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US 51 Planning *Study*

Bardwell, Kentucky
Carlisle County

Final Report

Summary of Findings and Recommendations

KENTUCKY TRANSPORTATION CABINET

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Study Background and Purpose

The US 51 Study in Bardwell, Kentucky is a planning and feasibility study to assess the need for potential improvements to US 51 in the vicinity of Bardwell in Carlisle County, Kentucky. The Kentucky Transportation Cabinet (KYTC) initiated the study in 2002 as part of the implementation of the KYTC Six-Year Highway Plan. This project was programmed in the highway plan in response to a 1995 US 51 Wickliffe to Fulton corridor study. The 1995 study concluded that widening US 51 from Wickliffe to Fulton was not warranted. However, it identified the portion of US 51 through the town of Bardwell as a potential future traffic congestion area.

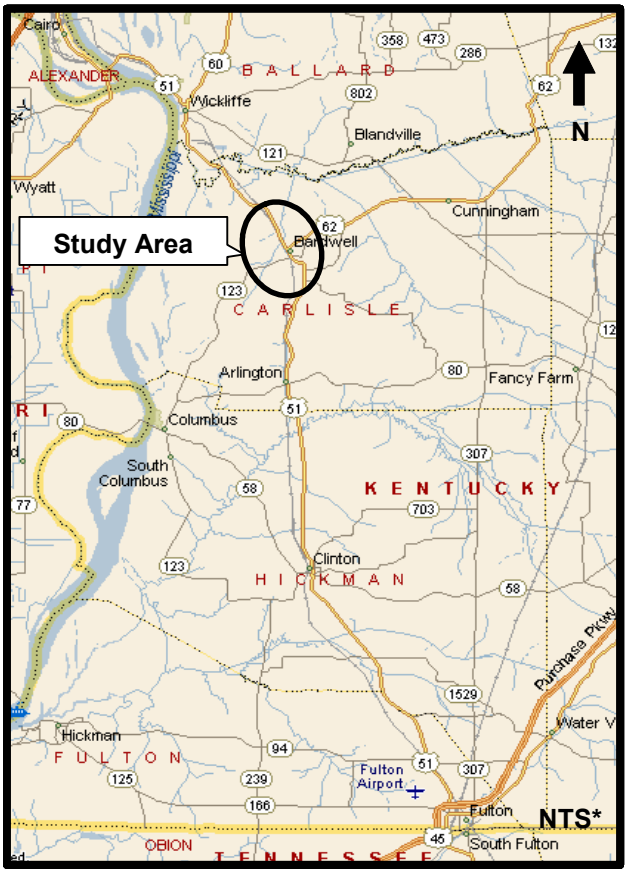
This current study therefore examined traffic and highway conditions on US 51 in Bardwell to confirm whether there are current or projected future deficiencies and to evaluate the extent of those deficiencies. A range of improvement alternatives were developed to address each identified deficiency. The alternatives were then compared and evaluated based on transportation, community, economic, environmental, and construction benefits and impacts/costs. The result of the study was a recommended set of highway improvements for future implementation.

At the outset of the project, KYTC informed the project team, local officials, and members of the public that the study would examine a wide range of possible improvements from doing nothing, to in-town improvements, to bypass alternatives. The Cabinet also made it clear that there was not a predetermined solution or outcome to the study.

Study Location and Limits

US 51 is a north-south highway in Western Kentucky, connecting Cairo, Illinois to Fulton, Kentucky near the Tennessee border. Bardwell, Kentucky is located along US 51 in Carlisle County. This study is limited to the portion of US 51 in the vicinity of Bardwell and extends from KY 1203 in the north to half a mile beyond KY 1377 in the south for a distance of approximately six miles. Figure ES 1 illustrates the study location.

Figure ES 1: Study Location



*NTS = Not to Scale

No-Build Conditions Analysis

US 51 is an undivided two-lane highway. Average daily traffic volumes (ADT) peak at approximately 5,600 ADT in town, with 2,600 ADT north of town and 2,800 ADT south of town. Truck traffic percentages are approximately 15% south of town, 22% north of town, and 9% in town. Based on the traffic volumes, the current traffic levels of service (LOS) are acceptable (LOS B or C) indicating little vehicle delay and good

traffic flow conditions from a capacity standpoint.

Traffic growth on US 51 in Bardwell has been modest over the last 15 years with an average growth rate of 0.6% per year at the ten study area count stations. In fact, traffic volumes are lower now on US 51 than they were in the late 1970s due to the construction of I-55 in Missouri. However, for purposes of this study a 1.5% growth rate was applied to evaluate how traffic conditions would change if the traffic growth rate were higher than it has been historically. Using the 1.5% growth rate, traffic volumes increase to a high of approximately 8,500 ADT in 2030, with volumes of around 4,000 ADT north and south of town. Using these traffic volumes and assuming no highway improvements, the side street approaches to two intersections in town are projected to be below the threshold of LOS C in 2030. This is associated with the left turn movements from the minor streets onto US 51.

There are several geometric issues with the current highway. While the average lane width is 11 feet, there are sections with limited shoulders of well less than 3 feet. There are no curb and gutter sections in the town. There is one sharp curve south of town with limited sight distance. There is also one steep hill south of town. Intersection corner radii are too small for trucks at two key intersections. There is one unwarranted traffic signal. There are no left turn lanes to or from US 51 (though this does not create a capacity problem at present). There are utility poles and trees in close proximity to the traveled way. Many sidewalks on US 51 are in disrepair, and there are discontinuities in the sidewalk system.

A review of recent crash data showed that US 51 through Bardwell has a high crash rate compared to the statewide average. Specifically, US 51 from East Court Street to US 62 had a critical crash rate 1.67 times higher than the critical crash rate threshold. In addition, there were two crash clusters observed in the study area, one of which exceeds the statewide average. This location between Jennings Street and KY 123 had a crash rate 1.17 times higher than the critical spot crash rate. These high crash locations indicate the possible need for improvements to the existing highway.

Project Issues and Goals

Based on the technical analyses, as well as extensive public involvement, the Project Team identified a number of important issues for consideration in examining US 51 in Bardwell. A list of these issues is provided below:

- Vehicular Safety and Highway Design
- Pedestrian Safety
- Truck Traffic
- Traffic Flows
- Economic Development and Regional Access
- Environmental Issues
- Community Character and Beautification / Amenities
- Utilities and Drainage
- Historic Preservation and Property Impacts
- Low-Income and Senior Populations
- Bicycle / Pedestrian Facilities and Streetscape Improvements

The goals for projects to be evaluated in the US 51 study directly relate to the key issues discussed above. These goals were developed with extensive input from the

local community as well as the project team and technical analysis. The key project goals include:

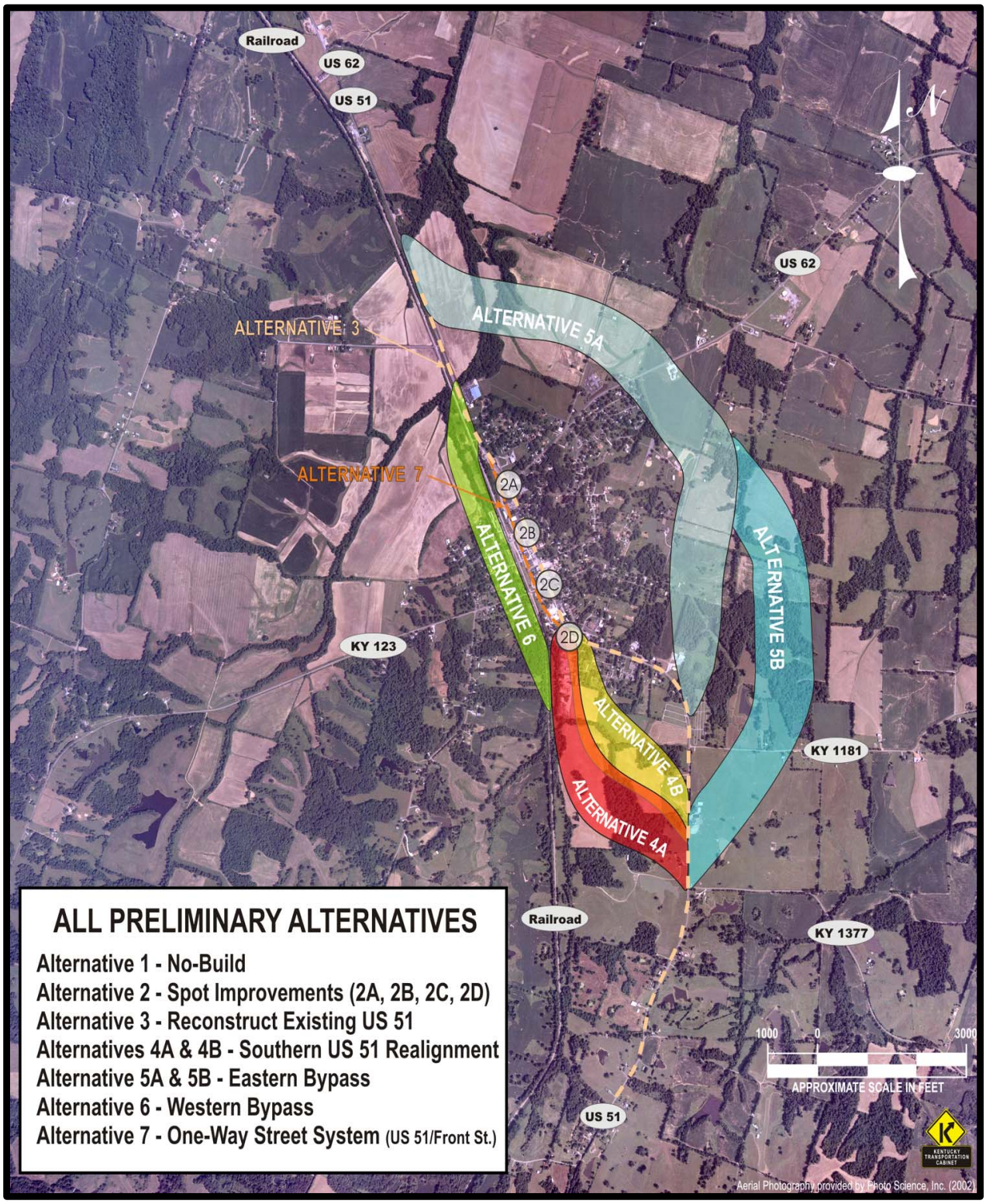
1. Mitigate the negative impacts of heavy truck traffic on US 51, while maintaining an efficient through route for trucks and other vehicles;
2. Preserve downtown business and community character;
3. Maintain appropriate traffic controls and traffic flow conditions;
4. Avoid, minimize, and/or mitigate property takings as well as other community and environmental impacts (This was put forward specifically by many local citizens and has been included even though it is understood to be part of the normal KYTC planning and design process);
5. Improve highway geometry and drainage;
6. Enhance vehicle and pedestrian safety on US 51 in the study area; and
7. Enhance the visual aspects of the community infrastructure and provide improved recreation (bicycle/pedestrian) facilities in keeping with the local economic development goals.

Alternatives Development

In response to roadway deficiencies identified in the No-Build Conditions analysis and the project issues and goals listed in the previous section, nine alternatives were developed. The alternatives were based on both technical analysis and public input. They are shown in Figure ES 2 and include:

- Alternative 1 – No-Build
- Alternative 2 – Spot Improvements
  - 2A – US 51 / US 62 / Front Street Intersection
  - 2B – US 51 / Jennings Street Intersection
  - 2C – US 51 / KY 123 (Elsey Avenue) Intersection
  - 2D Curve – US 51 at Curve by Methodist Church
  - 2D Hill – US 51 at Hill by the Lions Club Building
- Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes
- Alternative 4A – US 51 Realignment West of the Methodist Church
- Alternative 4B – US 51 Realignment East of the Methodist Church
- Alternative 5A – US 51 Bypass from the Curve near the Fire Station
- Alternative 5B – US 51 Bypass from South of the Bardwell Cemetery
- Alternative 6 – US 51 Western Bypass
- Alternative 7 – One-Way Street System (US 51 and Front Street)

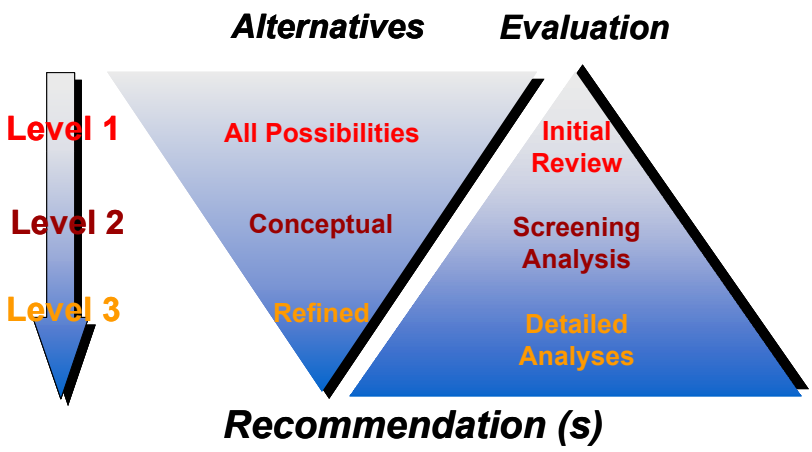
Figure ES 2: All Preliminary Alternatives



Alternatives Evaluation

The evaluation process used in this study is a three-step process (see Figure ES 3). The goal is to successively refine the list of alternatives from all possible alternatives, to a short list of promising alternatives, and then finally to the recommended alternative(s). The evaluation begins at Level 1 with a qualitative analysis applied to all possible alternatives. Alternatives advanced to Level 2 are subjected to a more detailed analysis that combines both qualitative and quantitative evaluation criteria. The final level, Level 3, uses the most detailed information about each of the remaining alternatives to select the recommended alternative or set of alternatives.

Figure ES 3: Three-Level Process



Recommendation

The final recommendation for improvements to US 51 through Bardwell is Alternative 3 which includes Alternatives 2A, 2B, 2C, and 2D. The Alternative 3 improvements could be constructed in three phases, with Phase 1 consisting of Alternatives 2A, 2B, 2C, and reconstruction of US 51 through town. Phase 2 consists of Alternatives 2D Curve and Hill, and Phase 3 is improvements to US 51 south of town.

Alternative 2A was selected based on a recognized need for traffic flow improvements, access management, and increased turning radii for trucks at the intersection of US 51 and US 62. It also had considerable community support. Alternative 2B was selected since the current signal is not warranted and the removal will eliminate unnecessary stops through town. Again, it had strong community support. Alternative 2C was selected because the current corners of the intersection of US 51 and KY 123 are deficient with regard to truck turning movements. The proposed increases in radii will allow for greater turning safety and ease, and can be accomplished at a low cost. The installation of a signal in the future will address future traffic flow issues. Alternative 2D, both the curve and the hill, was selected as a recommended alternative to improve the safety of the section of US 51 in the vicinity of the curve by the Methodist Church. This section of US 51 was identified as a problem area through the analysis of crash data on US 51. The analysis revealed a high crash location through Bardwell to East Court Street just past the church.

Finally, the recommendation includes the reconstruction of US 51 through town. This will improve safety and traffic flow generally in the area with wider lanes and other improvements. The reconstruction will also improve drainage through town through the installation of a better drainage system. The installation of curb and gutter will improve

safety by limiting access to US 51 from the development located through town. The construction of sidewalks will improve accessibility for pedestrians through town, and should improve the aesthetics of the roadway. South of town, improvements are to be made to the curves and hills to improve roadway safety.

1.0 INTRODUCTION

In 1995, the Kentucky Transportation Cabinet (KYTC) Division of Transportation Planning completed a study examining the US 51 corridor from Fulton to Wickliffe. The purpose of the study was to evaluate the need for future improvements in the corridor. In the study, KYTC concluded that corridor-wide improvements, including widening to four lanes, were not warranted. Instead, the No-Build option was recommended. However, KYTC did recommend that bypasses be considered for Bardwell (Carlisle County) and Clinton (Hickman County), based on projected poor traffic flow conditions in 2020.

In 2002, the KYTC initiated a more extensive planning study to re-evaluate and specifically define the need for improvements to US 51 in the vicinity of Bardwell. The KYTC Division of Planning intended for the study to examine a wide range of possible alternatives from doing nothing, to in–town improvements, to bypass options. The KYTC Division of Planning made it clear to both the project team and the community that there was not a predetermined solution or outcome for the study.

Members of the project team included: KYTC Central Office Division of Planning, KYTC Central Office Division of Design, KYTC District 1 – Planning, KYTC District 1 – Design, Federal Highway Administration, and the Purchase Area Development District. KYTC selected the consulting firm of Parsons Brinckerhoff (PB) to lead the study effort. Three specialty subconsultant firms were also employed: Jordan, Jones and Goulding for traffic forecasting and analysis; Third Rock Consultants for the environmental overview; and Cultural Resource Analysts for the historic and archeological overview.

1.1 Study Objectives

Based on the initial direction provided by the KYTC Division of Planning, the project team developed six primary study objectives as summarized below.

1. Examine the current and future transportation conditions on US 51;
2. Determine where (or if) there are problems or deficiencies;
3. Define the key project issues and project goals;
4. Develop a range of possible alternatives to address the identified problems;
5. Evaluate and compare the alternatives (including the No-Build), considering transportation, community, environmental, and economic benefits and impacts; and
6. Recommend a preferred alternative or set of alternatives for implementation.

While KYTC has the ultimate responsibility for constructing and maintaining safe and efficient highways, KYTC desires to incorporate public and agency input into the evaluation and decision making process. Therefore, all six of these study objectives were addressed in coordination with a comprehensive public and agency involvement program.

1.2 Project Location and Study Area

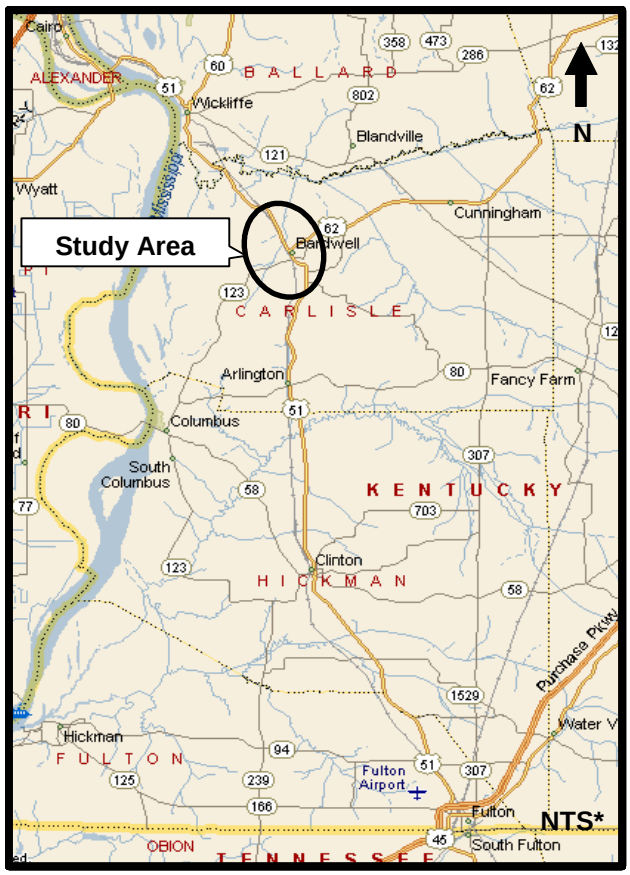
The town of Bardwell is located in Carlisle County in Western Kentucky as shown in Figure 1.

Figure 1: Location of Study Area in Kentucky

Figure 2 shows the general location of the study area within Carlisle County.

The project team set a study area boundary to determine the extent of US 51 to be studied and to establish an approximate limit for investigating new bypass corridors. The study area runs from the vicinity of Tom Loney Road in the south to KY 1203 in the north. This is a distance of approximately 6 miles (from milepost 4.9 to milepost 10.9). To the east and west, the study area extends approximately one to two miles from US 51. Figure 3 (Appendix B) shows the specific study area boundary. Large tables and figures are in Appendices A and B for reference.

Figure 2: Study Location



*NTS = Not to Scale

1.3 Study Process

The study process used to examine US 51 in Bardwell consisted of four major elements: 1) Define project issues and goals, 2) Develop alternative corridors, 3) Evaluate the alternatives, and 4) Recommend an alternative(s).

The subsequent chapters in this report follow these steps, beginning with the development of the key project issues and goals. The following six chapters contain the technical analysis and documentation used to confirm the issues and goals and then develop the alternatives. These chapters include an analysis of existing and future no-build highway conditions, a review of related studies, an overview of past and future transportation projects, a summary of the human environment, a summary of the natural environment, and a geotechnical overview. In addition to the technical analysis, public input and feedback was gathered throughout the study process. The framework for including the public in the study process, and agency coordination efforts are presented in the section following the technical analysis. Next, the discussion of the alternatives development procedure and a description of the initial alternatives are presented. Once defined, the initial alternatives were subjected to a three-level evaluation procedure. The goal of the three-level evaluation process was to successively refine the list of alternatives from all possible alternatives (Level 1), to a short list of promising alternatives (Level 2), and then finally to the recommended alternative(s) (Level 3). Each of these evaluation levels is presented in the report. The final stage in the study process was to recommend an alternative(s), which is also the final section in this report.

2.0 STUDY ISSUES AND GOALS

2.1 Project Issues

Based on the technical analyses, as well as extensive public involvement, the Project Team identified a number of important issues for consideration in examining US 51 in Bardwell. A summary of the issues is given below.

Vehicular Safety and Highway Design – There are a number of roadway deficiencies on US 51 in the study area, including poor lines of sight, narrow shoulders, sharp curves, damaged curbs and sidewalks, an unwarranted signal, no turn lanes, lack of access control, and angled intersections. Locations with safety concerns include US 51 through town (high crash rate); the curve by the Methodist Church (poor line of sight), and the hill by the Lions Club (steep grade). There is also a curve 1.5 miles south of town where a fatal accident occurred.

Pedestrian Safety – There are sidewalk deficiencies on US 51 through Bardwell, including sections without sidewalks or adequate shoulders. Local residents view improved pedestrian connections between the senior housing, post office, and bank as very important. This is a particularly important issue for senior citizens, children, and residents without cars.

Truck Traffic – Truck traffic is an important part of the local and regional economy; however it also creates issues for the local transportation system and community such as geometric requirements, safety, and truck noise. Truck percentages on US 51 range from 9% to 22% in the study area. Through truck traffic includes logging and poultry trucks. One reason for the high truck volumes is that the next major river crossing to the south is near Dyersburg, TN (I-155). Many trucks from northwest Tennessee and southwest Kentucky likely use US 51 to cross the Ohio and Mississippi Rivers at Cairo, IL. The movement of farm equipment through the study area is a related issue. There is also recreation vehicle traffic going to and from Columbus-Belmont State Park.

Traffic Flows – The current highway system operates well with regard to traffic flow, with minimal delay and congestion. There is even some concern that traffic volumes are too low (they are down from the mid 1970s). The one traffic signal in town is unwarranted. In the future, assuming traffic volumes grow, delay may increase for traffic turning left onto US 51 from US 62 and KY 123. This may cause peak hour level of service deficiencies in 2010 and 2020, respectively.

Economic Development and Regional Access – The relationship between US 51 and local economic development is a critical study issue. Promotion of economic development is important to both Bardwell and Carlisle County. Preservation of current businesses is one significant concern, while another is the attraction and/or development of new businesses in the area. One focus for economic development in Carlisle County is on the tourism and recreation industry. There is only a moderate amount of local business in tourism and recreation at present but the desire is to

increase this business sector. Local leaders are also pursuing businesses and development related to a family oriented community and a retirement community. The community has never had a large manufacturing / industrial base and they do not appear to desire it now. New commercial development in Bardwell has occurred north and east of town. Most new residential development in the County is occurring in Cunningham, which is closer to Paducah, with little new residential development in Bardwell. A third issue relates to connections from the County to other regional roadways such as US 62 to Paducah.

Bicycle / Pedestrian Facilities and Streetscape Improvements – The Great River Road Scenic Byway runs north-south through the western portion of Carlisle County (west of Bardwell). The Ramblin' River Tour bike route runs east-west through Bardwell on KY 123. The Mississippi River Trail bike route also runs north-south west of Bardwell. The presence of these official routes is in line with the local goal of promoting tourism and recreation businesses. Therefore, residents requested that streetscape enhancements and bicycle facilities be considered in the study.

Community Character and Beautification / Amenities – Maintaining and preferably enhancing the character and quality of life in Bardwell is an important issue. This includes building on current assets, improving the town visually, and avoiding major adverse affects on the resident and business communities.

Utilities and Drainage – Many of the utilities in Bardwell are municipally owned including water, sewer, and electric. There are a number of issues with the current systems such as drainage problems on US 51 in town (e.g. near US 51 / KY 123, Jennings Street, and across from the Dollar Store) and stormwater infiltration to the local sanitary sewer system. The town is currently planning to upgrade the local water system, including the water main along US 51. Utility relocations may be required for certain improvement alternatives.

Historic Preservation and Property Impacts – Preservation of the Methodist Church as well as the two cemeteries is an important issue. With regard to highway widening, the potential for property impacts is a concern.

Low-Income and Senior Populations – There is a substantial low-income population in the study area. These residents should be involved in the study process to the greatest extent practicable. There are also many seniors with and without access to vehicles. Therefore, both senior drivers and pedestrians should be considered.

Environmental Issues – The study area may contain state or federal threatened or endangered species and does contain many wetlands. Avoidance, minimization, and/or mitigation should be pursued with respect to these sensitive environmental features. The potential for earthquakes in the region is another issue for consideration.

2.2 Project Goals

The goals for projects to be evaluated in the US 51 study directly relate to the key issues discussed above. These goals were developed with extensive input from the

local community. Local leaders and citizens participated through the Project Work Group in proposing specific goals and even assisting with drafting the language for the goals. The general public also had opportunities to propose and comment on the goals. The key project goals include:

1. Mitigate the negative impacts of heavy truck traffic on US 51, while maintaining an efficient through route for trucks and other vehicles;
2. Preserve downtown business and community character;
3. Maintain appropriate traffic controls and traffic flow conditions;
4. Avoid, minimize, and/or mitigate property takings as well as other community and environmental impacts (This was put forward specifically by many local citizens and has been included even though it is understood to be part of the normal KYTC planning and design process);
5. Improve highway geometry and drainage;
6. Enhance vehicle and pedestrian safety on US 51 in the study area; and
7. Enhance the visual aspects of the community infrastructure and provide improved recreation (bicycle/pedestrian) facilities in keeping with the local economic development goals.

The issues discussed above were put forward by the Project Team, Project Work Group, or the general public. However, they were also supported by the technical analysis that is presented in the following chapters. Similarly, the goals were put forward by various individuals, but were related to documented issues and/or significant public concerns.

Overall, the project goals and issues were critical to the success of the study. The list of issues was utilized to make sure that key concerns were given proper attention. They were also used to develop the project alternatives. The goals were employed to focus the study and move it toward completion. They were also used to evaluate the alternatives and to make sure the final recommendations achieved the goals set for the project.

3.0 EXISTING AND FUTURE NO-BUILD CONDITIONS

To determine if there are deficiencies or problems with the existing highway a detailed analysis was completed looking at traffic volumes, highway geometrics, truck traffic, vehicle speeds, levels of service, crash rates, and other key issues. The analysis considered current and future traffic conditions assuming no changes to the current highway. In support of the analysis, highway and traffic data was collected from a variety of sources including:

- KYTC Highway Information System database;
- KYTC District 1 data sources;
- Study area field reviews;
- Peak hour turning movement traffic counts;
- 24-hour vehicle classification counts; and
- Field spot speed data collection.

3.1 US 51 Highway Characteristics and Average Daily Traffic Volumes

US 51 is the primary north-south highway in the study area. It is an undivided two-lane highway and is functionally classified as a rural principal arterial. US 51 runs from Cairo, Illinois in the north, south through Wickliffe, to Bardwell. From Bardwell it continues south through Arlington and Clinton before reaching Fulton and the Tennessee line.

In 2002, US 51 carried approximately 2,600 vehicles per day (vpd) north of Bardwell and 2,800 vpd south of Bardwell. In town, traffic peaks at approximately 5,600 vpd between US 62 and Elsey Ave. (KY 123). Figure 4 (Appendix B) shows average daily traffic volumes on US 51.

A summary of the highway characteristic data for US 51 is presented in Table 1 (Appendix A) and Figure 5 (Appendix B). The highway has adequate lane widths of approximately 11 feet in most portions of the study area. The shoulders are paved and average 2-3 feet, but there are some areas, especially in town, with minimal shoulders. There are portions of US 51 with wide driveways and perpendicular parking areas adjacent to the highway. There are also utility poles and other objects in close proximity to the travel way, restricting the clear zone. There are currently no substantial sections of US 51 with curb and gutter in the study area. Refer to Figure 6 (Appendix B) for pictures.

The posted speed limit through Bardwell ranges from 55 mph on the outskirts of town, to 25 mph in the center of town. The typical right-of-way (ROW) width through town is 50 feet with wider rights-of-way north and south of town as shown in Figure 5. Sidewalks are present along portions of US 51 through town, but there are discontinuities in the system. Some sidewalks are in good condition, but the majority are in disrepair (see Figure 6).

At the southern end of the town, near the First United Methodist Church, is a sharp curve that limits sight distance. Southeast from the curve is a steep hill leading into the town (see Figure 6). Both of these sections present challenges for through truck traffic. Intersection corner radii at the US 51 / US 62 and US 51 / KY 123 (Elsey Avenue) intersections are inadequate for large trucks. Field observations confirmed that trucks

have a difficult time turning at these locations without crossing into the opposing traffic lane (Refer to Figure 6 – Top Left Picture).

There is one traffic signal on US 51, at the Jennings Street intersection. The signal is not currently warranted according to recent traffic count data. All other intersections are STOP controlled on the minor (or side) street approach. There are no left turn lanes to or from US 51, though this does not create a capacity problem at present.

3.2 Other Study Area Roadways and Average Daily Traffic Volumes

Other important roadways in the study area include US 62, KY 123, KY 1022, and KY 1181. Table 2 presents summary information for each highway. Current traffic volume data is shown in Figure 4 (Appendix B). **US 62** is a major east-west highway through the study area. US 62 is the main route from Bardwell east to Paducah. It is a two-lane undivided highway and is functionally classified as a Rural Major Collector. US 62 enters Bardwell from the east at the north end of town and then runs to the north as US 62 / US 51. It carries 2,400 to 3,000 vpd east of US 51. **KY 123** (Elsey Avenue) runs east-west through the study area. KY 123 runs from Bardwell west to Columbus, KY. It is a two-lane undivided highway and is classified as a Rural Major Collector. It carries between 900 and 2,000 vehicles per day through the study area.

Table 2: Summary of Study Area Roadway Characteristics

ROUTE	FROM MP	TO MP	VEHICLE CLASS	ADT	R.O.W. (FT.)	LANE WIDTH (FT.)	NUMBER OF LANES	POSTED SPEED LIMIT MPH
US 62	0	0.31	Rural Major Collector	3,010	60	10	2	35
	0.31	0.5	Rural Major Collector	2,570	60	10	2	45
	0.5	1.062	Rural Major Collector	2,750	60	10	2	55
	1.062	2.868	Rural Major Collector	2,380	60	10	2	55
KY 123	6.034	6.7	Rural Major Collector	920	60	9	2	55
	6.7	7.39	Rural Major Collector	910	60	9	2	55
	7.39	7.6	Rural Major Collector	1,450	50	10	2	35
	7.6	7.703	Rural Major Collector	2,040	60	10	2	35
KY 1022	0	1.806	Rural Local	50	40	8	2	55
	1.806	4.863	Rural Minor Arterial	70	40	8	2	55
KY 1181	0	1.6	Rural Minor Collector	390	60	9	2	55
KY 1372	2.054	3.47	Rural Local	300	50	10	2	55
KY 1377	6.413	8.459	Rural Minor Collector	730	50	10	2	55
KY 1591	3.947	5.897	Rural Local	420	50	9	2	55

Source: KYTC Highway Information System

3.3 Truck Volumes

To determine the current truck volumes on US 51, directional 48-hour vehicle classification counts were conducted at four locations in the study area as shown on Figure 7 (Appendix B). The results, given in Table 3, indicate that 22 percent of the observed traffic north of Bardwell is truck traffic (13 percent being semi-trailer traffic) and 15 percent of the traffic south of Bardwell is truck traffic (9 percent semi-trailers). Based on these volumes the percent trucks near the center of town is about 9 percent (5 percent semi-trailers). Counts were also taken on US 62 and KY 1181, both east of Bardwell. At these locations, 12 and 7 percent, respectively, was truck traffic, with 4 percent semi-trailer traffic on US 62. Most of the truck traffic on US 62 turns north on US 51.

Table 3: 2002 Vehicle Classification Counts

Location	Total Vehicles Per Day	Cars, 2-Axle Trucks, and Motorcycles	Buses and Trucks with 3-4 Axles	Trucks with 5 of more axles (semi-trailers)	Total Truck %
Station 1: US 62 East of Bardwell – Milepoint 1.162	2,260	1,979 (88%)	184 (8%)	97 (4%)	12
Station 2: US 51/62 North of Bardwell – Milepoint 8.180	2,930	2,287 (78%)	275 (9%)	368 (13%)	22
Station 3: KY 1181 East of Bardwell – Milepoint 0.250	409	379 (93%)	28 (7%)	2 (0%)	7
Station 4: US 51 South of Bardwell – Milepoint 6.621	3,181	2,700 (85%)	195 (6%)	286 (9%)	15

The range of 15 to 22 percent trucks on US 51 is somewhat higher than the statewide average for similar rural principal arterials, which is 13.4[1] percent. Historic classification counts on US 51 were obtained to examine historic trends. Three classification counts were conducted in the study area between 1979 and 2001 as shown in Table 4. During that time, the average truck percentages at these locations increased from 11.1 percent to 15.3 percent. The historical data combined with the current truck count numbers indicates that truck percentages may have increased over time. Regardless, it is clear that trucks make up a substantial portion of the traffic stream.

Table 4: Historic Vehicle Classification Counts on US 51

Location	Year	Axles per Truck	Percent Trucks
US 51 Near KY 1181 (Milepoint 6.2)	1979	3.756	11.1%
US 51 Near KY 1181 (Milepoint 6.3)	1991	3.913	11.2%
US 51 at Elsey Ave. (Milepoint 7.4)	1996	3.506	15.3%

Source: KYTC Multimodal Programs 2001 Vehicle Classification Database

3.4 Spot Speeds

Speed data was collected on US 51 to determine vehicle speeds relative to the posted speed limit. The data was collected manually by recording vehicle description and the time of passage at two points separated by a distance of 100 feet. Vehicle speeds were calculated by comparing the times the same vehicle passed each endpoint. Directional speed data were collected at two locations on US 51; one north and one south of Bardwell as shown on Figure 7 (Appendix B). The posted speed limit on US 51 north and south of Bardwell is 55 mph. As drivers approach the corporate limits, the speed limit drops to 45 mph, then 35 mph, and then again to 25 mph for a short stretch in downtown Bardwell (see Figure 7 in Appendix B). The speed survey locations were just beyond the corporate limits where the speed limit changes from 55 mph to 45 mph.

[1] Traffic Forecasting Report 2002, KYTC Division of Multimodal Programs, August 2002, Page 20.

In speed studies the most significant statistic is the 85th percentile speed. The 85th percentile speed is the speed threshold at or below which 85 percent of the motorists travel. Generally, speed limits are set within five mph of the 85th percentile speed.

Table 5 presents a summary of the speed statistics for US 51. As shown in the table, the 85th percentile speeds were within 5 mph of the posted speeds at both locations. At Station 1 (north of Bardwell), the northbound 85th percentile speed of 59 mph was four mph above the posted 55 mph speed limit. Southbound, the 85th percentile speed was five mph higher than the 45 mph posted speed limit. This is not unusual, as drivers often do not begin decelerating until after they have entered the lower speed zone. At Station 2 (south of Bardwell), the southbound 85th percentile speed was two mph higher than the 55 mph posted speed limit, while the northbound 85th percentile speed was five mph above the posted 45 mph speed limit. Again, the observed speeds were not unusual for transition zones.

Table 5: US 51 Speed Data Summary

Statistics	Station 1 (North of Town)		Station 2 (South of Town)	
	Northbound	***Southbound***	***Northbound***	***Southbound***
Location (Milepoint)	8.068	8.068	6.55	6.55
Number of Observations	33	33	45	42
Minimum Speed (mph)	31	30	22	31
Maximum Speed (mph)	80	57	64	67
Mean (mph)	51	43	42	48
50th Percentile (mph)	51	42	42	49
85th Percentile (mph)	59	50	50	57
Posted Speed Limit (mph)	55	45	45	55
Difference (85th-Posted)	+4	+5	+5	+2

3.5 Traffic Analysis Methodology

Study Intersections and Highway Segments

The US 51 study in Bardwell focused on critical intersections and highway segments in the study area. Specifically, traffic operations were examined at the following locations:

Intersections

- US 51 at US 62 – Unsignalized
- US 51 at Jennings Street – Signalized
- US 51 at KY 123 (Elsey Ave.) – Unsignalized
- US 51 at KY 1181 – Unsignalized
- US 51 at KY 1377 – Unsignalized

Highway Segments

- US 51 south of Bardwell
- US 51 north of Bardwell

Intersection Analysis

For this analysis the Highway Capacity Software package (HCS 2000) was used to assess the morning and afternoon (AM and PM) peak hour traffic operating conditions for both current and future years. This software package implements the Highway

Capacity Manual intersection analysis method. For each study intersection, average vehicle delays were calculated as well as the resulting levels of service.

Level of service (LOS) is a qualitative measure of expected traffic conflicts, delay, driver discomfort, and congestion. Levels of service are described according to a letter rating system ranging from LOS A (free flow, minimal or no delays – best conditions) to LOS F (stop and go conditions, very long delays – worst conditions). For intersections the Highway Capacity Manual defines levels of service based on the average delay due to signal or STOP control as shown in Table 6.

In general terms, a facility is considered to have reached its physical capacity at LOS E. However, for rural conditions, LOS C is often considered the threshold for desirable traffic conditions. In this study, levels of service below this threshold are noted as undesirable and warrant improvement. LOS C corresponds to ≤ 35 seconds of delay per vehicle at a signalized intersection and ≤ 25 seconds of delay at an unsignalized intersection.

Table 6: LOS Criteria for Intersections

LOS	Signalized Intersections Control Delay (seconds/vehicle)	Unsignalized Intersections Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	>10 – 20	>10 – 15
C	>20 – 35	>15 – 25
D	>35 – 55	>25 – 35
E	>55 – 80	>35 – 50
F	>80	>50

Source: Highway Capacity Manual (2000)

Rural Two-Lane Highway Analysis

A peak hour traffic operations analysis was prepared for segments of US 51 north and south of town using the Highway Capacity Software two-lane road analysis package. This is based on the 2000 Highway Capacity Manual (Chapter 20) methodology. For this method, there are two classes of roadways: Class I highways include higher speed arterials and daily commuter routes, while Class II highways include lower speed collector roadways and roads primarily designed to provide access. Driver expectations regarding speed and flow are important in determining a highway's class. US 51, as the main arterial and as the major through-route, is a Class I highway.

Levels of Service for Class I highways are based on the estimated average travel speeds and percent time vehicles spend following other vehicles as shown in Table 7. Again, LOS C is the threshold used for desirable traffic operations in this study. Operations below this threshold are noted as undesirable and warrant improvement. For Class I highways, LOS C corresponds to an average travel speed of >45 miles per hour with ≤65 percent of the time spent following another vehicle.

Table 7: LOS Criteria for Two-Lane Highways

LOS	Class I Highways	
	Percent Time Spent Following	Average Travel Speed
A	≤ 35	>55
B	>35 - 50	>50 – 55
C	>50 - 65	>45 – 50
D	>65 – 80	>40 - 45
E	>80	≤40
F	LOS F applies whenever the flow rate exceeds the capacity	

Source: Highway Capacity Manual (2000)

3.6 Existing Traffic Operating Conditions

Intersection Level of Service and Delay

In order to evaluate the current traffic conditions at the five study intersections, a.m. and p.m. peak period turning movement counts were conducted at each location. Figure 8 (Appendix B) shows the intersection controls and turning movement volumes. The approaches to all intersections are single lane approaches (i.e. there are no turn lanes).

The resulting 2002 levels of service are LOS B or better for all locations, as shown in Table 8. Figure 9 (Appendix B) illustrates the levels of service graphically. On Figure 9, the LOS displayed for the unsignalized intersections is that of the stop-controlled approach with the highest delay (the HCM method does not calculate whole intersection levels of service for unsignalized intersections).

Table 8: 2002 Intersection LOS Summary

Int. No.	Intersection	Type	LOS AM	LOS PM
1	US 51 / US 62*	2-Way STOP	B	B
2	US 51 / Jennings Street	Signal	B	B
3	US 51 / KY 123 (Elsey Ave.)*	2-Way STOP	B	B
4	US 51 / KY 1181*	1-Way STOP	A	A
5	US 51 / KY 1377*	1-Way STOP	A	A

* LOS is for the intersection approach with the highest delay.

