucky Commerce Cabinet, Department of Parks, September 1, 2004**

This study will not directly impact any of their facilities.

**Kentucky Department of Agriculture, September 2, 2004**

They had no specific concerns at this time.

**Kentucky Cabinet for Health and Family Services, September 7, 2004**

This Cabinet does lease property in the immediate area, they do not anticipate that the construction will create a hardship on their staff nor clients unless US 421 is shut down for long periods of time. Given the goals of the study, they believe the changes would ultimately have a positive impact on the traffic flow within the area.

**KYTC Traffic Operations, September 8, 2004**

Due to the critical crash rate on the northernmost section of US 421, crash reports for the intersection of US 421 and US 42 in Bedford were reviewed. They thought that the intersection may be a source of the higher crash numbers on this section. Based on the available crash reports, there does not appear to be a significant pattern of crashes at the southernmost junction of US 421 and US 42. As a result, they do not think that the high crash rate on this section can be attributed to that intersection. They said it appeared to be advantageous to consider realigning US 421 and US 42 to provide one intersection as opposed to the existing two intersections.

**John Logan Brent, Henry County Judge/Executive, September 8, 2004**

There are no specific issues to address. He knows from first hand experience that it is not a pleasant road to drive. Straightening the road would not only be a safety benefit, it would also be a huge boost to commerce in the region as travel from Madison and Bedford to locations along I-71 would become much more feasible. He is 100% behind seeing this project move forward and will work with Transportation Department on it in whatever capacity he can be of assistance.

**United States Coast Guard, September 10, 2004**

It has been determined that the project is located in an area of a waterway where the Coast Guard has elected to not exercise jurisdiction for Bridge Administration purposes. A Coast Guard bridge permit will not be needed.

**Trimble County Schools, September 13, 2004**

They believe travel time for school transportation will be reduced and safety will be improved. The only negative impact would be the rerouting of buses during the construction phase of the project.

**KYTC Permits Branch, September 13, 2004**

The Branch urges the Cabinet to classify this project as a partially controlled access facility. Assuming the project is a partially controlled access, they encourage all possible access points be set on the plans. When buying R/W for this, assuming the access control is partially controlled, new deeds for all adjoining property owners need to be executed to identify the access control even if no new R/W is acquired. They would like to make every effort possible to have the design speed to be the same as the anticipated posted speed when the project is complete. They would like to see an access control fence installed with the project. Please notify this office if the proposed roadway is to be placed on the National Highway System (NHS). This information is needed to assist this office in regulating the installation of any outdoor advertising device. If the proposed roadway is to be on the NHS, early notification of the final line and grade is needed. This enables them to monitor outdoor advertising devices prior to road construction being completed.

**Kentucky State Police, September 13, 2004**

Members of the Kentucky State Police assigned to the Campbellsburg Post have thoroughly reviewed the referenced planning study. Post 5 personnel are in complete agreement with the draft statement of the project goals, particularly those goals that address correcting the roadway's horizontal and vertical deficiencies and improving the lane and shoulder widths, as well as possible improvements to the Milton-Madison Bridge. Based

on the information provided in the study and their general knowledge of the area and roadway, the Kentucky State Police is unaware of any issues that may negatively impact the proposed project.

**Kentucky Transportation Cabinet, Division of Structures, Geotechnical Branch, September 27, 2004**

Glacial drift may be encountered on the ridge tops in and around the town of Bedford. The Glacial Drift should only be encountered in the vicinity of the intersection of US 421 and US 42. The material is considered to be highly erosive and flatter cut and fill slopes may be required.

The branch has no preferred line or corridor and no major geotechnical issues are expected to be encountered. The quality of the limestone from roadway excavation may not be suitable for rock roadbed.

**Kentucky Commerce Cabinet, October 5, 2004**

Based upon the information provided, this improvement will positively impact the area in both the tourism and industrial development segments of the economy.

The maps provided do not indicate historical structures or wildlife management areas. These are areas of interest in the development and stability of the tourism industry and cultural activities in the area. They asked that the Kentucky Historical Society, Kentucky Heritage Council and the Kentucky Department of Fish and Wildlife be contacted, if this has not already occurred, to insure properties of interest to these agencies are not impacted in a negative manner.

