PROGRAMMING STUDY
US 60
UNION COUNTY
STURGIS TO MORGANFIELD
ITEM NO. 2-8102.00

I. INTRODUCTION

A. Study Purpose

The purpose of this Programming Study was to: (a) evaluate US 60 from Sturgis to Morganfield and determine possible alternatives to improve safety and traffic flow that can be used for future programming documents; (b) provide data to be used when and if the project enters the design phase; (c) provide background information that can be utilized in the National Environmental Policy Act (NEPA) documentation for the project. Tasks undertaken as part of this effort included:

- Identifying project goals and issues
- Defining the need for the project
- Determining project termini and potential corridors
- Describing the conditions along the existing roadway
- Identifying preliminary environmental concerns
- Estimating the project costs
- Identifying priority segments for future programming activities
- Initiating contact with public officials and agencies

One of the steps in this process was the collection of technical and resource agency input concerning the project. This was accomplished by:

- Compiling information from existing data and reports
- Establishing a project team to provide direction and review for the study
- Coordinating with resource agencies and local officials

Information thus collected was evaluated to accomplish the following:

- Evaluate the project description and logical termini
- Address the geometrics, level of service, vehicle crashes, and other issues that are influencing the project
- Address, in general terms, the project design criteria
- Document known environmental concerns
- Develop a draft statement of project goals

B. Programming and Schedule

The project is described in the 2002 Kentucky Six-Year Highway Plan (FY 2003-2008) as a "Planning Study To Construct 4-Lanes on US 60 from Sturgis to Morganfield". No future project phases are defined or scheduled at this time.

II. PROJECT LOCATION, EXISTING CONDITIONS, AND TRAFFIC

A. Project Location

The project termini, as described in the 2002 Kentucky Six-Year Highway Plan (see previous paragraph), were quite specific: from milepoint 5.671 (the intersection with KY 109 (Main Street) in Sturgis) to milepoint 16.339 (the intersection with KY 56 (Main Street) in Morganfield).

B. Existing Highway Features

Data on the existing conditions along US 60 were taken from the Division of Planning's Highway Information System (HIS) database. The US 60 corridor is located in generally rolling terrain. Passing sight distance varies from zero percent to ninety percent with a weighted average of fifty-seven percent. There are thirty-five horizontal curves along this roadway segment as shown in Table 1, two of which are 3.5 degrees or greater and another seven of which are between 2.5 degrees and 3.4 degrees. Further, there are twenty-seven vertical curves along this roadway segment as shown in Table 2, nine with approach grades greater than 2.5 percent.

US 60 in the study segment is an undivided two-lane highway with lane widths ranging from 11 to 14 feet as shown in Table 3. The shoulder width is generally three feet except for curbed segments and a few very short segments with ten-foot widths. The driving surface is a high flexible pavement except for a short segment in Sturgis that is a reinforced jointed rigid pavement; the flexible pavement sections have all been resurfaced within the past five years. Widths of existing rights-of-way currently held by the Kentucky Transportation Cabinet range from 60 to 150 feet as shown in Table 4. There are two structures in the study segment of US 60 with data on these bridges shown in Table 5. Both structures have bridge sufficiency ratings above 82, meaning that neither is considered in need of replacement; hence neither is eligible for replacement funding. Finally, neither of these bridges has historical significance.