Two-Lane Highway Level of Service and Delay

The current traffic volumes and roadway characteristics were used to evaluate operating conditions on US 51 north and south of Bardwell. The analysis showed that both highway segments are currently operating at LOS C with average travel speeds of just under 48 to 50 mph and a percent time-spent following ranging from 42 to 53 percent. This indicates that the roadways north and south of Bardwell are functioning in an acceptable manner. The segment levels of service are illustrated on Figure 9 (Appendix B).

3.7 Future No-Build Traffic Operating Conditions

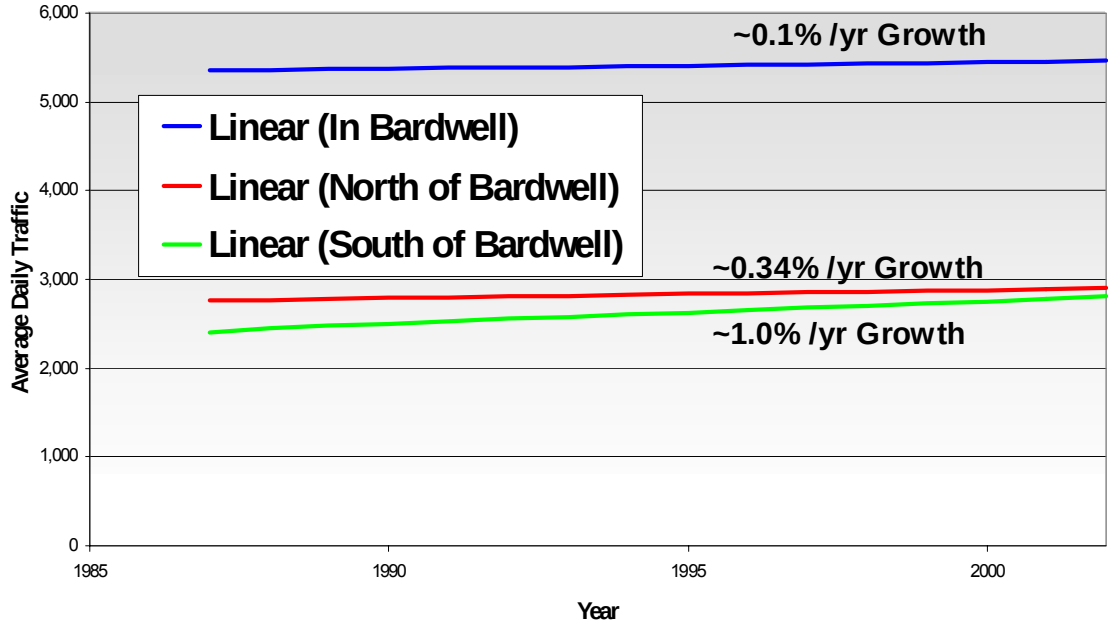
Traffic projections were developed for 2010, 2020, and 2030 to determine how the highway system would function if no improvements (beyond normal maintenance) were made during that time period. This scenario is referred to as the No-Build Scenario. The No-Build Scenario provides a snapshot of future traffic conditions, highlighting expected problems and deficiencies. It also provides a baseline for developing and evaluating possible build alternatives. Typically, projects that are under construction or planned for construction in the KYTC Six-Year Plan are taken into account in this analysis. However, in this study area there are no significant planned projects that would affect the future No-Build traffic conditions. (For further discussion of planned projects refer to Chapter 5.)

Future Traffic Volumes

Traffic growth on US 51 in Bardwell has been modest over the last 15 years with an average growth rate of approximately 0.6% per year at the ten study area count stations (1985 to 2002). In fact, traffic volumes are lower now on US 51 than they were in the

late 1970s due to the construction of I-55 in Missouri. Overall, traffic has declined about 20 to 25 percent since that time. For comparison purposes, historic data for three typical count stations: one in-town, one north of town, and one south of town were examined for 1985 to 2002 using linear interpolation. The results are shown in Figure 10. Traffic growth at the in-town count station was nearly flat at 0.1% annually. Growth north of town was also modest at 0.34% per year. Traffic growth south of town was the highest at approximately 1.0% per year. However, for purposes of this study a 1.5% traffic growth rate was applied to evaluate how traffic conditions would change if the growth rate were higher. Figure 11 (Appendix B) shows average daily traffic volumes (ADT) on US 51 for 2002, 2010, 2020, and 2030 using this higher 1.5% growth rate.

Figure 10: US 51 Historic Traffic Volumes (1987 to Present)



Future Intersection LOS and Delay

No-Build Scenario levels of service for the five key intersections on US 51 were evaluated using the projected traffic volumes. As mentioned previously, all of the intersections currently operate at LOS A and B. However, by 2010 the side street approaches to the US 51 / US 62 intersection may begin to experience unacceptable delays as shown in Table 9. By 2020, the eastbound approach at the intersection of US 51 and KY 123 may also begin to operate poorly. The poor levels of service at these two intersections are directly related to delays for vehicles turning left from the side streets onto US 51. Figure 12 (Appendix B) illustrates the 2030 intersection LOS for each of the five study intersections, giving the LOS for the worst approach for each of the unsignalized intersections.

Table 9: PM Peak Hour Intersection Levels of Service for No-Build Scenario

Int. No	Intersection	Type	Approach	2002		2010		2020		2030	
				Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS
1	US 51 / US 62	2-Way STOP	Eastbound	13.1	B	26.7	D	29.8	D	41.7	E
			Westbound	12.9	B	45.7	E	100.2	F	774.5	F
			Northbound	7.6	A	8.0	A	8.1	A	8.2	A
			Southbound	8.1	A	9.1	A	9.2	A	9.6	A
2	US 51 / Jennings Street	Signal	Eastbound	16.4	B	16.3	B	16.6	B	16.6	B
			Westbound	15.8	B	16.1	B	16.3	B	16.3	B
			Northbound	13.4	B	18.2	B	21.2	C	28.0	C
			Southbound	12.7	A	16.4	B	17.6	B	20.9	C
			Whole Int.	13.4	B	17.3	B	19.2	B	24.1	C
3	US 51 / KY 123 (Elsey Ave)	2-Way STOP	Eastbound	10.3	B	21.7	C	31.1	D	61.5	F
			Westbound	12.9	B	17.4	C	21.2	C	23.9	C
			Northbound	7.8	A	8.3	A	8.4	A	8.7	A
			Southbound	7.8	A	8.2	A	8.4	A	8.6	A
4	US 51 / KY 1181	1-Way STOP	Westbound	9.9	A	10.8	B	12.0	B	12.8	B
			Southbound	7.5	A	7.8	A	7.9	A	8.1	A
5	US 51 / KY 1377	1-Way STOP	Westbound	8.8	A	10.1	B	10.1	B	10.4	B
			Southbound	7.6	A	7.9	A	7.9	A	8.1	A

Notes: Only the p.m. peak is shown, as it represents the higher of the two peak periods.
The 2000 Highway Capacity Manual analysis methods were used (implemented by HCS 2000).
2002 LOS analysis employed the peak hour count data collected for the study.
2010-2030 LOS analyses used projected ADT with design hour and directional distribution factors and the turn percentages from 2002 turning movement counts; 2010 and 2020 ADT were based on linear growth.
Average delay is in seconds per vehicle.

Two-Lane Highway Level of Service and Delay

The two-lane highway methodology was used to assess the future traffic conditions on US 51 outside of town. As shown on Table 10, all four study segments will continue to operate acceptably at LOS C through 2030 without improvements. Figure 12 (Appendix B) illustrates the year 2030 segment LOS results.

Table 10: PM Peak Hour Two-Lane Levels of Service for No-Build Scenario

Segment	2002	2010	2020	2030
Stanley Road to KY 1203	C	C	C	C
KY 1203 to Ballard County Line	C	C	C	C
KY 1181 to KY 1377	C	C	C	C
KY 1377 to Bob Brown Road	C	C	C	C

Note: Only the p.m. peak is shown, as it represents the higher of the two peak periods.

3.8 Crash Analysis

The Kentucky Transportation Cabinet provided crash data for a three and one half-year period from January 1, 1998 through June 30, 2001. During this period, 33 crashes occurred on US 51 within the study area (between mileposts 4.928 and 10.725).

Crash rates were computed for five specific segments of US 51 within the study area. Segment crash rates are typically expressed in terms of crashes per 100 million vehicle-miles to take into account the amount of traffic on a particular highway segment. A segment's crash rate is then compared to a statewide critical crash rate for the same type of roadway to identify high crash locations. Highway sections with a crash rate higher than the critical crash rate are considered high crash locations and are potential candidates for safety improvements.

The analysis revealed that Section 3 has a crash rate (455 crashes per 100 million vehicle-miles) that is more than three times higher than the statewide average and 67% higher than the section critical rate as shown in Table 11. This section extends from East Court Street to just north of US 62. For the remaining segments, the observed crash rates were all below the statewide average and section critical rates.

Table 11: Segment Crash Analysis

Section	Description	Total Crashes	ADT	Section Length (miles)	Statewide Average Crash Rate	Section Crash Rate	Section Critical Rate	Critical Crash Rate Factor
1	MP 4.928 to 6.00	3	2770	1.072	131	79	282	0.28
2	MP 6.00 to 7.05	4	3390	1.05	131	88	269	0.33
3	MP 7.05 to 7.81	20	4520	0.76	131	455	272	1.67
4	MP 7.81 to 8.81	2	3190	1	131	49	277	0.18
5	MP 8.81 to 10.725	4	2870	1.915	131	57	242	0.24

Notes: Crash data for January 1, 1998 to June 30, 2001
Rates are in crashes per 100 million vehicle-miles.
Critical crash rate factor is the section crash rate divided by the section's critical crash rate.

A crash cluster analysis was also conducted for the study area. Two crash clusters were identified: one between Jennings Street and KY 123 and a second near the Methodist Church as shown on Figure 13 (Appendix B). Both of these locations are within the previously defined high crash section. A spot crash analysis was conducted to determine how the crash rates at these two "spots" compared to the critical spot crash rates for similar facilities (refer to Table 12).

Table 12: Spot Crash Analysis

Location	Begin MP	End MP	No. of Crashes	Analysis Period (Years)	Average ADT	Spot Crash Rate*	Critical Crash Rate*	Ratio of Spot Rate to Critical Rate
Jennings to KY 123	7.3	7.6	11	3.5	4,500	1.91	1.63	1.17
Near Methodist Church	7	7.3	6	3.5	4,500	1.04	1.63	0.64

* Crashes per million vehicles

As indicated in the table, the spot crash rate observed between Jennings Street and KY 123 was higher than the critical crash rate. A review of the crash data showed that six of the 11 crashes were rear-end or backing collisions, two were related to driveways,

and the remaining three were sideswipe crashes. Only one was an injury crash. These crash types are consistent with the area type and highway issues identified previously. The spot crash rate near the Methodist Church was lower than the critical rate. The crash analysis also showed that one fatal crash was recorded near mile point 5.5. Details for all the spot crashes are shown in Tables 13 through 15 (Appendix A).

3.9 Pedestrian and Bicycle Facilities

There are sidewalks on portions of US 51 in Bardwell. However, most segments do not have sidewalks, and there is little continuity between the existing sections. The condition of the existing sidewalks ranges from good to poor, but most are in poor condition. There are no striped crosswalks or pedestrian signals on US 51. Currently, the Ramblin' River Tour bike route on KY 123 runs through Bardwell and the Mississippi River Trail bike route runs north-south west of Bardwell.

3.10 Existing and Future No-Build Traffic and Highway Conditions Summary

An analysis of the existing and future No-Build traffic and highway conditions on US 51 in the Bardwell area was performed considering the following items: average daily traffic volumes, vehicle classification information, speed data, levels of service, highway geometry, pedestrian facilities, and crash data. US 51 currently carries between 2,500 to 5,500 vehicles per day, with 9 to 22 percent truck traffic. Traffic growth in the study area has been modest (<1%) over the last 15 years (however a conservatively high growth rate of 1.5% was employed in the study). There are a number of geometric issues that were identified such as limited shoulders, restricted clear zones, inadequate corner radii, one sharp curve, and deteriorated sidewalks. The speed data did not show any clear problems, though vehicle speeds entering the town in the transition zones are higher than the posted speed limits. The current (2002) levels of service are LOS C or better for all intersections and road segments, indicating little vehicle delay and good traffic operation conditions from a capacity standpoint. However, the side street levels of service at two intersections will drop below LOS C in the future because of delay associated with traffic turning left from the side streets onto US 51. The crash analysis showed that the portion of US 51 between East Court Street and just north of US 62 is a high crash location, with the majority of the crashes being angle and rear end crashes.

4.0 REVIEW OF RELATED STUDIES

A review of previous transportation studies is necessary to understand the problems and solutions that have already been identified or studied. In this case there is only one previous report relevant to the current study, the *US 51 Fulton to Wickliffe Scoping Study*, prepared by the KYTC, Planning Division in October 1995. The purpose of the study was to evaluate the need for and feasibility of improvements in the US 51 corridor.

KYTC evaluated the existing (1995) physical infrastructure and highway operations and found deficiencies with regard to passing sight distance, vertical and horizontal alignments, and stopping sight distance. Most bridges on US 51 are physically and operationally adequate, though the older structures had narrow widths. Most sections of US 51 were found to operate at LOS C, with some sections operating at LOS B. Crashes (accidents) were also examined on US 51 and found to be within normal ranges for similar roadways throughout the state.

The following improvement alternatives were examined in the study:

1) The No-Build Alternative (termed the Do-Nothing Alternative in the study)
2) Reconstruct US 51 on its existing alignment (2-lanes)
3) Widen US 51 to 4 lanes on its existing alignment
4) Improve (2-lane or 4-lane) US 51 with bypasses in Clinton and Bardwell.

For the No-Build Alternative, the 2020 design year level of service was calculated to be LOS C or D throughout the length of the study corridor, except through the towns of Clinton and Bardwell, where it would be LOS F. This projection was based on an assumed annual traffic growth rate of approximately 3% per year. (The actual growth rate has been less than 1% per year in the vicinity of Bardwell.)

The 2-lane Reconstruction Alternative resulted in LOS C on all segments in the design year of 2020, again with the exception of US 51 in Clinton and Bardwell, which would operate at LOS E and F, respectively. The proposed bypasses in Clinton and Bardwell would operate at LOS B and C, respectively. To achieve LOS B or better, the 4-lane widening alternative was required. The 4-lane alternative would provide LOS A 50 years beyond the design year.

Construction cost estimates were developed on a per mile basis (in 1995 dollars). The 2-lane alternative costs ranged from $110 to $130 million, depending on whether the bypasses were constructed. The 4-lane costs ranged from $170 to $200 million, depending on whether the bypasses were constructed. Environmental, socio-cultural and geotechnical overviews were performed. While impacts were anticipated, the analysis did not reveal any issues that would prevent the alternatives from advancing.

Ultimately, the study concluded, that with a reasonably good alignment, 11’ lane widths, no apparent crash problems, and average truck traffic, that the no build or do-nothing alternate was adequate. However, it was recommended that the existing narrow bridges be replaced and that construction of bypasses at Clinton and Bardwell be considered if funding were to become available.

5.0 PAST AND FUTURE TRANSPORTATION PROJECTS

An understanding of the region's past transportation projects and future plans is important for study context and decision-making. Plans analyzed for this study include:

- Recommended KYTC Six-Year Highway Plan FY 2005 – FY 2010 (February 2004)
- KYTC Statewide Transportation Plan FY 1999 – FY 2018 (December 1999)
- KYTC District 1 Unscheduled State Highway Plan Needs (May 2002)

Past Transportation Projects – A number of transportation projects have been completed in or near the study area during the past several decades. The projects mainly include spot improvements to structures and bridges such as widening, replacements and rehabilitation and some work to sections of highways such as paving shoulders, grading, drainage, etc. Most of the projects have been done for safety and/or operational reasons and have not added capacity.

Future Transportation Projects – A review of relevant planning and programming documents indicates that there are two projects that are programmed in the current KYTC Six-Year Highway Plan in Carlisle County. Only one is of consequence in the Bardwell study area. The project is in the western portion of the study area and involves replacing the bridge over Truman Creek on KY 123 one mile west of US 51.

Another planned project in the study area is an eastern bypass of Bardwell which is included as a long-range project (2005 to 2018) in the KYTC Statewide Transportation Plan. The proposal identifies the bypass length as approximately 2.7 miles at a cost of $10.0 million. The Statewide Transportation Plan does not include any other projects in or near the Bardwell study area.

There are three other projects that have been proposed in the study area, but are not included in the Six-Year Highway Plan or the Statewide Transportation Plan. They are:

1. US 51 – Construct turn lanes at the site of the proposed Bardwell industrial park;
2. US 51 – Reconstruction to 2-lane standards through Bardwell with urban section and turn lanes; and
3. US 51 – Reconstruction to 2-lane standards from proposed Bardwell eastern bypass to Illinois Central railroad bridge at Wickliffe

The current US 51 Study at Bardwell is examining the proposed eastern bypass project as well as potential improvements to US 51 in Bardwell.

Another significant and relevant project is the I-66 project. I-66 is proposed as a new interstate-type highway facility that would possibly traverse the southern portions of Kentucky. KYTC is considering four major segments of I-66. The westernmost section may begin in the vicinity of I-24 near Paducah and run north and/or west into either Missouri or Illinois. A number of different corridors have been evaluated as part of an on-going I-66 planning study for the westernmost section, including some that pass through Carlisle County, north of Bardwell.

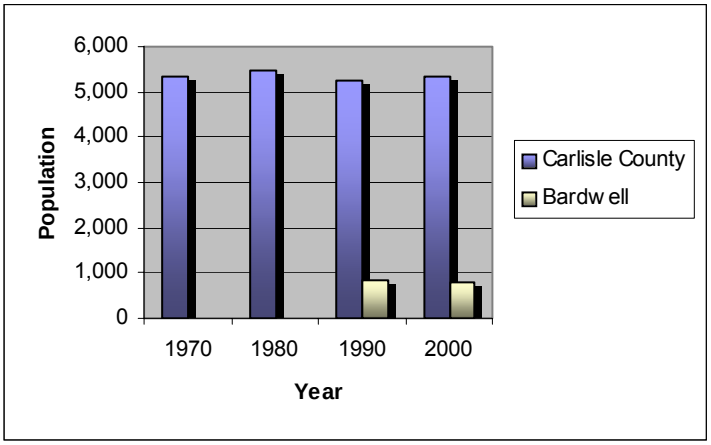
6.0 HUMAN ENVIRONMENT OVERVIEW

An overview was conducted to determine the general characteristics of the human environment in the study area. The analysis addresses: general socioeconomic characteristics, environmental justice, land use, agricultural activity, hazardous materials sites, and historic / archeological resources. Additional environmental justice documentation and environmental overview information can be found in Appendices C and D.

6.1 Socioeconomic Profile

Population Growth – According to the 2000 Census, the population of Carlisle County was 5,351 and the population of the City of Bardwell was 799. The county population increased from 5,238 in 1990 and the city population decreased slightly from 818 in 1990. According to the Kentucky State Data Center, the population of Carlisle County is projected to increase to 5,807 by 2030 (an increase of 0.27% per year). Refer to Figure 14 for the historic population data.

Figure 14: Historic Population Data (1970-2000)



Source: 2000 U.S. Census

Minority Populations – Carlisle County has a minority population of 2.3 percent. The City of Bardwell has a slightly higher percent minority population at 5.4 percent. These minority populations are both less than the statewide average of 10.7 percent.

Low – Income Populations – In 2000, approximately 13.1 percent of the Carlisle County population was below the poverty line. In Bardwell, approximately 24.3 percent was below the poverty line. These numbers exceed the national average of 12.4 percent, but only the Bardwell number exceeds the statewide figure of 15.8 percent.

Age of Population – The City of Bardwell and Carlisle County both have a larger than average percent of residents age 62 and over (26.3 and 21.1 percent respectively) compared to the national and statewide averages (14.7 and 14.9 percent respectively).

Local Economy – In 2001, Carlisle County's unemployment rate was 6.1 percent. This is higher than the 2001 unemployment rates for Kentucky and the U.S., which were 5.5 and 4.8 percent, respectively. Of those that are employed, the highest percentage (19.2 percent) works in retail trade, followed by services (16.7 percent), and manufacturing (15.4 percent). The remainder of the county workforce is employed in a range of other fields as shown in Table 16 (Appendix A). There is only one major manufacturer in the Bardwell area, RBS China Inc as shown in Table 17 (Appendix A).

Commuting – Approximately 38 percent of employed Carlisle County residents work in the county, with the remaining 62 percent commuting to other counties such as Ballard, Fulton, McCracken, Graves, and Hickman as shown in Table 18 (Appendix A). Most of the employees working in the county also live in the county (82%).

Community Facilities and Development Patterns – Typical community facilities are located within Bardwell, e.g., city hall, police station, churches, etc. (Refer to Figure 15 in Appendix B) Three additional community facilities were identified: the Roselawn Cemetery located west of US 51 near the US 51 / KY 1181 intersection; the Bardwell Cemetery located across US 51 from the Roselawn Cemetery; and the Carlisle County Park located on Morgan Road near US 62. No public schools are located in the study area. Most commercial development is located on US 51 with a concentration in downtown Bardwell. Residential development is also centered on Bardwell (mainly east of US 51). Other than the town of Bardwell, there are no named communities in the area.

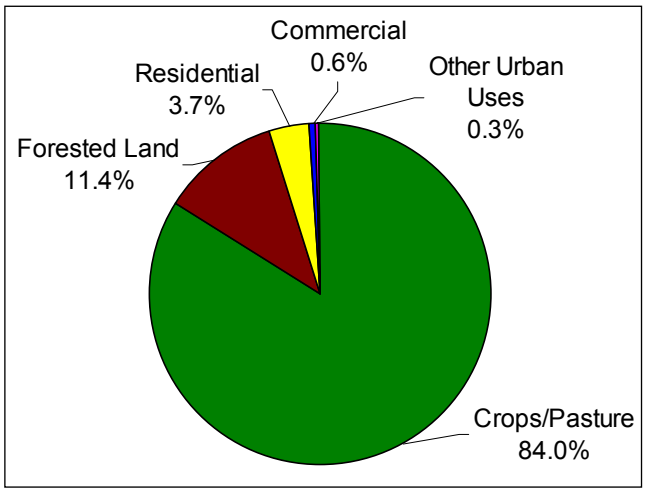
6.2 Environmental Justice

Based on the race and income data available from the U.S. Census Bureau and input from the community of Bardwell, there is no specific, defined Environmental Justice community within the project study area. Refer to the Environmental Justice Review in Appendix C for more details.

6.3 Land Use

Carlisle County currently does not have land use planning ordinances in effect (zoning or subdivision regulations). There are five primary land use types found within the study area as shown in Figure 16. By far, the largest land use category is crops/pasture land (6,359 acres), with forested land next at 864 acres. Figure 15 (Appendix B) shows a map of the land use categories.

Figure 16: Land Use



6.4 Agricultural Activity and Prime and Unique Farmland

As noted above, agriculture is the predominant land use in the study area. In 1998, the county ranked 16th in production of corn for grain, soybeans, and winter wheat. Carlisle County was 3rd in dark-fired tobacco production. The prevalence of agricultural activity may be in part attributable to the availability of fertile soils. Over half (55.8 percent) of the County's 127,354 acres are considered prime and unique farmland. Related to this, there are three agricultural districts in or adjoining the study area: Agricultural District 20-05 (west and north of Bardwell); District 20-04 (south of Bardwell); and a small portion of District 20-03 (northeast of Bardwell). (See Figure 15 in Appendix B)

6.5 Underground Storage Tanks/Hazardous Materials

Potential hazardous materials sites are primarily located in and around the urban limits of Bardwell. An environmental database search for the study area revealed five underground storage tank sites in the study area as shown on Figure 15 in Appendix B. A limited site reconnaissance located one additional site on US 51 in Bardwell. Outside Bardwell, hazardous materials location considerations are primarily related to agricultural activity since large-scale farming operations often store fuel and oil on-site.

6.6 Previously Documented Cultural Historic and Archeological Sites

The cultural historic overview identified 65 cultural historic sites (50 years of age or older) within the study area. Each site is listed in Table 19 (Appendix A) and mapped on Figure 17 (Appendix B). Twelve sites were identified as potentially eligible, including eight along the existing US 51 corridor as shown in Figure 18 (Appendix B). Additional work was conducted on these twelve sites to make recommendations on eligibility. As a result, eight sites (14, 15, 20, 22, 43, 45, 32, and 60) were recommended as eligible for the National Register of Historic Places (NRHP). A review by the State Historic Preservation Office (SHPO) confirmed that the eight sites are eligible for the NRHP.

Discussions were held between KYTC and SHPO regarding the four sites (Sites 1, 16, 31 and 37) not recommended as potentially eligible. After further investigation it was agreed that sites 16 and 31 were not eligible. It was also decided that there is not an eligible historic district in Bardwell. No further specific investigation was conducted for Sites 1 and 37 as they are not expected to be affected by the alternatives under consideration, however SHPO expressed support for their eligibility in the discussions.

The sites deemed eligible for the NRHP are listed in Table 19. They included Sites 14 (3 bay house with a cross gable), 15 (American Bungalow), 20 (office structure), and 22 (Tudor Revival) on US 51 in downtown Bardwell as well as sites 43 (commercial building) and 45 (First National Bank building) on Front Street in downtown Bardwell. The other two sites were site 32 (First United Methodist Church) and site 60 (T-plan house) located south of the town center on US 51. Site 1 (T-plan house) is also located on US 51, while Site 37 is located on Front Street. (Refer to Appendix D for correspondence and to the separate cultural resource report for more details.)

The archeological overview identified two potential archaeological sites in the study area. The sites have not been assessed and additional field evaluations are necessary to determine the status of the sites. Site 15Ce20 is located north of Bardwell and east of US 51. Site 15Ce3 is located east of US 51, near the Bardwell city limit. The potential archeological sites as well as site types and condition are listed in Table 20.

Table 20: Known Archaeological Sites in Bardwell

County	Site No.	Quad	Site Type	Condition	National Register Status	Owner
Carlisle	15Ce3	Arlington	Mound Complex	disturbed, % unknown	unknown	private
Carlisle	15Ce20	Wickliffe	Open Habitation Without Mounds	apparently undisturbed	not assessed	private

7.0 NATURAL ENVIRONMENT OVERVIEW

An overview was conducted to determine the characteristics of the natural environment in the study area. Resources addressed in this section include: aquatic ecosystems (surface waters, wetlands, ponds, and 100-year flood plains) and terrestrial ecosystems (threatened and endangered species, floral communities, and faunal communities). Refer to Appendix D for more information and copies of agency correspondence.

7.1 Aquatic Ecosystems

Surface Water – The study area drains primarily into Truman Creek and an unnamed tributary of Mayfield Creek as shown in Figure 19 (Appendix B). All streams in the study area flow short distances into tributaries of the Mississippi River system (the Mississippi River is approximately six miles west of Bardwell). Most blueline streams and tributaries in the study area flow north. The largest is Truman Creek, which runs northeast across the center of the study area and crosses US 51 just north of Bardwell. Most of the remaining creeks and tributaries are unnamed.

Wetlands and Ponds – A total of 137 wetlands were indicated on National Wetland Inventory (NWI) mapping for the study area, however the vast majority of these (122) are impounded or diked areas (i.e farm ponds) and another eight are the result of excavation activities (see Figure 19 in Appendix B). Only seven appear to be natural wetlands based on their type and may be considered jurisdictional by USACE. All seven are located in the northeast quadrant of the study area; either along the Truman Creek floodplain or along the floodplain of an unnamed tributary of Mayfield Creek. Four of these wetlands are significant in size, ranging from approximately 8 to 32 acres. Five potential hydric soils are also found within the study area, suggesting the presence of other wetlands. In an informal interview, the Carlisle County District Conservationist noted that the alluvial bottoms in the study area are very likely to contain hydric soils.

Floodplains – Six 100-year floodplains cover over 8 percent of the study area (626 acres), with the largest being the Truman Creek floodplain (see Figure 19 in Appendix B). The other floodplains include: two unnamed tributaries of Gray Creek, Thomas Creek, an unnamed tributary of Mayfield Creek, and an unnamed tributary of Truman Creek. Significant floodplains areas also lie just north of the study area.

7.2 Terrestrial Ecosystems

Threatened and Endangered Species – Initial research indicated that a total of 12 threatened or endangered species may occur in or near the study area as listed in Table 21 (Appendix A). However, based on the available habitat, three species are not likely to be found in the study area (Alabama shad, Spotted sandpiper, and Interior least tern). Instead, these species are likely to find suitable habitat in or very near the Mississippi River. The remaining nine species may occur or have been known to occur in the area.

Floral and Faunal Communities – No major issues or concerns were identified relative to plant or animal communities in the study area, other than the potential for nine threatened or endangered species as discussed above.

8.0 GEOTECHNICAL OVERVIEW

A geotechnical overview was prepared by the Geotechnical Branch of the Kentucky Transportation Cabinet, Division of Materials. Information was also provided by the University of Kentucky, Kentucky Geological Survey (KGS). According to the KYTC Geotechnical Branch "There are no major geotechnical concerns anticipated within the study area."

There are seven geologic map units present at the surface in the study area as shown in Figure 20 (Appendix B). However, the majority of the study area is underlain by Loess, Alluvium, and Continental deposits. These deposits are mainly made up of silt, sand, and gravel. The first two deposits are the most common and are unconsolidated Quaternary deposits; Loess sediment on upland surfaces and Alluvium along stream drainages, particularly Truman Creek. Neither of these presents severe limitations for road construction.

Cut and fill slopes will mainly encounter Loess silt throughout the study area. Cut slopes in this material are usually erosive and may require some type of slope protection to eliminate erosion. Cuts with high water tables may require 3:1 slopes and extra right-of-way may be needed. Ditchlines will require channel lining to prevent erosion. According to the KGS documentation, Loess sediment is susceptible to mass movement and landslides on slopes that are exposed to moisture and vertical cuts are more stable.

Areas underlain by Alluvium require more extensive geotechnical evaluation because they are often sources of groundwater, sites for archeological settings, and may be susceptible to liquefaction during regional earthquakes. Alluvial valleys along major streams in the study area are 2,000 to 3,000 ft wide, a considerable span where special attention to structures is needed. Embankments in Alluvium should be stable on 2:1 fill slopes. Rock and fabric may be needed in soft and wet areas to provide a working platform for construction.

Continental Deposits composed of gravel occur at the headwaters of small tributaries. These gravels may be a local source for road metal, subgrade, and base materials. They may, however, be locally cemented with iron oxide and difficult to excavate.

Occurring in isolated pockets within the study area are deposits of Artificial Fill and deposits from the Tertiary geologic age which includes formations of the Jackson and Claiborne. The Jackson and Claiborne Formations contain sand, silt and clay, with the Claiborne formation containing a few lignite seams.

9.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

9.1 Public Involvement Program Summary

To encourage public participation and ensure that all groups are represented equally throughout the study process, a Public Involvement Program was developed for the US 51 Study at Bardwell. The public refers to the full range of interest groups such as citizens, businesses, local organizations, public interest groups, and any other affected parties interested in participating. It was the Kentucky Transportation Cabinet's (KYTC) and the consultant team's desire to engage the public in determining the overall direction of the study, as well as in advising the KYTC in the decision making process.

The public was asked to give input to the KYTC at various points during the study. Input was requested on the following:

1. Identification of Study Issues and Goals
2. Development of the Range of Improvement Alternatives to be Considered
3. Evaluation of the Alternatives
4. Selection of a Preferred Alternative

The process and methods for public involvement are outlined in this chapter. The results and feedback from implementation of the public involvement are provided throughout the entire report. For example, public input on the alternatives development is included in that section of the report and feedback on the alternatives is integrated into the alternatives evaluation sections.

Specific public involvement methods used included a Project Work Group, stakeholder meetings, public workshop / meetings, community outreach activities, and other publicity efforts. This section describes each of these activities in more detail. Meeting minutes for these meetings are included in Appendix E in the back of the report.

Project Work Group – A Project Work Group (PWG) was created for the US 51 Study at Bardwell. The PWG was comprised of landowners, business representatives, local residents, community leaders, and government officials. The members of the PWG were selected to represent the various stakeholders that would have an interest in the study. They were to work with the project team which is comprised of KYTC Central Office staff, KYTC District Office staff, Purchase Area Development District staff, and consultant staff.

The purpose of the PWG was to provide input and feedback to the project team regarding key project issues and decisions. They helped the project team by putting forward a wide range of ideas, opinions, and suggestions. Three PWG meetings were held during the study. Each of these meetings is described below.

- Project Work Group Meeting #1 – This meeting was held on April 29, 2002. Items that were presented and discussed included the study process and

schedule, study background information, public involvement program, and study issues and goals. Feedback on the last two items played a prominent role in the meeting.

- Project Work Group Meeting #2 – The second meeting was held on August 22, 2002. A portion of the meeting was used to review the previous PWG meeting, work that had been completed to date, existing conditions data, and project issues and goals. The rest of the meeting was devoted to discussing the three-level evaluation process and the range of potential alternatives to be included in the first level of analysis.

- Project Work Group Meeting #3 – A third PWG meeting was held on May 12, 2003. The project goals and study process were reviewed along with existing and future traffic conditions. A brief presentation of each of the three analysis levels was made, followed by a discussion of the preliminary findings and possible recommendations. Potential short and long term recommendations were also discussed.

Stakeholder Meetings – Stakeholder meetings were conducted in the community to gather input on the project. The intent of the meetings was to gather input and opinions about various issues to be considered in the study. Two meetings were held with different stakeholder groups. A meeting with the business stakeholders in the study area took place on April 30, 2002. A meeting with non-profit stakeholders was held on May 14, 2002.

Meetings with Local Officials – Public officials' briefings were held to introduce local officials to the study and to inform them regarding the study process. An initial meeting with various local elected officials and leaders was held on February 22, 2002. The meeting was held to inform those present about the study and to encourage them and their constituents to get involved. Subsequent meetings were held with the Carlisle County Fiscal Court and the Bardwell City Council on April 2, 2002 and April 9, 2002, respectively.

Public Meetings (Open House Workshops) – Two public meetings were held in the study area. Key goals for these meetings were to gather public input on the issues and alternatives to be considered and then to obtain feedback on the final refined alternatives before a final recommendation was made. Each of these meetings is described below.

- Public Meeting #1 – This meeting was held on September 9, 2002. The main purpose of the workshop was to 1) inform the public regarding the study; 2) obtain feedback from the public on the study goals and issues, and 3) receive input on the alternatives to be evaluated. This was done through the presentation of the study area, existing conditions, project issues and goals, and possible alternatives. The public was asked to provide written feedback regarding the above items. They were also encouraged to offer additional alternatives for consideration in the study.

- Public Meeting #2 – This meeting was held on July 1, 2003. The purpose of the meeting was to present to the public all of the analysis work completed up to that time and to present and request feedback on the final round of refined alternatives prior to KYTC making a final decision on the project.

These public meetings utilized an open forum format after a brief presentation on relevant study topics and issues. Take home / leave behind materials and a series of display stations were utilized during each meeting. The purpose of this approach was to facilitate an environment of open communication between all in attendance. All attendees were encouraged to provide their thoughts and opinions on the comment forms provided at each meeting. Project team representatives were also present to discuss all aspects of the study.

9.2 Agency Coordination

An agency mailing was prepared at the outset of the study. The mailing was prepared by PB and sent by the Kentucky Transportation Cabinet to various local, state and federal agencies to obtain input early in the study process. A copy of the mailing and the list of recipients are both included in Appendix D for reference. Supplemental letters were sent by Third Rock Consultants to gather data from four specific agencies for the environmental overview. These letters are also included in Appendix D.

Responses were received from a variety of agencies. Many of the responses indicated that their agency did not anticipate any significant project related issues in the study area. Others outlined standard requirements and guidance related to project planning, design, and construction. A third set of agencies did have specific concerns or issues that they wanted to be considered in the study. The agencies with specific concerns or issues included:

- United States Department of the Interior, Fish and Wildlife Service
- Kentucky Department of Fish and Wildlife Resources
- National Park Service
- Kentucky Transportation Cabinet, Division of Multimodal Programs
- MeadWestvaco

A brief summary of concerns and comments related to the project from these agencies is provided below. Copies of all responses to the agency mailing are included in Appendix D.

Both the United States Fish and Wildlife Service and the Kentucky Department of Fish and Wildlife Resources expressed concern regarding the potential for impacts to the federally endangered Indiana bat that is known to have a summer maternity habitat in this area of western Kentucky. The Kentucky Department of Fish and Wildlife Resources suggested that the project should examine the impact on this species. The United States Fish and Wildlife Service requested an assessment of impacts and recommended submitting a copy of the assessment and finding to them for review. A finding of “may affect” could require the initiation of a formal consultation.

In addition, the Kentucky Department of Fish and Wildlife Resources provided a list of rare and/or endangered species known to occur in the study area. They also expressed concern regarding the potential for wetlands impacts in the study area.

The National Park Service (NPS) expressed interest regarding the preservation and protection of historic resources associated with the Trail of Tears. While the currently designated routes for the Trail of Tears National Historic Trail do not pass through the study area, NPS indicated that there may be trail segments in this part of Kentucky that are eligible for the National Register of Historic Places. In particular, the Benge Route has been tentatively identified as crossing Hickman and Carlisle Counties. NPS recognized the difficulty in assessing impacts during the early planning process, but requested consideration as an interested party to the project development process. They asked to review cultural resource reports and that archeological testing or historical investigations account for the possibility of Trail of Tears associated resources.

The Kentucky Transportation Cabinet, Division of Multimodal Programs recommended that the project take into consideration the provision of bicycle and pedestrian facilities. Specifically, sidewalks and bike lanes or shoulder bikeways were put forth for any improvements in and near town. Right-of-way for a shoulder bikeway and possible future sidewalk were recommended for any bypass alternatives.

A letter requesting input on the study was also sent to MeadWestvaco which is a paper mill in Wickliffe, Kentucky. Many of their suppliers' log trucks pass through Bardwell. A substantial portion of the trucks headed to the mill enter Bardwell on US 62, turning right on US 51. According to MeadWestvaco's letter, their primary concern is safety and they support local residents deciding which alternative is best for the town. They also stated that a bypass would provide some benefits in terms of speed and time, but for the hauling distance, the time savings are not very significant. The most beneficial improvement as stated by MeadWestvaco would be improvements to the intersection of US 51 and US 62 in Bardwell or a portion of Alternative 5A that would bypass this intersection and provide a connection between US 62 and US 51 north of Bardwell.

10.0 ALTERNATIVES DEVELOPMENT

10.1 Alternatives Development Process

The alternatives development process involved both technical analysis and public input. The process was iterative, with the project team developing concepts and then asking for feedback from the public (including new concepts). To begin the process, the project team completed a preliminary examination of reasonable alternatives, taking into account topography, environmental constraints, community constraints, previous studies, and feedback from early public involvement activities. Five generalized alternatives were then put forward first at a Project Work Group meeting and then at a Public Information Meeting. Based on feedback at these two meetings and on additional project team input, the total number of alternatives increased to nine.

Overall, the alternatives development process was designed to be inclusive with input from the following sources contributing to the final set of alternatives:

- General Public
- Specific Stakeholders
- Initial Technical Review (environmental, topographic, etc.)
- Project Work Group Members
- Project Team
- Previous Studies

For copies of meeting minutes for each of the above groups refer to Appendix E.

10.2 Preliminary Alternatives

The nine preliminary alternatives are defined below. Please refer to Figure 21 (Appendix B) for a concept map of the preliminary alternatives.

10.2.1 Alternative 1 – No-Build

This alternative assumes that no new improvements are made to US 51. The current highway would remain in place with no modifications.

10.2.2 Alternative 2 – Spot Improvements

This alternative is intended to improve four specific locations identified as having potential safety or design concerns as described below and illustrated in Figure 21.

Alternative 2A - US 51 / US 62 / Front Street Intersection
The intersection is STOP controlled in the east-west direction (US 62 and Front Street). All approaches are single lane approaches. It has a fifth approach that intersects US 51 close to US 62. Most of the traffic on US 62 turns to or from US 51. There are wide curb cuts serving businesses at the intersection. The turning radius for the westbound to northbound movement is poor, resulting in difficulties for trucks (this is a heavy truck movement). The crash rate from this location south to East Court Street exceeds the critical crash rate, indicating a potential safety problem south of the intersection.

The improvements proposed for this location include reconstructing the curbs and gutters, constructing sidewalks, increasing the turning radii (flattening the corners), and installing northbound and southbound left turn-lanes. Installation of a fully actuated traffic signal will also be considered for the intersection. The signage and striping at the intersection would be updated with the new improvements.

Alternative 2B - US 51 / Jennings Street Intersection
The Jennings Street intersection has a traffic signal, which is not warranted. Turn volumes are very low. The intersection has had at least four reported crashes, including one injury crash. Other crashes have been reported in the vicinity of the intersection. The proposed improvement is to remove the traffic signal, reconstruct the curbs and sidewalks, and re-stripe the intersection.