***[The Kentucky Historical Society, Kentucky Heritage Council and the Kentucky Department of Fish and Wildlife were contacted as part of this resource agency coordination. As of 10/13/04, only the Department of Fish and Wildlife has responded.]***

**Kentucky Environmental and Public Protection Cabinet, Department for Natural Resources, Division of Forestry, October 14, 2004**

In relation to the potential widening of US 421 in the counties of Henry and Trimble, there is not a huge concern with the type of woodland being affected. Most of the woodland is second growth with a variety of species included. It would appear that the biggest concern would be the woodland areas affected along the stream channels that are near the existing roadbed. The Division of Forestry would greatly encourage the Transportation Cabinet to consider planting a variety of tree species to replace the ones being removed. Mr. James R. Wright of the Bluegrass District

could provide any technical assistance the Transportation Cabinet may need in determining the type species to re-plant. Please contact Leah MacSwords in the Division of Forestry at (502) 564-4496 or Mr. James R. Wright of the Bluegrass District at (502) 573-1085 if you need any additional information pertaining to this project.

**Kentucky Environmental and Public Protection Cabinet, Division of Conservation, October 14, 2004**

There are no agricultural districts established in the project area, therefore land enrolled in the Agricultural District Program will not have to be mitigated by the Department of Transportation.

They would like to see the issue of the loss of farmland addressed. Both prime farmland and farmland of statewide importance could be impacted by this project. Every year pressure imposed by utility right-of-ways, urban expansion, and new roads reduce the land available for agricultural use in the Commonwealth. There are two documents that could be utilized to identify these farmland designations: the Soil Survey of Henry and Trimble Counties (NRCS 1992) and Important Farmland Soils of Kentucky (NRCS 1981). This information is available through our office or the offices of Henry and Trimble County Conservation Districts. The soil survey information can also be downloaded at the following web site: <http://soildatamart.nrcs.usda.gov/>

One other concern they would like to comment on is the control of erosion and sedimentation during and after earth-disturbing activities once this project begins. They recommend best management practices (BMPs) be utilized to prevent non-point source water pollution. This would protect the water quality and aquatic habitat of several perennial and intermittent streams that this project could impact.

The manual, *Best Management Practices for Construction Activities*, contains information on the kinds of BMPs most appropriate for this project and is available through the Henry and Trimble County Conservation Districts or this office. Also, an electronic version of the *Kentucky Erosion Prevention and Sediment Control Field Guide* can be located on their web site: <http://www.water.ky.gov/sw/nps/Publications.htm>.

## **4.0 DEVELOPMENT PROCESS**

Following the existing conditions review and the first round of public involvement, preliminary alternates were developed both on and off the existing US 421 route. This chapter details the sequence of events that preludes the developing of alternates for this study.



#### **4.1 Second Project Team Meeting**

On June 8, 2007, at KYTC District 5, a meeting was held to bring the Project Team, including new members, up to date on the status of this study. The team brainstormed ideas and discussed possible alternates to present to the next local officials meeting and public meeting. Several alternates were discussed, but the team concluded by deciding to have all the alternates reviewed by the Local Officials when they have obtained the cost estimates. Lastly, a schedule for completion was drafted and assignments were made in order to move the project forward. The details of this meeting are recorded in the minutes in Appendix H.

#### **4.2 Draft Statement of Project Goals**

In the 2<sup>nd</sup> Project Team meeting there were discussions that led to having the “Draft Statement of Project Goals” reevaluated. This description is separated from subsection 4.1 because it had its own process that helped develop the final “Statement of Project Goals” as stated in Chapter 5. The Draft Statement was first introduced at the first project team meeting. During the course of this study, the team felt that some edits were needed due to more current projects in the surrounding area. The project team worked via e-mail to clarify and define the Project Goals. See Appendix H for generated e-mail discussion on this topic from the team.

### **5.0 STATEMENT OF PROJECT GOALS**

Based on consideration of all of the identified corridor issues, input from local officials, public opinion, resource agencies, and evaluation of existing and forecasted highway conditions, the project team generated the project goals for improving US 421 from I-71 to Bedford as follows:

1. Enhance regional connectivity by improving the connection from I-71 to Bedford and to points north of Bedford.
2. Improve safety for the traveling public and school busses, by addressing less than optimal horizontal and vertical alignments and by utilizing a typical highway cross-section that more closely meets current guidelines.
3. Improve access to Henry and Trimble Counties to support development in the region by providing better access to I-71.