TABLE 1
HORIZONTAL CURVES

	Begin MP	End MP	Degree of Curve (Range)
1	5.68	6.25	0.0 - 0.4 DEGREES
2	6.25	6.40	2.5 - 3.4 DEGREES
3	6.40	6.80	0.0 - 0.4 DEGREES
4	6.80	7.00	1.5 - 2.4 DEGREES
5	7.00	8.00	0.0 - 0.4 DEGREES
6	8.00	8.10	2.5 - 3.4 DEGREES
7	8.10	8.20	0.0 - 0.4 DEGREES
8	8.20	8.35	2.5 - 3.4 DEGREES
9	8.35	8.60	0.0 - 0.4 DEGREES
10	8.60	8.70	0.5 - 1.4 DEGREES
11	8.70	8.95	0.0 - 0.4 DEGREES
12	**8.95**	**9.10**	**3.5 - 4.4 DEGREES**
13	9.10	10.40	0.0 - 0.4 DEGREES
14	10.40	10.50	2.5 - 3.4 DEGREES
15	10.50	10.60	0.0 - 0.4 DEGREES
16	10.60	10.65	2.5 - 3.4 DEGREES
17	10.65	10.75	0.0 - 0.4 DEGREES
18	**10.75**	**10.80**	**3.5 - 4.4 DEGREES**
19	10.80	11.10	0.0 - 0.4 DEGREES
20	11.10	11.25	2.5 - 3.4 DEGREES
21	11.25	12.10	0.0 - 0.4 DEGREES
22	12.10	12.25	2.5 - 3.4 DEGREES
23	12.25	13.20	0.0 - 0.4 DEGREES
24	13.20	13.40	1.5 - 2.4 DEGREES
25	13.40	13.55	0.0 - 0.4 DEGREES
26	13.55	13.85	1.5 - 2.4 DEGREES
27	13.85	14.02	0.0 - 0.4 DEGREES
28	14.02	14.40	0.0 - 0.4 DEGREES
29	14.40	14.50	0.5 - 1.4 DEGREES
30	14.50	15.05	0.0 - 0.4 DEGREES
31	15.05	15.10	0.5 - 1.4 DEGREES
32	15.10	15.35	0.0 - 0.4 DEGREES
33	15.35	15.55	0.5 - 1.4 DEGREES
34	15.55	15.82	0.0 - 0.4 DEGREES
35	15.82	16.65	0.0 - 0.4 DEGREES

Posted speed limits along the study segment of US 60 are shown in Table 6, Roadway Adequacy Ratings are depicted in Table 7, and traffic count information is shown in Table 8. Current year traffic and level of service information is shown in Exhibit 1; future year traffic and level of service information is shown in Exhibit 2. Table 9 indicates the intersections with significant crossroads along the study segment of US 60. There is one railroad crossing within the study segment, located at MP 6.335 in Sturgis. The rail line is owned and operated by the Western Kentucky Railway, a short line operator in

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TABLE 2
VERTICAL CURVES

	Begin MP	End MP	Percent Grade (Range)
1	5.083	6.5	0.0 - 0.4 Percent
2	6.5	6.6	0.5 - 2.4 Percent
3	6.6	7.6	0.0 - 0.4 Percent
4	7.6	8.2	0.5 - 2.4 Percent
5	8.2	8.8	0.5 - 2.4 Percent
6	8.8	9.1	2.5 - 4.4 Percent
7	9.1	9.5	2.5 - 4.4 Percent
8	9.5	10.2	0.0 - 0.4 Percent
9	10.2	10.65	2.5 - 4.4 Percent
10	10.65	10.95	0.0 - 0.4 Percent
11	10.95	11.1	0.5 - 2.4 Percent
12	11.1	11.7	2.5 - 4.4 Percent
13	11.7	13.5	0.0 - 0.4 Percent
14	13.5	14.024	2.5 - 4.4 Percent
15	14.024	14.2	0.5 - 2.4 Percent
16	14.2	14.35	0.0 - 0.4 Percent
17	14.35	14.5	0.5 - 2.4 Percent
18	14.5	14.6	2.5 - 4.4 Percent
19	14.6	15	0.0 - 0.4 Percent
20	15	15.25	2.5 - 4.4 Percent
21	15.25	15.3	0.5 - 2.4 Percent
22	15.3	15.45	0.0 - 0.4 Percent
23	15.45	15.6	2.5 - 4.4 Percent
24	15.6	15.7	0.0 - 0.4 Percent
25	15.7	15.824	2.5 - 4.4 Percent
26	15.824	16.1	0.0 - 0.4 Percent
27	16.1	16.5	0.5 - 2.4 Percent

TABLE 3
ROADWAY CROSS-SECTION

Beginning MP	End MP	Number of Driving Lanes	Lane Width
5.671	5.742	2	14
5.742	6.763	2	12
6.763	12.989	2	11
12.989	14.024	2	12
14.024	15.984	2	11
15.984	16.295	2	12
16.295	16.429	2	12

TABLE 4
AVERAGE RIGHT-OF-WAY WIDTH

Beginning MP	End MP	Average Right-of-Way Width
5.671	6.763	80
6.763	12.989	60
12.989	14.024	150
14.024	17.187	60

TABLE 5
BRIDGES

MP	Bridge Number	Length	Width	Sufficiency Rating	Other Information
6.476	B00026	134	46	83.8	.40 MI SOU. OF JCT KY 270
13.059	B00029	107	45.7	83	.10 MI SOU. OF JCT KY 492

TABLE 6
POSTED SPEED LIMITS

Beginning MP	End MP	Posted Speed Limit
5.671	5.742	25
5.742	6.34	35
6.34	15.65	55
15.65	16.27	35
16.27	16.58	25

this region of the state. The principal commodity shipped along this railroad is coal. More information about this rail line can be found in the Kentucky Transportation Cabinet's 2002 Kentucky Statewide Rail Plan at this web site: http://transportation.ky.gov/Multimodal/railsystems.htm.