Alternative 2C – US 51 / KY 123 (Elsey Avenue) Intersection
This intersection is STOP controlled on KY 123. It is within the high crash rate section of US 51 in Bardwell. The turning radii are insufficient for large trucks turning to and from KY 123. Proposed improvements include increasing the turning radii and constructing curbs and sidewalks. Other improvements such as turn lanes or a signal could be considered for the future if warranted.

Alternative 2D – US 51 at Curve by Methodist Church
The section of US 51 from the curve by the Methodist Church to the hill by the Lions Club has experienced approximately six crashes in the last three and a half years. The curve is sharp, especially for trucks headed down the hill (northbound on US 51). Potential improvements include realigning the roadway to decrease the curve as well as to flatten the grade on the hill. Lane and shoulder widths could also be increased. In later stages of the analysis this alternative was divided into 2D – Curve and 2D – Hill.

10.2.3 Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes

Alternative 3 addresses the safety and truck traffic issues in Bardwell through the reconstruction of US 51 as an upgraded two-lane roadway. The project would extend from north of town, south to the study area boundary for a distance of approximately 2.8 miles. The majority of the improvements would be in and near town, including the project elements discussed previously for Alternative 2. Additional spot improvements could be made to the hills and curves along US 51 south of Bardwell between KY 1181 and the study area boundary. Refer to Figure 21 for the extent of the proposed improvements.

Alternative 3 assumes a two-lane urban cross-section in town as shown in Figure 22 (Appendix B).[2] Turn lanes could be provided at major intersections. It would have two 13 foot travel lanes with a 2 foot curb and gutter (with bicycle safe grates). The 13 foot lanes and bicycle safe grates were included to provide a “wide curb lane” to better accommodate bicyclists in town. (This was done to conform to planning requirements

[2] Typical sections were developed for the range of alternatives in Bardwell. The typical sections are not for design use, but rather provide a conceptual basis for evaluating the alternatives including the development of cost estimates.

of the *KYTC Pedestrian and Bicycle Travel Policy*. If the wide curb lane was not pursued the lanes could be reduced to 12 feet.)

The urban cross section also includes a sidewalk and buffer area on either side of the roadway. Widths for these items were minimized to keep the minimum cross section at 50 feet. This was done because the majority of US 51 through Bardwell has a 50-foot right-of-way. The presence of a number of potentially historic properties through town further emphasizes the need for a limited right-of-way. Where possible the urban right-of-way should be increased to provide additional buffer area. It would have to be widened at intersections where left turn lanes are being considered. In areas with side slope problems, small retaining walls may be required. Landscaping treatments and street lighting could also be considered in town, especially at key intersections. (Community leaders and local residents requested the consideration of streetscape improvements.)

South of town a typical rural two-lane cross section is proposed, with 12 foot lanes and 10 foot shoulders (8 feet paved). The shoulders provide sufficient paved width to support bicycling at all operating speeds and with high truck volumes. For reconstruction of existing segments the cross section could be limited to 100 feet or less where necessary, such as where historic properties limit the available right-of-way. However, for new construction, the cross section and required right-of-way will depend on the design and topography and could be as much as 200 feet in places where significant cut or fill is necessary. This especially applies to Alternatives 4 through 6 below.

10.2.4 Alternative 4A – US 51 Realignment West of the Methodist Church

Alternative 4A would address the safety issues associated with the hill and curve near the Methodist Church by straightening US 51 south of Bardwell. The corridor for this alternative is shown in Figure 21. The new roadway would connect to US 51 near the Methodist church in the north and between KY 1181 and KY 1377 in the south for a distance of approximately 1.5 miles. It would maintain the traffic flow through the town but bypass the segment of US 51 from KY 1181 to the Methodist Church. The corridor would run west of the church, heading south along the railroad tracks. The corridor would then turn southeast, crossing agricultural land, and reconnecting with the current US 51 south of KY 1181. It is assumed that the new highway would have a two-lane rural cross section with a design speed ranging from 30 to 55 mph depending upon location (refer to Figure 22). Alternative 4A could be combined with the other improvements described above as part of Alternatives 2 and 3 through town and south of KY 1377.

10.2.5 Alternative 4B – US 51 Realignment East of the Methodist Church

Alternative 4B is similar to Alternative 4A in its objective, which is to improve safety by removing through traffic from the section of US 51 from KY 1181 to the Methodist Church. However, the proposed new corridor runs on the east side of the Methodist Church in the vicinity of West Court Street. From there it runs southeast to reconnect with US 51 for a distance of approximately 1.3 miles.

10.2.6 Alternative 5A – US 51 Bypass from the Curve near the Fire Station

This alternative would construct a new US 51 bypass approximately 2.0 miles in length east of Bardwell generally within the corridor shown in Figure 21. The bypass would be a two-lane rural type highway (shoulders and drainage ditch) with turn lanes at major intersections such as KY 1181 and US 62 (refer to Figure 22). The highway would have a design speed of at least 50 mph throughout. Travel time on this new route would be shorter than for the existing US 51 because the average travel speed would be higher. The current portion of US 51 would be tied into this roadway at "T" intersections.

10.2.7 Alternative 5B – US 51 Bypass From South of the Bardwell Cemetery

This alternative would be similar to Alternative 5A. However, it would diverge from the current US 51 alignment south of the Bardwell and Roselawn cemeteries to avoid potential impacts to the cemeteries and other sensitive sites just north of the cemeteries. The approximate length of the Alternative 5B bypass would be 2.5 miles, 0.5 miles longer than Alternative 5A.

10.2.8 Alternative 6 – US 51 Western Bypass

This alternative would realign US 51 through Bardwell for approximately one mile to the west side of the railroad tracks. The highway would cross the railroad line north of town, run south through town and re-cross the railroad to connect with the north end of Alternative 4A. The highway would be a two-lane roadway with STOP controls on the local side streets. It would require two bridges over the railroad to provide grade separation.

10.2.9 Alternative 7 – One-Way Street System (US 51 and Front Street)

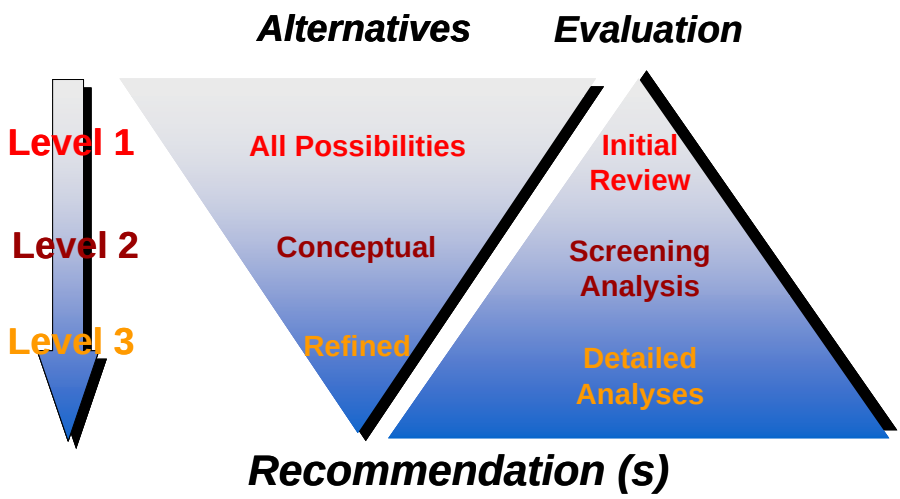
This alternative would convert the current US 51 to one-way northbound for a distance of slightly less than one mile. Front Street which runs parallel to US 51 through town would be one-way southbound. A new short connector road would be constructed at the north end of Front Street to provide a direct connection to southbound Front Street. This alternative would shift southbound US 51 traffic to Front Street and northbound Front Street traffic (which is minor) to US 51 northbound. Front Street would be reconstructed to accommodate the increased traffic including truck traffic. Parking on the street may also be revised to replace the angled and perpendicular parking with parallel parking. New curbs and sidewalks would be considered for both highways.

11.0 EVALUATION METHODOLOGY

The alternatives evaluation procedure used in this study is a three-step process. The purpose of the three-step process is to refine the list of alternatives from all possible alternatives to a short list of promising alternatives and then finally to a recommended alternative or set of alternatives. The evaluation uses increasingly detailed analysis methods to complete the screening and to refine the alternatives remaining after each round of analysis. The goal is to study and further develop feasible alternatives that best meet the project's goals, while not spending extensive effort on those that are unworkable or do not meet the project's goals.

Initially, a few pertinent and important details are identified about a broad array of possible alternatives. As the analysis progresses, the range and depth of information increases and the number of alternatives being studied decreases as shown in Figure 23.

Figure 23: Three-Level Evaluation Procedure



During Level 1, much of the analysis is based on qualitative or comparative information. The principal goals at this level are to determine if an alternative is feasible (physically, financially, environmentally, and socio-politically) and generally how it compares to the other alternatives. During the next two levels, the amount of quantitative data and analysis increases substantially (i.e. traffic forecasts, cost estimates, potential numbers of impacted wetlands, etc.) allowing for more detailed and definitive comparisons. The goal of the final Level 3 analysis is to determine a recommended project(s).

Appendix F describes in more detail the evaluation procedures for each level of analysis. This includes a detailed discussion of the evaluation criteria used for each evaluation level. The following three report sections present a summary of each of the three analysis levels.

12.0 LEVEL 1 EVALUATION – INITIAL SCREENING

12.1 Level 1 Evaluation Summary

The following pages present the results of the Level 1 Initial Screening analysis. For the alternatives advanced to Level 2, a brief summary is given. However, for the alternatives set aside from further consideration in Level 1, a more in-depth discussion is provided to clearly illustrate the reasons for not pursuing those alternatives further. Refer to Table 22 (Appendix A) for a list of the preliminary alternatives and the corresponding ratings for each in the following five evaluation categories:

- *Implementation / Construction Feasibility*
- *Project Goals*
- *Community Impacts*
- *Environmental Impacts*
- *Public Support*

Alternative 1 – No-Build

The No-Build Alternative involves no new construction and is therefore rated GOOD for both *Implementation / Construction Feasibility* and *Environmental Impacts*. However, with regard to *Project Goals*, the No-Build Alternative is rated POOR. While the No-Build limits negative impacts, it offers no benefits to safety, traffic flow, highway geometry, and truck traffic conditions. In fact, the current traffic safety issues may intensify if traffic volumes grow. The No-Build is rated FAIR for *Community Impacts*. Again, it limits physical impacts to the community, but it also offers no community benefits. Deficiencies such as the poor continuity and condition of sidewalks in town are not addressed. It also does nothing to change the impact of truck traffic on the community. The initial stakeholder meetings and the first public meeting revealed some support for doing nothing, giving it a rating of FAIR for *Public Support*.

Although the No-Build Alternative may not improve the transportation system or address the transportation deficiencies identified in the study, it was carried forward to Level 2 (and throughout the study) both as a possible alternative, as well as to provide a baseline for comparing the potential build alternatives.

Alternative 2 – Spot Improvements

The spot improvements are rated GOOD for *Implementation / Construction Feasibility* because they require the least amount of new construction of any build alternative, minimizing cost and construction complexity. The spot improvements may achieve a number of project goals such as enhanced traffic flow and safety, improved geometry and better truck traffic operations. However, they are not expected to provide the same traffic benefits as complete reconstruction of the highway or a new highway. They do leave traffic flowing through town, providing continued visibility for existing businesses on US 51. They are rated FAIR for *Project Goals.* The spot improvements minimize community impacts (both positive and negative), giving a rating of FAIR for *Community Impacts*. They are also unlikely to have significant negative environmental impacts,

yielding a GOOD rating for *Environmental Impacts*. Based on initial stakeholder meetings, and on the results of the first public meeting, the spot improvements had more support than any other alternative (50 percent of all survey respondents supported this alternative). It is rated GOOD for *Public Support*.

Alternative 2 (Spot Improvements) has the potential to achieve many project goals with minimal cost and impact. It also has substantial local support. Therefore this alternative was recommended for further study in Level 2.

Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes

Improving the existing highway is feasible, but may be complicated and costly, especially given the expected utility and right-of-way issues. It is rated FAIR for *Implementation / Construction Feasibility*. Improving the current highway addresses many project goals including improved traffic flow, safety, and truck traffic operations. The benefits in these areas are expected to be greater for Alternative 3 than for Alternative 2, but possibly less than a complete new highway east or west of town. Visibility for existing businesses on US 51 is also maintained. Overall, it is rated GOOD for *Project Goals*. Alternative 3 is expected to support current businesses through continued visibility and enhance the aesthetics of the existing developed community. It may have some physical or right-of-way impacts on businesses and properties along US 51. Overall it is rated GOOD for *Community Impacts*. Improving the current highway is unlikely to affect the natural environment, but it does have the potential for historic resource impacts. These would be avoided to the greatest extent possible. Alternative 3 is rated GOOD for *Environmental Impacts*. There appears to be considerable public support for Alternative 3. (Approximately 37 percent of survey respondents supported this alternative.) It is rated GOOD for *Public Support*.

Alternative 3 is likely to achieve a number of the key project goals, while minimizing negative community and environmental impacts. It also has local public support. Therefore this alternative was recommended for further study in Level 2.

Alternative 4A – US 51 Realignment West of the Methodist Church

The improvements in town may be complicated and costly. However, the realignment and other improvements north and south of town are likely to be straightforward. It is rated FAIR for *Implementation / Construction Feasibility*. Alternative 4A addresses many of the project goals including improved traffic flow, safety, and truck traffic movement while providing continued visibility for existing businesses on US 51 in town but not south of the Methodist Church. It is rated GOOD for *Project Goals*. It is expected to support most current businesses and enhance the aesthetics of the existing developed community, but it may impact some homes, farms, and businesses. Overall, it is rated GOOD for *Community Impacts*. Alternative 4A crosses an area with wetlands, streams and a floodplain southwest of the Methodist Church as well as an agricultural district. It may also result in impacts to one or more potentially historic sites. These issues give it a FAIR rating for *Environmental Impacts*. Based on input from the Project Work Group and the public, it appears that some local residents and community leaders

support Alternative 4A (approximately 20% of the surveys from the first public meeting supported Alternative 4.) It is rated FAIR for *Public Support*.

Alternative 4A is expected to provide identifiable benefits and has the potential to achieve a number of the key project goals; however, it appears to have the potential for some negative environmental impacts. Alternative 4A was recommended for further study and evaluation in Level 2.

Alternative 4B – US 51 Realignment East of the Methodist Church

Alternative 4B is similar to Alternative 4A in many ways, therefore it is rated the same in three of the five evaluation categories. Alternative 4B is rated FAIR for *Implementation / Construction Feasibility* and GOOD for *Project Goals*. Regarding community issues, Alternative 4B differs from Alternative 4A because it may result in property impacts on the east side of US 51 and the Methodist Church instead of on the west side. Due to potential issues in this area Alternative 4B is rated FAIR for *Community Impacts*. Alternative 4B, unlike Alternative 4A, stays away from the wetlands, streams and floodplain southwest of the Methodist Church, though it still crosses the agricultural district and has potential historic resource impacts. Overall, it is rated GOOD for *Environmental Impacts*. Similar to Alternative 4A, Alternative 4B is rated FAIR for *Public Support*.

Alternative 4B addresses identified problems and has the potential to achieve a number of the key project goals. However, it may have negative property impacts. Alternative 4B was recommended for further study and evaluation in Level 2.

Alternative 5A – US 51 Bypass from the Curve near the Fire Station

Alternative 5A is rated GOOD for *Implementation / Construction Feasibility*. It follows a new bypass alignment for US 51, reducing construction complexity and certain costs (i.e. utilities, maintenance of traffic, and property access). However, other issues may add costs such as route length, right-of-way, and bridge construction (Truman Creek). The 5A bypass addresses the highway related project goals including improved traffic flow, safety, and truck traffic movement. However, it reduces visibility for existing businesses; may not enhance the physical condition of the existing community; and may require substantial property acquisition. Overall, *Project Goals* is rated FAIR. It is rated FAIR for *Community Impacts*. It bypasses Bardwell, reducing the visibility of current businesses and doing nothing to improve community aesthetics. However, it minimizes direct impacts to homes and businesses and opens land for development, though the potential for new development is expected to be low. Alternative 5A crosses at least one stream (Truman Creek), two floodplain areas, an agricultural district, a potential Indiana Bat habitat, and has possible wetland impacts. Cultural resource impacts are possible at either end of the corridor including cemeteries and an archeological site. Therefore, Alternative 5A is given a POOR rating for *Environmental Impacts*. Based on public input, there is limited support for this alternative with a significant portion of the public opposed to a bypass. It is rated POOR for *Public Support*.

Alternative 5A has a mix of benefits and drawbacks. It may have a number of environmental impacts. It also has significant local opposition. However, it offers potential traffic flow, safety, and truck operations benefits. It also has the construction benefits of a new highway alignment and is the best of the three bypass options. As a result, Alternative 5A was recommended for further study in Level 2.

Alternative 5B – US 51 Bypass From South of the Bardwell Cemetery

Implementation / Construction Feasibility - Similar to Alternative 5A, Alternative 5B will be along a new alignment, limiting construction complexity. However, issues such as route length, new right-of-way, bridges, and topography will influence design and may increase project costs. For example, at least one bridge will be necessary to cross Truman Creek. Alternative 5B is also longer than Alternative 5A. Given that Alternative 5B is longer than Alternative 5A and given the uncertainty regarding how it compares to the other alternatives (including Alternative 3) it has been given a rating of FAIR.

Project Goals - Alternative 5B addresses the traffic and highway related goals such as improved traffic flow, safety, and truck traffic movement. However, it reduces visibility for existing businesses and may not enhance the aesthetics of the existing community. It may also require substantial property acquisition. Overall, it is rated FAIR.

Community Impacts - Alternative 5B diverts traffic from the town center, reducing visibility for current businesses in town. It runs further from town than Alternative 5A at its southern end. Also, it may not improve the appearance of the existing developed community. It may open up land to development, though the potential for significant new development is expected to be low. Much of the new right-of-way required for the project is in undeveloped areas, thereby minimizing direct impacts to homes and businesses. However, a considerable amount of right-of-way may be required, some of which is active agricultural land. Overall, Alternative 5B is rated POOR.

Environmental Impacts - Alternative 5B crosses predominantly undeveloped land east of the town of Bardwell. This includes crossing at least one stream (Truman Creek) and two floodplain areas, as well as possible wetland impacts. It crosses one potential Indiana Bat habitat area. Cultural resource impacts are possible at either end of the corridor. While the alignment runs east of the Bardwell Cemetery, there is another unmarked African-American cemetery just to the north of the Bardwell Cemetery. In addition, there is a potential archeological site near the northern end of the corridor. The new road would also cross an agricultural district in the north. These potential environmental impacts give Alternative 5B a POOR rating.

Public Support - Based on input from the Project Work Group, stakeholders, public officials, and the general public, it is apparent that there is limited support for this alternative. In fact there are many local leaders, business owners, and residents that are opposed to this alternative. Approximately 17 percent of survey respondents indicated support for Alternative 5, while 27 percent indicted opposition to a bypass. In addition, many of the local officials involved in the study process spoke out against a bypass. It is rated POOR.

Alternative 5B has drawbacks in the areas of community and environmental impacts as well as significant local opposition and little public support. Alternative 5B was therefore NOT recommended for further study in Level 2.

Alternative 6 – US 51 Western Bypass

Implementation / Construction Feasibility - Alternative 6 will follow Alternative 4A from the south and then cross the railroad to run north through town. At this point, it crosses the railroad again, to rejoin US 51 north of town. The two railroad crossings both increase the complexity of the project as well as the project cost. The new highway along the western side of the railroad through town will also require new right-of-way and is expected to be more costly than the other corridors and improvement alternatives. Therefore, given the structures, right-of-way issues, involvement of the railroad, and other complexities, Alternative 6 has been given a rating of POOR.

Project Goals - Alternative 6 has the potential to address some of the project goals such as improved traffic flow and truck movements; however, it may cause some problems as well. For example, with the town on the other side of the railroad from US 51, the amount of traffic at the at-grade crossings in town would be expected to increase leading to possible safety problems. In addition, while the traffic would still go through town, it would not run along "old" US 51 thereby reducing visibility for existing businesses. The aesthetics of the downtown area could be improved with this alternative. However, Alternative 6 also requires new property/right-of-way acquisition. Overall, it is rated FAIR with respect to the project goals.

Community Impacts - Alternative 6 may not maintain the current through-traffic flow in the town, but shifts traffic to the west side of town. This may reduce visibility for current businesses. It may improve the appearance of the existing developed community, but exactly how much or where is uncertain. This alternative could also open some new land for development on the west side of town, though the potential for significant new development is expected to be low. The direct impacts to homes and businesses are also uncertain, though new right-of-way would be required. Given the apparently mixed potential for community impacts, Alternative 6 is rated FAIR.

Environmental Impacts - Alternative 6 crosses at least one stream (an unnamed tributary of Truman Creek), floodplain areas, and possible wetland areas. The corridor would cross at least one and possibly two agricultural districts. Cultural resource impacts are possible but not certain at present. The potential environmental impacts give Alternative 6 a rating of FAIR.

Public Support - Based on public input received on the project, there appears to be little if any support for this alternative. Essentially, none of the survey respondents voiced support for this or any similar western bypass type alternatives. One citizen at the meeting discussed it and showed it on a map. It is rated POOR.

Alternative 6 has drawbacks in the areas of implementation and public support. It also may have substantial negative environmental and/or community impacts. Alternative 6 was therefore NOT recommended for further study in Level 2.

Alternative 7 – One-Way Street System (US 51 and Front Street)

Implementation / Construction Feasibility - Implementation of Alternative 7, the one-way street concept is expected to be similar in complexity (and possibly even cost) to Alternative 3. The issues of property access and utilities would be present. Alternative 7 may however require less right-of-way acquisition, unless the right-of-way along Front Street is deemed inadequate. The most difficult areas for this alternative would be at the northern and southern ends where Front Street would be tied back into the existing US 51. Overall, Alternative 7 is rated FAIR.

Project Goals - Alternative 7 may improve the highway system and address some of the project's goals such as improved through-traffic flow and better truck traffic movement. However, one-way streets cause drivers to travel further to reach their destinations. In a town with low traffic volumes, like Bardwell, the increase may seem unnecessary and burdensome. With regard to safety, one-way streets can improve safety by decreasing the number of potential vehicle-vehicle and pedestrian-vehicle conflict points and by improving lines of sight.[3] However, vehicles may also be encouraged to drive faster on a one-way street system. As far as business visibility, the traffic would be split between the two streets with some loss to businesses on US 51 and some gain to those on Front Street. Property impacts would be anticipated to be minimal except at the northern and southern ends of Front Street where more extensive improvements would be necessary. Overall, Alternative 7 is rated FAIR.

Community Impacts - Alternative 7 is expected to support current businesses through continued visibility and enhance the aesthetics of the existing developed community. It may however, have some physical or right-of-way impacts on businesses and properties along US 51 and along Front Street. The nature of Front Street might change dramatically from a quiet, low volume street to a fairly busy main street with many large trucks. This traffic impact may affect the entire length of Front Street from the stockyard in the north, to the senior center and City Hall, to the commercial properties throughout, and to the residential homes at the southern end of the street. The parking, traffic patterns, and even the treatment of the railroad grade crossings may need to be modified. A one-way street system also seems out of character with the current rural, small town, nature of the community. Overall, Alternative 7 is rated FAIR.

Environmental Impacts - Alternative 7 may have minor impacts on the natural environment. It has the potential for historic resource impacts, but these would be avoided as far as is possible. Alternative 7 is therefore rated GOOD.

Public Support - There does not appear to be significant support for (or opposition to) a one-way street system in Bardwell. Approximately 7 percent of survey respondents supported this alternative. It is rated POOR.

[3] There are some researchers that contend that one-way streets are less safe for pedestrians. (*Downtown Streets – Are We Strangling Ourselves on One-Way Networks?,* Walker, Kulash and McHugh, TRB Circular E-C109: Urban Street Symposium, F-2/p.10)

In addition to the above discussion, the Institute of Transportation Engineers, Traffic Engineering Handbook (ITE, 1999) lists a number of general conditions that should be met for a roadway to be converted from two-way operations to one-way operations. Two of these conditions include:

- *A specific traffic problem would be alleviated and the overall efficiency of the transportation system improved;*
- *The overall advantages significantly outweigh the disadvantages.*

The proposed one-way street system in Bardwell does not clearly meet these two conditions. Instead, there appear to be other alternatives that would provide benefits to the local street system, thus meeting the needs of the community. It is also useful to note that there has been a recent trend across the nation away from one-way street systems.

At best, Alternative 7 (one-way street system) has mixed benefits and drawbacks. Considering its potential negative impacts, lack of local support, and other shortcomings, Alternative 7 was NOT recommended for further study in Level 2.

12.2 Level 1 Analysis Summary

The overall ratings for each of the nine alternatives are shown in Table 22 in Appendix A. Of the nine (9) initial alternatives, six (6) were recommended for further study in Level 2. These included Alternatives 1, 2, 3, 4A, 4B, and 5A. It was recommended that the three (3) remaining alternatives (5B, 6, and 7) be removed from further consideration. The reasons for discarding these three alternatives ranged from anticipated adverse environmental and community impacts to implementation and construction cost issues, to a lack of local support (or outright opposition).

13.0 LEVEL 2 EVALUATION – PRELIMINARY ANALYSIS

13.1 Level 2 Evaluation Summary

The Level 2 evaluation assigned qualitative ratings and/or numerical values for each alternative in each evaluation category. The results of the Level 2 evaluation are discussed below and presented in Tables 23 and 24 in Appendix A. Quantitative values presented in the matrices are approximations or estimates based on general alignments located within the proposed corridors. *Again, brief summaries are given for alternatives being carried forward to Level 3, while those not carried forward beyond this analysis level are discussed more thoroughly.* For reference the traffic forecasts for each of the alternatives are included in Appendix G.

Alternative 1 – No-Build

Alternative 1 (No-Build Alternative) offers no physical improvement to the current transportation system, nor does it address the traffic and transportation deficiencies identified in the study. It also offers no new opportunities for economic development. However, the No-Build Alternative also has few if any impacts on the human and natural environments; no construction cost; no property or utility impacts; and some local support. It preserves the visibility of current businesses on US 51 and has little effect on community character. The No-Build Alternative also provides the basis for comparing other build alternatives. Therefore Alternative 1 was carried on to Level 3 both as a benchmark and as a viable alternative.

Alternative 2 – Spot Improvements

Alternative 2 seeks to improve traffic operations on US 51 by upgrading four critical locations highlighted as potential problem areas. Each of the four locations is discussed briefly below, with a recommendation regarding advancement to the Level 3 evaluation.

Alternative 2A – US 51 / US 62 / Front Street Intersection

The proposed improvements benefit traffic flow, truck operations, and traffic safety as shown in Table 23. Few if any environmental impacts are expected. The major community issue associated with the project is the closure of Elm Street, however, access would be maintained via Ashford Street located a block further north on US 51. Alternative 2A had the highest level of support of any of the proposed improvements in the town and the cost is estimated to be “Low to Medium”. Based on the expected benefits, Alternative 2A was recommended for advancement to Level 3.

Alternative 2B – US 51 / Jennings Street Intersection

Alternative 2B includes removing the unwarranted signal at Jennings Street, with potential benefits to both traffic flow and traffic safety at a negligible cost. Many local

residents also appear to support the project, with 40 percent of survey respondents giving it positive marks. Alternative 2B is recommended for advancement to Level 3.

Alternative 2C – US 51 / KY 123 (Elsey Avenue) Intersection

Alternative 2C includes widening and reconstructing the US 51 / KY 123 intersection to provide the turning radii necessary for trucks turning to and from KY 123. Few if any environmental impacts are expected and the effect on the community is expected to be limited. Alternative 2C is beneficial, feasible, and the estimated cost is low. Therefore it was recommended for advancement to Level 3.

Alternative 2D – US 51 at Curve by Methodist Church

Alternative 2D includes increasing the radius of the curve by the Methodist Church and reducing the grade of the hill by the Bardwell Community Center (Lions Club). The curve realignment would improve the sight distance and both elements could benefit truck traffic operations and highway safety. The project is unlikely to impact the natural environment; however significant efforts would have to be made to avoid impacts to three sites that are potentially eligible for the National Register of Historic Places. There are also possible impacts to the Lions Club and a chiropractor's office. It also may have significant utility impacts. The cost estimate ranges from "Low to High" depending on the extent of reconstruction. Overall however, Alternative 2D directly addresses the safety and traffic concerns related to the curve and hill for the least cost of any alternative. Therefore, Alternative 2D was recommended for advancement to Level 3.

Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes

Traffic Operations - As shown in Table 23, Alternative 3 rates "High" with respect to traffic benefits due to the signalization improvements, turn lanes, and wider lanes. It also benefits all roadway users (i.e. both local and through traffic). Alternative 3 rates "High" for truck traffic benefits due to increased radii and the other items mentioned in the spot improvement alternatives. Alternative 3 also receives a "High" mark for safety since the project may mitigate the high crash rate problem in Bardwell. In addition, the project offers the possibility of improved access control and significantly improved bicycle and pedestrian facilities.

Environment - Alternative 3 is expected to have a very limited affect on the natural environment as shown in Table 23. With regard to the human environment, there are a number of potential hazardous material sites in the corridor, but the most important issue is the presence of 6-7 sites that are potentially eligible for the National Register of Historic Places.

Community - As shown in Table 24, Alternative 3 is rated "Good" for current businesses in town because it not only preserves their visibility, but may also enhance the aesthetics of the community through new sidewalks and other enhancements. With regard to new development, Alternative 3 opens no new land for development. It may also result in some residential and business impacts. During reconstruction, delays and other maintenance of traffic issues are expected.

Public Support - Of the proposed build alternatives, Alternative 3 received the second highest level of public support in the public comment form responses (37 percent), second only to the Alternative 2 Spot Improvements.

Implementation / Construction - Construction complexity and cost will be higher for this alternative than for Alternative 2 because US 51 would be completely reconstructed. There is also the potential for issues related to major utility relocations because many utilities are located in the current right-of-way.

Construction of Alternative 3 may result in some short-term disruptions to the community. However, upon completion the traffic, safety, and community character benefits are expected to outweigh the construction impacts. Furthermore, the Level 2 analysis shows only modest potential impacts to the community and the environment. Therefore, Alternative 3 was recommended for further study in Level 3.

Alternative 4A – US 51 Realignment West of the Methodist Church

Traffic Operations - Because of its similarity through town, Alternative 4A offers the same or better traffic improvements as Alternative 3. In town, traffic volumes will be similar to the Alternative 3 volumes, with most traffic south of town shifting to the new alignment. Again, it benefits all highway users (local and through). Truck traffic benefits for Alternative 4A were rated "High" because it bypasses the hill and curve and because it includes the other Alternative 3 improvements. The straightened highway may improve overall travel times and efficiency for through trucks. Expected benefits to vehicular and pedestrian safety were also rated "High".

Environment - As shown in Table 23, Alternative 4A has several potential impacts on the natural environment. The alternative crosses two streams and may require the relocation of nearly half a mile of stream just east of the railroad. The alternative also may impact one to two farm ponds and approximately seven acres of floodplain. As a result of the many water resources located within the corridor, there is the potential for habitat impacts related to the streams, farm ponds, and floodplain areas.

Table 23 shows that there are 5-6 sites potentially eligible for the National Register of Historic Places along the corridor including the Methodist Church. The alternative will likely require acquisition of a portion of the church property. Direct impacts to the church building as well as the other potentially eligible buildings can be avoided. Based on public comments, there may also be one or more unmarked cemetery sites within the proposed corridor that could be affected. Impacts to farming operations can be expected since the proposed corridor runs through an agricultural district. Possible impacts to potential hazardous material sites are expected to be similar to Alternative 3 with no additional sites impacted by the proposed realignment.

Community - Alternative 4A is rated "Good" for current businesses in town, similar to Alternative 3, because it both preserves visibility and enhances local aesthetics. However, Alternative 4A reduces traffic flow passing by the few businesses on US 51 south of the Methodist Church. It is rated "Fair" for new business development because it opens some land south of the town for new development. As was mentioned

previously, this land is currently productive farmland. In order to construct Alternative 4A, one to two homes and one to two outbuildings may need to be acquired. Other non-building acquisitions are necessary to provide the necessary right-of-way. During reconstruction in town, maintenance of traffic issues are expected. After reconstruction, the community character and aesthetics may be improved through the provision of new sidewalks and other enhancements.

Public Support - Based on the comment form responses, it appears that the community may be willing to accept implementation of Alternative 4A. Approximately 20 percent of the respondents at the public meeting favored this alternative, with only three percent of respondents indicating direct opposition to the alternative.

Implementation / Construction - The realignment of US 51 is unlikely to pose any significant construction problems, but construction difficulties may still exist for the proposed improvements in town, as discussed for Alternative 3. As shown in Table 24, approximately 35 acres of right-of-way will be required to realign US 51, which is more than the required right-of-way for Alternative 3. As a result of improvements in town, utilities impacts are rated "Poor". Overall, the construction cost is rated "High". This is due in part to the length of new road construction south of the town.

In order to improve the current safety problems associated with a sharp curve and hill near the Methodist Church, Alternative 4A was developed to realign US 51 south of Bardwell and west of the Methodist Church. However, compared to Alternative 4B, which provides many of the same benefits listed above, this alternative has more potential environmental impacts, requires more right-of-way, and has a higher estimated construction cost. The differences are highlighted in Tables 23 and 24 as well as Figure 24 in Appendix B. Therefore Alternative 4A was not recommended for further study.

Alternative 4B – US 51 Realignment East of the Methodist Church

Traffic Operations - The traffic benefits of Alternative 4B are similar to those of Alternative 4A. Truck traffic benefits and safety benefits are also expected to be similar as the two alignments have many similar characteristics.

Environment - As shown in Table 23, environmental issues associated with Alternative 4B are expected to be less significant than those associated with Alternative 4A. Alternative 4B is not expected to have any significant impact on streams or floodplains, but could impact one to two farm ponds. As with Alternative 4A, there are 5-6 structures in the corridor that area potentially eligible for the National Register of Historic Places. No direct building impacts are expected for any of these, but property acquisition may be required. This is especially true for the church property. Similar to Alternative 4A, the corridor goes through an agricultural district and may split some farmland. The potential hazardous material site issues are also similar to Alternative 4A.

Community - Alternative 4B supports current businesses on US 51 (except the few south of the church) through continued visibility. It opens some land south of town to potential new development (land that is currently in agricultural use). As shown in Table 24, Alternative 4B may require the acquisition and demolition of one or two homes.

Other undeveloped property will be required for the new alignment south of town and some frontage may be needed in town. Otherwise the same maintenance of traffic issues and streetscape benefits for Alternative 4A apply to Alternative 4B.

Public Support - Approximately one-fifth of the community supported a general southern realignment of US 51, with three percent of respondents specifically opposed to it. The public support for a southern realignment was less than the support for spot improvements and US 51 reconstruction, but there was still measurable public support for this alternative.

Implementation / Construction - There is little development in the proposed Alternative 4B corridor therefore construction of the highway could be relatively straightforward. Approximately 30 acres of right-of-way will be required, which is more than Alternatives 2 and 3 require, but less than that required for constructing Alternative 4A. Impacts to utilities are rated "Poor" due to construction improvements in town. Overall, the construction cost is expected to be "Medium to High" depending on the final alignment and extent of reconstruction in town. Alternative 4B is expected to be less expensive than Alternative 4A and therefore rates better than Alternative 4A for this category.

Alternative 4B provides similar benefits to Alternative 4A without the additional cost and impact to the environment. In addition, the realignment of US 51 will be shorter in length than Alternative 4A, requiring less construction and less additional right-of-way. Compared to spot improvement Alternative 2D, this alternative offers another possible solution to the safety problem of the curve and hill by the Methodist Church. Based on this analysis, Alternative 4B was recommended for further study in Level 3.

Alternative 5A – US 51 Bypass from the Curve near the Fire Station

Traffic Operations - Alternative 5A proposes construction of a two-mile bypass on the east side of Bardwell. As shown in Table 23, up to 1,200 vehicles per day (vpd) may divert to the new highway in 2003 (1,900 in 2030). This compares to 4,200 vpd (7,100 in 2030) that will remain on US 51 in the center of town. The traffic remaining in town is enough to require improvements at the US 51 / US 62 intersection to achieve a good LOS even with the bypass. It is anticipated that nearly all of the through truck traffic will use the bypass, reducing truck traffic in town. The bypass provides a higher speed alternate route for this through traffic. However, one large trucking firm (Mead WestVaco) indicated that "bypasses would provide some benefits to our wood fiber haulers in terms of speed and time, but at the distance from which most of our fiber comes, the time savings are not very significant." Instead their main concerns appeared to be safety and improvements to the US 51 / US 62 intersection.

The reduction in traffic and especially truck traffic may benefit safety in town, though the current safety and geometric issues in town will not be addressed directly. A portion of the traffic simply avoids the high crash rate section. However, the future 2030 traffic volumes in town exceed the current traffic volumes and as a result the high crash rate problem in town may persist even with the bypass. The bypass benefits the through traffic somewhat more than local traffic by providing a new through route, while leaving the more heavily traveled road through town unimproved. However, the local traffic

does benefit from some reduction in traffic, especially truck traffic. Refer to Figure 25 in Appendix B for a summary of key issues for Alternative 5A.

Environment - As demonstrated in Table 23, Alternative 5A may impact two streams, one of which is Truman Creek, which runs north of Bardwell. The existing US 51 currently bridges Truman Creek just north of town. Alterative 5A may impact both the natural wetland and the floodplain along Truman Creek. In addition a number of farm ponds may be impacted. Table 23 also shows that impacts to the western edge of a potential maternity (summer) Indiana Bat habitat are possible, along with impacts to habitats related to stream, farm pond, wetland, and floodplain areas.

In addition to impacts to the natural environment, there could be impacts to potential historic sites and agricultural districts. In the northern end of the Alternative 5A corridor is a potential archeological site that is an open habitation site and is currently unassessed as to eligibility for the National Register of Historic Places. In the southern portion of the corridor there is the possibility of an impact to an unmarked African-American cemetery located north of the Bardwell Cemetery. For cultural historic reasons, the State Historic Preservation Office also expressed opposition to a bypass and support for in town improvements. The bypass may impact farming operations by splitting one or more of the farms in the corridor. There is also an agricultural district at the northern end of the corridor. Overall, Alternative 5A appears to present a number of potential environment issues and concerns.

Community - Of all of the alternatives, Alternative 5A likely results in the most extensive changes for the community. The most frequently discussed concern for local residents is the shifting of traffic to the bypass. Based on the initial estimates, approximately 20 percent of the total traffic in the center of town could be diverted, diminishing local business visibility. The existing road would also remain as is without highway or streetscape improvements. For these reasons, the alternative received a “Poor” rating for support of current businesses. It receives a “Fair” rating for new business development because it potentially opens land for new development. However, based on a recent University of Kentucky research report as well as local population and employment data, it appears unlikely that any significant new development will take place along the bypass.[4] Therefore, it appears unlikely that a bypass will impact the economy of Bardwell substantially.

Table 24 shows that up to three residences may have to be acquired to construct the highway along with as much as 45 acres of additional right-of-way. The community character benefits associated with Alternatives 3, 4A, and 4B are not present with Alternative 5A because the community is bypassed; therefore, the alternative is rated “Fair” in this category.

Public Support - Comment form responses gathered at the first public meeting in Bardwell revealed that more people were specifically opposed to an eastern bypass (27 percent) than were in favor of it (17 percent). In addition, many local community leaders

[4] *The Impact of a New Bypass Route on the Local Economy and Quality of Life*, Thompson, Miller and Roenker, KTC Research Report KTC-01-10/SPR219-00-2I, June 2001.

and Project Work Group members spoke out against construction of a bypass. Even the MeadWestVaco (trucking interest) representative to the Project Work Group focused mainly on other alternatives such as improving US 51 / US 62; though they indicated they might support the north portion of the Alternative 5A Bypass.

Implementation / Construction - The two-mile Alternative 5A bypass passes through primarily undeveloped land, which may limit construction complications. However, the additional right-of-way required (approximately 45 acres) is the most of any of the build alternatives. Few major utility issues are anticipated in the corridor; therefore, impacts to utilities are rated as "Good". The order of magnitude cost estimate for this alternative is "High" mainly because of the construction length.

Overall, construction of the Alternative 5A bypass offers benefits for through traffic, but the benefits come with a high capital cost and at the expense of the environment and community. It also does not address the safety problems in the town. In addition, the public feels strongly that construction of a bypass would be harmful to the community. For these reasons, Alternative 5A was not recommended for further analysis in Level 3.

13.2 Level 2 Analysis Summary

Tables 23 and 24 in Appendix A include information for the designated categories used to compare the alternatives remaining after Level 1. After the Level 1 initial screening evaluation, six (6) of the original nine (9) alternatives remained for further consideration. The more detailed analysis performed in the Level 2 preliminary analysis evaluation further reduced the alternatives to only four (4) alternatives. It was recommended that the other two alternatives (Alternatives 4A and 5A) be removed from further consideration. Major reasons for discarding these alternatives included potentially significant community and environmental impacts, high construction costs, and local community opposition.