### **6.0 STUDY ALTERNATES**

Following the existing conditions information, the public input and the Project Team’s review, four alternates were developed to improve US 421. A brief description of each alternate is given. All alternates have the southern termini at the same location, which is at the interchange of I-71 (MP 24.113, Henry Co.). Maps and aeriels of the alternates are in Appendix G.

#### **6.1 Alternate #1 – Do Nothing**

This alternate is self explanatory.

## **6.2 Alternate #2 – Eastern Quire-Joslin Route**

Starting at its southern termini with an upgrade to the existing US 421, this alternate involves a new eastern corridor that diverges from its current alignment at Burton Hill Road (Trimble MP 3.850) then establishes an eastern corridor using Quire-Joslin Lane to connect US 421 at US 42 which is 1.9 miles east of Bedford.

## **6.3 Alternate #3 – Rebuild Existing Route**

This alternate has two sub alternates:

**3a)** Rebuild the existing route by widening and correcting US 421 to current design standards of 12' lanes and 8' shoulders. The major horizontal curve is from Trimble MP 1.100 to Trimble MP 2.400.

**3b)** Spot improvements along the US 421 corridor based on high crash spots and input from the public and project team. Below is a brief description of the spots:

- Spot #1 ~ widen US 421 to four lanes for safer access near I-71 Interchange (Henry MP 21.113 to 24.486).
- Spot #2 ~ re-grade the roadway with shoulder improvements and clearing vegetation to alleviate inadequate sight distance. (Henry MP 24.600 to Trimble MP 0.100).
- Spot #3 ~ improve by eliminating the major horizontal curve (Trimble 1.000 to 2.400).
- Spot #4 ~ improve shoulders and hillside rock cuts at the entrance of the Antioch Baptist Church. Clear vegetation from right-of-way to improve sight distances.
- Spot #5 ~ two options (Trimble MP 6.700-6.800)
  - 1) Add turning lanes and widen the combined US 421/US 42 route.
  - 2) Develop a new alignment between US 421 and US 42 for approaches to cross at a 90 degree angle. Move both US 421 approaches east near Hughes Drive.
- Spot #6 ~ widen lanes and shoulders through this 40 mph curve to current design standards (Trimble MP 0.200 to 0.600).
- Spot #7 ~ improve shoulders and add specified passing bays along the whole existing route (Henry MP 24.280 to Trimble MP 6.704).

## **6.4 Alternate #4 – Western KY 3175 Route**

Starting at its southern termini with an upgrade to the existing US 421, this alternate diverges from its current alignment at Meadow Clark Court (Trimble MP 0.500) then establishes a western corridor using KY 3175 to connect US 421 at US 42 southwest of Bedford.

## 6.5 Cost Estimates for Alternates

TABLE 5

### Cost Estimates for Alternates

Alternate	Planning	Design	ROW	Utilities	Construction	Total
1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	\$ 500,000.00	\$ 6,246,000.00	\$ 9,498,000.00	\$ 7,915,000.00	\$ 50,121,000.00	\$ 74,280,000.00
3a	\$ 200,000.00	\$ 4,000,000.00	\$ 3,937,500.00	\$ 2,362,500.00	\$ 31,500,000.00	\$ 42,000,000.00
4	\$ 500,000.00	\$ 6,833,533.00	\$ 10,308,000.00	\$ 13,590,000.00	\$ 78,155,667.00	\$ 109,387,200.00

Note: #3b is not on this table. For clarity this Alternate has a separate table. *See Table 6.*

TABLE 6

### Cost Estimates for Spots (3b)

Spot #	Design	ROW	Utilities	Construction	Total
1	\$ 300,000.00	\$ 350,000.00	\$ 300,000.00	\$ 4,300,000.00	\$ 5,250,000.00
2	\$ 230,000.00	\$ 470,000.00	\$ 470,000.00	\$ 1,410,000.00	\$ 2,580,000.00
3	\$ 650,000.00	\$ 1,550,000.00	\$ 1,300,000.00	\$ 6,300,000.00	\$ 9,800,000.00
4	\$ -	\$ -	\$ -	\$ 50,000.00	\$ 50,000.00
5 (1)	\$ 450,000.00	\$ 1,200,000.00	\$ 720,000.00	\$ 4,776,000.00	\$ 7,146,000.00
5 (2)	\$ 600,000.00	\$ 1,440,000.00	\$ 1,200,000.00	\$ 7,572,000.00	\$ 10,812,000.00
6	\$ 200,000.00	\$ 400,000.00	\$ 250,000.00	\$ 1,200,000.00	\$ 2,050,000.00
7	\$ 50,000.00	\$ -	\$ -	\$ 200,000.00	\$ 250,000.00