For maintenance purposes, it is classified as a State Primary Route between MP 5.671 in Sturgis and the Morganfield Bypass (MP 15.412); between the Morganfield Bypass and the intersection with KY 56 (Main Street in Morganfield, MP 16.339), the study segment of US 60 is classified as a State Secondary Route. It has a Truck Weight Class of "AAA" (80,000 pounds gross weight limit).

TABLE 7
ROADWAY ADEQUACY RATINGS

Beginning MP	End MP	Adequacy Rating	Adequacy Rating Percentile
5.671	5.81	64.2	72
5.81	6.17	63	68
6.17	6.34	84	99
6.34	6.763	64	71
6.763	6.921	67.3	87
6.921	7.197	67.3	87
7.197	9.045	67.3	87
9.045	10.515	67.3	87
10.515	13.289	67.3	87
13.289	14.024	68.5	92
14.024	15.412	67.3	87
15.412	15.516	65.8	78
15.516	15.824	65.8	78
15.824	15.936	65.8	78
15.936	16.27	63	68
16.27	16.339	62	63

TABLE 8
TRAFFIC COUNT INFORMATION

Beginning MP	End MP	Current (2003) ADT
5.671	6.921	6130
6.921	7.197	6560
7.197	10.515	5360
10.515	12.151	5590
12.151	13.289	6520
13.289	15.412	7720
15.412	16.265	9050
16.265	16.339	8260

TABLE 9
MAJOR CROSSROADS AND RAIL CROSSINGS

MP	Description	Functional Classification
5.671	KY 109 (Main Street in Sturgis)	Rural Major Collector
6.335	Railroad Crossing	N/A
6.921	KY 270 East	Rural Minor Collector
7.197	KY 270 West	Rural Minor Collector
10.515	KY 950	Rural Minor Collector
12.151	KY 1176	Rural Local
15.412	Morganfield Bypass	Rural Minor Arterial
16.339	KY 56 (Main Street in Morganfield)	North Side: Rural Minor Arterial South Side: Rural Major Collector

Between MP 5.671 in Sturgis and the Morganfield Bypass (MP 15.412), US 60 is a part of the State Designated portion of the National Truck Network. The study segment of US 60 is not part of the National Highway System, the Forest Highway System, the Bicycle Route System, or the National or Kentucky Scenic Byway System.

C. Highway Systems

The study segment of US 60 is functionally classified as a Rural Minor Arterial. This functional classification is used to describe highway segments that:

- Link cities and larger towns
- Are part of an integrated network providing intercounty service
- Serves mobility as a higher priority than providing access
- Serves trips that may be of relatively long distance
- Have relatively high average travel speeds with minimum interference to through movements

D. Vehicle Crash Analysis

A total of two hundred (200) vehicle crashes were recorded with valid reference points on the study segment of US 60 during the three-year period between January 1, 2000 and December 31, 2002. Sixty-eight of the crashes produced injuries to at least one person, while two crashes resulted in fatalities. Table 10 depicts a segmental analysis of the study segment of US 60. As indicated therein, there are three segments with a critical rate factor (CRF) in excess of 1.0 [(1)]. Pinpointing spots within these sections indicate two spots with a CRF in excess of 1.0. Specific crash data summaries were prepared for the three segments and two spots for which the CRF exceeded 1.0; this information is summarized in Table 11 and depicted graphically in Exhibit 3. In general terms, it appears that the typical crash along these segments and spots of the study portion of US 60 occurred during daylight hours in clear weather with a dry roadway; one vehicle "rear-ending" another on a straight and level roadway segment was the most common type of crash.

E. Traffic and Level of Service

The average daily traffic volume (ADT) in the Year 2002 varied from about 4500 vehicles per day west of Morganfield to approximately 8500 vehicles daily within Morganfield (Table 12). Year 2002 level of service is "C" except within Morganfield where it is "D". Projected future year (2030) average daily

1. The critical crash rate factor (CRF) is the quotient of the crash rate for a roadway spot or segment divided by the critical crash rate for roadway spots or sections based on the roadway type, number of lanes, and median type. The critical crash rate is the sum of the average crash rate for a given roadway type plus a factor which measures the exposure (vehicle miles of travel) to possible crashes. A critical crash rate factor greater than one is indicative of the statistical probability that crashes are not occurring randomly at the spot or in that segment.