14.0 LEVEL 3 EVALUATION – DETAILED ANALYSIS

14.1 Final Refinement

Based on the Level 2 analysis, the remaining alternatives were refined for the Level 3 evaluation. This included minor modifications to the preliminary corridors and the typical sections based on available technical analyses as well as public and agency input. The typical sections shown in Figure 22 reflect the adjustments made for the Level 3 analysis and are the final conceptual typical sections used for cost estimating purposes. Construction phasing was also considered for each alternative when applicable. The refinements were made to give the best corridors for future highway design and to yield reasonable cost estimates for the final evaluation.

14.2 Alternative Refinement and Phasing

Alternative 2A – US 51 / US 62 / Front Street Intersection

The refined Alternative 2A includes the following major elements:

- Installation of a traffic actuated signal;
- Construction of left turn lanes on US 51 (north and south);
- Closure of the intersection's fifth leg (Elm Street);
- Reconstruction of curbs, gutters, and drainage structures;
- Increased northeast intersection corner radius for truck turning movements; and
- Sidewalks if construction is possible within the existing right-of-way.

Although this alternative closes Elm Street at US 51, access to Greg's Supermarket and the nearby residential area will be maintained via Ashford Street. (Refer to Figure 26 in Appendix B)

Alternative 2B – US 51 / Jennings Street Intersection

Alternative 2B involves no construction work, only the removal of the current traffic signal and associated re-striping of the intersection. (Refer to Figure 27 in Appendix B)

Alternative 2C – US 51 / KY 123 (Elsey Avenue) Intersection

A minimum of construction is proposed for Alternative 2C as well. Curb and gutter is to be placed along both corners of KY 123 (Elsey Avenue) where it intersects with US 51 to provide adequate turning radii for trucks. In addition, installation of a traffic signal is proposed in 2020. A signal warrant analysis using the forecasted volumes shows that the signal will be warranted by 2020. (Refer to Figure 28 in Appendix B)

Alternative 2D Curve – US 51 at Curve by Methodist Church

As part of the refinement process, Alternative 2D was broken into two projects (realign curve and lower hill). Each of these improvements can be implemented independent of the other and should be evaluated with respect to individual merit.

For Alternative 2D Curve, the only improvement would be to the curve by the Methodist Church. The roadway would be realigned to flatten the curve. The travel lane and shoulder widths would be increased and the line of sight would be improved. (Refer to Figure 29 in Appendix B)

Alternative 2D Hill – US 51 at Hill by the Lions Club Building

For Alternative 2D Hill, the only improvement would be to the hill by the Community Center (Lions Club). The hill would be lowered to improve the transition to the curve, and lane and shoulder widths could be increased. (Refer to Figure 29 in Appendix B)

Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes

Alternative 3 is a composite of the proposed spot improvements with the addition of full reconstruction of US 51 from just north of town to KY 1181 and spot improvements to the hills and curves south of town. (Refer to Figure 30 in Appendix B) Due to the nature and extent of the proposed improvements, it is possible to construct Alternative 3 in phases. The benefits of phased construction are defrayed construction costs and almost immediate results for the community. One possible phasing plan would be to complete all spot improvements excluding Alternatives 2D Curve and Hill as Phase 1 including reconstructing US 51 through town. The spot improvements require minimal to moderate construction and can be finished in a timely manner. The reconstruction of US 51 through town will be more difficult and should be undertaken once the spot improvements have been completed. Phase 2 would likely consist of Alternatives 2D Curve and Hill. These improvements could be a stand-alone project due to the extensive construction work required to realign the roadway and the associated traffic delays. The final phase (Phase 3) would be improvements to the hills and curves south of town. Improvements to the hills and curves south of town are proposed as the last phase since they are likely to provide the least overall benefit.

Alternative 4B – US 51 Realignment

Alternative 4B is a variation of Alternative 3. (Refer to Figure 31 in Appendix B) Instead of the proposed Alternative 2D improvements, the curve and hill would be bypassed with a realignment of US 51 from the curve by the Methodist Church to between KY 1377 and KY 1181. Originally Alternative 4B tied into the current alignment of US 51 east of the Methodist Church and Alternative 4A tied into the current alignment of US 51 west of the church. However, Alternative 4A was dismissed during the Level 2 evaluation because it was determined to have multiple environmental impacts including stream relocation. In addition it was longer than Alternative 4B, leading to higher construction costs. The major issue with construction of Alternative 4B involves the potential relocation of a house located in the curve by the church. The initial cultural

historic survey recommended the house as potentially eligible for listing in the National Register of Historic Places (NRHP). Subsequent analysis has shown that this site is not a particularly outstanding example of the Tudor style and was removed from consideration for listing in the NRHP. Therefore Alternative 4B was determined to be the preferential realignment alternative. However, during a field visit, the optimal route was determined to be a combination of Alternatives 4B and 4A. For this analysis, the realignment was refined to begin to the east of the church, but then curve slightly west, avoiding the floodplain and stream areas. To determine the optimal route, further analysis is recommended to identify all environmental and cultural / historic features in this area. Therefore, if Alternative 4B is recommended, a broad corridor will be designated as the area of potential realignment to allow for adequate flexibility in design.

In addition to realigning a portion of US 51, Spot Improvements 2A, 2B, and 2C are included in this alternative as well as reconstruction of US 51 north of the realignment. This alternative can be constructed in phases, with a phasing scheme similar to the one proposed in Alternative 3. Instead of realigning the curve and lowering the hill as Phase 2, the realignment of US 51 would be the second phase.

14.3 Level 3 Analysis Summary

After refining each of the four alternatives advanced from Level 2, they were subjected to a detailed analysis to determine which alternative or combination of alternatives should be recommended for implementation. A discussion of the results from this analysis is included below for each alternative. An evaluation matrix for each of the four primary categories (Traffic Operations, Environment, Community, and Implementation / Construction) is included as Tables 25 – 28 in Appendix A. For reference the traffic forecasts for each of the alternatives are included in Appendix G. In the next chapter, the recommended alternative or set of alternatives is presented.

Alternative 1 – No-Build

Traffic Operations - Between 2002 and the design year of 2030, traffic volumes on US 51 in town are expected to increase. This additional traffic is likely to affect intersection operating conditions at the major intersections in the study area. Level of service (LOS) analysis for the current operating conditions (2002) and the design year of 2030 showed a decline in LOS for both the intersection of US 51 at US 62 and the intersection of US 51 at KY 123. Currently, the intersection of US 51 at US 62 operates at a LOS A on the northbound and southbound approaches (US 51), and operates at a LOS B on the eastbound and westbound approaches (US 62). By the year 2030, the eastbound and westbound approaches (US 62) are expected to fall below the desirable LOS threshold, giving the intersection an overall rating of LOS F. The intersection of US 51 at KY 123 currently does not have significant operational issues. In the design year of 2030, the northbound and southbound approaches (US 51) are expected to remain at a desirable LOS, but the eastbound approach (KY 123) is expected to decline to a LOS F.

This alternative proposes no improvements to address these LOS deficiencies. In addition, truck traffic will continue to go through town on an unimproved highway,

thereby not improving safety or efficiency for through trucks, other highway vehicles, and bicyclists / pedestrians. Other safety issues including the high crash rate in town, and discontinuous sidewalks through Bardwell are not addressed with this alternative.

Environment - Alternative 1 is a No-Build alternative, and is not expected to have any significant impact to the environment other than increased noise from predicted increases of traffic in town.

Community - The No-Build alternative is not expected to impact the community in a negative way, nor is it expected to enhance the community.

Based on comment forms received at the second public meeting, the highest percentage (57%) of respondents thought that doing nothing was the worst alternative. As a result, Alternative 1 was rated the lowest of all of the alternatives.

Implementation / Construction - There are no physical improvements associated with this alternative, therefore no additional new right-of-way (ROW) is required, and there is no cost for this alternative.

Alternative 1 Conclusion: The No-Build alternative has been developed as a baseline for alternative comparison throughout the entire study process. It has the least direct impact to the environment, but also has the least benefit for the community and transportation system. Also, the traffic analysis indicates that there are current safety problems and future traffic deficiencies at two intersections on US 51 in town. Because this alternative does nothing to address these concerns (and therefore the project goals) and is not supported by the public, it is not recommended as the preferred alternative.

Alternative 2A – US 51 / US 62 / Front Street Intersection

Traffic Operations - Traffic volumes at US 51 / US 62 are expected to increase between 2002 and 2030, causing delays for westbound and eastbound traffic. The current (2002) level of service for this intersection is LOS A/B, but in 2020 the west leg (US 62) will be LOS F with no improvements. With the proposed intersection improvements including constructing northbound and southbound left turn lanes along with the installation of a traffic signal, the LOS is expected to operate at LOS B/C, which is within the desirable range of operations.

In addition to the construction of turn lanes and the installation of a traffic signal, several other aspects of this alternative have been included to improve safety at this intersection as well as facilitate truck turning movements. Access is to be limited on all four legs of the intersection, thereby reducing the potential points of vehicle conflict with the through movements. The placement of the curb and gutter at the northeast corner of the intersection will be such that the turning radius for trucks is increased to facilitate turning movements to/from US 51 and US 62. Improvements to this intersection were strongly supported by Mead WestVaco and could be expected to have wide shipper / trucker support.

Environment - There are no known environmental impacts associated with this alternative except for possible impacts to up to two potential hazardous materials sites, including Huck's gas station.

Community - The benefits associated with this alternative are local in nature and primarily are associated with traffic flow. Access will be limited for the development around the intersection, particularly Huck's gas station and Greg's Supermarket; however, adequate access to the development will be maintained. In fact, as a result of limiting access at the intersection, additional land may be added to Huck's gas station to be used as alternative parking. Comment form respondents at the second public meeting gave this alternative an average score between "Fair" and "Good", which was one of the highest ratings given to any of the alternatives.

Implementation / Construction - The estimated construction cost for Alternative 2A is $800,000. The total estimated cost (including right-of-way, utilities, and design) is $1,700,000. This includes modifications to access, property acquisition, closure of the fifth leg, and relocation of business signage. Utility work includes relocating the utility pole on the northeast corner of the intersection to provide adequate space for turning truck movements. The required new right-of-way is low, with less than one acre expected to be required for construction.

Alternative 2A Conclusion: Traffic flow, safety, and geometric issues have been identified at this intersection. Some of these issues are already a problem, while others will become a problem as traffic grows. The proposed improvements directly address these deficiencies and meet the goals of the study. The public, local officials, and local shippers also support the improvements. The project team recognizes the need for improvements and supports the recommendation of this alternative. Therefore, Alternative 2A is to be included in the final recommendation for this study.

Alternative 2B – US 51 / Jennings Street Intersection

Traffic Operations - Currently, this intersection operates at LOS B as shown in Table 25. If the traffic signal remains in place, intersection operations remain at a LOS B in the design year of 2030 for the eastbound and westbound directions of travel, and degrade to a LOS C for the northbound and southbound directions of travel. If the traffic signal is removed, the forecasted LOS for this intersection in 2030 is a LOS C for the eastbound and westbound movements, and LOS A for the northbound and southbound movements. Therefore, intersection operations are expected to remain at or above the desirable threshold for operations with or without the traffic signal. To eliminate unnecessary stops, the traffic signal could be removed without detrimental impact to intersection operations. The signal also does not meet warrants currently and is not expected to meet warrants in the future (2030).

Environment - There are no known environmental impacts associated with this alternative.

Community - There are no known negative impacts to the community with implementation of this alternative. Based on responses received via comment forms at

the second public meeting, this alternative was given an average score between "Fair" and "Good" which was one of the highest ratings given to any of the alternatives.

Implementation / Construction - Of the proposed spot improvements, this alternative has the least cost associated with it ($13,000). There is to be no construction, only the cost associated with the removal of the signal and restriping the intersection. There is no impact to the existing utilities associated with this alternative, nor is acquisition of new right-of-way required.

Alternative 2B Conclusion: The removal of the traffic signal is unlikely to have any significant impacts to the community and environment. Furthermore, the traffic analysis shows that there are no expected major impacts to traffic flow conditions through the intersection. Public response for this alternative has been favorable, and the project team agrees that this is a beneficial improvement to US 51. Therefore, Alternative 2B is to be included in the final recommendation for this study.

Alternative 2C – US 51 / KY 123 (Elsey Avenue) Intersection

Traffic Operations - The current level of service for this intersection is LOS A/B, with operations expected to degrade to LOS F for the west leg (KY 123) by the design year 2030. Installation of a traffic signal would reduce the overall intersection delay, resulting in LOS C for the intersection in 2030. The intersection currently does not warrant the installation of a traffic signal; however, based on the forecasts the signal may be warranted in 2020 when the west leg becomes a LOS D. Because of the expected poor LOS, a traffic signal is recommended at this location when warranted. The improvements proposed for Alternative 2C are also designed to facilitate truck turning movements to/from US 51 and KY 123. The increase in the turning radii are expected to benefit vehicle safety by reducing crossover of trucks into opposing travel lanes.

Environment - There are no known environmental impacts associated with this alternative.

Community - Based on comment form responses received at the second public meeting, this alternative received an average score between "Fair" and "Good". Compared to the other proposed alternatives, this alternative received one of the highest ratings.

Implementation / Construction - In order to increase the turning radii at this intersection, minimal construction is necessary. As a result, the estimated construction cost is $30,000. There is likely to be minimal impact to the existing utilities. Right-of-way would need to be acquired for these improvements. The overall total cost for this spot improvement (including design, right-of-way, and utilities) is estimated at $180,000.

Alternative 2C Conclusion: Alternative 2C benefits traffic movement, particularly truck traffic movements. The estimated construction cost is low for the proposed improvements, and there is general support for this alternative. The project team agrees that this is a project that should be done. Therefore, Alternative 2C is to be included in the final recommendation for this study.

Alternative 2D Curve – US 51 at Curve by Methodist Church

Traffic Operations - The improvements proposed in this alternative are in response to identified safety issues with the curve located on US 51 near the First United Methodist Church. The crash analysis performed for US 51 in the study area revealed a high crash section that begins at Ashford Street and continues through town to East Court Street, encompassing the curve by the First United Methodist Church. The proposed realignment of the curve is expected to reduce the potential for crashes at this location through improved sight distance.

Traffic analysis of US 51 at this location does not indicate any capacity or congestion issues. As a result, the proposed improvements are not likely to impact traffic flow aside from increasing roadway safety.

Environment - There are no streams, wetlands, or floodplains within the vicinity of the proposed Alternative 2D Curve improvements; therefore, there is no expected impact to these environmental features. To the south of the curve is one site (Methodist Church) that is eligible for the National Register of Historic Places (NRHP). To the north is another site (Tudor Revival House) that was potentially eligible for the NRHP, but subsequent review has determined it to not be recommended as eligible. Impacts to the church building are not expected. The property surrounding the church may be impacted, but efforts can be made to avoid the church property. The second site will need to be relocated or demolished in order to realign the curve.

Community - One of the benefits to fixing the current alignment of US 51 is the visibility of all businesses located along US 51 is maintained. Because the proposed improvements will require major reconstruction of US 51 at the curve by the Methodist Church, the Tudor Revival house will need to be relocated or demolished. In addition to the acquisition of this building, right-of-way may be required from several land owners located along this portion of US 51, including at least one additional home.

Despite the property impacts associated with this alternative, the community of Bardwell recognizes the need for improvements to this section of US 51. When asked to score the refined alternatives, respondents at the second public meeting gave Alternative 2D Curve a high average rating, higher than the average rating for Alternative 4B which consists of a realignment of US 51 to bypass the curve and hill. Also, when asked to identify the worst alternative, no respondents selected Alternative 2D Curve, but several respondents selected Alternative 4B.

Implementation / Construction - Construction complexity is likely to be high for the proposed improvements due to the constraints imposed by limited right-of-way along this section of US 51. The estimated construction cost is $500,000 (estimated total cost is $1.5 million), which is high for a spot improvement, but is of a similar magnitude as Alternative 2A which also includes substantial improvements. Compared to Alternative 4B, fixing the current alignment of US 51 at the curve and hill south of town is less costly than constructing a new highway south of town. Also, the estimated right-of-way acquisition for Alternative 2D Curve is significantly less than that estimated for Alternative 4B.

Alternative 2D Curve Conclusion: Improvements to the curve by the First United Methodist Church is a project that has been recognized by the community and the project team as beneficial to reduce the high crash rate on that section of US 51. Both Alternatives 2D Curve and 4B specify means for reducing the high crash rate. The main difference between the two alternatives is Alternative 2D Curve is a proposal to fix the current alignment of US 51 whereas Alternative 4B is a proposal for realigning US 51 to bypass the curve and hill. A comparison of the two alternatives shows that fixing the current alignment of US 51 is likely to impact less property overall, require less right-of-way acquisition, costs less, and has more community support. The complexity of construction is likely to be higher for Alternative 2D with significant maintenance of traffic issues. However, the design and construction of the tie-ins to US 51 of a new highway are also likely to be difficult considering the limited right-of-way availability, particularly by the Methodist Church. Furthermore, community response is in favor of fixing the curve on US 51. Based on the acknowledged need for improvements to reduce the crash rate and comparisons of the two alternatives that address this need, Alternative 2D Curve is the preferred alternative to be included in the final recommendation.

Alternative 2D Hill – US 51 at Hill by the Lions Club Building

Traffic Operations - The improvements proposed in this alternative are in response to identified safety issues with the hill located on US 51 near the First United Methodist Church. The hill leads into the high crash section identified on US 51 through Bardwell. The lowering of the hill is expected to improve safety by reducing the grade leading into the curve, thereby lowering speeds and improving sight distance. These improvements particularly benefit truck traffic since trucks traveling on this portion of US 51 typically pick up speed going down the hill, making it difficult to negotiate the sharp curve.

Traffic analysis of US 51 at this location does not indicate any capacity or congestion issues. As a result, the proposed improvements are not likely to impact traffic flow aside from increasing roadway safety.

Environment - There are no streams, wetlands, or floodplains within the vicinity of the proposed Alternative 2D Hill improvements; therefore there is no expected impact to these environmental features. There is one site eligible for the National Register of Historic Places (T-plan house) located along US 51 where the roadway begins to curve to the south. The building is not likely to be impacted, but portions of the surrounding property that front US 51 may be required for the construction project of lowering the hill.

Community - One of the benefits to fixing the current alignment of US 51 is the visibility of all businesses located along US 51 is maintained. Because the proposed improvements will require major reconstruction of US 51 from the curve at the Methodist Church to where US 51 curves to the south, several buildings located along this portion of US 51 may need to be relocated. These buildings include the Bardwell Lion's Club and a chiropractor's office. (Detailed design may reveal other possible impacts but no others are known at present.). In addition to the acquisition of these buildings, right-of-way may be required from several land owners located along this portion of US 51.

Despite the property impacts associated with this alternative, the community of Bardwell recognizes the need for improvements to this section of US 51. When asked to score the refined alternatives, respondents at the second public meeting gave Alternative 2D Hill a high average rating, higher than the average rating for Alternative 4B which consists of a realignment of US 51 to bypass the curve and hill. Also, when asked to identify the worst alternative, no respondents selected Alternative 2D Hill, but several respondents selected Alternative 4B.

Implementation / Construction - Construction complexity is likely to be high for the proposed improvements to the hill due to the constraints imposed by limited right-of-way along this section of US 51. The estimated construction cost is $900,000 (total estimated cost is $3 million) which is higher compared to the other spot improvements as shown in Table 28. Compared to Alternative 4B, fixing the current alignment of US 51 is less costly than constructing a new highway. Also, the estimated right-of-way acquisition for Alternative 2D Hill is significantly less than that estimated for Alternative 4B (<3 acres for Alternative 2D Hill compared to 30 acres for Alternative 4B).

Alternative 2D Hill Conclusion: Improvements to the hill leading into the curve is a project that has been recognized by the community and the project team as beneficial to reduce the crash rate on US 51. Both Alternatives 2D Hill and Alternative 4B specify means for reducing the crash rate. Alternative 2D Hill is favored over Alternative 4B for the same reasons as Alternative 2D Curve. Therefore, Alternative 2D Hill is the preferred alternative to be included in the final recommendation.

Alternative 3 – Reconstruct US 51 as Two-Lane Roadway with Turn Lanes

Traffic Operations - Current traffic operations on US 51 in Bardwell are good at LOS C or better. In the design year 2030, traffic operations will remain at a good level of service except for side street traffic at the US 51 / US 62 and US 51 / KY 123 intersections, which will degrade to LOS F without any improvements. The main north-south traffic flow on US 51 will remain at a good level of service in 2030. The reconstruction of US 51 does not significantly increase capacity, but instead is proposed to improve congestion at key locations and to improve safety. Safety will be improved (particularly for the high crash section), and congestion will be decreased through the removal of an unwarranted signal, widening of corner radii, widening of travel lanes, widening of shoulders (rural section), installation of curbs, gutters and sidewalks (urban section), limiting access to US 51, installation of signals at US 51 / US 62 and US 51 / KY 123, improvements to the curve and hill, and the installation of turn lanes. This alternative benefits all highway users (both through and local traffic).

Environment - As shown in Table 26, impacts to streams, wetlands, floodplains, and threatened and endangered species are unlikely. Through Bardwell, 6-7 sites that are eligible for listing on the National Register of Historic Places are located along US 51. The proposed reconstruction can remain close to the existing right-of-way, but some acquisition from these properties may be necessary. Efforts to minimize impacts to these sites will be made and preliminary discussions seem to indicate that minor work in the front of some of these buildings (which will ultimately benefit the properties) may be

viewed as having no adverse affect. Other sites that may be impacted include up to seven potentially hazardous materials sites.

Community - US 51 is the primary route through Bardwell, and reconstruction of this road with the addition of sidewalks will greatly benefit the aesthetics of the town. Currently there are small sections of sidewalk scattered along US 51 with no continuity between the sections. Furthermore, installing curb and gutter through town is expected to improve drainage and reduce the amount of standing water in the front of properties bordering US 51 through town. Detention basins could be included if necessary.

Based on ratings obtained through comment forms distributed at the second public meeting, the average rating of Alternative 3 was "Fair", which was lower than the ratings assigned to the spot improvements. However, when asked to identify the best short-term (5+ years) alternative, the majority of respondents selected Alternative 3.

Implementation / Construction - The reconstruction of US 51 will be an extensive construction project with major utility impacts through town due to the location of several municipally owned utilities in the highway right-of-way. To construct the proposed improvements, including all of the spot improvements, approximately ten acres of new right-of-way will be required with much of the right-of-way being acquired for the Alternative 2D improvements. The construction cost estimate for this alternative is $5.7 million with a total estimated cost of $13.4 million (including design, right-of-way, and utilities). According to the table, the construction cost of Alternative 3 is similar to the estimated construction cost for Alternative 4B. For Alternative 3, the reconstruction through town to the southern end of 2D including the spot improvements is the largest portion of the cost estimate at $3.6 million for construction and $8.5 million total.

Alternative 3 Conclusion: A significant traffic capacity increase was not an issue identified for this study and therefore highway widening is not warranted. However, several intersections have been recognized as being deficient and a high crash rate through town has been identified. Therefore, the Alternative 3 and spot improvements have been developed to address the issues identified as warranting improvement. The spot improvements target the deficient intersections while the reconstruction of US 51 improves safety through access control and improved design. In addition, the community benefits from improved drainage and sidewalk construction through town. Improvements south of where Alternative 2D ends are a low priority but have been proposed to improve the curves and hills south of town. Therefore, all phases of Alternative 3 are included in the final recommendation.

Alternative 4B – US 51 Realignment

Traffic Operations - Construction of a new highway from the Methodist Church to between KY 1181 and KY 1377 would divert most of the traffic using the current alignment of US 51. The diverting traffic includes the majority of truck traffic, thereby removing large, heavy trucks from the sharp curve and steep grade on the current alignment of US 51. As shown in Table 25, the level of service for both current year and the design year of 2030 was determined to be LOS C for both the realignment and old US 51.

Environment - The proposed corridor for the realignment primarily runs through farmland, and may split one agricultural district. Depending upon the alignment within the proposed corridor, up to two streams, one to two farm ponds, and five acres or less of floodplain may be impacted.

Community - There are several advantages and disadvantages associated with Alternative 4B from a community standpoint. One advantage is most of the businesses in Bardwell are not bypassed. However, the realignment will bypass the few businesses located between the First United Methodist Church and KY 1181 and KY 1377. These businesses include a car wash and a chiropractor's office. The proposed realignment would tie into the existing US 51 alignment in the vicinity of the curve by the First United Methodist Church. At the tie-in location, several properties could be impacted including one to two houses and the Carlisle County Maintenance Barns.

Alternative 4B was given an average rating of "Fair" by respondents at the second public meeting. When asked which alternative was the worst regardless of timeframe, the greatest number of respondents said doing nothing (Alternative 1) was the worst, with the second greatest number of respondents selecting Alternative 4B as the worst.

Implementation / Construction - Construction costs for realigning US 51 are likely to be the highest cost for any of the build alternatives. As shown in Table 28, the estimated cost for the realignment only is approximately $2.4 million for construction and $5.0 million overall. This is $500,000 more than the cost of realigning the curve and lowering the hill on the current alignment of US 51 (Alternatives 2D Curve and Hill). Because this is new construction, this alternative requires the acquisition of the greatest amount of new right-of-way of any of the alternatives. Furthermore, particularly at the tie-in locations to US 51, a realignment of US 51 is constrained by limited right-of-way and utilities.

Alternative 4B Conclusion: Compared to Alternatives 2D Curve and Hill, this alternative has more disadvantages associated with it. The proposed realignment of US 51 is likely to impact as many properties as Alternatives 2D Curve and Hill with the addition of potentially dividing prime farmland. The construction cost is higher for this alternative than Alternatives 2D Curve and Hill, especially with more new right-of-way required. Public response indicates that the community thinks this alternative would have negative impacts. The safety issues associated with the curve and hill have been identified as being projects that need to be addressed, and the response of the project team was to recommend Alternatives 2D Curve and Hill instead of Alternative 4B based on the reasons listed above.

15.0 RECOMMENDED PLAN

The final recommendation for improvements to US 51 through Bardwell is Alternative 3 which includes Alternatives 2A, 2B, 2C and 2D Curve and Hill. The Alternative 3 improvements are to be constructed in three phases with Phase 1 consisting of Alternatives 2A, 2B and 2C and reconstruction of US 51 through town. Phase 2 consists of Alternatives 2D Curve and Hill, and Phase 3 is improvements to US 51 south of town.

15.1 Recommended Alternatives

Alternative 2A was selected based on a recognized need for traffic flow improvements, access management, and increased turning radii for trucks at the intersection of US 51 and US 62. It also had considerable community support.

Alternative 2B was selected since the current signal is not warranted and the removal will eliminate unnecessary stops through town. Again, it had strong community support.

Alternative 2C was selected because the current corners of the intersection of US 51 and KY 123 are deficient with regard to truck turning movements. The proposed increases in radii will allow for greater turning safety and ease, and can be accomplished at a low cost. The installation of a signal in the future will address future traffic flow issues.

Alternative 2D, both the curve and the hill, was selected as a recommended alternative to improve the safety of the section of US 51 in the vicinity of the curve by the Methodist Church. This section of US 51 was identified as a problem area through the analysis of crash data on US 51. The analysis revealed a high crash location through Bardwell to East Court Street just past the church.

Finally, the recommendation includes the reconstruction of US 51 through town. This will improve safety and traffic flow generally in the area with wider lanes and other improvements. The reconstruction will also improve drainage through town through the installation of an improved stormwater sewer system. The installation of curb and gutter will improve safety by limiting access to US 51 from the development located through town. The construction of sidewalks will improve accessibility for pedestrians through town, and should improve the aesthetics of the roadway. South of town, improvements are to be made to the curves and hills to improve roadway safety.

15.2 Comparison of Recommendation to Project Goals

Alternative 3 (including the Alternative 2 improvements) was selected for implementation because overall, it best addresses the following key project goals.

- **Enhance vehicle and pedestrian safety on US 51 in the study area.**

  The section of US 51 through town has been shown to be a high crash section, warranting safety improvements. The proposed Alternative 2 and 3 projects directly address these safety issues by upgrading key intersections and bringing the road up to current design standards. For example, Alternative 2A will improve safety at the US 51 / US 62 intersection, Alternative 2D will improve a deficient curve, and the lane widening and addition of curbs and sidewalks will make the highway safer for vehicles, pedestrians, and bicycles. Overall, improving the existing highway is a very solid and direct means of addressing this goal.

- **Mitigate the negative impacts of heavy truck traffic on US 51, while maintaining an efficient through route for trucks and other vehicles.**

  Alternatives 2 and 3 mitigate the effect of the truck traffic without removing it from the highway. They also make the route more efficient for through truck traffic. In particular, the Alternative 2A spot improvement may significantly benefit truck movements between US 62 and US 51. The improvements to the hill and curve, the other radii improvements at KY 123, and even the removal of the signal at Jennings Street may all benefit truck traffic while enhancing safety.

- **Maintain appropriate traffic controls and traffic flow conditions.**

  Alternatives 2 and 3 modify the existing highway to provide appropriate traffic controls and to provide adequate (LOS C or better) traffic flow conditions. Current traffic controls in at least two locations (2A and 2B) should be altered and this is accomplished with Alternatives 2 and 3.

- **Preserve downtown business and community character.**

  Alternative 3 preserves downtown business by maintaining the existing infrastructure in support of existing businesses. It does not shift traffic away from the main corridor through town but maintains visibility for existing businesses. It may also have a positive impact on community character. A majority of the community appears to favor these alternatives as being in their best interests.

- **Improve highway geometry and drainage.**

  Alternative 3 addresses this goal very well since it involves reconstructing US 51 to meet current design standards. Drainage could be improved at the same time through the addition of curb and gutter with storm sewers and detention facilities as necessary.

- **Avoid, minimize, and/or mitigate property takings on US 51 as well as other community and environmental impacts.**

  This was goal was put forward specifically by many local citizens and has been included even though it is understood to be part of the normal KYTC planning and design process. All alternatives were developed in accordance with this goal. However, compared to many of the other alternatives, Alternative 3 meets this goal very well since the proposed improvements require the least amount of new right-of-way and have the fewest expected environmental impacts. The area where this alternative may have more impacts is in potential impacts to homes or businesses.

- **Enhance the visual aspects of the community infrastructure and provide improved recreation (bicycle/pedestrian) facilities in keeping with the local economic development goals.**

  Alternative 3 offers significant advantages for improving the visual nature of the town as well as upgrading bicycle and pedestrian facilities through the developed area where they are most likely to be used. The enhancements can be used by the local community to try and improve their economic development goals which local officials indicate are focused on recreation, senior citizens, and young families.

16.0 PROPOSED DESIGN / MITIGATION AND NEXT STEPS

16.1 Design Elements

The reconstruction of US 51 through town will have an urban section with a minimum 50-foot right-of-way (ROW) cross section as shown in Figure 22. This cross section is used to attempt to stay within the existing right-of-way through Bardwell. Where possible the urban right-of-way could be increased to provide additional buffer area. In addition, in areas with side slope problems, retaining walls may be required.

A rural typical section is to be used just south of town where Alternative 2D begins. This will include two 12 foot lanes and 10 foot shoulders. The proposed minimum right-of-way is approximately 80 feet, but much more may be required in some areas to achieve acceptable grades and side slopes.

16.2 Bicycle / Pedestrian Facilities

The reconstruction of US 51 through town specifies lane widths of 13 feet. The increased lane width provides a slightly wider curb lane for bicycle use on US 51 through town. The typical section also provides for sidewalks for pedestrians in the corridor through town. The conceptual rural cross section to be applied to the improvements south of town has shoulders with sufficient paved width to support bicycling at all operating speeds and with high truck volumes. These bicycle and pedestrian provisions have been incorporated in keeping with the recently adopted KYTC Pedestrian and Bicycle Travel Policy (July 2002).

16.3 Intelligent Transportation Systems (ITS)

No intelligent transportation systems have been included in the proposed recommendations.

16.4 Phasing and Funding

In order to defer construction costs and ensure that the high priority elements of Alternative 3 are constructed first, improvements to US 51 are to be implemented in three phases. The essentials of each phase are as follows:

<u>Phase 1 – Spot Improvements and Reconstruct US 51 in Town</u>

Improving US 51 through town has been identified as the highest priority of proposed improvements in the study area. The removal of the traffic signal at US 51 and Jennings Street and the widening of the intersection corners of US 51 and KY 123 are low cost projects that involve minimal construction. As such, these two projects are recommended for completion first. Alternative 2A will require more extensive construction than Alternatives 2B and 2C, but less than the complete reconstruction of US 51 through town. Alternative 2A should therefore follow 2B and 2C. The complete

reconstruction of US 51 through town should follow as funding allows. (Each piece of this phase should be done with the other pieces in mind.)

Phase 2 – Improvements to Curve and Hill

Phase 2 consists of Alternatives 2D Curve and Hill combined to form one project extending from the church south past the fire station. Realigning the curve and lowering the hill leading into the curve is likely to be a complex construction project. Due to the associated cost and maintenance of traffic issues, Alternatives 2D Curve and Hill have been separated into a new project that is independent of the reconstruction of US 51 in town.

Phase 3 – Improvements to US 51 South of Town

The improvements to the curves and hills south of town are the lowest priority of all proposed projects since there is no immediate concern with traffic flow or high crash sections (though there was one fatal crash at a curve on US 51 in this area). These improvements have been proposed as general safety improvements and are proposed as part of the third, and final, phase of construction.

16.5 Commitment Action Plan

KYTC is committed to incorporating appropriate pedestrian and bicycle facilities into the proposed highway projects. KYTC is also committed to working with KHC/SHPO as the project progresses to avoid, to the extent possible, impacts to the identified National Register eligible properties. KYTC also received agency coordination letters from other agencies including the National Park Service (regarding the Trail of Tears and reviewing cultural resource reports) and the US Department of Fish and Wildlife (regarding potential impacts to Indiana Bat habitat). It is not expected that upgrading the existing highway will impact these resources. However, as the project progresses additional coordination efforts should be pursued with these agencies as necessary.

16.6 Next Steps / Implementation

A public announcement regarding the recommendation for improvements to US 51 through Bardwell is the next step. Following the announcement, Alternatives 2B and 2C could be undertaken as soon as possible since they involve minimal construction and cost. Design plans will need to be developed for the remainder of Phase 1 as well as Phases 2 and 3. A provision to begin design for these phases is the suggested next step in addition to the implementation of Alternatives 2B and 2C.

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Table 1: US 51 Highway Characteristics Data Summary
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Table 1: US 51 Highway Characteristics Data Summary

US 51 Study at Bardwell US 51 - HIS Data (MP 4.928 - 10.855)		
Roadway Facility Data	Functional Classification	Rural Principal Arterial
	State System Class	State Primary
	Facility Type	2 Lane Undivided Highway
	Average Right-of-Way Width (feet)	65 (MP 0-6.889) 50 (MP 6.889-8.049) 120 (MP 8.049-8.177) 60 (MP 8.177-9.867) 280 (MP 9.867-10.392) 60 (MP 10.392-11.228)
	Lane Width (feet)	11 (MP 0-12.527)
	Shoulder Width (feet)	3 (MP 1.448-7.975) 4 (MP 7.975-8.056) 10 (MP 8.059-8.177) 3 (MP 8.177-9.867) 8 (MP 9.867-10.392) 3 (MP 10.392-11.228)
	Shoulder Type	Stabilized, Paved w/Bituminous Material
	Percent Passing Sight Distance	30 (MP .996-10.725) 58 (MP 10.725-12.527)
	Type of Terrain	Rolling
	Coal Haul (Annual Tons)	0
	Scenic Byway System	1 (Great River Road)
	National Highway System	No
	National Truck Network	Yes (State Only Auth. Route)
	Defense Highway	2 (Hickman-FAP 94, FAP 94-Ballard)
	Extended Weight System	No
	Truck Weight Class	AAA
Volumes and Posted Speeds	Current Volume (Vehicles per Day)	2,590-5,620 (See Traffic Volume Figure)
	Speed Limit (Miles per Hour)	55 (MP 1.646-6.55) 45 (MP 6.55-6.846) 35 (MP 6.846-7.132) 25 (MP 7.132-7.573) 35 (MP 7.573-7.883) 45 (MP7.883-8.068) 55 (MP 8.068-12.527)
Pavement and Structures	Surface Type	High Flexible
	Last Year Surfaced	1991 (MP 0-6.855) 1994 (MP 6.855-7.736) 1993 (MP 7.736-8.037) 1991 (MP 8.037-8.338) 1993 (MP 8.338-9.895) 1991 (MP 9.895-10.36) 1993 (MP 10.36-12.2)
	Number of Bridges	4

Source: KYTC Highway Information System Database (2002) and Field Views

Table 13: US 51 between Jennings Street and KY 123 Crash Details

Date & Time	Location	Severity	Type	Directional Analysis	Roadway Character	Roadway Conditions
10/27/1999 9:00	MP 7.366	Non-Injury	Collision with Other Motor Vehicle	Rear End - One Vehicle Stopped	Straight & Level	Dry
02/23/2000 20:32	MP 7.439	Non-Injury	Sideswipe, Opposite Direction	Opposite Direction - Both Vehicles Going Straight Ahead	Straight & Level	Wet
12/06/1999 15:00	MP 7.45	Non-Injury	Collision with Other Motor Vehicle	1 Vehicle Leaving Driveway (Including Business Entrance)	Straight & Grade	Dry
01/29/2001 11:22	MP 7.462	Non-Injury	Angle	1 Vehicle Entering/Leaving Entrance	Straight & Level	Wet
06/23/2000 15:25	MP 7.517	Non-Injury	Sideswipe, Opposite Direction	Opposite Direction - Both Vehicles Going Straight Ahead	Straight & Level	Dry
05/11/2000 14:24	MP 7.542	Non-Injury	Backing	1 Vehicle Parked Position (Not Parking Lot, Driveway)	Straight & Level	Dry
12/15/2000 13:51	MP 7.542	Non-Injury	Backing	Vehicle Backing	Straight & Level	Ice
05/28/1998 16:00	MP 7.559	Non-Injury	Collision with Other Motor Vehicle	Rear End - One Vehicle Stopped	Straight & Level	Dry
12/17/1998 14:00	MP 7.561	Non-Injury	Collision with Other Motor Vehicle	Rear End In Traffic Lanes - Both Vehicles Moving	Straight & Level	Dry
06/20/1999 18:00	MP 7.561	Injury	Collision with Other Motor Vehicle	Rear End - Both Vehicles Going Straight	Straight & Level	Dry
11/24/2000 22:40	MP 7.561	Non-Injury	Sideswipe, Opposite Direction	Sideswipe Collision - Opposite Direction	Curve & Hillcrest	Wet

Table 14: US 51 near Methodist Church Crash Details

Date & Time	Location	Severity	Type	Directional Analysis	Roadway Character	Roadway Conditions
03/14/2001 10:57	MP 7.000	Injury	Rear End	Rear End - One Vehicle Stopped	Straight & Grade	Dry
04/14/2001 9:45	MP 7.000	Non-Injury	Angle	1 Vehicle Entering/Leaving Entrance	Straight & Level	Dry
08/10/2000 12:10	MP 7.161	Non-Injury	Angle	Angle Collision – One Vehicle Turning Left	Straight & Grade	Dry
01/08/2000 1:50	MP 7.176	Non-Injury	Head On	Collision with Non-Fixed Object	Straight & Level	Dry
04/24/2000 15:34	MP 7.176	Non-Injury	Sideswipe, Opposite Direction	Sideswipe Collision – Opposite Direction	Curve & Level	Wet
12/20/2000 17:30	MP 7.177	Injury	Sideswipe, Same Direction	Sideswipe, Same Direction	Straight & Hillcrest	Dry

Table 15: US 51 near MP 5.5 Crash Details

Date & Time	Location	Severity	Type	Directional Analysis	Roadway Character	Roadway Conditions
06/21/1999 17:12	MP 5.500	Fatal	Non-Collision, Overturned	Overturned in Roadway	Curve and Level	Dry

Table 16: Carlisle County Employment by Major Industry (2000)

Carlisle County	Employment	Percent
Agriculture, Forestry & Fishing	25	2.9
Contract Construction	51	6.0
Manufacturing	132	15.4
Transportation and Public Utilities	14	1.6
Wholesale Trade	0	0.0
Retail Trade	164	19.2
Finance, Insurance and Real Estate	61	7.1
Services	143	16.7
State and Local Government	35	4.1
All Industries	**855**	**100.0**

Source: Kentucky Economic Development Information System

Table 17: Bardwell Area Major Manufacturers

Firm	Product(s)	Employees	Year Est.
Carlisle County News	Newspaper publishing	2	1894
Carlisle Manufacturing	Cultured marble sinks, panels, counter tops & products	4	1991
Ford Construction Co.	Ready-mixed concrete & livestock water tanks	5	1957
RBS China Inc.	Lamps (portable lighting)	40	1992

Source: Kentucky Economic Development Information System

Table 18: Carlisle County Commuting Patterns

	2000	%
Residents of Carlisle County		
Working and Residing In County	840	38.1
Commuting Out of County	1,362	61.9
Total Residents	2,202	100
Employees in Carlisle County		
Working and Residing In County	840	78.8
Commuting Into County	226	21.2
Total Employees	1,066	100

Source: Kentucky State Data Center

Table 19: Cultural Historic Overview Survey

Site No.	KHC Number	Description	Potentially Eligible For NRHP	Consultant Recommended Eligible For NRHP	Final Recommendation For NRHP
1	CEB-20	1½ story, T-plan house – vinyl siding, new porch, additions	Yes	No	[1]
2		1 story, 5 bay eave-oriented house – vinyl siding, new windows	No	No	No
3		1 story, T-plan house – reoriented to side, new windows	No	No	No
4		1 story, Southern Bungalow – vinyl siding, enclosed porch	No	No	No
5		1½ story, T-plan house – vinyl siding	No	No	No
6		1 story, 4 bay, saddlebag house – composite siding, rear addition	No	No	No
7		Church of Christ – brick, bricked-in openings, large side addition	No	No	No
8		1 story, hip-roof house with brick veneer	No	No	No
9		1½ story, 3 bay, house with front gable-oriented section	No	No	No
10		1½ story, T-plan house – asbestos siding, enclosed porch	No	No	No
11		1 story, hip-roof structure – enclosed porch with rusticated concrete block columns	No	No	No
12		1 story, 4 bay, eave-oriented house	No	No	No
13		Demolished – 1½ story American Bungalow	N/A	N/A	N/A
14	CEB-11	1½ story, 3 bay house with a cross gable – vinyl siding	Yes	Yes	Yes
15	CEB-21	1½ story, 3 bay, American Bungalow – weatherboard, original windows	Yes	Yes	Yes
16	CEB-22	2 story, 3 bay, brick commercial structure – brick detailing, cast iron storefront columns	Yes	No	No
17		1 story, brick commercial structure – new upper front section	No	No	No
18		1 story, 4 bay bungalow with partial recessed porch	No	No	No
19		1 story, 3 bay, brick commercial building	No	No	No
20	CEB-23	1 story, poured concrete, Spanish Revival office structure – concrete detailing – missing roof, windows, door	Yes	Yes	Yes
21		Bardwell Baptist Church – brick with large side additions	No	No	No
22	CEB-24	1½ story, 4 bay Tudor Revival – stone veneer, half-timbered gables – large handicap ramp on front	Yes	Yes	Yes
23		1 story, hip-roof bungalow	No	No	No
24		1 story, T-plan house – entry with sidelights and transom, new windows, new porch	No	No	No
25		1 story, T-plan house – aluminum siding, enclosed porch	No	No	No
26		1½ story, 3 bay house with a cross gable – vinyl siding	No	No	No
27	CEB-17	Demolished – First Christian Church of Bardwell (earlier)	N/A	N/A	N/A
28		1½ story, 3 bay house with front gable-oriented sections	No	No	No
29		1 story, 3 bay house – vinyl siding, original door	No	No	No
30		1 story, 3 bay, hip-roof bungalow	No	No	No
31	CEB-25	1½ story, 3 bay, brick Tudor Revival	Yes	No	No
32	CEB-5	First United Methodist Church	Yes	Yes	Yes

[1] KHC disagreed with the recommendation of not eligible for Site 1. KHC was concerned about potential impacts to the site and as a result, further discussion was held regarding the site's eligibility status. However, no additional analysis or documentation was produced because the recommended alternatives are not expected to impact the site.