Grand Totals    OPT #1 → \$    27,126,000.00  
                          with    OPT #2 → \$    30,792,000.00

## 7.0 ADDITIONAL PUBLIC INPUT

### 7.1 Second Local Officials Meeting

The second local officials' meeting was held on August 28, 2007. This meeting's purpose was to update everyone on the current status of the project. Traffic and crash data were updated and explained to the group. Alternates along with their estimated costs were introduced. The estimated costs were based on current design standards of 12-foot lanes and 8-foot shoulders. Participants had concerns of land changes/uses in the route's future. It was noted that the Milton Madison Bridge project was underway with \$41 million allotted for its rehabilitation. The Draft Statement of Projects Goals was also reintroduced. Appendix H has details of the 2<sup>nd</sup> Local Officials Meeting Minutes.

### 7.2 Second Public Meeting

This final public meeting was held at the Trimble County Middle School on September 25, 2007. The meeting was intended to communicate the study process, update the public on the current status, and solicit input on potential

alternates. Handouts were distributed which included, *The Draft Statement of Project Goals*, current traffic and crash data, suggested alternates with cost estimates and spot improvements. The minutes to this 2<sup>nd</sup> public meeting can be found in Appendix H.

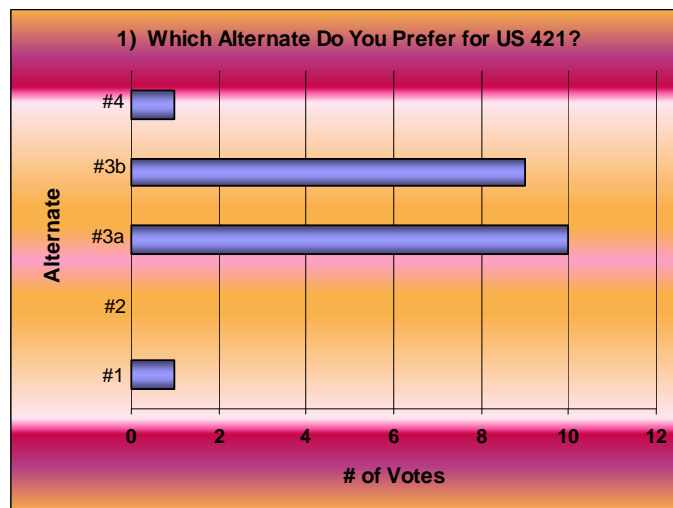
Exhibit boards were displayed for the public to review and make comments. KYTC Staff members were available to address any questions or suggestions made by the attendees. The exhibits posted were the exact copies of what was given in the handouts.

Attendees were also given a survey for feedback on the alternates. The survey could be submitted at this meeting or be mailed with a self addressed stamped envelope that was available. Responses to the three questions are summarized and depicted in Tables 7, 8 & 9 and Charts 1 & 2.

1. Which Alternate Do You Prefer for US 421? (21 Respondents)

ALTERNATES					Table 7
#1	#2	#3a	#3b	#4	
1	0	10	9	1	

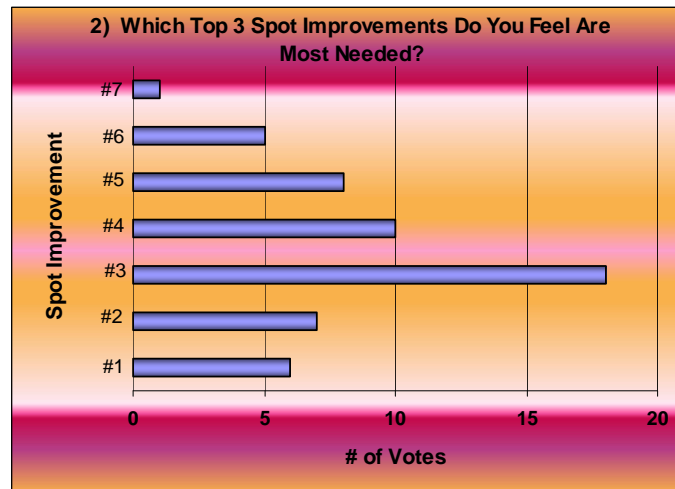
Chart 1



2. Which Top Three Spot Improvements Do You Feel Are Most Needed? (21 Respondents)

Spot Improvements							Table 8
#1	#2	#3	#4	#5	#6	#7	
6	7	18	10	8	5	1	

Chart 2



3. The Spot Improvement @ Crash Spot #5 is at the intersection of US 421 and US 42. There are 2 Options. Please choose which Option you think is Better or Give Suggestions or Comments. (18 Respondents)

Options

#1	#2
15	3

Table 9

A more descriptive summary and list of comments are in Appendix E as *Survey Results*. A total of 21 Surveys were returned.