Table 10 Goes on This Page

Table 11 Goes on This Page

traffic volumes, based on an assumed annual growth rate of 2.4 percent, ranges from 8700 vehicles per day to 16,600 vehicles. These projected future year average daily traffic volumes would result in a level of service of "D" except within Morganfield where it would be "E" without any improvements. Current truck volumes are 6.4% of total vehicular traffic.

TABLE 12
CURRENT (2002) AND PROJECTED FUTURE YEAR (2030)
AVERAGE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE

Begin MP	End MP	2002 ADT	2002 Level of Service	Projected 2030 ADT	Projected 2030 Level of Service
5.671	5.848	6630	C	12900	D
5.848	6.200	6980	C	13600	D
6.200	7.197	6130	C	11900	D
7.197	10.515	5360	C	10400	D
10.515	13.289	6520	C	12700	D
13.289	15.412	4500	C	8700	D
15.412	16.265	4500	C	8700	D
16.265	16.300	8520	D	16600	E

Sources: Highway Information System (HIS) Database and Highway Capacity Manual 2000

III. CABINET, PUBLIC, AND AGENCY INPUT

A. Project Team Meeting

A programming study project team meeting was conducted on April 9, 2003. The purpose of the meeting was to discuss the project and to assist in determining issues and concerns to be addressed in the study. A copy of the minutes is included in Appendix A. Issues and concerns discussed by the project team with observations and conclusions are as follows:

- The project area as defined in the 2002 Kentucky Six-Year Highway Plan is along existing US 60 from Main Street in Sturgis (KY 109) to Main Street in Morganfield (KY 56). However, it was noted that the section in Morganfield from MP 15.412 (junction with Morganfield Bypass) and MP 16.339 (Main Street in Morganfield) might be treated as a separate section in future project development phases. The project area is shown graphically in Exhibits 4 and 5.
- Traffic data (as discussed above)
- Crash data (as discussed above)
- No previous design plans have been found. However, at least two previous planning studies (excluding several planning studies for the Morganfield Bypass) have been conducted:

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- *Project Planning Report, US 60, Paducah to Lewisport* completed in 1988 by the Division of Planning, Kentucky Transportation Cabinet. That study ranked the segments of US 60 in Union County between Sturgis and Morganfield needing improvement as follows:
  - ✓ MP 4.8 to 8.3: Ranked 8th (out of 35 segments); study recommended a bypass of Sturgis for this segment.
  - ✓ MP 8.3 to 13: Ranked 10th
  - ✓ MP 13 to 15.2: Ranked 7th

  (It should be noted that the segment between MP 15.2 and 17.8 ranked as the highest priority segment of the entire route with the recommendation that a bypass of Morganfield be constructed; this has subsequently occurred.)
- *Advance Planning Study for US 60 from Paducah to Henderson* completed in 1998 by Bernardin-Lochmueller and Associates for the Division of Planning, Kentucky Transportation Cabinet. That study ranked the segments of US 60 in Union County between Sturgis and Morganfield needing improvement as follows:
  - ✓ MP 4.8 to 8.3: Ranked 7th (out of 27 segments for which no improvements were programmed at the time of that study); study recommended a bypass of Sturgis for this segment.
  - ✓ MP 8.3 to 10.5: Ranked 10th
  - ✓ MP 10.5 to 13.3: Ranked 9th
  - ✓ MP 13.3 to 15.2: Ranked 8th
- MP 15.2 to 17.8: Noted that a Morganfield Bypass was in the Six-Year Highway Plan at that time; as noted above, this has subsequently occurred.

These studies varied in their priority designation along what would become the current study segment. The 1988 study ranked the section in mid-Union County lower than the segments near Sturgis and Morganfield. The 1998 study essentially ranked the segments of US 60 in Union County from east to west in priority.

- No ITS solutions were apparent to the project team
- It was noted that the Rambling River Bike Tour is located on KY 130 adjacent to the study segment of US 60. No dedicated bicycle facilities are anticipated at this time for future US 60 project development activities, as the shoulder widths for the assumed roadway cross section would be sufficient to accommodate bicycle traffic. However, in accordance with Cabinet policy, this issue should be evaluated further during future project development phases.
- No significant property relocations had been experienced on other, nearby sections of US 60 so none were anticipated along the study segment since homes were located at some distance from the roadway. The exception to this generality would be within Sturgis, where there are also historic property concerns. It was felt that the market could easily observe whatever relocations ultimately were required.