Site Number	KHC Number	Description	Potentially Eligible For NRHP	Consultant Recommended Eligible For NRHP	Final Recommendation For NRHP
33		Commercial/industrial building clad in corrugated tin	No	No	No
34	(CEB-7)	2 story, 5 bay, brick commercial building – new storefront	No	No	No
35	(CEB-7)	2 story, 3 bay, brick commercial building – new storefront	No	No	No
36	CEB-6	City Hall – new brick veneer, mansard roof	No	No	No
37	CEB-26 (CEB-7)	1 story, 8 bay, brick 20th century commercial building – cast iron columns (Mesker plate)	Yes	No	[2]**
38	(CEB-7)	1 story, 3 bay, brick 20th century commercial building	No	No	No
39	(CEB-7)	2 story, 5 bay, brick commercial building – new storefront, bricked-in windows	No	No	No
40	(CEB-7)	2 story, 4 bay brick 20th century commercial building	No	No	No
41	(CEB-7)	1 story, brick 20th century commercial building	No	No	No
42	(CEB-7)	2 story, 2 bay commercial building – upper story clad, new storefront	No	No	No
43	CEB-27 (CEB-7)	2 story, 9 bay brick commercial block – brick detailing, center original storefront	Yes	Yes	Yes
44	(CEB-7)	2 story, 3 bay brick commercial building – storefront clad, balcony removed	No	No	No
45	CEB-28 (CEB-7)	2 story, 3 bay, rusticated concrete block façade – First National Bank building	Yes	Yes	Yes
46	(CEB-7)	2 story, 3 bay, brick commercial building – new storefront	No	No	No
47	(CEB-7)	2 story, 3 bay, brick commercial building – cast iron columns, new storefront	No	No	No
48	CEB-4	Demolished – Railroad depot	N/A	N/A	N/A
49		2 story, 3 bay, eave-oriented house – aluminum siding	No	No	No
50		1 story, 5 bay, saddlebag house – 3 bay enclosed porch	No	No	No
51		1 story, frame commercial/industrial structure – partially demolished (brick section?)	No	No	No
52		1½ story, cross plan house – aluminum siding	No	No	No
53		1½ story, 3 bay Tudor Revival house – front sloped gable section	No	No	No
54		1½ story, 3 bay house with large shed-roof dormer	No	No	No
55		2 story, 3 bay, hip-roof house – large side addition	No	No	No
56		1½ story, 3 bay, saddlebag house – new carport	No	No	No
57		1 story, 3 bay, house with pyramidal roof – recessed full porch	No	No	No
58		2 story, 3 bay, gable-oriented house – rear addition	No	No	No
59		1½ story, American Bungalow – gable-roof dormer	No	No	No
60	CEB-29	2 story, brick, T-plan house – fishscale shingles in gables	Yes	Yes	Yes
61		1 story, 4 bay, saddlebag house – aluminum siding	No	No	No
62		Roselawn Cemetery	No	No	No
63		Bardwell Cemetery	No	No	No
64		1 story, asymmetrically massed cottage – hip-roof	No	No	No
65		1 story, 3 bay, hip-roof house with recessed central porch	No	No	No

[2] The Kentucky Heritage Council disagreed with the recommendation of not eligible for Site 37. However, since the recommended alternatives are not expected to impact the site, no further analysis or documentation was produced.

Table 21: Threatened or Endangered Species

Common Name	Scientific Name	Status
Indiana bat	*Myotis sodalis*	Federally endangered, state endangered
Interior least tern	*Sterna antillarum athalassos*	Federally endangered, state endangered
Hooded merganser	*Lophodytes cucullatus*	State endangered
Spotted sandpiper	*Actitis macularia*	State endangered
Cypress minnow	*Hybognathus hayi*	State endangered
Alabama shad	*Alosa alabamae*	State endangered
Evening bat	*Nycticeius humeralis*	State threatened
Yellow-crowned night-heron	*Nyctanassa violaceus*	State threatened
Common moorhen	*Gallinula chloropus*	State threatened
Least bittern	*Ixobrychus exilis*	State threatened
Spotted sunfish	*Lepomis punctatus*	State threatened
Taillight shiner	*Notropis maculatus*	State threatened

Source: Kentucky Fish and Wildlife Information Systems

Table 22: Level 1 Evaluation Matrix

Alt. No.	Description	Implementation / Construction Feasibility	Project Goals	Community Impacts	Environmental Impacts	Public Support	Advance to Level 2
1	No Build	Good	Poor	Fair	Good	Fair	Yes
2	Spot Improvements	Good	Fair	Fair	Good	Good	Yes
3	Reconstruct Existing US 51 as two-lane highway	Fair	Good	Good	Good	Good	Yes
4A	Southern Realignment of US 51 - Option A	Fair	Good	Good	Fair	Fair	Yes
4B	Southern Realignment of US 51 - Option B	Fair	Good	Fair	Good	Fair	Yes
5A	Eastern Bypass - Option A	Good	Fair	Fair	Poor	Poor	Yes
5B	Eastern Bypass - Option B	Fair	Fair	Poor	Poor	Poor	No
6	Western Bypass	Poor	Fair	Fair	Fair	Poor	No
7	One-way Street Option (using Front Street)	Fair	Fair	Fair	Good	Poor	No

Table 23: Level 2 Traffic Operations and Environment Evaluation Matrix

Alternative	Description	Traffic Operations					Environment							
			Average Daily Traffic on US 51				Natural Environment					Human Environment		
		Traffic Benefits	2002 ADT	2030 ADT	Truck Traffic Benefits on US 51	Vehicle / Pedestrian / Bicycle Safety Benefits	No. of Streams Impacted	Wetlands Impacted (Based on NWI Mapping)	Floodplain Impacts (Acres)	Threatened and Endangered Species	Other	No. of National Register Sites or Potentially Eligible Sites that May be Impacted	Potential Agricultural District / Farmland Impacts	Potential HAZMAT Sites
Alternative 1	Do Nothing	None	2,800 - 5,600	4,200 - 8,500	None (Maintains Current Volume Through Town)	None	0	0	0	None	---	0	None	0
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	Medium	5,500	8,350	Medium (Increased Turning Radii, Traffic Signal, Turn Lanes Benefit Turning Trucks)	Medium (Improves Safety for Turning Vehicles)	0	0	0	None Likely	---	0	None	0-2
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	Medium	5,300	8,100	Medium (Eliminates Unnecessary Stop)	Low (Eliminates Unwarranted Signal)	0	0	0	None Likely	---	N/A	None	0
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	Low	4,800	7,300	Medium (Increased Turning Radii)	Low (Reduces Crossover into Opposing Travel Lanes)	0	0	0	None Likely	---	0	None	0
Alternative 2D US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	Low	4,200	6,400	High (Mitigates Current Problems With Hill and Curve)	Medium (Improves Curve and Hill, Wider Lanes)	0	0	0	None Likely	---	2 Sites	None	0
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to KY 1181 With Spot Improvements to Hills and Curves South of Town and Alternative 2 Improvements	High	2,800 - 5,600	4,200 - 8,500	High (See Above Items)	High (Improves Curve and Hill, Wider Lanes, Better Traffic Control)	0	0	0	None Likely	Increased Runoff	6 - 7 Sites	None	0-7
Alternative 4A US 51 Realignment West of Church	New US 51 Highway From West of Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	High	3,200 - Realignment 400 - 1,200 Old US 51	4,900 - Realignment 600 - 1,800 Old US 51	High (Bypasses Sharp Curve and Hill)	High (Eliminates Curve and Hill, Wider Lanes, Better Traffic Control)	Crosses 2 Streams, Relocate 2700' Stream (2 Culverts Needed)	Potential Impacts to 1-2 Farm Ponds	2900' ~ 7 Acres	Potential Habitat Impacts Related to Stream, Farm Pond, and Floodplain Areas	Increased Runoff	5 - 6 Sites, May Also Impact 1 or More Unmarked Cemetery Sites	Bisects One Agricultural District, May Split One or More Farms	0-7
Alternative 4B US 51 Realignment East of Church	New US 51 Highway From East of Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	High	3,200 - Realignment 400 - 1,200 Old US 51	4,900 - Realignment 600 - 1,800 Old US 51	High (Bypasses Sharp Curve and Hill)	High (Eliminates Curve and Hill, Wider Lanes, Better Traffic Control)	Crosses 0 - 2 New Streams	Potential Impacts to 1-2 Farm Ponds	< 5 Acres	Expect Minimal Habitat Impacts	Increased Runoff	5 - 6 Sites	Bisects One Agricultural District, May Split One or More Farms	0-7
Alternative 5A Eastern Bypass	New 2-Lane Highway From the Curve Just North of the Bardwell Cemetery, North to KY 123 and US 62, and then Northwest to the Current US 51 Alignment North of Town	High	800 - 1,200 on Bypass 3,100 - 4,200 on Current US 51	1,400 - 1,900 on Bypass 4,800 - 7,100 on Current US 51	High (Bypasses Sharp Curve, Hill, and High Crash Area on US 51, Diverts Trucks Around Town)	High (Eliminates Curve and Hill, Wider Lanes, Diverts Trucks, Reduces Traffic in Town)	2 New Stream Crossings (1 Major Stream Crossing)	Potential Impacts to 1-4 Farm Ponds and 1 Natural Wetland Area	700' < 2 Acres	Impacts to Potential Bat Habitat, Potential Impacts Related to Stream, Farm Pond, Wetland and Floodplain Areas	Increased Runoff (Most of Any Alternative)	Possible Impact to Known Archeological Site, May Impact Unmarked African-American Cemetery	Crosses a Portion of One Agricultural District, May Split One or More Farms	0

Table 24: Level 2 Community and Implementation / Construction Evaluation Matrix

Alternative	Description	Community				Public Support	Implementation / Construction				
		Economic Development Impacts	Buildings Impacted (Homes, Businesses, Other)	Community Impacts	Community Character		Construction Feasibility	Construction Length (Miles)	New ROW Required (Acres)	Potential Utility Impacts	Cost Estimate* (Total)
Alternative 1	Do Nothing	**None**	**0**	**Fair**	**Poor**	**43%**	**Good**	**0**	**0**	**Good**	**N/A**
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	**None**	**0**	**Fair (Access Impacts)**	**Fair**	**43%**	**Good**	**N/A**	**< 1**	**Fair**	**Low-Medium**
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	**None**	**0**	**Good**	**Fair**	**40%**	**Good**	**N/A**	**N/A**	**Good**	**Low**
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	**None**	**0**	**Good**	**Fair**	**10%**	**Good**	**N/A**	**< 1**	**Good**	**Low**
Alternative 2D US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	**None**	**2 Homes**	**Good**	**Fair**	**N/A**	**Good**	**0.5**	**<5**	**Poor**	**Low-High**
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to KY 1181 With Spot Improvements to Hills and Curves South of Town and Alternative 2 Improvements	**Good for Current Businesses, Poor for New Development**	**2 Homes**	**Good (Traffic Issues in Town During Construction)**	**Good (Streetscape Improvements)**	**37%**	**Poor**	**2.8**	**10**	**Poor**	**Medium - High**
Alternative 4A US 51 Realignment West of Church	New US 51 Highway From West of Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	**Good for Current Businesses, Fair for New Development**	**1 - 2 Homes 1 - 2 Barns / Outbuildings**	**Good (Traffic Issues in Town During Construction)**	**Good**	**20%**	**Poor**	**Bypass - 1.5 Total - 2.0**	**35**	**Poor**	**High**
Alternative 4B US 51 Realignment East of Church	New US 51 Highway From East of Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	**Good for Current Businesses, Fair for New Development**	**1 - 2 Homes, 0 - 1 Businesses, County Maintenance Outbuildings**	**Good (Traffic Issues in Town During Construction)**	**Good**	**20%**	**Poor**	**Bypass - 1.3 Total - 1.7**	**30**	**Poor**	**Medium-High**
Alternative 5A Eastern Bypass	New 2-Lane Highway From the Curve Just North of the Bardwell Cemetery, North to KY 123 and US 62, and then Northwest to the Current US 51 Alignment North of Town	**Poor for Current Businesses, Fair for New Development**	**0 - 3 Homes**	**Good (Alignment will Avoid Local Park)**	**Fair (Community Bypassed)**	**17% supported 27% opposed**	**Good**	**Bypass - 2.0 Total - 3.3**	**45**	**Good**	**High**

*Cost estimate excludes bridges at railroad crossings, purchase or relocation of any property, environmental work, relocation of utilities

Table 25: Level 3 Traffic Operations Evaluation Matrix

Alternative	Description	Average Daily Traffic (ADT) on US 51 in Town		Level of Service (LOS)*		Truck Traffic Benefits	Estimated 2030 Truck Volumes (Trucks per Day)	Vehicle / Pedestrian / Bicycle Safety Benefits
		2002	2030	2002	2030			
Alternative 1	Do Nothing	2,800-5,600	4,200-8,500	C	C	None (Maintains Current Volume Through Town)	700 - 980	None
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	5,500	8,350	A/B	C	Medium (Increased Turning Radii, Traffic Signal, Turn Lanes Benefit Turning Trucks)	980	Medium (Improves Safety for Turning Vehicles)
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	5,300	8,100	B	A/C	Medium (Eliminates Unnecessary Stop)	730	Low (Eliminates Unwarranted Signal)
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	4,800	7,300	A/B	C (Assuming Signal is Installed in 2020 - Otherwise A/C/F)	Medium (Increased Turning Radii)	730	Low (Reduces Crossover into Opposing Travel Lanes)
Alternative 2D Curve US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	4,200	6,400	N/A	N/A	High (Mitigates Current Problems With Curve)	700	Medium (Improves Curve, Wider Lanes)
Alternative 2D Hill US 51 at Hill by Methodist Church	Reduce Grade (Steepness) of Hill, Widen Lanes and Shoulder	3,500	5,300	N/A	N/A	High (Mitigates Current Problems With Hill)	740	Medium (Improves Hill, Wider Lanes)
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to KY 1181 With Spot Improvements to Hills and Curves South of Town and Alternative 2 Improvements	2,800-5,600	4,200-8,500	C	C	High (See Above Items)	700 - 980	High (Improves Curve and Hill, Wider Lanes, Better Traffic Control)
Alternative 4B US 51 Realignment	New US 51 Highway From Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	3,200 - Realignment 400 - 1,200 - Old US 51	4,900 - Realignment 600 - 1,800 - Old US 51	C - Realignment C - Old US 51	C - Realignment C - Old US 51	High (Bypasses Sharp Curve and Hill)	690 - Realignment 50 - Old US 51	High (Eliminates Curve and Hill, Wider Lanes, Better Traffic Control)

*Alternatives 2A-2C Intersection LOS; Alternatives 1, 3, and 4B Two-Lane Highway LOS

Table 26: Level 3 Environment Evaluation Matrix

Alternative	Description	Natural Environment				Human Environment		
		No. of Streams Impacted	Wetlands Impacted (Based on NWI Mapping)	Floodplain Impacts (Acres)	Threatened and Endangered Species	No. of National Register Sites or Potentially Eligible Sites that May be Impacted	Potential Agricultural District / Farmland Impacts	Potential HAZMAT Sites
Alternative 1	Do Nothing	0	0	0	None	0	None	0
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	0	0	0	None Likely	0	None	0 - 2
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	0	0	0	None Likely	N/A	None	0
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	0	0	0	None Likely	0	None	0
Alternative 2D Curve US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	0	0	0	None Likely	1 Site (First United Methodist Church)	None	0
Alternative 2D Hill US 51 at Hill by Methodist Church	Reduce Grade (Steepness) of Hill, Widen Lanes and Shoulder	0	0	0	None Likely	1 Site (T-Plan House)	None	0
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to KY 1181 With Spot Improvements to Hills and Curves South of Town and Alternative 2 Improvements	0	0	0	None Likely	6 - 7 Sites	None	0 - 7
Alternative 4B US 51 Realignment	New US 51 Highway From Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	Crosses 0 - 2 New Streams	Potential Impacts to 1 -2 Farm Ponds	<5 acres	Expect Minimal Habitat Impacts	5 - 6 Sites	Bisects One Agricultural District, May Split One or More Farms	0 - 7

Table 27: Level 3 Community Evaluation Matrix

Alternative	Description	Economic Development Impacts	Buildings / Property Impacts (Homes, Bus., Other)	Community Impacts	Community Character	Public Support		
						Comment Form Responses From Public Meeting #1		Average Alternative Rating From Public Meeting #2 (1 - 5 with 1 = Poor and 5 = Good)
Alternative 1	Do Nothing	None	0	Fair	No Benefit	43% of Comment Form Respondents Believed Doing Nothing Would Have No Significant Neg. Impacts; However, 57% Believed Doing Nothing Would Result in Negative Traffic and Safety Impacts		1.7
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	None	0	Fair (Access Impacts)	Benefit at Intersection Only	Local Residents, Community Leaders, and Truck Drivers Supported Improvements (43% Support Based on Comment Forms)	Overall, Spot Improvements Were Supported by 50% of Comment Form Respondents	4.3
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	None	0	Good	Benefit at Intersection Only	Appears to be Broad Local Support (40% Support Based on Comment Forms)		4.2
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	None	0	Good	Benefit at Intersection Only	Alternative has Some Local Support (10% Support Based on Comment Forms)		4.5
Alternative 2D Curve US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	None	2 Homes	Good	Benefit at Curve Only	Local Residents and Community Leaders Acknowledged Problems at this Location; Extent of Support Improvement is Unknown		3.6
Alternative 2D Hill US 51 at Hill by Methodist Church	Reduce Grade (Steepness) of Hill, Widen Lanes and Shoulder	None	Possible Business, Residential and Community Facility Impacts	Good	Benefit at Hill Only	Local Residents and Community Leaders Acknowledged Problems at this Location; Extent of Support Improvement is Unknown		3.7
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to KY 1181 With Spot Improvements to Hills and Curves South of Town and Alternative 2 Improvements	No Existing Businesses Bypassed / Community Enhanced	2 Homes, Possible Business and Community Facility Impacts	Good (Traffic Issues in Town During Construction)	Enhances Aesthetics in Town Including Repaired / New Sidewalks	Many Community Leaders and Residents Supported Upgrading the Existing Highway (37% Support Based on Comment Form Respondents)		3.0
Alternative 4B US 51 Realignment	New US 51 Highway From Methodist Church to Between KY 1181 and KY 1377 in South, and Alternative 2A, 2B, 2C and 3 Improvements North of Realignment	Businesses in Town Not Bypassed, Businesses Located Between Methodist Church and KY 1181 / KY 1377 Bypassed / Community Enhanced	1 - 2 Homes, 0 - 1 Businesses, County Maintenance, Outbuildings	Good (Traffic Issues in Town During Construction)	Benefits Similar to Alts. 2A, 2B, 2C, and 3	Some Community Leaders and Residents Supported or Were Open to the Possibility of Realigning US 51 (20% Support Based on Comment Form Respondents)		2.9

Table 28: Level 3 Implementation / Construction Evaluation Matrix

Alternative	Description	Construction Length (Miles)*	Constructability Issues	New ROW Required (Acres)	Design Estimate	Right-of-Way Estimate	Utilities Estimate	Construction Cost Estimate**	Total Cost Estimate (including Design, ROW, Utilities, and Construction Cost)
Alternative 1	Do Nothing	0	None	0	N/A	N/A	N/A	**N / A**	**N/A**
Alternative 2A US 51 at US 62	Sidewalk / Curb & Gutter Reconstruction, Provide Adequate Turning Radii, Construct Left-Turn Lanes, Install Actuated Signal	N / A	Utility Pole Needs to be Relocated	< 1	$100,000	$400,000	$400,000	**$800,000**	**$1,700,000**
Alternative 2B US 51 at Jennings Street	Remove Traffic Signal, Re-stripe Intersection	N / A	None	N / A	$1,000	N/A	N/A	**$12,000**	**$13,000**
Alternative 2C US 51 at KY 123	Provide Adequate Turning Radii	N / A	None	< 1	$4,000	$100,000	$40,000	**$30,000**	**$180,000**
Alternative 2D Curve US 51 at Curve by Methodist Church	Realign Roadway to Reduce Curve, Widen Lanes and Shoulder	0.2	Constrained by Limited ROW	< 2	$60,000	$600,000	$300,000	**$500,000**	**$1,500,000**
Alternative 2D Hill US 51 at Hill by Methodist Church	Reduce Grade (Steepness) of Hill, Widen Lanes and Shoulder	0.3	Constrained by Limited ROW	< 3	$100,000	$1,300,000	$700,000	**$900,000**	**$3,000,000**
Alternative 3 Reconstruct US 51	Reconstruct US 51 North of Town to Southern End of 2D, and Alternative 2 Improvements	1.3	Constrained by Limited ROW and Utilities, Traffic Maintenance Issues During Construction	10	$400,000	$2,400,000	$2,100,000	**$3,600,000**	**$8,500,000**
	Reconstruct US 51 From 2D to Study Area Boundary	1.5			$300,000	$900,000	$1,600,000	**$2,100,000**	**$4,900,000**
Alternative 4B US 51 Realignment	Improvements to US 51 From US 62 to Realignment	0.9	Constrained by Limited ROW and Utilities, Traffic Maintenance Issues During Construction	30	$300,000	$500,000	$900,000	**$2,400,000**	**$4,100,000**
	New US 51 Highway From Methodist Church to Between KY 1181 and KY 1377	1.1			$300,000	$1,900,000	$400,000	**$2,400,000**	**$5,000,000**
	Improvements to US 51 From Realignment to Study Area Boundary in the South	0.9			$200,000	$500,000	$900,000	**$1,400,000**	**$3,000,000**

* Includes crossroads.
**Construction cost only, excludes mitigation costs. Improvements to existing highways assumed to include a combination of overlay and new construction.

APPENDIX B:
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Figure 4: 2002 Average Daily Traffic Volumes
Figure 5: US 51 Highway Characteristics Summary
Figure 6: Selected Study Area Pictures
Figure 7: Vehicle Classification Count Locations, Posted Speed Limits, and Speed Survey Locations
Figure 8: Intersection Controls and 2002 Peak Hour Volumes
Figure 9: Intersection and Segment 2002 Peak Hour Levels of Service
Figure 11: Existing and Future No-Build Average Daily Traffic Volumes
Figure 12: No-Build Intersection and Segment 2030 PM Peak Hour Levels of Service
Figure 13: Crash Rates and Crash Locations by Severity
Figure 15: Human Environment Map
Figure 17: Cultural Historic Overview Survey
Figure 18: Sites Potentially Eligible for the National Register of Historic Places
Figure 19: Natural Environment Map
Figure 20: Geologic Unit Map
Figure 21: All Preliminary Alternatives
Figure 22: Conceptual Typical Sections
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Figure 25: Alternative 5A Impacts
Figure 26: Alternative 2A – US 51 at US 62
Figure 27: Alternative 2B – US 51 at Jennings Street
Figure 28: Alternative 2C – US 51 at KY 123
Figure 29: Alternative 2D – US 51 at Curve by Methodist Church
Figure 30: Alternative 3 – Reconstruct US 51
Figure 31: Alternative 4B – US 51 Realignment

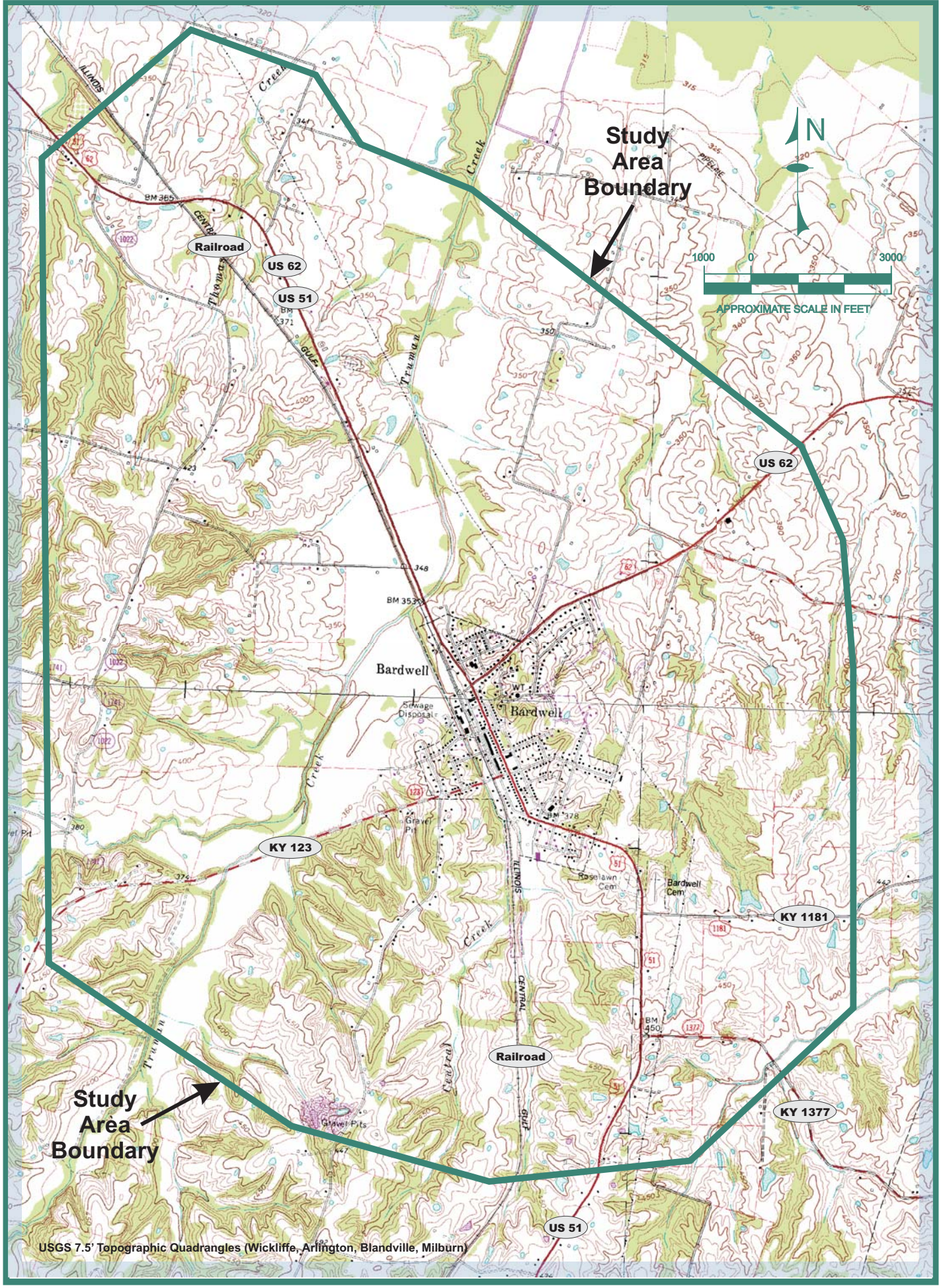

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Figure 3: Study Area Map

Figure 4: 2002 Average Daily Traffic Volumes

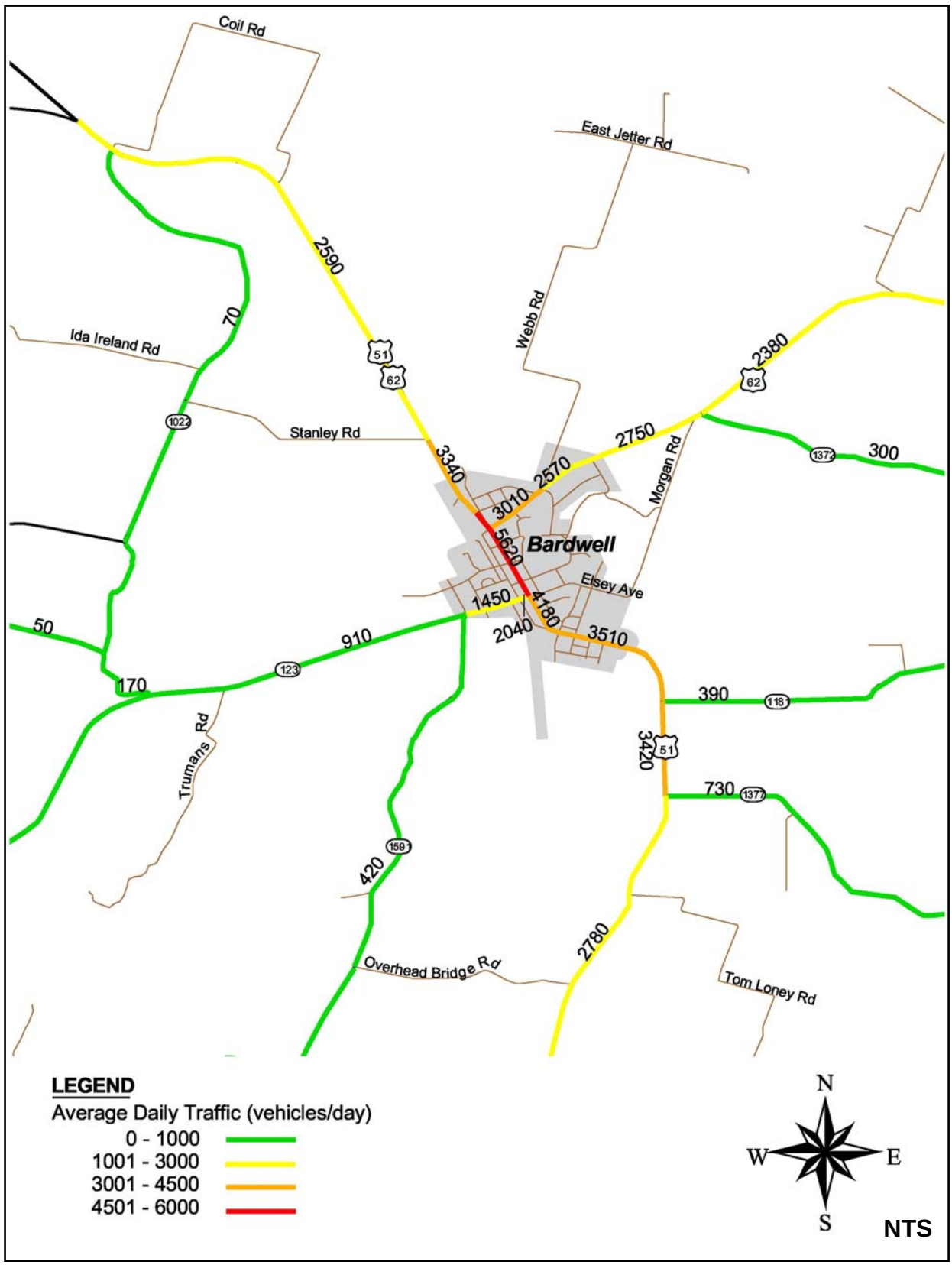


Figure 5: US 51 Highway Characteristics Summary

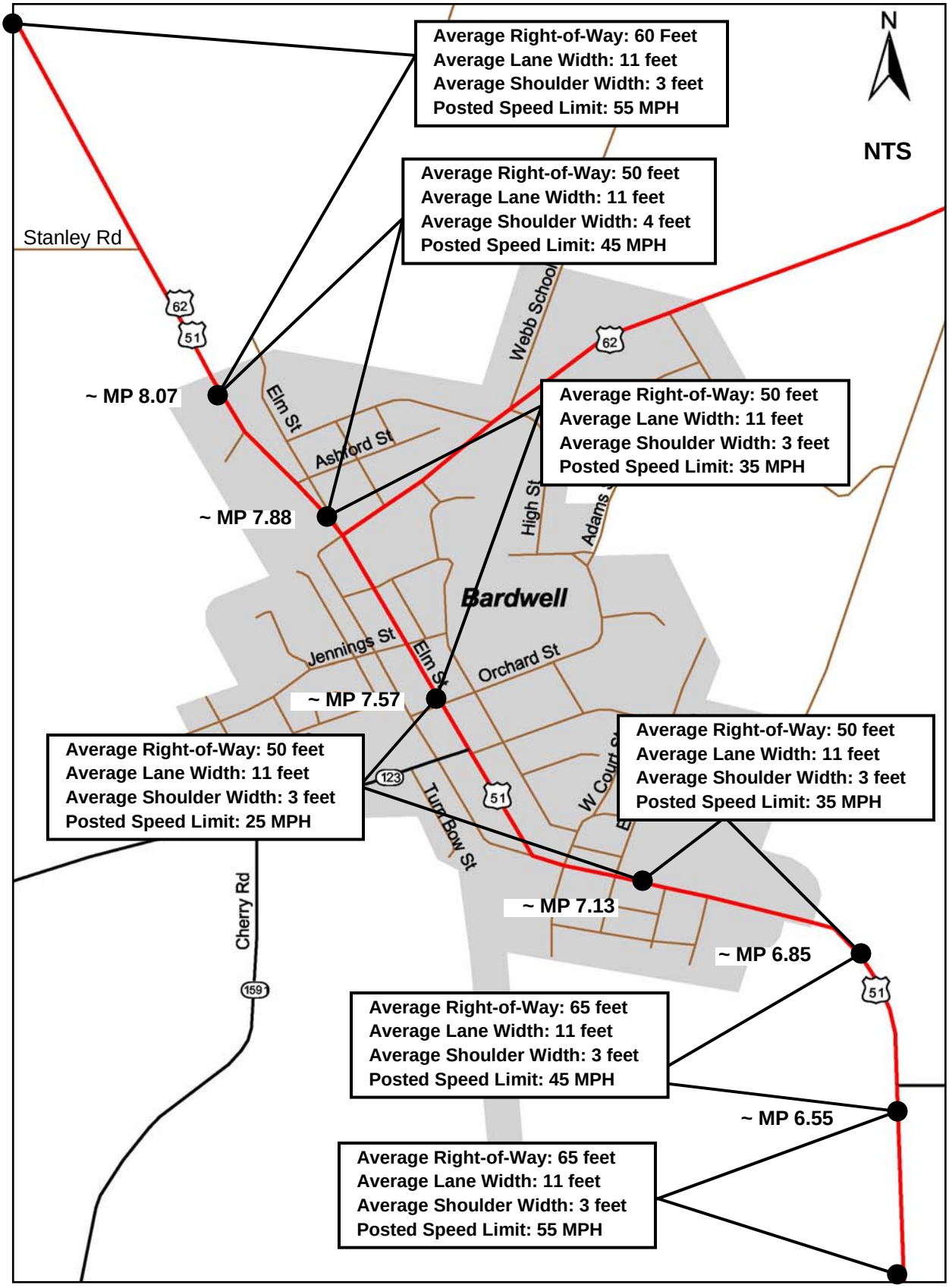


Figure 6: Selected Study Area Pictures

US 51 Through Bardwell

Sidewalks on US 51

Sharp Curve (Left) and Hill (Right) by the First United Methodist Church

Figure 7: Vehicle Classification Count Locations, Posted Speed Limits, and Speed Survey Locations