The information presented in this meeting is included in a second notebook on file with the KYTC Division of Highway Design and Division of Planning: *September 25, 2007 Public Meeting Notebook #2*.

## 8.0 CONCLUSIONS & RECOMMENDATIONS

This chapter details the conclusion process of this study along with recommended improvements to US 421 from I-71 to Bedford. The recommendations are the result of the total Alternatives Study process for the US 421 corridor.

### 8.1 Final Project Team Meeting

The project team meeting held its last meeting at the KYTC District 5 office on October 24, 2007. This meeting was to provide the team members with the results of the final survey from the 2<sup>nd</sup> Public Meeting. A brief review of the project's alternates and survey summary was made. The meeting concluded with recommendations being made for this report. The meeting minutes are in Appendix H.



## 8.2 Study Recommendation

Based upon consideration of the project goals, transportation issues, potential environmental and community impacts, and public/agency input, the project team agreed on the following:

1) Alternate #3a was chosen to be primary recommendation based on local officials, public input and technical analysis. This alternate includes the improvements to the large horizontal curve along with widening and upgrading the existing route to current design criteria. The estimated cost for this rebuild is \$62,000,000.

2) The team also decided that Alternate #3b should be considered as an interim recommended choice if funding does not become immediately available for the primary recommendation. This would provide the opportunity for lower-cost improvements to be programmed if lesser funding became available.

● Prioritization for Spot Improvements are as follows:

(For a more details see Section 6.3, Table 9 and Appendix H)

- 1 ~ #3 improvements to eliminate the major horizontal curve
- 2 ~ #4 minor improvements to shoulders, hillside cuts and clear vegetation for better sight distances
- 3 ~ #5\* develop a new alignment for a better US 421 and US 42 intersection (Option #2)
- 4 ~ #2 re-grade the roadway, shoulder improvements and clearing vegetation
- 5 ~ #1 widen US 421 at the I-71 Interchange
- 6 ~ #6 widen lanes & shoulders through the 40 mph curve to current standards
- 7 ~ #7 improve shoulders and add specified passing bays along the whole existing route

\*In regard to Spot Improvements, the team chose to recommend the bypass option (Option #2). The team concluded the bypass option better meets the needs and project goals of improving regional connectivity between I-71 and Bedford and to points north of Bedford. It also addresses the concerns expressed by the local officials of improving the entire corridor. Finally, this option would better serve the public by alleviating congestion and improving safety.

## 9.0 ACKNOWLEDGEMENTS & CONTACTS

Several individuals contributed to the completion of this Alternatives Study. It is with much gratitude and appreciation for the time, effort, and knowledge from the following participants:

- ❖ Thanks to Steve Ross, P.E. for his experience, guidance, and patience throughout the whole process.
- ❖ In great appreciation to the District 5 personnel namely Mary Ann Bond, P.E. and Tom Hall, P.E., who both have helped me; have a better understanding of the whole picture.
- ❖ And, finally, Randall Embry, Transportation Planner with the KIPDA, who was instrumental in coordinating local events for this project to proceed and given support where needed.

Additional information regarding the US 421 Alternatives Study can be obtained from the following KYTC Division of Planning staff members:

### **Address written comments to:**

Mr. Keith R Damron, P.E.  
Director  
Kentucky Transportation Cabinet  
Division of Planning  
200 Mero Street, 5<sup>th</sup> Floor West  
Frankfort, KY 40622

### **Or you may contact by phone or e-mail:**

Ms. Boday Borres, P.E.  
Project Manager  
Kentucky Transportation Cabinet  
Division of Planning  
(502) 564-7183 ext. 3275  
[boday.borres@ky.gov](mailto:boday.borres@ky.gov)

Mr. David Martin, P.E.  
SPAC Team Leader  
Kentucky Transportation Cabinet  
Division of Planning  
(502) 564-7183 ext. 3280  
[charles.martin@ky.gov](mailto:charles.martin@ky.gov)