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- The Green River Area Development District was to be asked to perform an Environmental Justice analysis.
- Logical Termini:
  - Morganfield Bypass on the east
  - The proposed Sturgis Bypass on the west, though no development of that project has yet been initiated
  - Analysis of US 60 west of an assumed Sturgis Bypass should be considered separately
- Project Goals and Objectives were determined to be:
  - Provide corridor and system connectivity between recent and planned future improvements to US 60 from Paducah to Henderson
  - Increase capacity to handle existing and projected future traffic volumes
  - Improve safety by correcting horizontal and vertical curvature deficiencies, and by providing lane and shoulder widths that meet current standards
  - Enhance the regional and local transportation network by improving access to schools and the hospital
- Initial cost estimates developed in the 1998 Bernardin-Lochmueller Study referenced above (and extracted into Table 13 below) appear reasonable
- QK4 consultants were to provide the project environmental footprint
- Probable Design Criteria
  - Rural Minor Arterial
  - Future Year Design Hour Volume of 1530 vehicles
  - 55 mph Design Speed except for urban curb and gutter sections where a 45 mph Design Speed should be assumed
  - Typical cross sections similar to recent US 60 improvements (see Appendix B)
  - Partial control of access is assumed in rural areas
  - Access by permit is assumed in urban areas
- The project team concluded that it is likely that improvements could be made along the existing corridor for most of the route. Two areas of concern cited were the schools and the hospital. The team concluded that it may be desirable to look at larger areas for alternatives at these locations in order to

TABLE 13
SEGMENT COST ESTIMATE BY PHASE

Begin MP	End MP	Cost Estimate (millions of dollars)				
		Design	R/W	Utilities	Construction	Total
4.8	8.3	1.0	1.8	1.2	14.4	18.4
8.3	10.52	0.7	2.2	1.6	10.0	14.5
10.52	13.29	0.9	2.5	1.7	12.5	17.6
13.29	15.20	0.6	1.7	1.1	8.6	12.0

Source: Advance Planning Study US 60, Paducah to Henderson, prepared by Bernardin-Lochmueller and Associates, Inc. for the Division of Planning, Kentucky Transportation Cabinet, April, 1998. These cost estimates were based on an assumed 4-lane cross section and were determined using cost per mile figures on similar projects. These are considered to be Class E cost estimates in the Division of Planning's Unscheduled Needs List.

avoid potential "Section 4(f)" areas and to avoid/minimize adverse impacts to the schools or the hospital. The area known locally as Blueberry Hill just north and east of Sturgis is another area where it may ultimately be desirable to deviate from the existing corridor.

B. Local Officials and Group Meetings

No public meetings were held during the course of this study since no further project development phases are currently funded. However, a meeting was held on July 7, 2003 with local officials in the area; minutes of this meeting may be found in Appendix C. Representatives of the Union County Board of Education, the Union County Economic Development Office, the Union County Fiscal Court, the Union County Planning Commission, the City of Morganfield, and the Green River Area Development District attended the meeting which was held in the conference room of the Paul Herron Technology Center adjacent to the Union County High School which is located along the study segment of US 60. KYTC officials discussed the issues that the Planning Study Project Team had articulated for the US 60 corridor as outlined above. In addition, local officials raised these issues:

- Problems within Morganfield may be due to bad lines of sight and/or on street parking;
- Better signage needed at Morganfield Bypass (KYTC District Personnel pointed out that improved signage would soon be installed.);
- There is a perception that bypass is not yet fully utilized; driving public not yet "used to using bypass";
- Desire that there ultimately be a southern bypass of Sturgis;
- There is a desire that any future roadway development concept be cognizant of slow moving vehicles (e.g. farm vehicles) that tend to become the controlling vehicles for traffic flow;
- A preference was expressed for future improvements to stay close to the existing roadway;
- Concerns were expressed about fair treatment in future right-of-way acquisition;
- Those present agreed with the four project goals identified by the Planning Study Project Team as outlined in Section A.