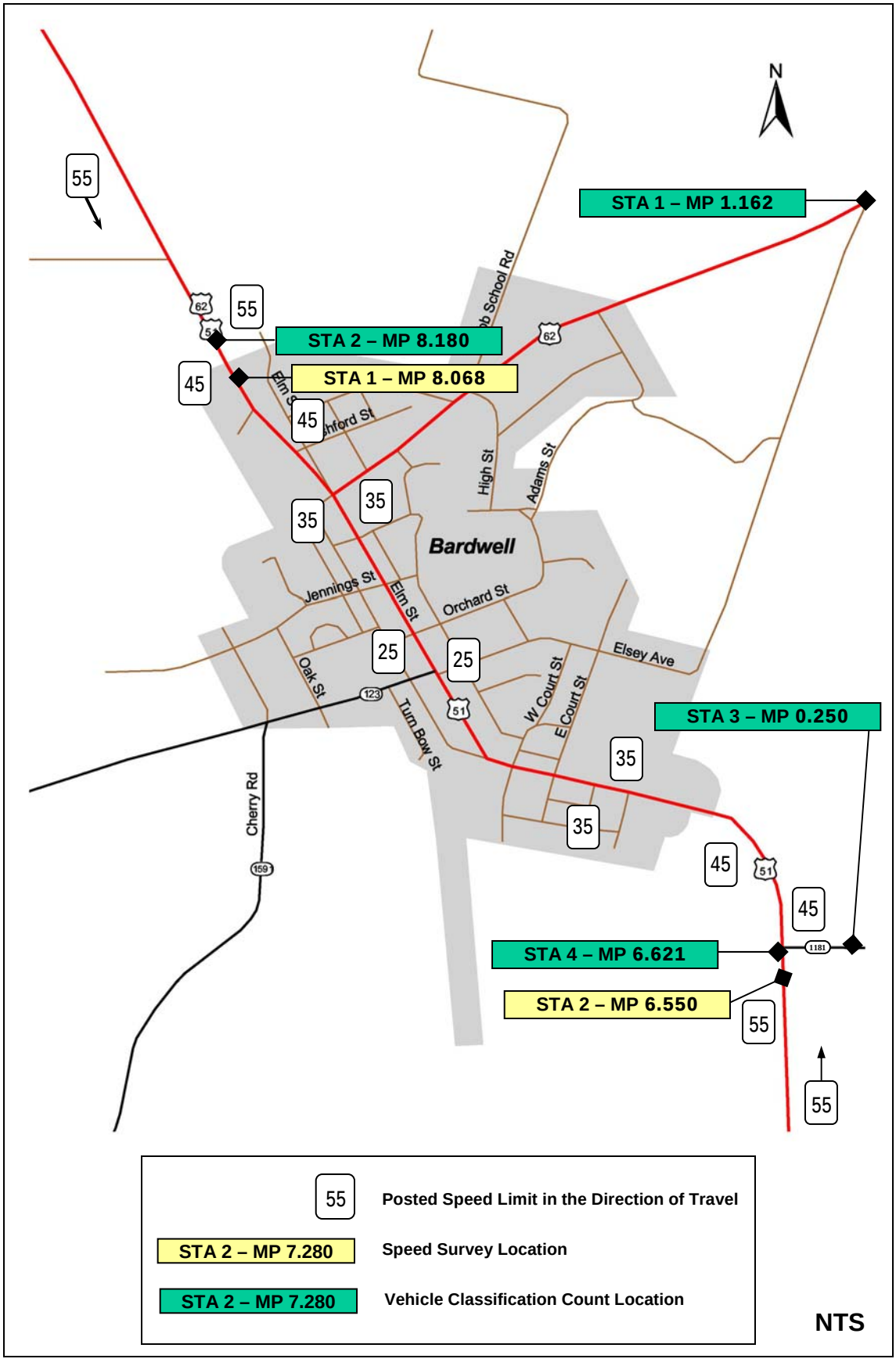


Figure 8: Intersection Controls and 2002 Peak Hour Volumes

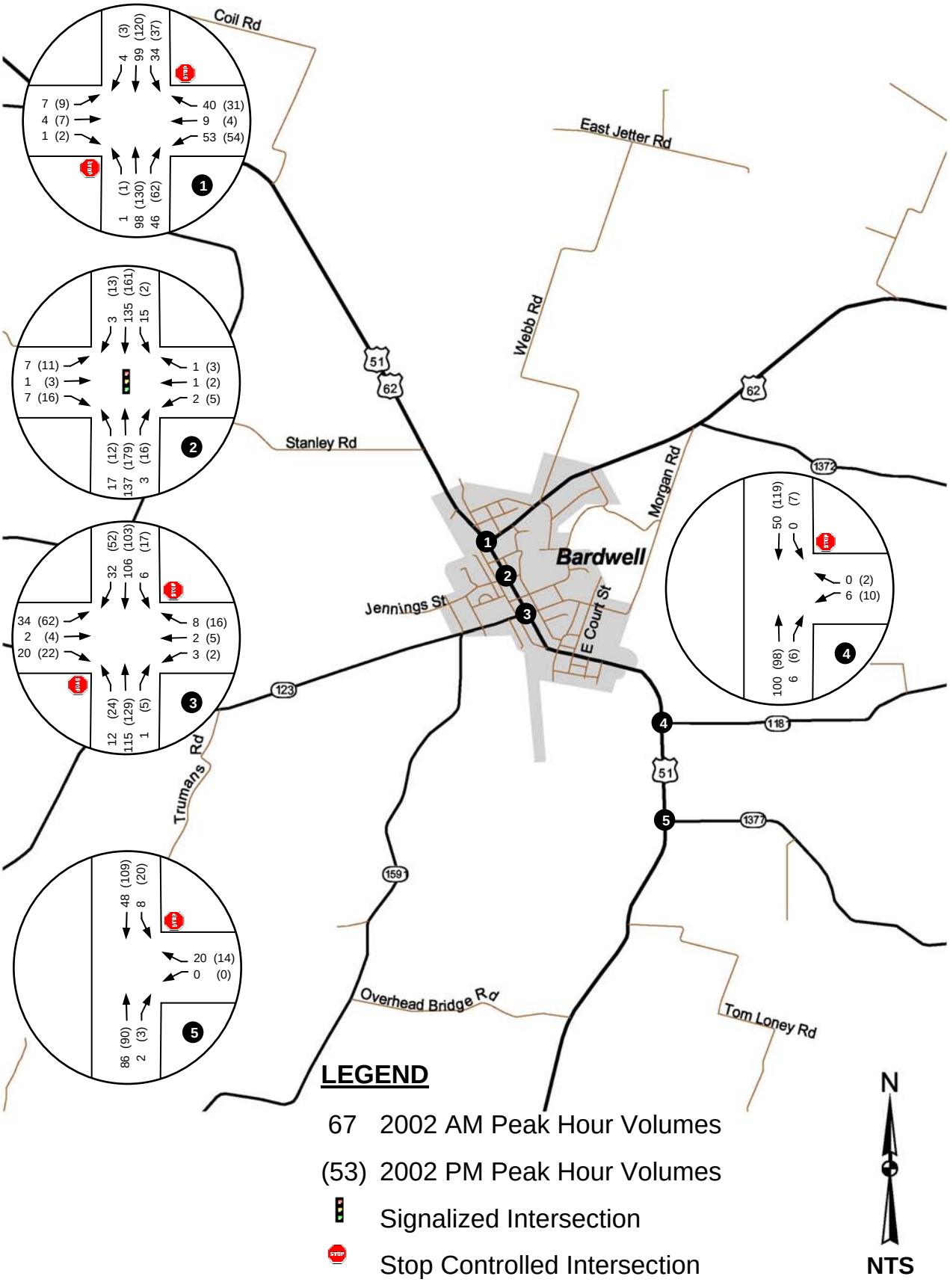


Figure 9: Intersection and Segment 2002 Peak Hour Levels of Service

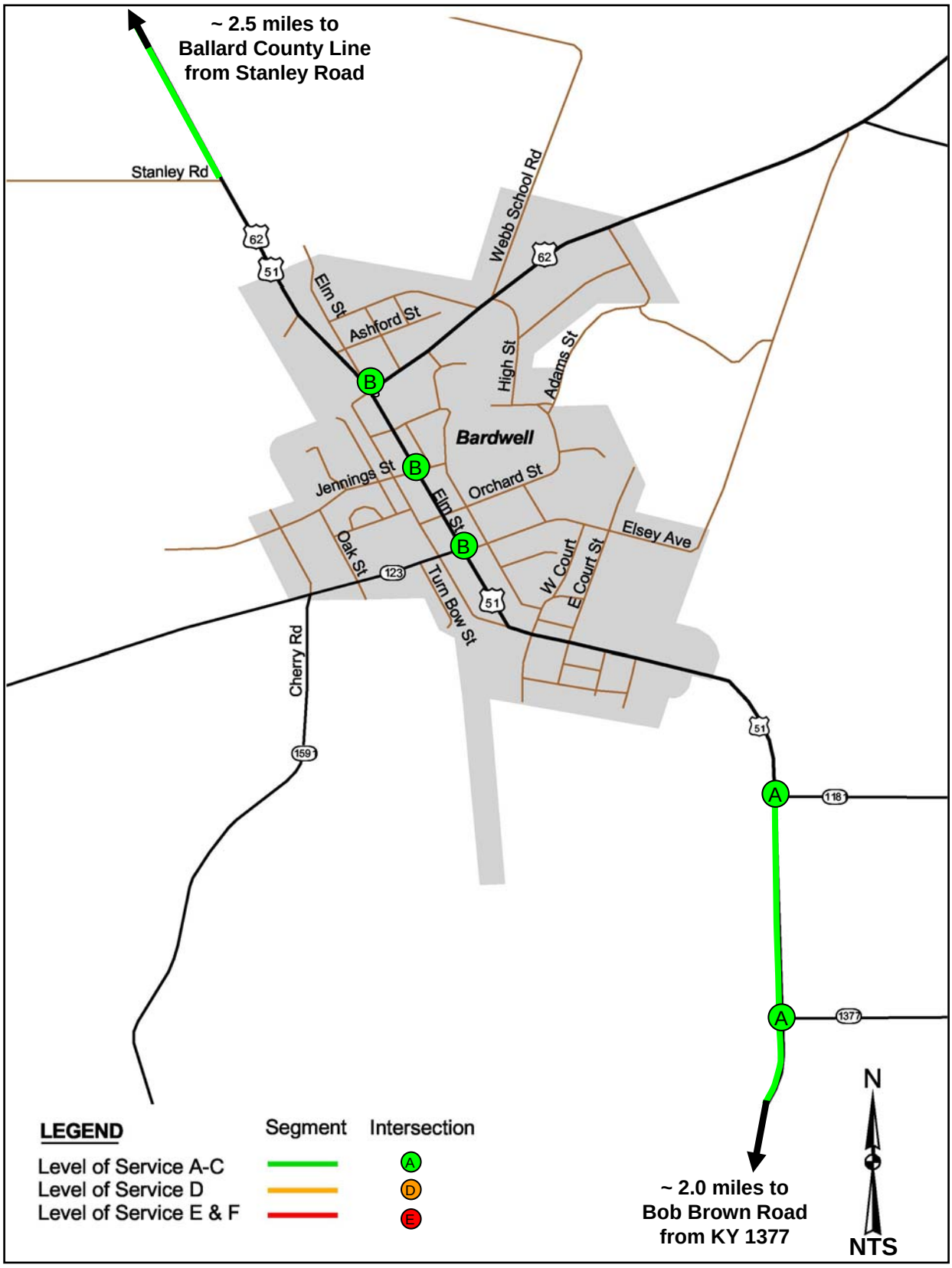


Figure 11: Existing and Future No-Build Average Daily Traffic Volumes

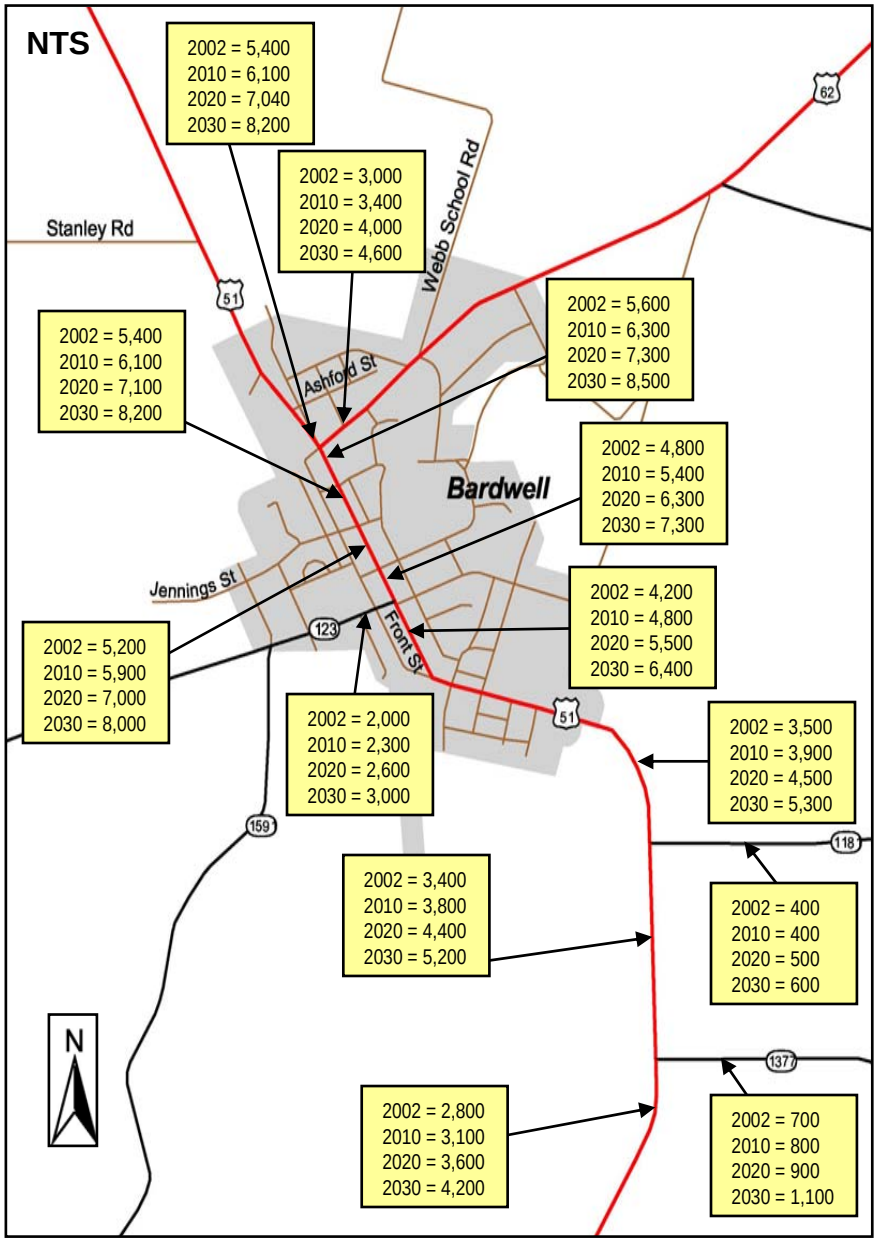


Figure 12: No-Build Intersection and Segment 2030 PM Peak Hour Levels of Service

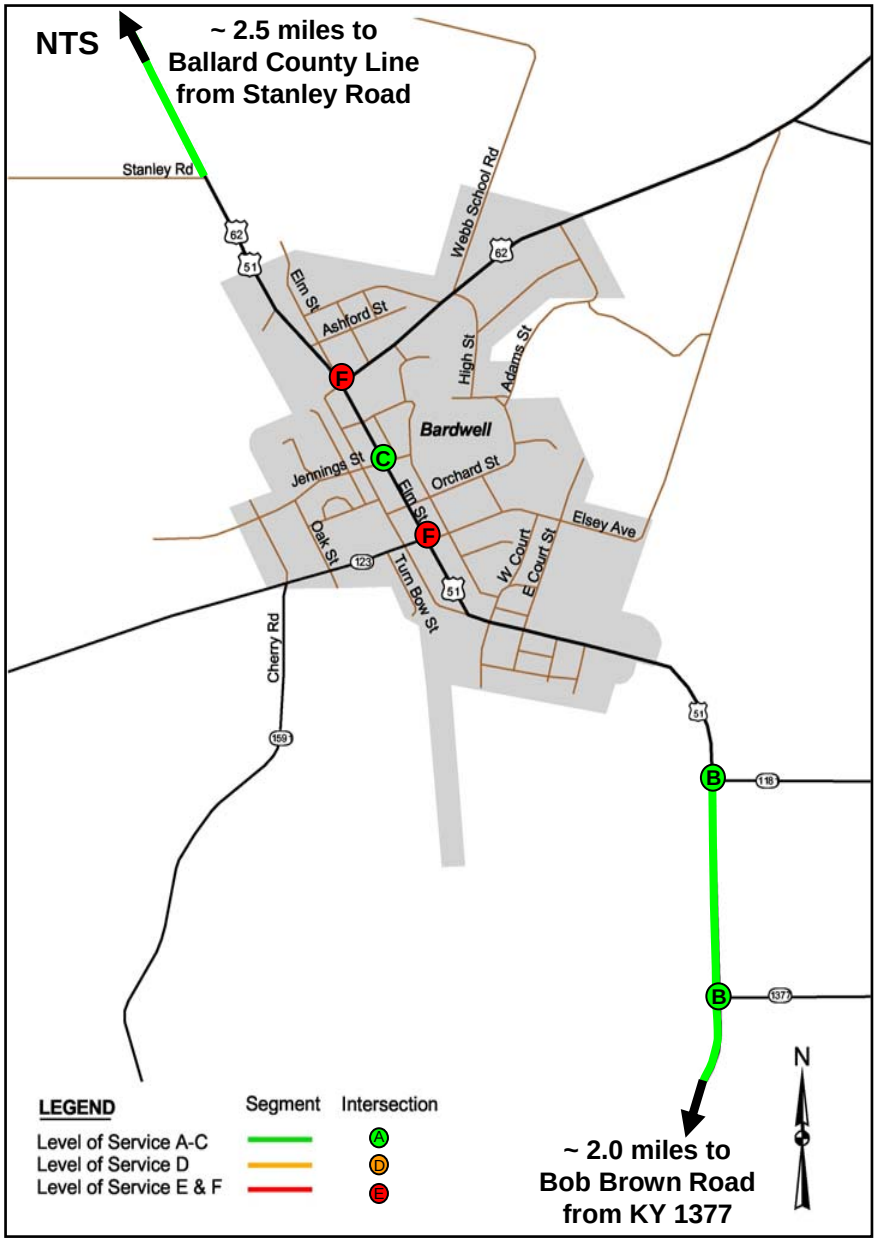
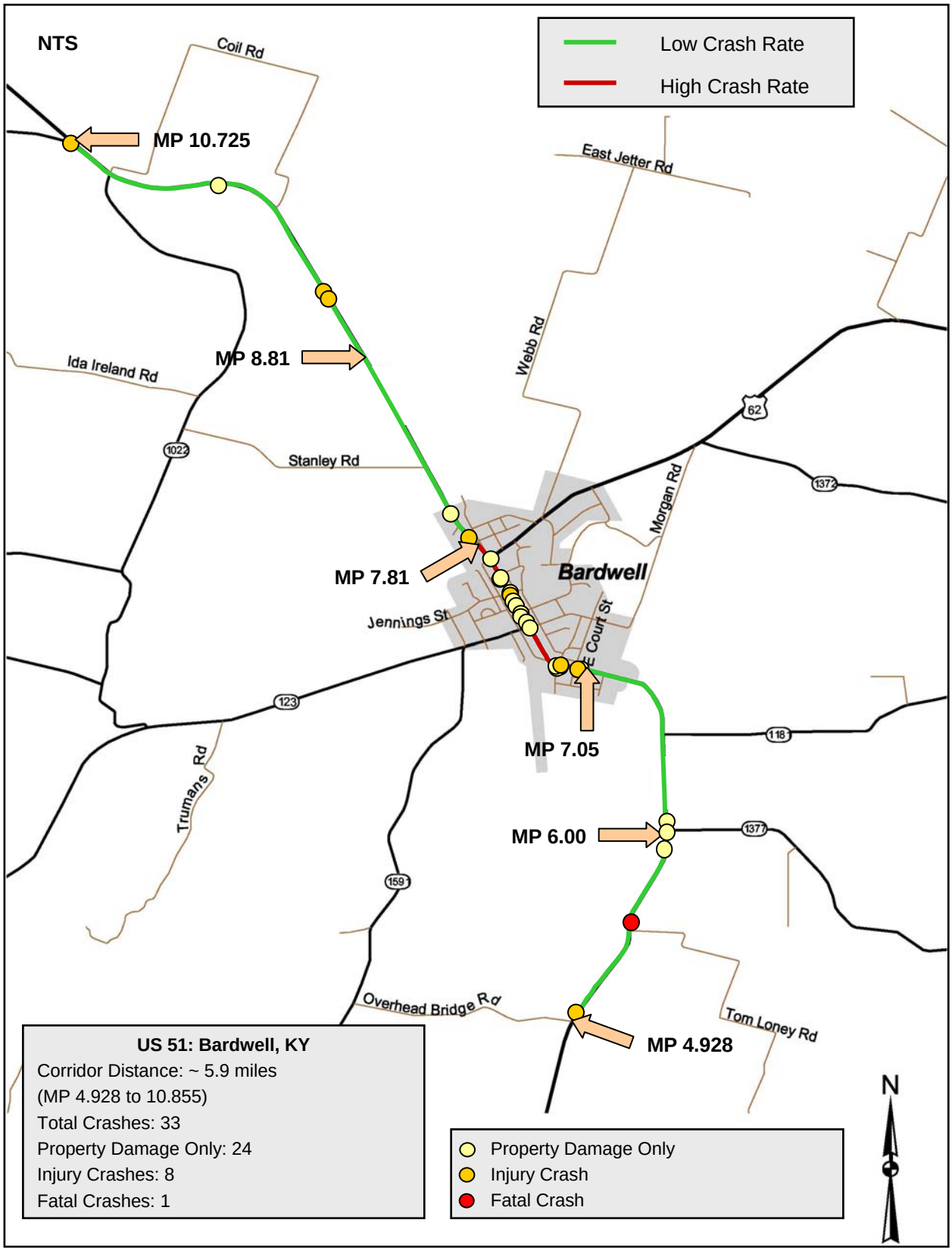


Figure 13: Crash Rates and Crash Locations by Severity
(January 1, 1998 – June 30, 2001)



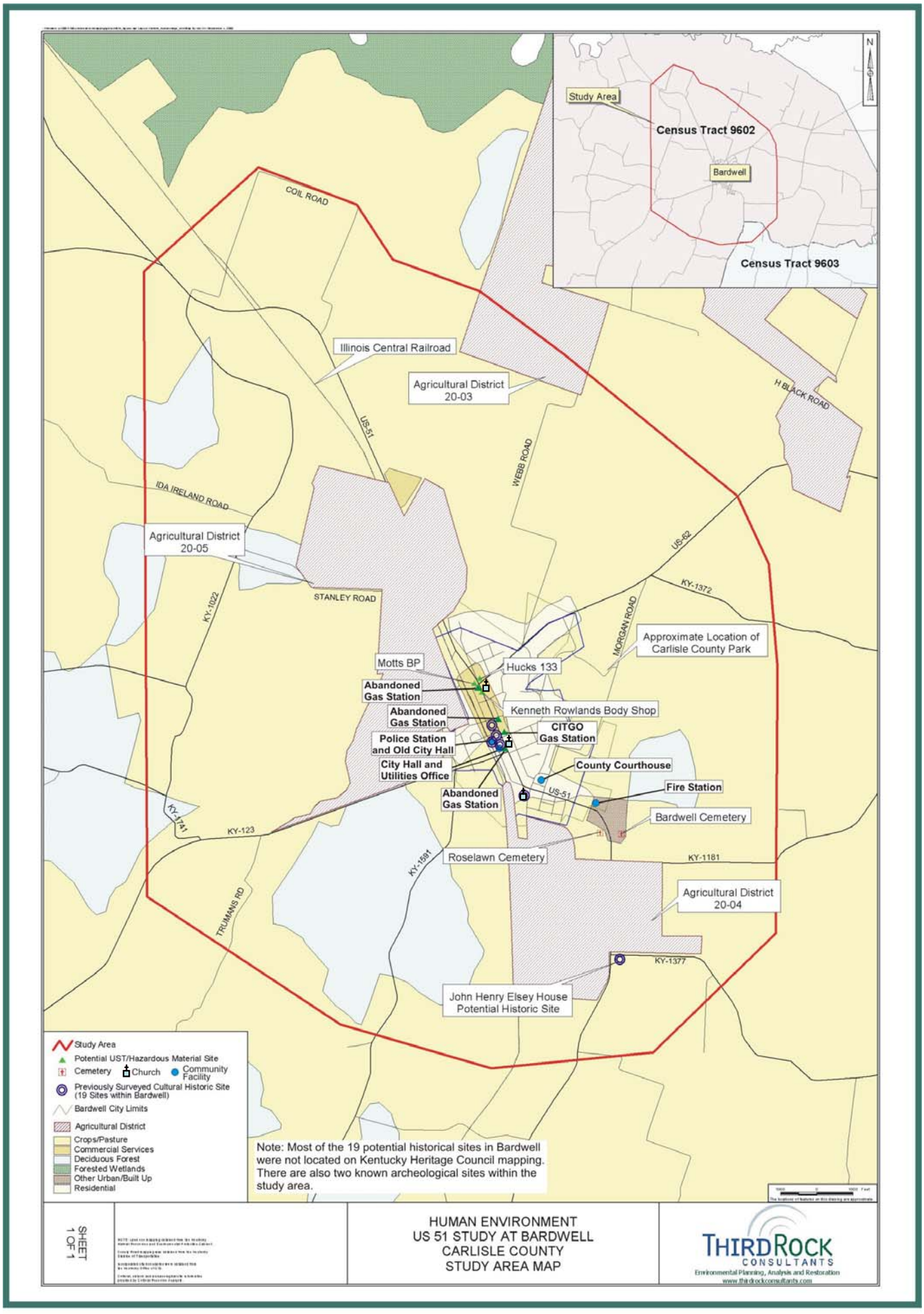


Figure 15: Human Environment Map

Figure 17: Cultural Historic Overview Survey

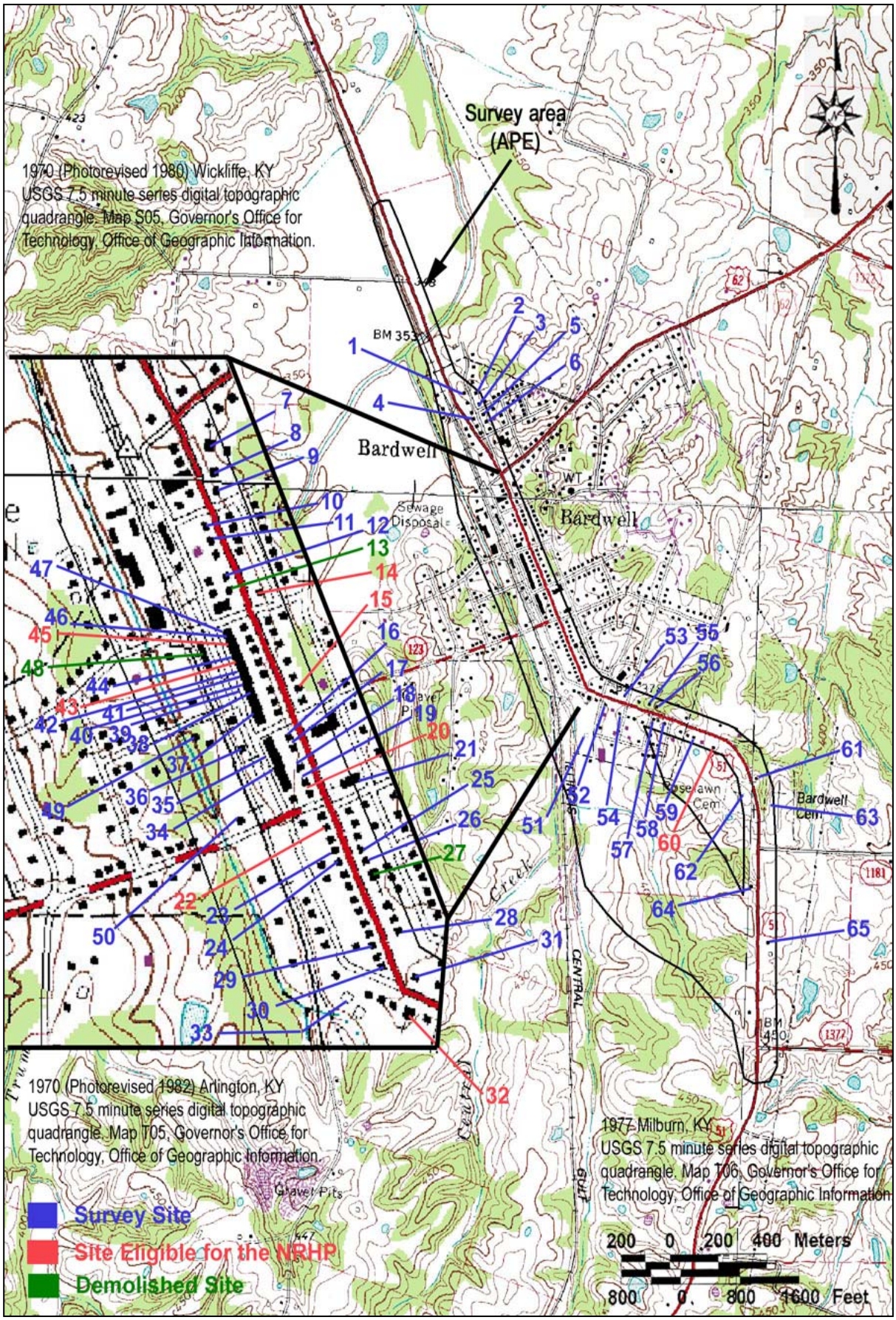
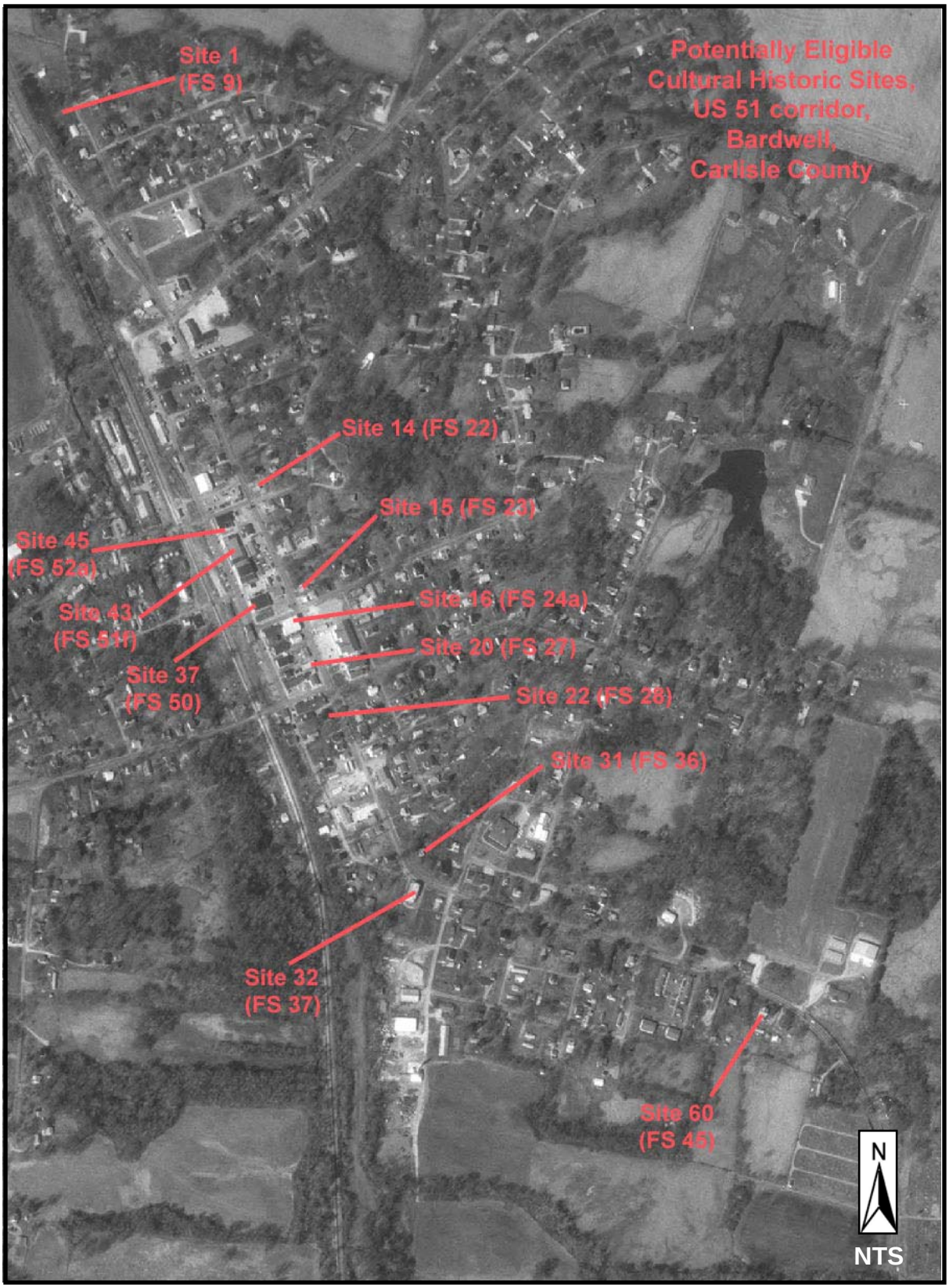


Figure 18: Sites Potentially Eligible for the National Register of Historic Places



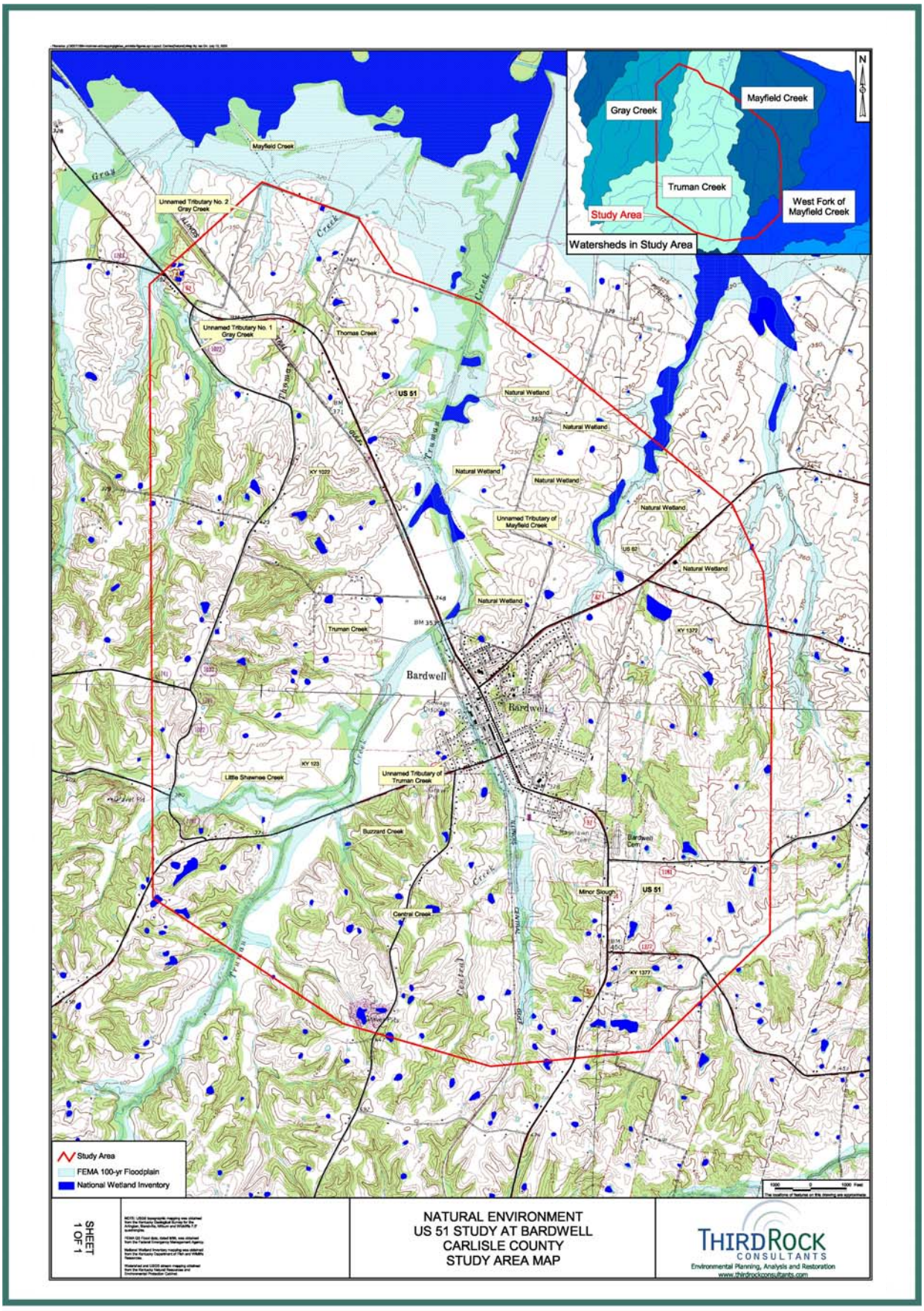
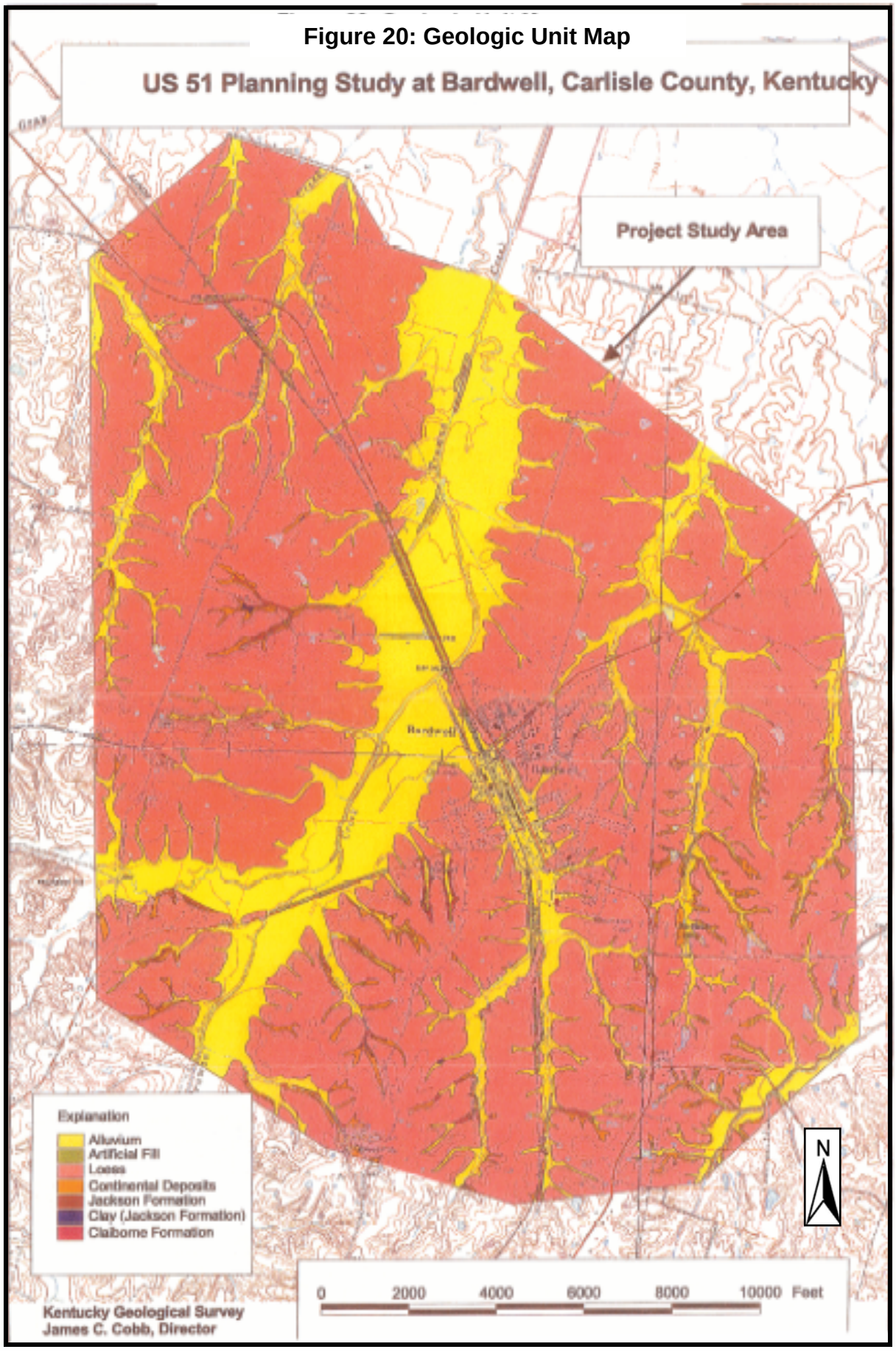
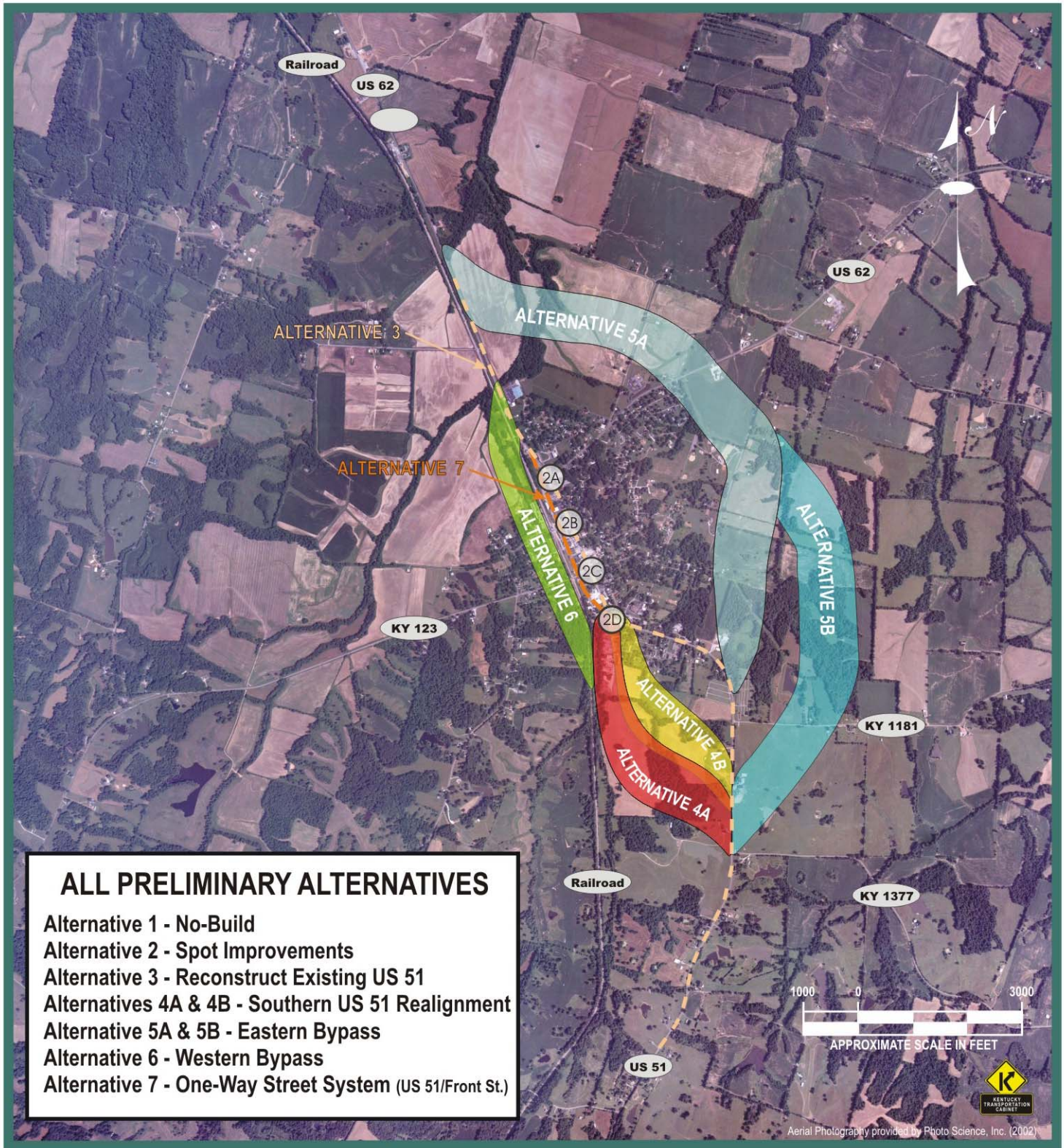


Figure 19: Natural Environment Map

Figure 20: Geologic Unit Map





ALL PRELIMINARY ALTERNATIVES

Alternative 1 - No-Build
Alternative 2 - Spot Improvements
Alternative 3 - Reconstruct Existing US 51
Alternatives 4A & 4B - Southern US 51 Realignment
Alternative 5A & 5B - Eastern Bypass
Alternative 6 - Western Bypass
Alternative 7 - One-Way Street System (US 51/Front St.)

Alternatives Legend

New Corridor
Improve Existing Road
2A Spot Improvement

Corridor: Approximately 500 to 1,000 foot wide bands to be studied for the potential placement of the roadway. Actual Right-of-Way width will be much less than 500 to 1,000 feet.

No-Build: Alternative 1 is the No-Build scenario in which no new construction would be planned as a result of this study.

10/04/02

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Figure 21: All Preliminary Alternatives

Figure 22: Conceptual Typical Sections

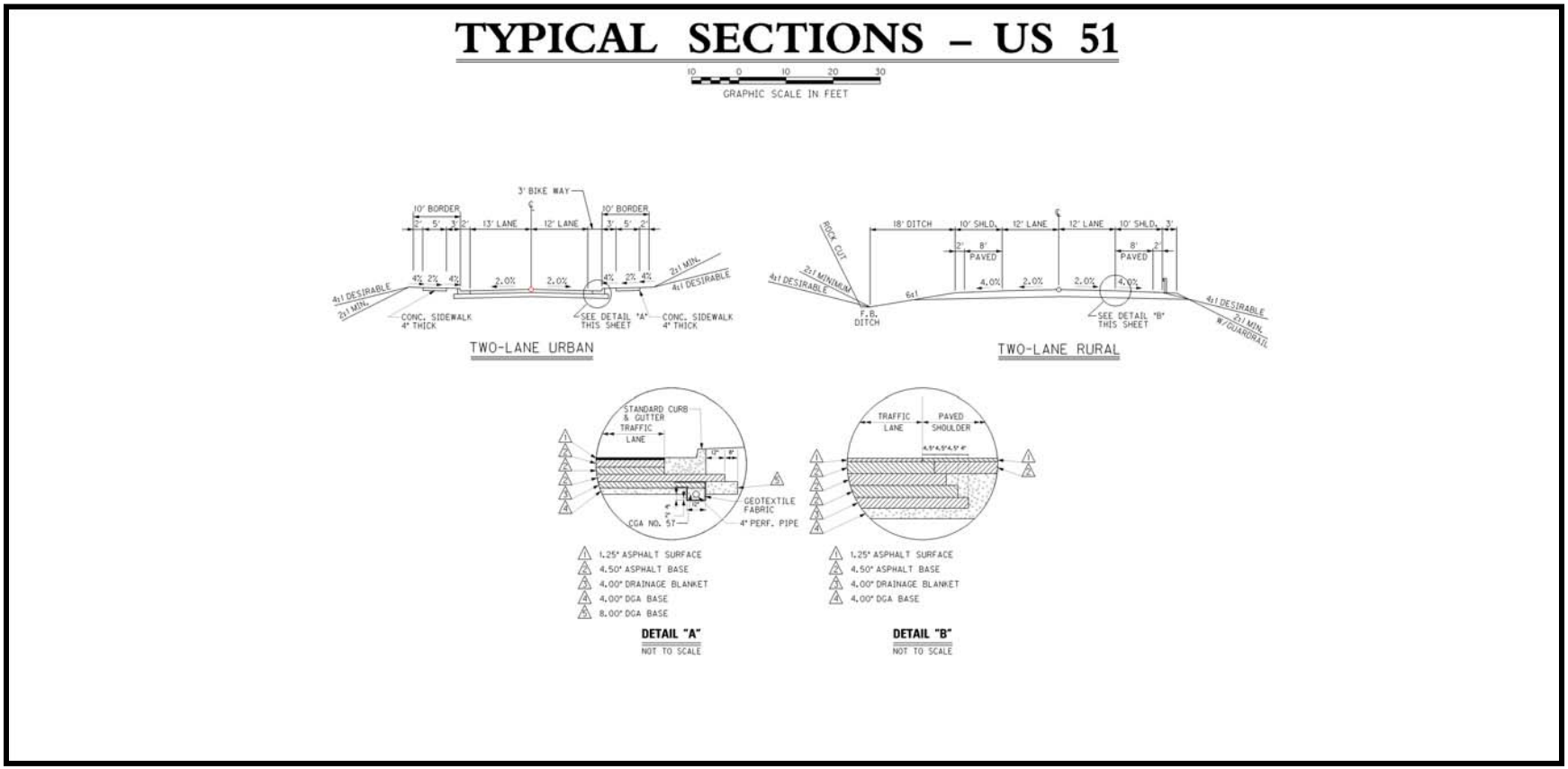


Figure 24: Alternative 4A Impacts

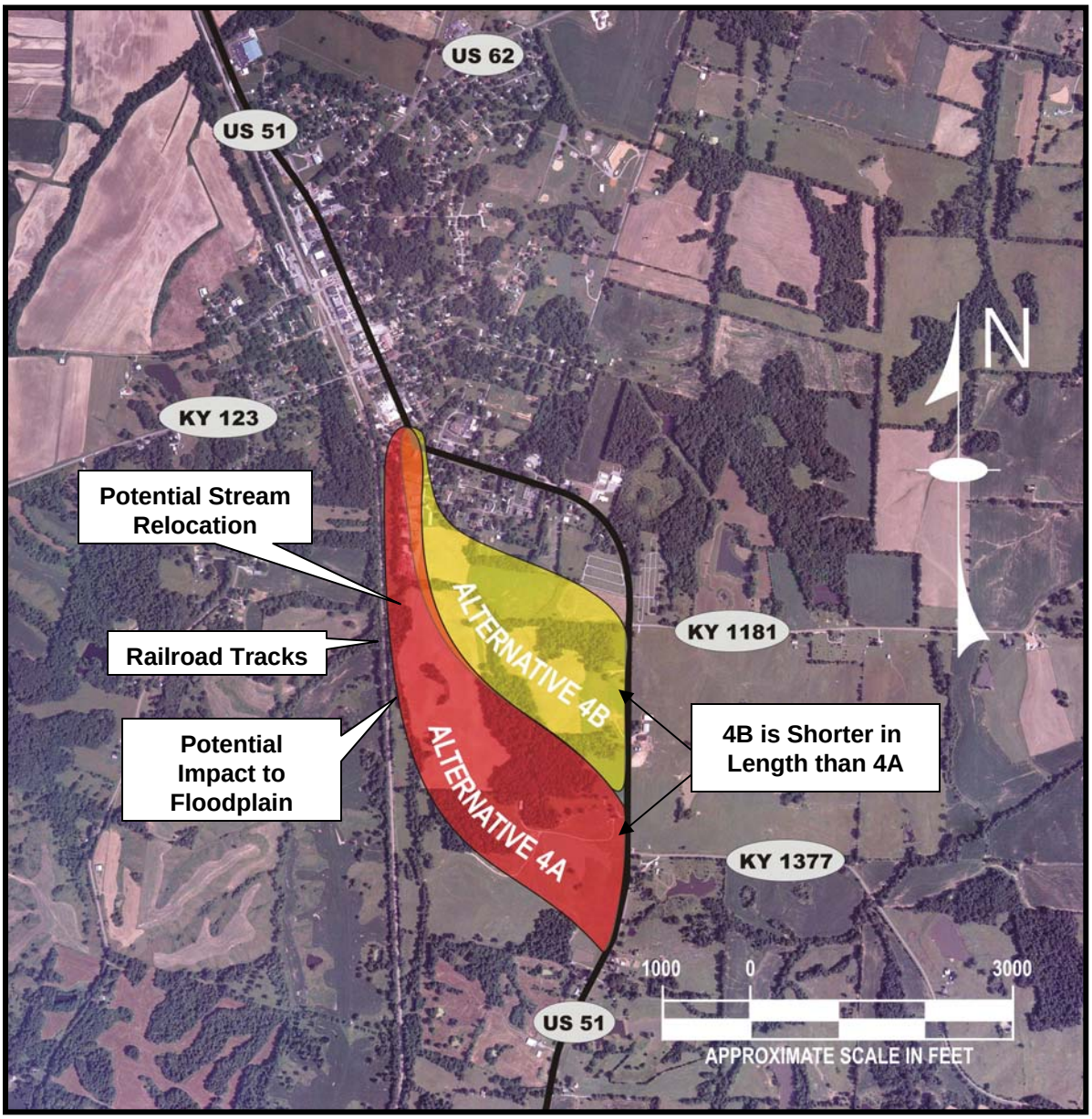


Figure 25: Alternative 5A Impacts

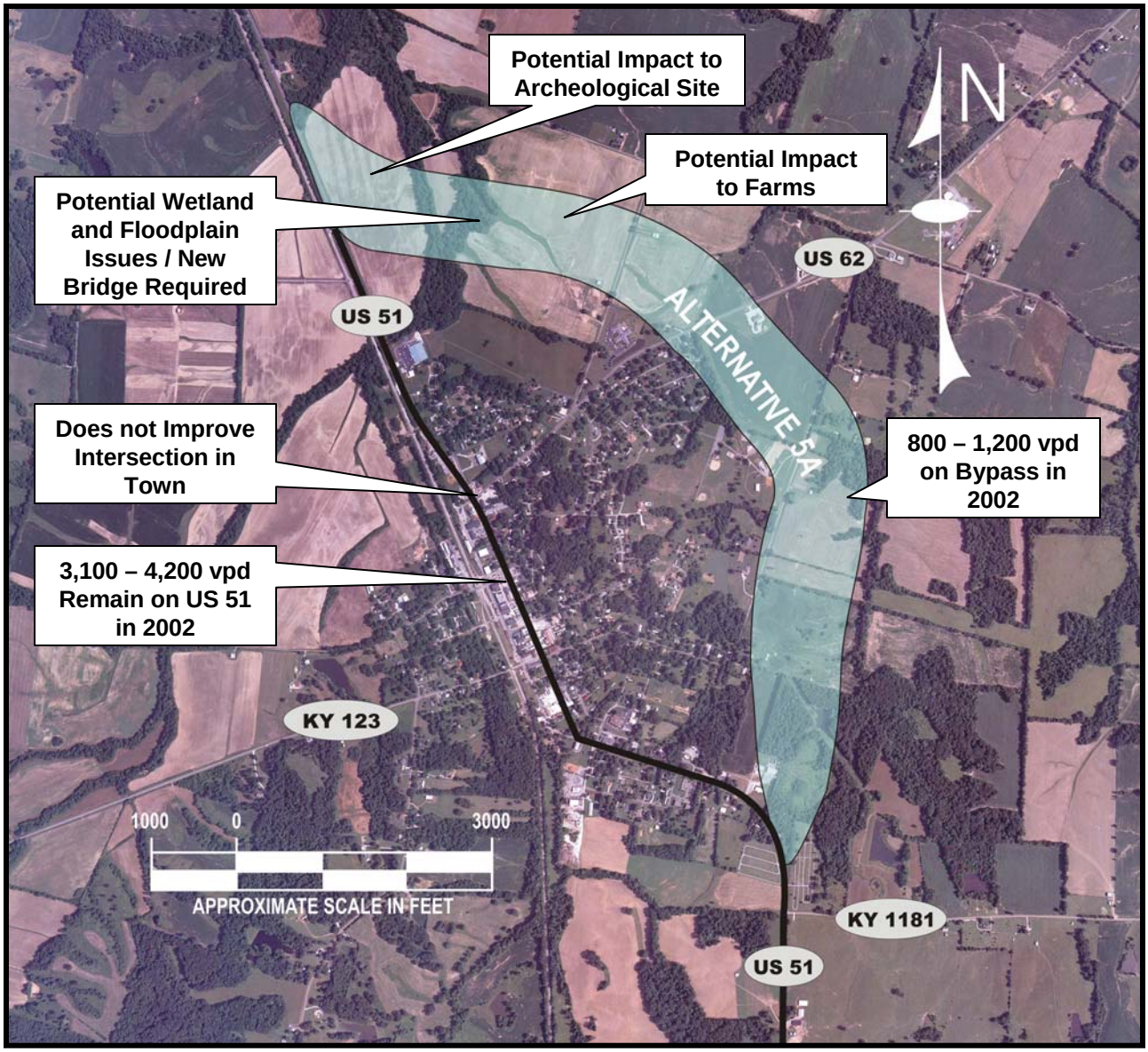


Figure 26: Alternative 2A – US 51 at US 62

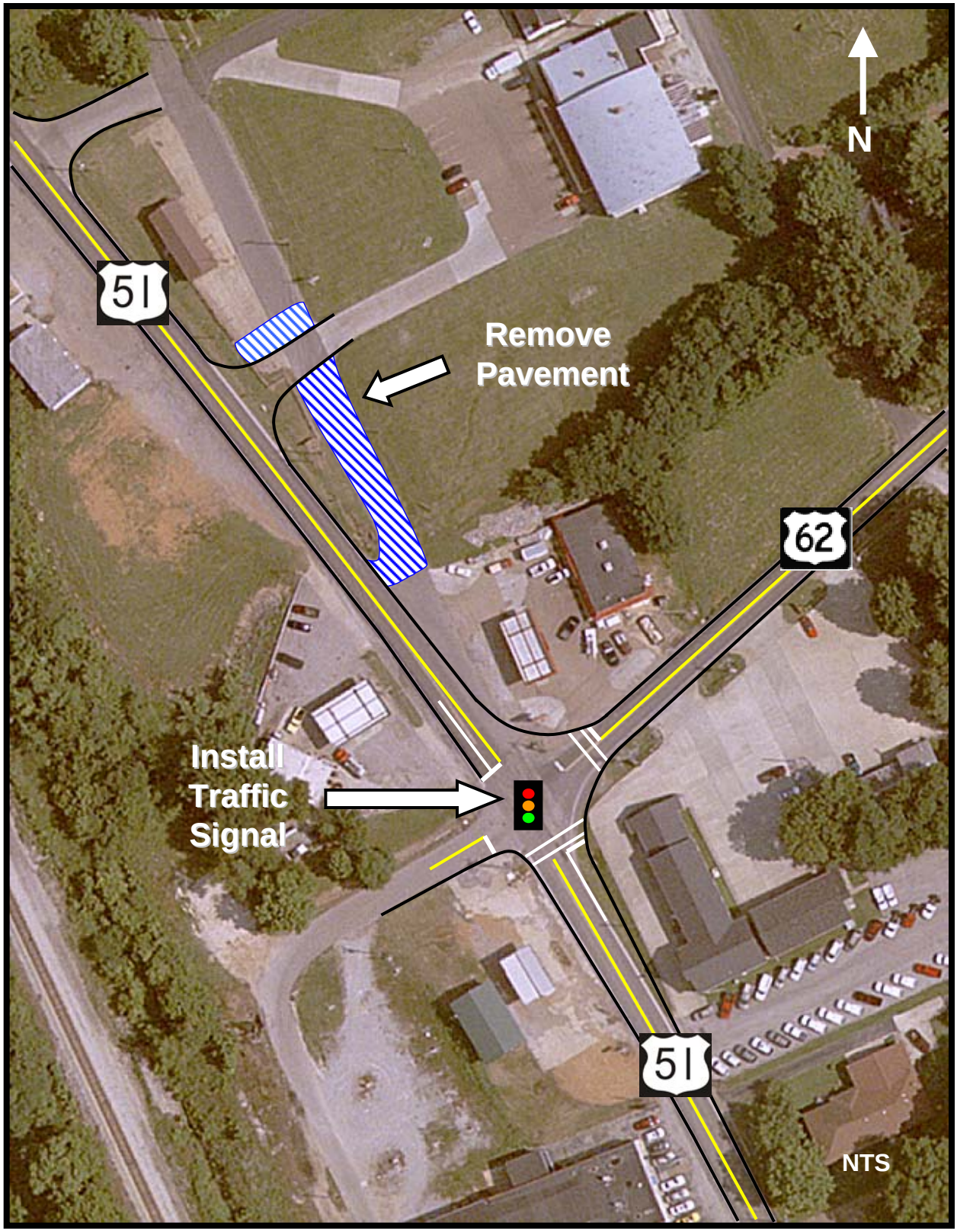


Figure 27: Alternative 2B – US 51 at Jennings Street

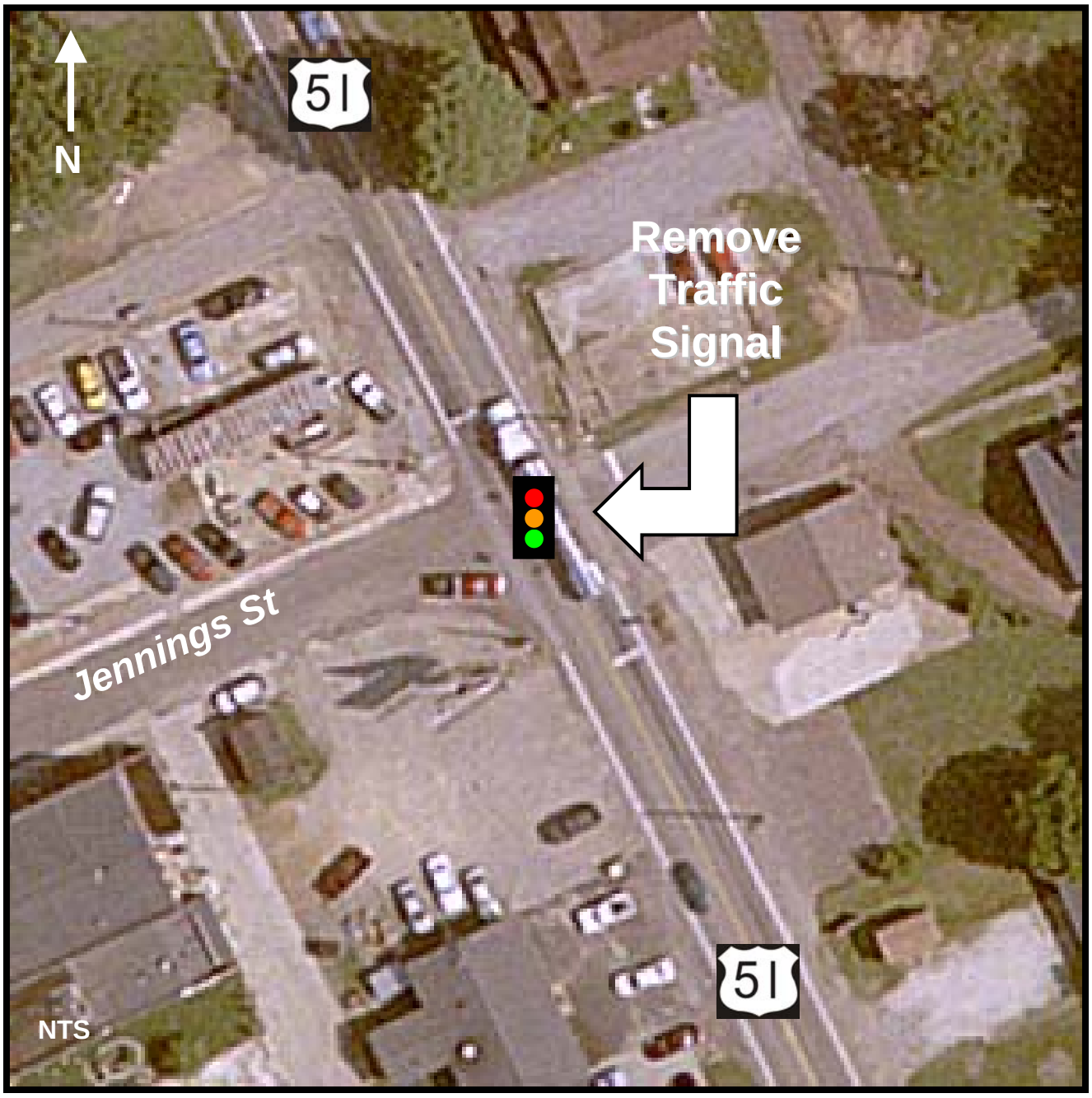


Figure 28: Alternative 2C – US 51 at KY 123

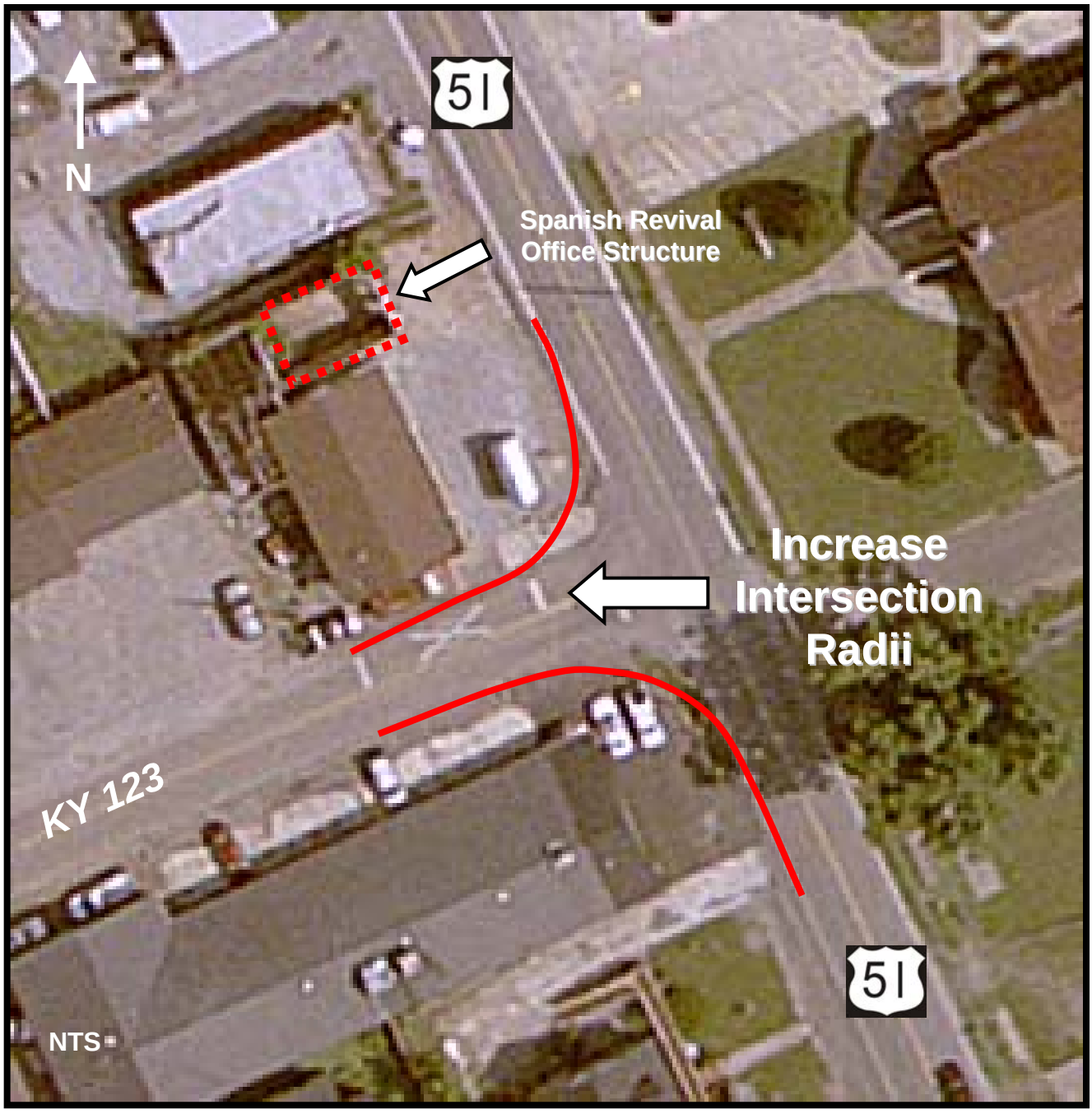
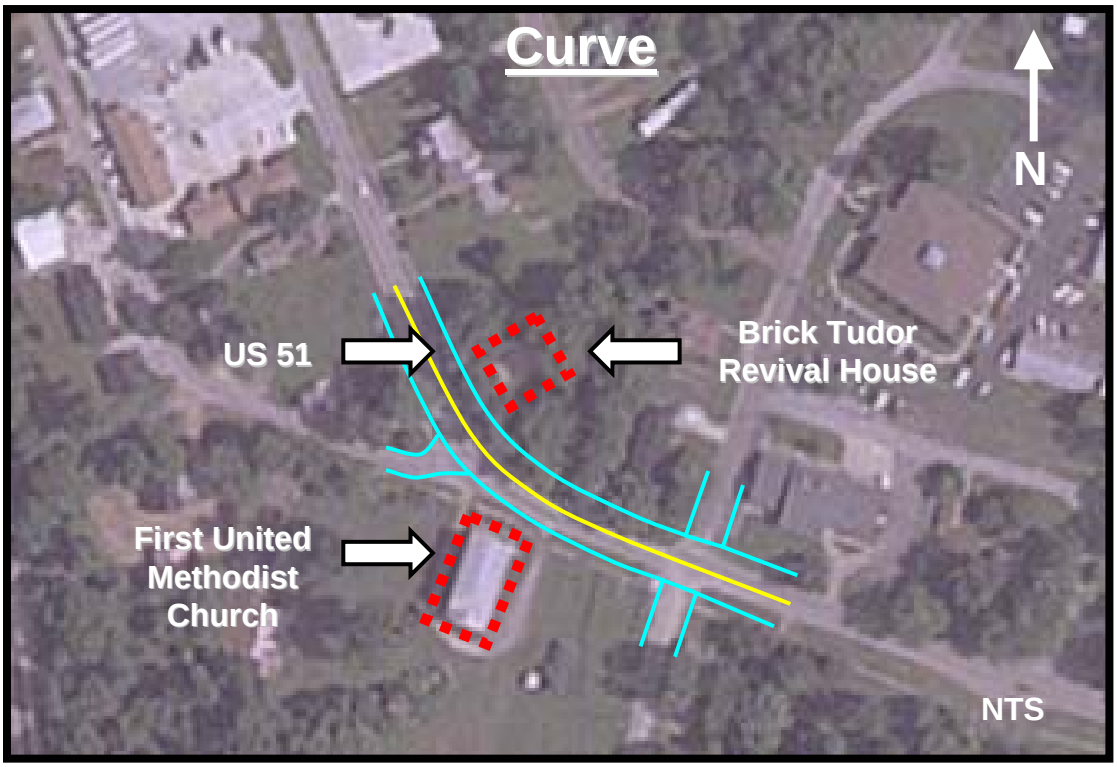


Figure 29: Alternative 2D – US 51 at Curve by Methodist Church



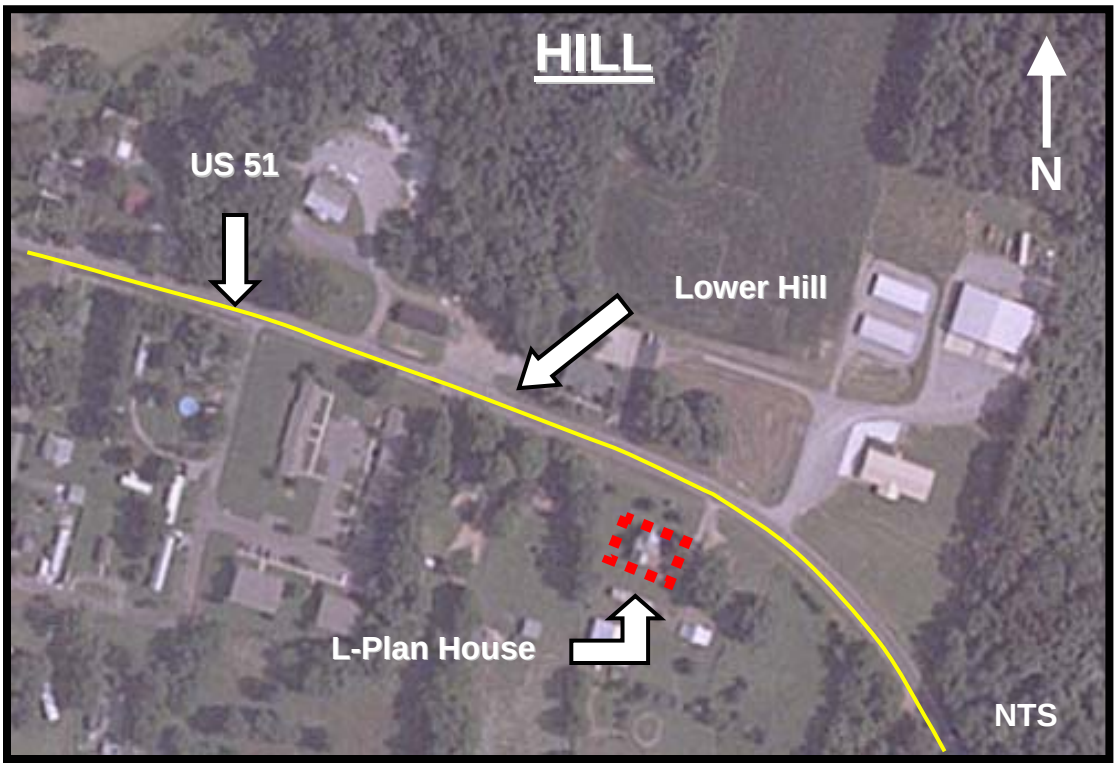
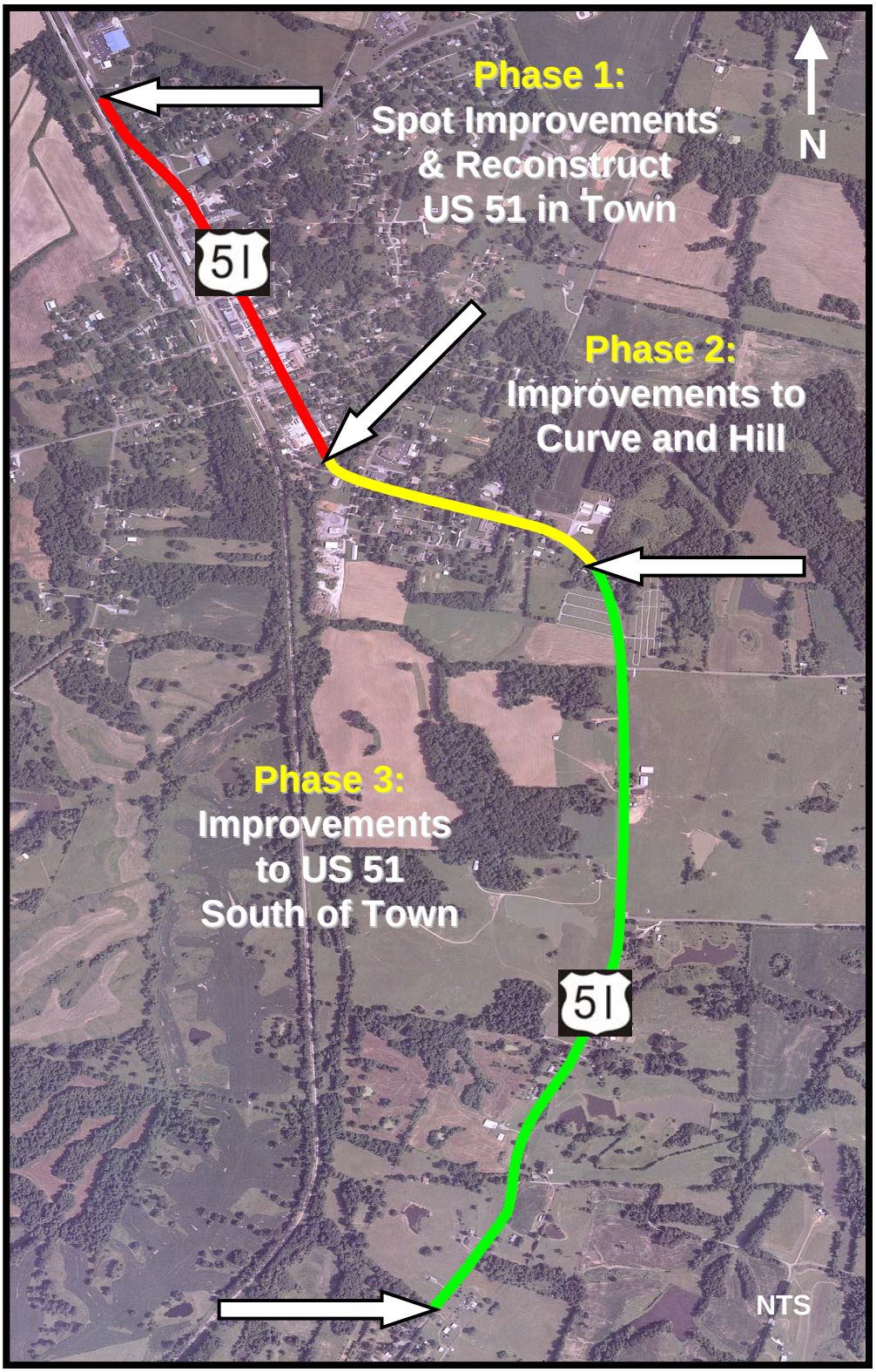


Figure 30: Alternative 3 – Reconstruct US 51



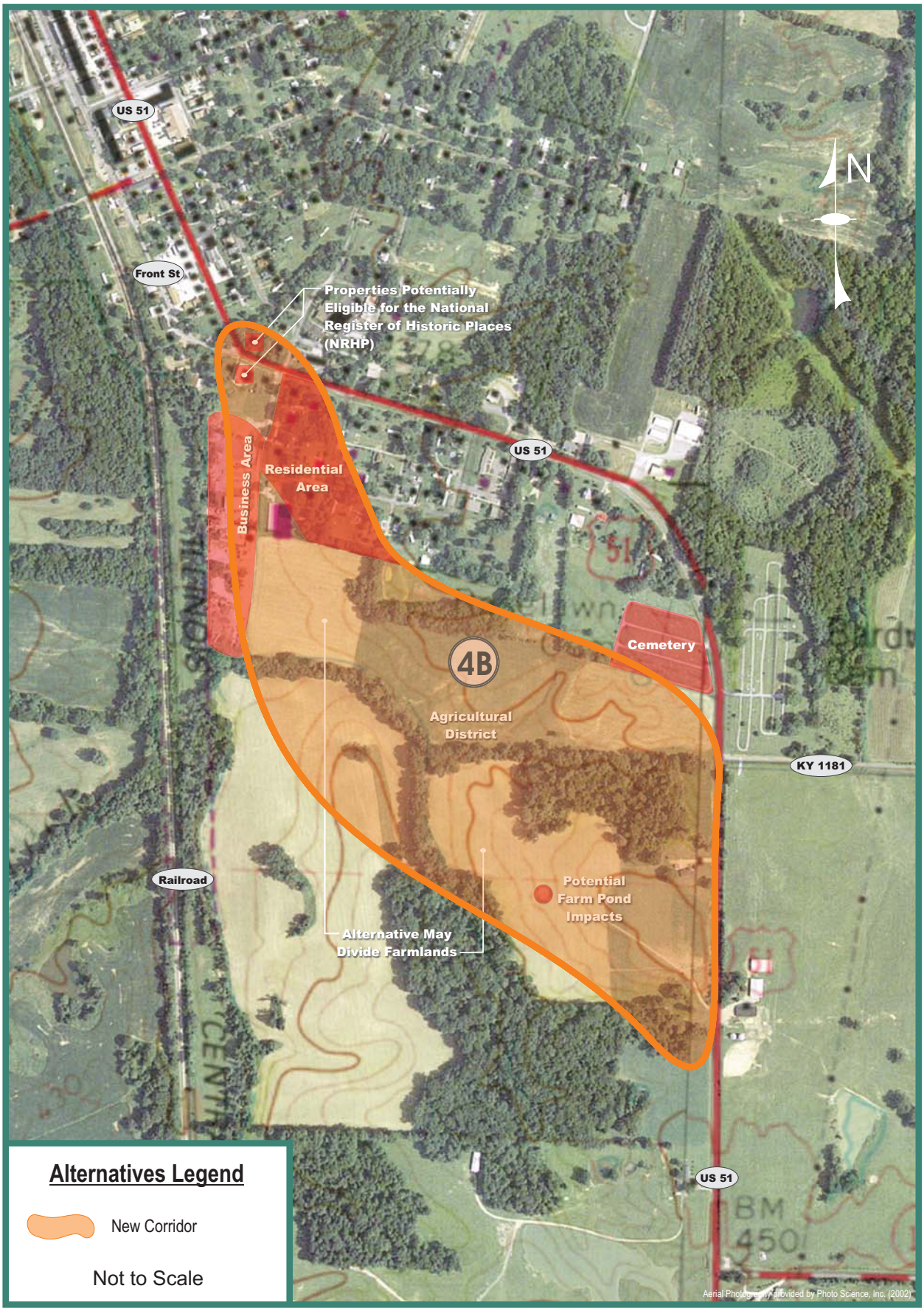


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Figure 31: Alternative 4B

APPENDIX C:
ENVIRONMENTAL JUSTICE REVIEW

US 51 STUDY IN BARDWELL

DRAFT WORKING PAPER

ENVIRONMENTAL JUSTICE REVIEW

Prepared for

Kentucky Transportation Cabinet (KYTC) – Division of Planning

Kentucky Transportation Cabinet (KYTC) – District 1

Prepared by

Parsons Brinckerhoff Quade & Douglas, Inc.

March 17, 2003

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1.0 INTRODUCTION

This report presents a review of community characteristics for the US 51 Project Area in the town of Bardwell (Carlisle County). The data used in the report comes from the U.S. Census Bureau, local officials meetings, stakeholder interviews, and field observations. The information and results are intended to assist the Kentucky Transportation Cabinet in making informed and prudent transportation decisions in the study area, especially with regard to the requirements of *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (signed on February 11, 1994). Executive Order 12898 states:

> "…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…"

The report outlines the portions of the community that may be considered minority or low-income population areas. It also highlights concentrations of elderly residents.

2.0 WHAT IS ENVIRONMENTAL JUSTICE

The U.S. Department of Transportation (DOT) outlines the three primary Environmental Justice concepts as:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

Low-income is defined in U.S. DOT Order (5610.2) as "a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines." A low-income population is "any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons…"

The U.S. DOT order defines minority as:

1. Black (a person having origins in any of the black racial groups of Africa);
2. Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
3. Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or

4. American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

A minority population is “any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons…”

A disproportionately high and adverse effect on a minority or low-income population means an adverse effect that:

1. is predominately borne by a minority population and/or a low-income population, or
2. will be suffered by the minority population and/or low-income population and is appreciable more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

An Environmental Justice community is therefore an identified minority or low-income population or concentration as defined above. These populations or concentrations are identified in this report as census areas exceeding a specified threshold level as outlined in the analysis section below.

Elderly populations (age 62 or above in this analysis) are not specifically recognized under the definition of an Environmental Justice community. However, the U.S. DOT specifically encourages the early examination of potential populations of the elderly, children, disabled, and other populations protected by Title VI of the Civil Rights Act of 1964 and related nondiscrimination statutes.

3.0 METHODOLOGY

Data for this study was collected from four primary sources: U.S. Census Data, meetings with local leaders, map and aerial photo reviews, and field observations. The U.S. Census Data used in the report includes:

- Census 2000 Population by Race and Hispanic Origin
- 1999 Poverty Status by Age for Census Block Groups
- Census 2000 Population by Age

The data was compiled with maps and tables to present a detailed description of the community conditions for the Bardwell project area in Carlisle County.