C. Resource Agency Coordination

Early agency coordination letters were sent to various resource agencies, interested organizations, local officials, and internal Cabinet offices to obtain input and comments regarding the potential impacts associated with this project. Copies of the request letter, mailing list, and the responses are included in Appendix D. Issues identified and concerns raised as a result of this process include:

- Kentucky Cabinet for Workforce Development: Supported concept of project.
- KYTC Division of Environmental Analysis: Indicated that air quality would likely not be an issue on this project; noted presence of many streams, flood prone areas, and wetlands throughout the area; these areas should be avoided if possible as these areas would pose mitigation issues if impacted and permits may be needed depending upon final project design details; a base study of wetlands will likely be required; an assessment of the immediate area near sinkholes may be warranted as there is a potential for agricultural and/or chemical runoff to enter the groundwater system through these sinkholes; a thorough site assessment would be needed to obtain specific details concerning hazardous materials (HAZMAT) and storage tanks; potential Section 4(f) and Section 106 issues exist in the corridor; a full baseline study will be needed and impacts to these resources should be avoided or minimized; farmland impacts, drainage concerns, and potential relocations could be substantial; biological assessments for the Indiana bat and the Gray bat will be required as will coordination with the U.S. Fish and Wildlife Service.

- Natural Resources Conservation Service, U.S. Department of Agriculture: expressed a general concern about potential impacts on prime farmland soils and farmlands of statewide importance.

- Permits Branch, KYTC Division of Traffic Operations: urged that this project be classified as a partially controlled access facility and discussed procedural requirements if this happens; recommended that design speed used in subsequent project development phases be the same as anticipated posted speed; recommended construction of access control fence; requested notification if this project were to be added to the National Highway System.

- Kentucky Geological Survey, University of Kentucky: Provided a list of general comments and specific concerns.

- Division of Air Quality, Department for Environmental Protection: Noted general concerns about Fugitive Emissions, open burning, and air quality conformity.

- Kentucky State Nature Preserves Commission, Natural Resources and Environmental Protection Cabinet: noted the absence in their database of any KSNPC listed species or unique natural areas that would be impacted by implementation of this project.

- Department of Fish and Wildlife Resources, Kentucky Tourism Development Cabinet: Notes likely presence of federally and/or state designated threatened or endangered species and included a list; noted potential negative impacts to aquatic resources and recommended procedural and mitigational efforts during subsequent project development phases in that regard; noted potential impacts to wetlands and recommended procedural techniques to be employed during subsequent project development phases.

- Union County Economic Development Foundation: Recommended that the study not consider urban sections within Sturgis and Morganfield.

- Geotechnical Engineering Branch, KYTC Division of Materials: noted presence of abandoned coal mines in region and noted their potential for mine subsidence problems in the area; noted presence of numerous oil and gas wells, as well as water injection wells (used to enhance oil recovery); indicated that US 60 in the study segment is in Seismic Risk Zone 3 (which is defined as an area of heavy property damage due to earthquake activity); listed some general geotechnical considerations.

- Office of Environmental Services, Kentucky Department of Agriculture: Stated preference for alternative improvement concepts that would disrupt the least amount of farmland.

- Resource Conservation and Local Assistance Branch, Division of Waste Management, Department for Environmental Protection: Requests the use of pulverized glass aggregates in roadbed construction during subsequent project development phases.

- Superfund Branch, Division of Waste Management, Department for Environmental Protection: There are twenty Superfund sites listed in Union County (Appendix D). A more detailed analysis of these features will be conducted as a part of any future project development activities.

- Underground Storage Tank Branch, Division of Waste Management, Department for Environmental Protection: There are 78 underground storage tank (UST) sites listed in Union County (Appendix D). A more detailed analysis of these features will be conducted as a part of any future project development activities.

- Enforcement Branch, Division of Waste Management, Department for Environmental Protection: There are three sites in Union County that have previously been investigated.

- Division of Forestry, Department for Natural Resources: Expressed concern about potential removal of large trees of native species during future construction. Expressed concern about potential loss of agricultural land and sedimentation issues.

- Sturgis Chamber of Commerce: Endorsed concept of a four-lane improvement between Sturgis and Morganfield.

- City of Sturgis: Endorsed concept of a four-lane improvement between Sturgis and Morganfield.

- Union County Planning Commission: Noted that the Union County Comprehensive Plan includes the development of a four-lane improvement between Sturgis and Morganfield.

- Centers for Disease Control and Prevention, Public Health Service, U. S. Department of Health and Human Services: Outlined issues that they want considered as a part of future project development phases, including air quality, water quality and quantity; wetlands and floodplains, hazardous materials and wastes, non-hazardous solid wastes and other materials, noise, occupational health and safety, land use and housing, and environmental justice.

- Fish and Wildlife Service, U.S. Department of the Interior: Encouraged use of Best Management Practices during future construction; indicated the possible presence of one Threatened or Endangered Species (Indiana bat) and outlined procedures to follow associated with that issue in future project development phases.

- The following agencies responded to KYTC's solicitation for comments, but had none at this time:
  - Kentucky State Police
  - Division of Aeronautics, Kentucky Transportation Cabinet
  - Kentucky Department of Military Affairs
  - Department for Surface Mining Reclamation and Enforcement

IV. ENVIRONMENTAL AND SOCIOECONOMIC OVERVIEW

A. Environmental Footprint

Presnell Associates, Inc. (d/b/a "QK4"), under contract to assist the Division of Planning, developed an Environmental Overview Report as shown in Appendix E. Included in that report was environmental resource data portrayed graphically on both USGS topographic and KYOGIS orthographic base maps. Issues identified as possibly requiring particular consideration in subsequent project development phases include:

- Culturally sensitive locations:
  - Five cemeteries
  - Numerous churches
  - Methodist Hospital
  - Union County Vocational School
  - Union County High School
  - Union County Middle School
  - Union County Fairgrounds

- No properties listed on the National Register of Historic Places, but seventeen historic sites; twelve of these sites have the potential to meet NRHP criteria. Two historic farms may also be located in the project study area.

- The archaeological overview revealed the project study area to be largely uninvestigated but full of archaeological potential. Additional archaeological investigations will be required in subsequent project development phases.
- Sixty-four surface streams generally feeding the Tradewater River.
- The requirement for development of a non-point source pollution control plan.
- No nationally or state listed wild and scenic rivers.
- The existing route crosses the 100-year floodplain of Cypress Creek east of Sturgis.
- Numerous wetlands
- Various permits
- Construction restrictions/conditions associated with the likely presence of the Indiana bat and/or the gray bat
- No known managed land areas or agricultural districts in the project study area.
- Significant acreage of prime and/or statewide important farmland in the project study area.
- Twenty-nine possible contamination sites

B. Environmental Justice

The Green River Area Development District (GRADD) conducted a review of the 2000 Census data for the purpose of identifying environmental justice and community impact issues. The purpose of this review was to assist the Kentucky Transportation Cabinet in meeting the requirements of Federal Executive Order 12898, which states that "….each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" and hence to ensure equal environmental protection to all groups potentially impacted by the US 60 project. Although EO 12898 does not specifically address consideration of the elderly population, the U. S. Department of Transportation encourages the consideration of this demographic subset in Environmental Justice discussions. In addition, GRADD identified a list of nearly sixty community leaders with whom the possible effects on the community of the potential highway project under analysis herein were discussed. A copy of GRADD's Environmental Justice and Community Impact Report is included in Appendix F.

The GRADD study concludes that the potential for disproportionately high and/or adverse affects on minority, low income, and/or elderly populations impacted by the US 60 project is generally small. (Although not a part of the required demographic analysis, GRADD reached this same conclusion in regard to disabled persons.) The study area for the US 60 project encompasses four Census Blocks: Blocks 1, 3, and 4 of Census Tract 9503 and Block 7 of Tract 9502. Table 14 summarizes the pertinent demographic factors of these four Census Blocks in comparison to county, statewide, and nationwide figures.

Demographic measures for which the data in a Census Block exceeds the corresponding figure for Union County as a whole are highlighted in red. As can be seen therein, the potential environmental justice consequences are greatest within the town of Sturgis.

TABLE 14
SELECTED CENSUS DATA FOR US 60 STUDY REGION

Census Unit Tract	Block	% Minority Persons [1]	% Low Income	% Elderly Persons	% Disabled
9502	7	2.6%	9.1%	12.7%	20.1%
9503	1	1.6%	10.9%	13.8%	32.9%
9503	3	3.8%	15.6%	17.2%	53.5%
9503	4	15.3%	4.4%	18.4%	63.2%
Union County		14.7%	17.7%	12.8%	42.0%
Kentucky		9.9%	15.8%	12.5%	41.7%
United States		29.7%	12.4%	12.4%	31.7%

1. For purposes of this table, "minority" is defined as non-white.

V. TERMINI AND LENGTH

As indicated previously, the project termini, as described in the 2002 Kentucky Six-Year Highway Plan, were quite specific: from milepoint 5.671 (the intersection with KY 109 (Main Street) in Sturgis) to milepoint 16.339 (the intersection with KY 56 (Main Street) in Morganfield).

VI. DRAFT PROJECT GOALS

As articulated by the US 60 Project Team, four goals were envisioned to be achieved by the completion of this project:

- Provide corridor and system connectivity between recent and planned future improvements to US 60 from Paducah to Henderson;
- Increase capacity to handle existing and projected future traffic volumes;
- Improve safety by correcting horizontal and vertical curvature deficiencies, and by providing lane and shoulder widths that meet current standards;
- Enhance the regional and local transportation network by improving access to schools and the hospital.

In terms of meeting federal (FHWA, CEQ) and KYTC guidance for development of a purpose and need statement for subsequent project development phases, if any, these four draft project goals reflect respectively the factors of system linkage, capacity, safety/roadway deficiencies, and social demands.

VII. RECOMMENDATIONS

A. Geometric Design Features

Probable design criteria were discussed by the US 60 project team, which agreed to the following recommendations:

- The functional classification of US 60 in Union County is currently Rural Minor Arterial. It is not expected that this functional classification will change, at least until such time that US 60 improvements are completed between Henderson and US 641 in Marion.

- The design year for this study will be 2030. The average daily vehicular traffic in 2030 ranges from about 8700 vehicles in the vicinity of the Morganfield Bypass to about 16,600 vehicles in downtown Morganfield (Table 12) with a design hour volume (DHV) at these respective locations of 985 and 1875.

- The expected design speed will be 55 mph to match the posted speed limit, except that the design and posted speeds may be lower near Sturgis and Morganfield.

- The typical cross-section for four-lane Rural Minor Arterial roads with a 62-mph design speed in rolling terrain with partial control of access is 12-foot lanes with 6-foot inside shoulders and 12-foot outside shoulders. A median width of 28 feet in addition to the inside shoulders is also included, resulting in a total median width of 40 feet. This would result in a roadway cross-section consistent with other planned or completed US 60 improvements in the region. Curb and gutter with sidewalks should be considered for the portions of the roadway in Sturgis and Morganfield.

B. Priority Segments and Cost Estimates

It is recommended that the priority section for subsequent project development phases of this project begin at the Morganfield Bypass (MP 15.412) and terminate at KY 950 (MP 10.515). The second priority is recommended to be the section immediately west of the first priority section, beginning at KY 950 (MP 10.515) and terminating at KY 270 west (MP 7.197). The exact termini of the third priority section would not be determined until such time that a final Kentucky Transportation Cabinet decision has been made concerning a bypass of Sturgis; the segment of US 60 beginning at the eastern terminus of any Sturgis bypass (or, alternatively, Main Street in Sturgis (MP 5.671)) and terminating at KY 270 west (MP 7.197) would be the third priority section. The fourth priority segment would begin at Main Street in Morganfield (MP 16.339) and terminate at the Morganfield Bypass (MP 15.412). Cost estimates for these segments are depicted in Table 15.

TABLE 15
COST DATA BY RECOMMENDED SECTION

Priority Segment	1	2	3	4
Development Characteristic	Primarily Rural	Rural	Urban Fringe	Urban
Western MP	10.515	7.197	5.671[2]	15.412
Eastern MP	15.412	10.515	7.197	16.339
Length	4.897	3.318	1.526	0.927
Preliminary Design/Location Approval	$0.50[1]	$0.35	$0.15	$0.25
Final Design	$1.50	$1.00	$0.40	$0.40
R/W Acquisition	$5.00	$3.50	$2.50	$1.50
Utility Relocation	$3.00	$2.00	$2.00	$1.30
Construction	$23.00	$15.00	$8.40	$5.10
Total Cost	$33.00	$21.85	$13.45	$8.55
Total Cost per Mile	$6.74	$6.59	$8.81	$9.22

(1) All Costs in Millions; (2) Assumed to be junction with KY 109 for cost estimating purposes only.

C. Programming Estimates

For programming purposes, cost estimates for priority segment 1 are recommended. As shown in Table 15, the phase cost estimates for this alternative are as follows:

Location Approval:	$ 500,000
Final Design:	$ 1,500,000
Right-of-Way:	$ 5,000,000
Utilities:	$ 3,000,000
Construction:	$ 23,000,000

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IX. CONTACTS

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