4.0 CENSUS DATA ANALYSIS

U.S. Census data is arranged according to geographic unit. For this study, data is presented at the national, state, county, town, census tract, block group, and census

block levels. According to the U.S. Census Bureau, the definitions of census tracts, block groups, and census blocks are as follows:

- **Census Tract – "**A small, relatively permanent statistical subdivision of a county or statistically equivalent entity, delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. Census tracts generally contain between 1,000 and 8,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. However, they may follow governmental unit boundaries and other invisible features in some instances; the boundary of a state or county is always a census tract boundary."

- **Block Group (BG) – "**A statistical subdivision of a census tract. A BG consists of all tabulation blocks whose numbers begin with the same digit in a census tract. BGs generally contain between 300 and 3,000 people, with an optimum size of 1,500 people."

- **Census Block** (or referred to as simply block) **– "**An area bounded on all sides by visible and/or nonvisible features shown on a map prepared by the Census Bureau. A block is the smallest geographic entity for which the Census Bureau tabulates decennial census data."

The study area lies primarily within census tract 9602, but also includes a very small portion of census tract 9603. The small portion of tract 9603 is insignificant and omitted from the data sets provided in this report. The location of tract 9602 is shown in Figure 4.1 along with the two blocks groups that comprise tract 9602. Data is presented for these two block groups along with data for the town, county, state, and nation for comparison.

4.1 Minority Population Analysis

Carlisle County has a low minority population percentage (2.3%) compared to both the state (10.7%) and national (30.9%) averages as shown in Table 4.1. The town of Bardwell has a slightly higher minority population percentage (5.4%), but it is still half of the statewide percentage. However, to determine if there is an identifiable minority population in the study area, the two block groups making up census tract 9602 were examined.

Block Group 1 has a slightly higher minority percentage (6.3%) compared to the county and town averages, but is well below the statewide average as shown in Table 4.1. The minority percentage in Block Group 2 (1.6%) is lower than both the town and county averages.

Figure 4.1: Census Tract 9602 and Block Groups 1 and 2
in Carlisle County

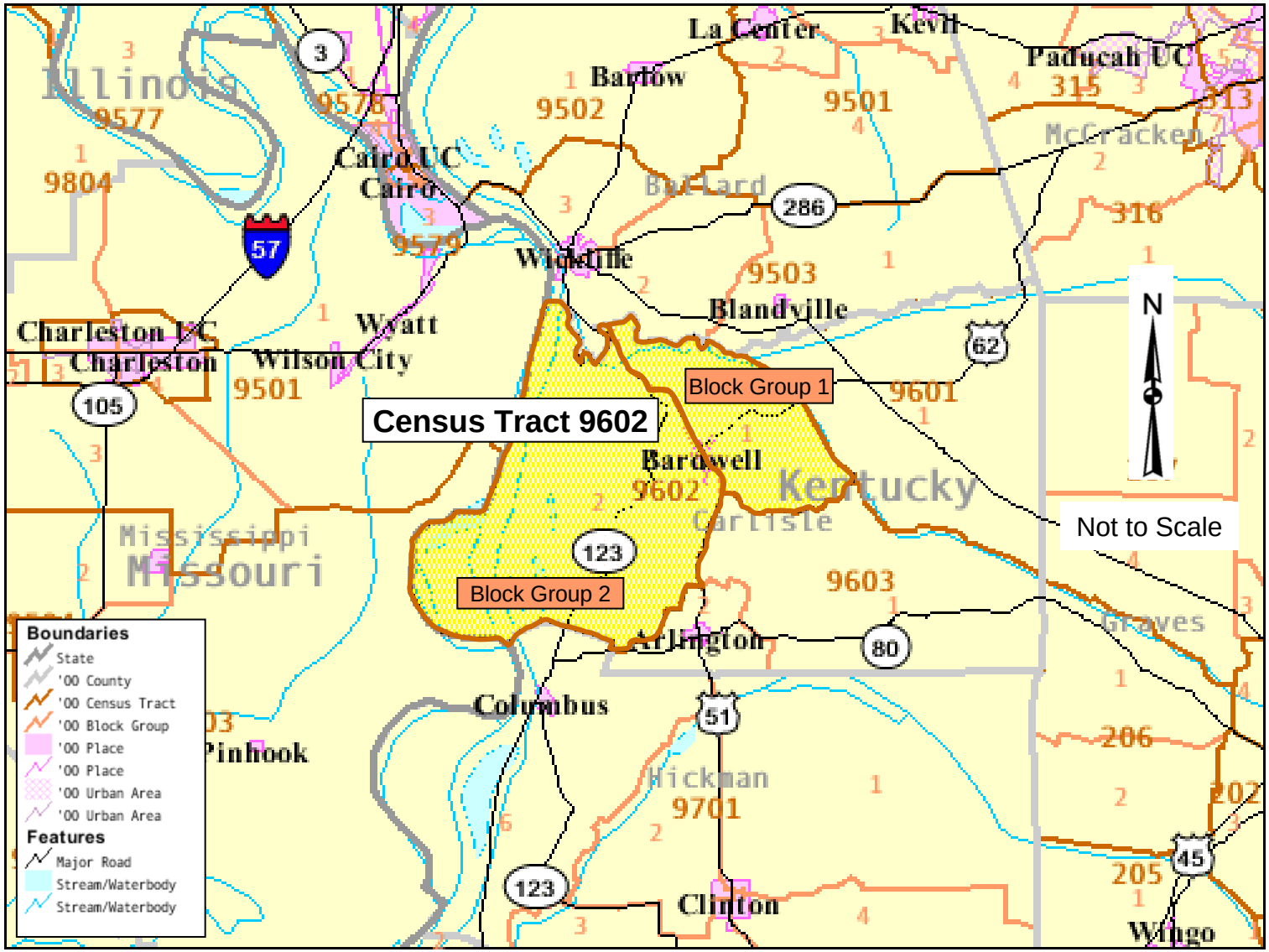


Table 4.1: 2000 Census Data by Race at Block Group Level

	United States	Kentucky	Carlisle County	Bardwell	Block Group 1	Block Group 2
Total Population	281,421,906	4,041,769	5,351	799	891	1,085
White alone	194,552,774	3,608,013	5,204	756	835	1,068
Black or African American alone	33,947,837	293,639	51	24	22	4
Hispanic or Latino	35,305,818	59,939	44	14	18	9
American Indian and Alaska Native alone	2,068,883	7,939	20	5	3	2
Asian alone	10,123,169	29,368	4	0	2	0
Native Hawaiian and Other Pacific Islander alone	353,509	1,275	0	0	0	0
Some other race alone	467,770	3,846	0	0	0	0
Two or more races	4,602,146	37,750	28	0	11	2
Total Minority Population	86,869,132	433,756	147	43	56	17
Percent Minority Population	30.9	10.7	2.3	5.4	6.3	1.6

Source: U.S. Census Bureau, Census 2000

Based on the U.S. DOT definition of minority populations it appears that there is no "readily identifiable" group of minority persons living within the study area. However, race data is available at the block level, and was examined for any small concentrations of minorities within each block group. A method developed by the Ohio Department of Transportation (ODOT)[1] to identify target populations of minorities or low-income residents is applied in this report.

The first step for determining a target population of minorities is to determine the regional or statewide average percentage of the minority population. In this case the statewide average of 10.7 percent is used since the county average is very low. The next step is to use this number as the reference threshold population percentage for defining a minority target area. Using 10.7 percent as the threshold percentage, the blocks from Block Group 1 that have higher percentages of minorities are listed in Table 4.2. Examination of the data for Block Group 2 revealed there are no blocks within the study area with a percentage of minorities greater than the threshold percentage.

Table 4.2: 2000 Census Data by Race for Blocks in Block Group 1

	Kentucky	Block 1019	Block 1025	Block 1039	Block 1049	Block 1055	Block 1067	Block 1068
Total Population	4,041,769	9	1	33	39	23	10	5
Total Minority Population	433,756	4	1	9	10	3	5	4
Percent Minority Population	10.7	44.4	100.0	27.3	25.6	13.0	50.0	80.0

Source: U.S. Census Bureau, Census 2000

The final step is to plot the locations of minorities on a map to identify the boundaries of any minority communities. Areas with percentages of minorities between the reference

[1] Ohio Transportation EJ Guidance, Ohio Department of Transportation, August 2002, Pages 10-11.

threshold and twenty-five percent above may or may not be considered part of the target population depending on the relative significance of the area compared to the other minority areas. Typically, any population percentages twenty-five percent above the threshold value are considered part of the target population. In this case, twenty-five percent above the reference threshold is 13.4 percent. As shown in Table 4.2, only one block has a percentage between 10.7 and 13.4 percent (Block 1055). This block is mapped to determine its relationship to the other blocks with higher percentages of minorities. Figures 4.2 and 4.3 illustrate the location of the blocks listed in Table 4.2 relative to the study area.

According to Figure 4.2, there is no significant concentration of minorities within Bardwell. There is a small group located adjacent to US 51 represented by blocks 1049, 1055, 1067, and 1068. However, the population of minorities for this total area is only 22. Throughout the study area surrounding Bardwell, there is only one block (1025) that has a percentage of minorities greater than 10.7 percent. Based on this data, there is not a sufficient minority population or concentration in the study area for an Environmental Justice community.

4.2 Low-Income Population Analysis

Listed in Table 4.3 is data for poverty levels by geographic unit. Both Block Groups 1 and 2 (20.1 and 18.3 percent) are slightly higher than the county average of 13.1 percent, the state average of 15.8 percent, and the national average of 12.4 percent. However, they are lower than the town average of 24.3 percent.

Using the ODOT method described in the previous section, the reference threshold set for this analysis of income data is the county average of 13.1 percent. Both block groups would be considered part of the target population for a low-income community because they have percentages of low-income residents higher than the threshold value. Data at the block level is not available; therefore, it is not feasible to determine where populations of low-income residents live in the block groups. As a result, the available data indicates that there could be concentrations of low-income residents in Bardwell, but without more conclusive data, it is not possible to determine the locations of these populations.

Table 4.3: 1999 Census Data for Poverty Levels

	United States	Kentucky	Carlisle County	Bardwell	Block Group 1	Block Group 2
Total Population	273,882,232	3,927,047	5,269	799	878	1,078
Population Below Poverty Level	33,899,812	621,096	691	194	176	197
% Population Below Poverty Level	12.4	15.8	13.1	24.3	20.1	18.3

Source: U.S. Census Bureau, Census 2000

Figure 4.2: Location of Minority Blocks in Bardwell

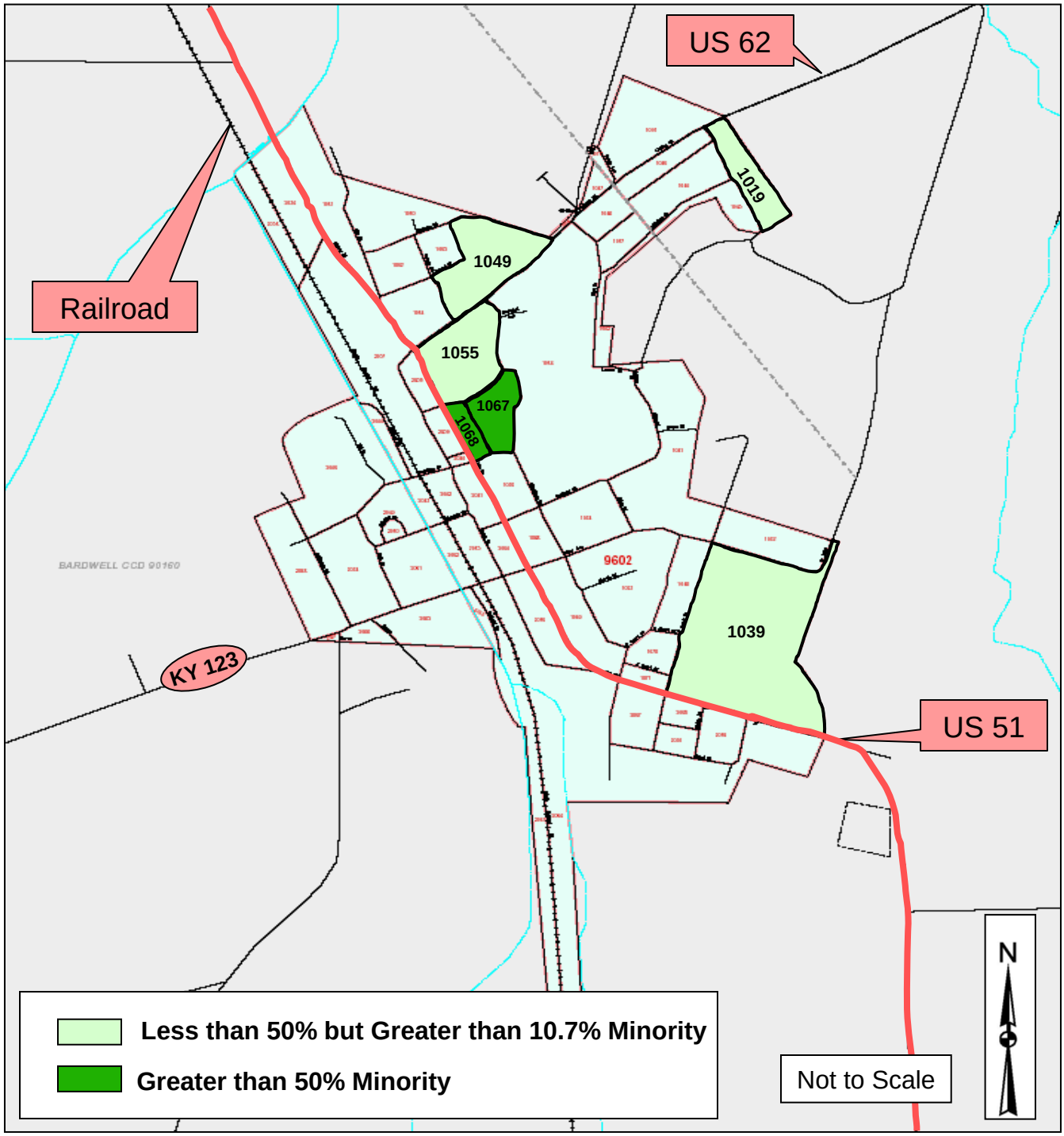
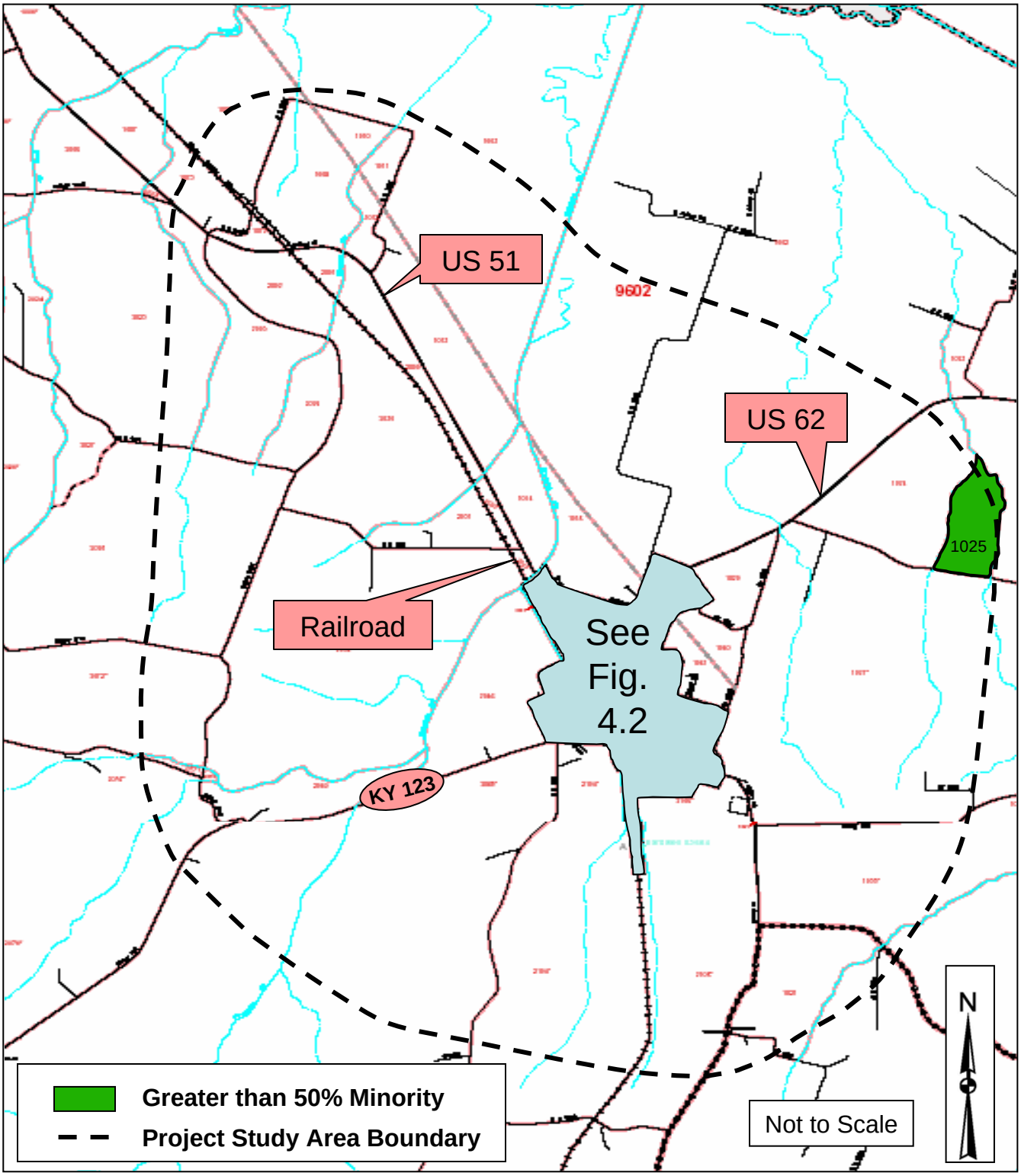


Figure 4.3: Location of Minority Blocks in Study Area Surrounding Bardwell



4.3 Population by Age

Data for the project study area based on age is shown in Table 4.4. At the block group level, both Block Groups 1 and 2 have a higher percentage of residents over the age of 62 compared to the state and nation. However, only Block Group 1 has a higher percentage of the elderly (26.5) compared to the county average of 21.1 percent. Block Group 1 also has a similar percentage of elderly residents (26.5 percent) compared to the town of Bardwell (26.3 percent).

Table 4.4: 2000 Census Data for Age 62+

	United States	Kentucky	Carlisle County	Bardwell	Block Group 1	Block Group 2
Total Population	281,421,906	4,041,769	5,351	799	891	1,085
# Persons 62 Years and Older	41,256,029	601,762	1,128	210	236	217
% Persons 62 Years and Older	14.7	14.9	21.1	26.3	26.5	20.0

Source: U.S. Census Bureau, Census 2000

Using the ODOT method, the threshold value is the county value of 21.1 percent. Only Block Group 1 is higher than the threshold value, but Block Group 2 will still be examined to determine if there are any blocks within the block group that exceed the threshold.

To determine if there are any population concentrations of residents age 62 or older in either block group, additional data for the block level was obtained. Using 21.1 percent as the threshold percentage, the blocks from Block Groups 1 and 2 that have percentages higher than the threshold are listed in Tables 4.5 and 4.6.

To identify the boundaries of any elderly communities within the study area, the blocks listed in Tables 4.5 and 4.6 are mapped in Figures 4.4 and 4.5. Blocks with percentages of the elderly between the reference threshold value of 21.1 percent and twenty-five percent above the threshold value (26.4 percent) may or may not be considered part of the target population depending on the relative significance of the block compared to the other elderly areas. Typically any population percentages twenty-five percent above the threshold value are considered part of the target population.

As shown in Figures 4.4 and 4.5, there are many blocks scattered throughout the study area with a percentage of elderly residents higher than the threshold value of 21.1 percent. There is no particular concentration of the blocks; therefore there is no specific community of elderly residents. However, a concern that is identified by this analysis is that the frequency of blocks with an elderly percentage greater than 21.1 percent indicates that there are a significant number of elderly residents in Bardwell and the surrounding area. This high concentration of the elderly throughout the study area should be taken into account in the project planning and any future design.

Table 4.5: 2000 Census Data for Age 62+ by Blocks for Block Group 1

	Total Population	# Persons 62 Years and Older	% Persons 62 Years and Older
Carlisle County	5,351	1128	21.1
Block 1002	38	8	21.1
Block 1015	8	4	50.0
Block 1018	1	1	100.0
Block 1019	9	3	33.3
Block 1021	36	13	36.1
Block 1024	9	3	33.3
Block 1025	1	1	100.0
Block 1036	6	2	33.3
Block 1038	7	3	42.9
Block 1039	33	7	21.2
Block 1040	5	3	60.0
Block 1042	23	8	34.8
Block 1043	21	10	47.6
Block 1044	19	8	42.1
Block 1045	10	6	60.0
Block 1046	12	5	41.7
Block 1051	7	3	42.9
Block 1052	13	3	23.1
Block 1053	17	7	41.2
Block 1056	56	22	39.3
Block 1060	13	4	30.8
Block 1064	26	16	61.5
Block 1066	12	12	100.0
Block 1067	10	4	40.0
Block 1069	31	8	25.8

Source: U.S. Census Bureau, Census 2000

Table 4.6: 2000 Census Data for Age 62+ by Blocks for Block Group 2

	Total Population	# Persons 62 Years and Older	% Persons 62 Years and Older
Carlisle County	5,351	1,128	21.1
Block 2001	13	9	69.2
Block 2003	14	4	28.6
Block 2024	2	2	100.0
Block 2026	12	3	25.0
Block 2030	19	6	31.6
Block 2046	4	2	50.0
Block 2051	15	5	33.3
Block 2054	3	1	33.3
Block 2055	16	7	43.8
Block 2058	4	2	50.0
Block 2059	15	4	26.7
Block 2060	6	2	33.3
Block 2062	8	2	25.0
Block 2063	13	4	30.8
Block 2065	14	4	28.6
Block 2066	2	1	50.0
Block 2068	84	18	21.4
Block 2076	56	18	32.1

Source: U.S. Census Bureau, Census 2000

5.0 CONCLUSIONS

Based on race and income data obtained from the U.S. Census Bureau and input from the community of Bardwell, there is no defined Environmental Justice community within the project study area. Analysis of the age distribution in the study area indicates that there is no specific concentration of residents 62 years or older, but there is a high distribution of elderly residents in the study area.

Figure 4.4: Location of Concentrated Elderly Population Blocks in Bardwell

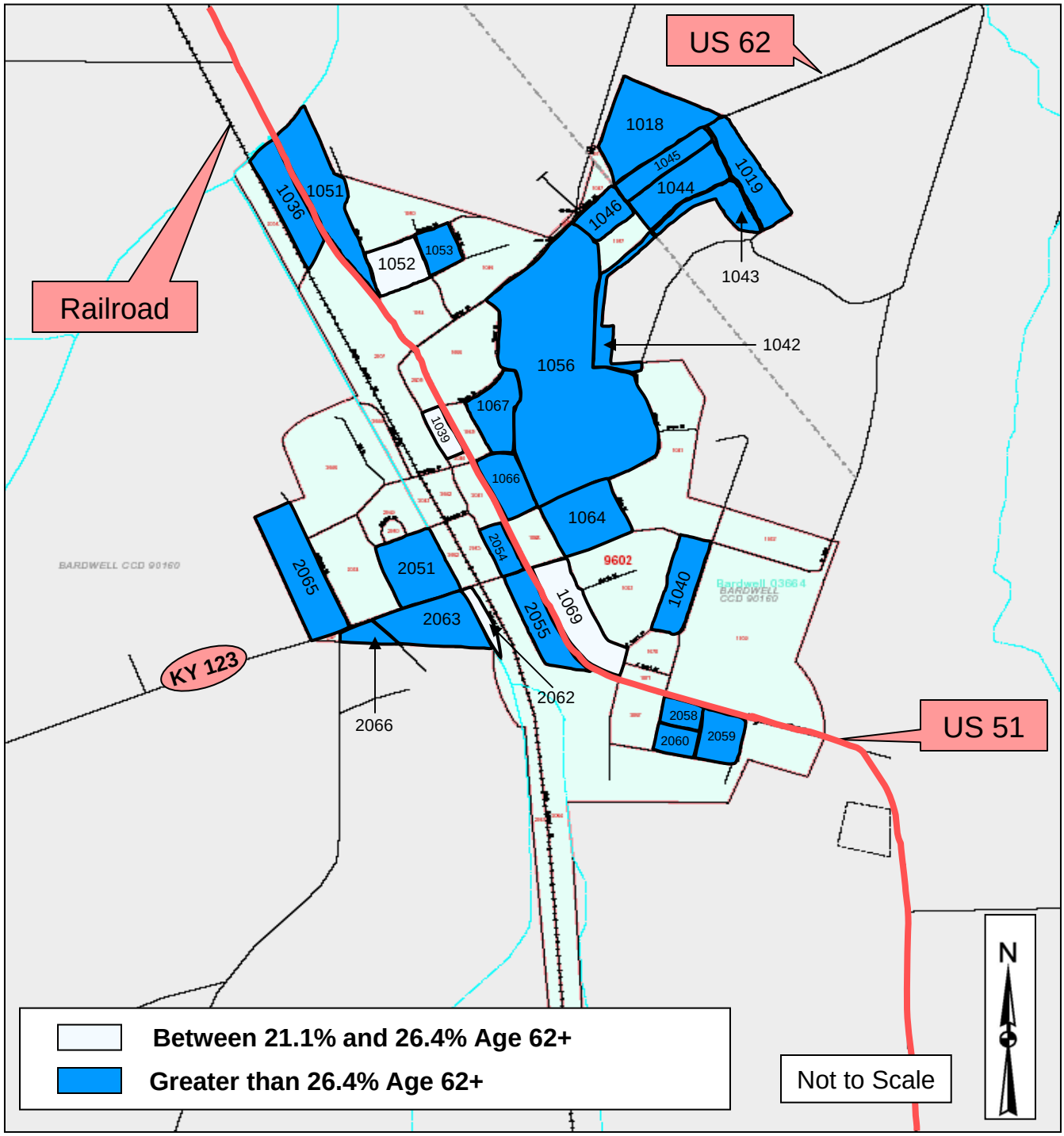
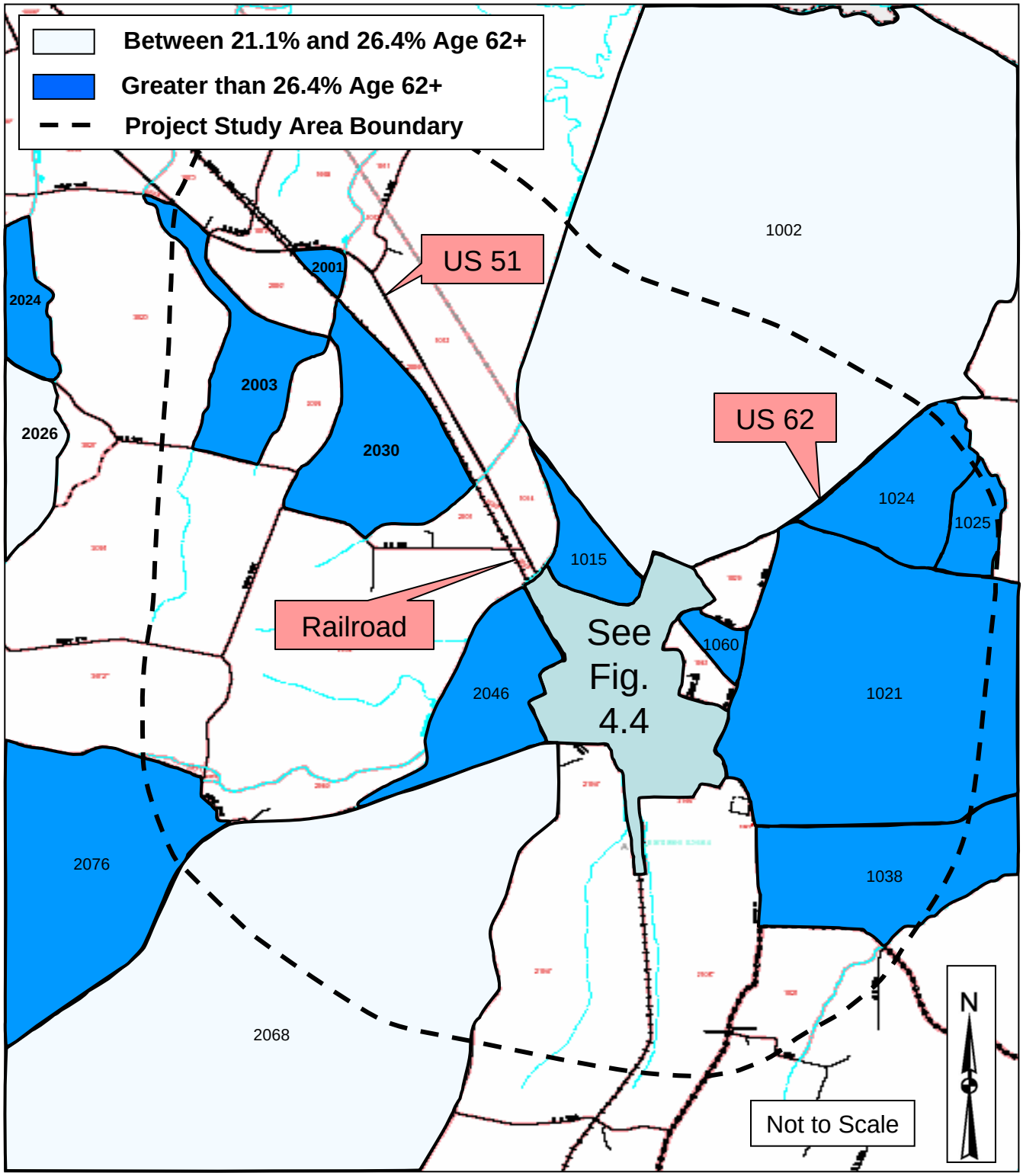


Figure 4.5: Location of Concentrated Elderly Population Blocks in Study Area Surrounding Bardwell



APPENDIX D:
ENVIRONMENTAL OVERVIEW AND AGENCY CORRESPONDENCE

NATURAL ENVIRONMENT BASELINE

Aquatic Ecosystems

Surface Water

The study area for Bardwell is located within the major water basin Hatchie-Obion. Four smaller watersheds cover the study area. Truman Creek watershed covers the central and most of the western portions of the study area. Mayfield Creek watershed covers a sizable section of the study area east of Bardwell. Smaller sections of the northwest and southeast portions of the study area are covered by Gray Creek and West Fork of Mayfield watersheds, respectively (United States Geological Survey [USGS] 1983).

All streams in the study area flow short distances into tributaries of the Mississippi River system (the Mississippi River is approximately six miles west of Bardwell). Most blueline streams and tributaries flow north in the study area. Truman Creek runs north to southwest across the entire study area and crosses US 51 just north Bardwell. Most of the remaining creeks and tributaries are unnamed, but four are named and lie in the southern half of the Bardwell study area. They are Little Shawnee Creek, Buzzard Creek, Central Creek, and Minor Slough.

Wetlands and Ponds

National Wetland Inventory (NWI) mapping was reviewed for the presence of wetlands within the project corridor. A total of 137 wetlands were indicated on NWI mapping; no one particular section of the study area is more saturated with wetlands than any other. A limited site visit of the study area was conducted April 19, 2002. Wetlands were observed throughout the study area as indicated on NWI mapping; most appeared to be farm ponds.

The jurisdictional status of 130 of the NWI wetlands would need to be determined in consultation with the US Army Corps of Engineers (USACE). These wetlands, also considered ponds, include 122 that are impounded or diked areas as part of farming operations and another other eight that are the result of excavation activities. The remaining seven wetlands appear to be natural in origin based on their type and may be considered jurisdictional by USACE. All seven exist in the northeast quadrant of the study area; most are either along the floodplain of Truman Creek or along the floodplain of an unnamed tributary of Mayfield Creek. Four of these wetlands are significant in size as well, ranging from approximately 8 acres to 32 acres. Attachment A includes a summary of the types and members of NWI wetlands within the study area.

Hydric soils are also found in the study area and suggest the presence of other wetlands in the study area. The soil survey for Carlisle and Hickman Counties, Kentucky (United States Department of Agriculture [USDA] 1997) shows twelve hydric soils have been identified within Carlisle County. Of these twelve, five potential hydric soils are found within the study area: Convent-Mhoon silt loams, Dekoven silt loam overwash, Routon-Center silt loams, Mhoon silt loam, and the most frequent hydric soil in the study area, Convent-Adler silt loams. Convent-Mhoon silt loams and Rhouton-Center silt loams are hydric only in low-lying areas. The low-lying areas within the study boundaries and with potential for these soils are in the alluvial bottoms (along creek valleys).

In an informal interview, Todd Templeton, Carlisle County District Conservationist, noted that the alluvial bottoms in the study area are very likely to contain hydric soils.

Floodplains

Six 100-year floodplains cover 8.3 percent of the study area (626 acres), with the largest being the Truman Creek floodplain (394 acres) (Federal Emergency Management Agency [FEMA] 1998). As noted previously, Truman Creek runs north to southwest across the entire study area. The other five floodplains are: two unnamed tributaries of Gray Creek (67 acres total), Thomas Creek (19 acres total), an unnamed tributary of Mayfield Creek (75 acres) and an unnamed tributary of Truman Creek (71 acres). The floodplains of the unnamed tributaries of Gray Creek and Thomas Creek are clustered in the upper northwest portion of the study area, while the unnamed tributary of Mayfield Creek is north of US 62 and east of Bardwell. The floodplain of the unnamed tributary of Truman Creek runs through Bardwell and south of the town. Significant floodplains areas lie just north of the study area.

Terrestrial Ecosystems

Threatened and Endangered Species

Correspondence with the US Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlfie Resources (KDFWR) and the Kentucky State Nature Preserves Commission (KSNPC) along with a review of KDFWR's online database indicated 12 species listed as potentially occurring in or near the study area. These species and their status are shown in Table 1. Copies of correspondence with agencies are included at the back of this appendix.

TABLE 1 –THREATENED OR ENDANGERED SPECIES

Common Name	Scientific Name	Status
Indiana bat	*Myotis sodalis*	Federally endangered, state endangered
Interior least tern	Sterna antillarum athalassos	Federally endangered, state endangered
Hooded merganser	*Lophodytes cucullatus*	State endangered
Spotted sandpiper	*Actitis macularia*	State endangered
Cypress minnow	*Hybognathus hayi*	State endangered
Alabama shad	*Alosa alabamae*	State endangered
Evening bat	*Nycticeius humeralis*	State threatened
Yellow-crowned night-heron	*Nyctanassa violaceus*	State threatened
Common moorhen	*Gallinula chloropus*	State threatened
Least bittern	*Ixobrychus exilis*	State threatened
Spotted sunfish	*Lepomis punctatus*	State threatened
Taillight shiner	*Notropis maculatus*	State threatened

Available habitat indicates whether these 12 species are likely to occur in the study area. Three species are not likely to be found in the study area; these are the Alabama shad, spotted sandpiper, and interior least tern. These three species are likely to find suitable habitat in or very near the Mississippi River.

All other species may occur or have been known to occur in the study area. These species are usually associated with one of four types of habitat found within the study area: streams, ponds, and lakes; marshy ponds and lakes; mature forests with nearby streams; and trees and buildings.

Streams, ponds, lakes, and areas immediately surrounding them are found throughout the study area. These habitats are suitable for the cypress minnow, spotted sunfish, taillight shiner, and yellow-crowned night heron. Marshy ponds and lakes with associated vegetation such as cattails, burreeds, bulrushes, and sedges are suitable nesting habitat for the least bittern and common moorhen.

Mature forests with nearby streams are suitable habitat for the hooded merganser and Indiana bat. Such potential habitat occurs along Truman Creek, Central Creek, and along an unnamed tributary of Gray Creek (No. 1). There is also a block of potential habitat in a forested area south of the unnamed tributary of Mayfield Creek. These same forested areas plus other treed areas and buildings are suitable habitat for the evening bat; such habitat exists throughout the entire study area.

Floral Communities

Primary plant communities existing in the study area include croplands (soybean, corn, wheat, and tobacco), pasture, residential lawns, and wetlands (Kentucky Natural Resources and Environmental Protection Cabinet [KNREPC]). Such highly disturbed habitats as these areas provide ideal habitat for weeds, exotics, and naturalized and introduced species to thrive. In addition to these highly disturbed habitats, several large blocks of forests exist in the project area, specifically along the unnamed tributaries of Gray Creek, along tributaries of Truman Creek to the west and southwest of Bardwell, and in the headwaters of the tributary of Mayfield Creek.

A review of *Kentucky's Big Trees* (Kentucky Division of Forestry 1995) indicated no national or state champion trees within the study area.

Faunal Communities

Common mammals that are abundant statewide or have large home ranges are likely to be found in the study area. These include mammals such as whitetail deer, opossum, raccoon, skunk, gray and fox squirrel, and chipmunk. Other species such as the short-tailed shrew and southeastern shrew are likely to inhabit the forested areas of the project area. Southern bog lemming, muskrat, and the swamp rabbit prefer wetland type habitats.

Wetlands in the study area provide habitat for amphibian species such as green frog, bullfrog, spotted salamander, smallmouth salamander, and mole salamander. Midland water snake and yellowbelly water snake will likely be found in the creeks. The early successional fields (found near croplands) and forested areas provide habitat for rat snake, kingsnake, black racer, and several species of lizard. Box turtle is found statewide and would be expected in the study area. Common birds such as robin, cardinals, starling, and mourning dove, are also likely to be found throughout the study area.

HUMAN ENVIRONMENT BASELINE

Land Use

The study area covers 7,579 acres. Five types of land use are found within the study area: crops/pasture, forest, residential, commercial, and other urban. Crops/pasture cover 6,359 acres (the largest percentage). Forested land covers the next largest percentage at 864 acres. Residential areas and commercial areas occupy 283 acres and 48 acres, respectively. The smallest land use is for other urban uses, accounting for 23 acres (KNREPC).

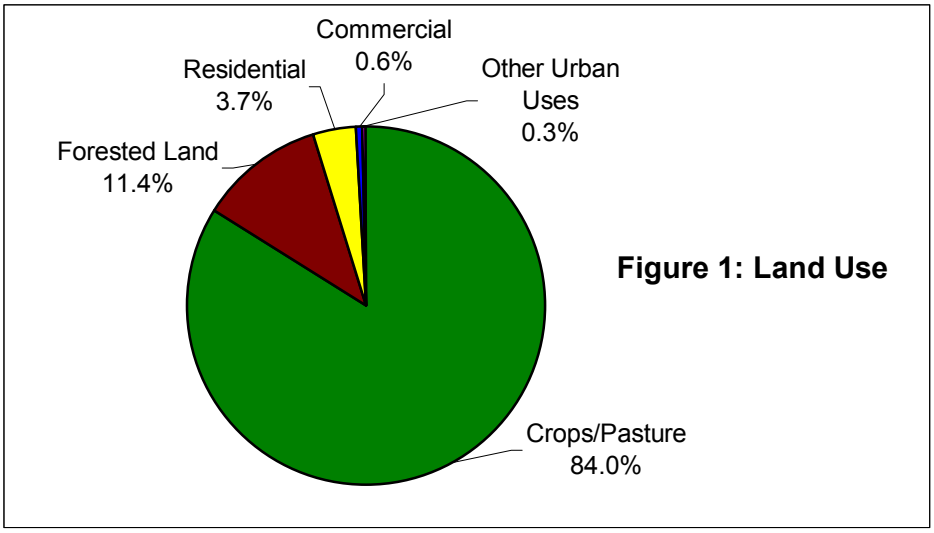


Figure 1: Land Use

The site visit verified these findings; the study area was comprised primarily of crops and pastures. Ribbons of forests separated crops and lined many of the streams. Outside the city limits, houses on farms and other rural homes were scattered. Bardwell is a small city (population 799 for the year 2000 according to the U.S. 2000 Census), and the majority of the residential, commercial, and urban land use in the study area is within the city's corporate limits.

Transportation

The numbers of connecting roadways branching out beyond Bardwell are limited. US 51 which traverses the study area from northwest to the south is a rural, principal arterial roadway. US 51 is a two-lane, undivided "AAA"-rated roadway. Main east/west routes include US 62 to the east of Bardwell and KY 123 to the west. US 62 also runs concurrently with US 51 north of Bardwell. Other roadways east of US 51 include KY 1377, KY 1181, and local roads Morgan Road and Webb Road. Roadways to the west of US 51 are KY 1591, KY 1022, Truman Road, Stanley Road, and Ida Ireland Road.

The Illinois Central railroad runs northwest to south across the Bardwell study area. Except for the northern end of the study area, the railroad tracks are west of US 51. For nearly two miles, the tracks are adjacent to US 51. The tracks run through Bardwell itself; buildings in the town, in fact, face the railroad rather than US 51, the main street in Bardwell. In the southern portion of the study area, the tracks are further west of US 51 (as much as one-half mile) (USGS 1983).

Total Population, Minority and Low-Income Populations

The study area lies primarily in census tract 9602 and within a very small portion of census tract 9603. The small portion within tract 9603 is insignificant and omitted from the data presented below.

As released for Census 2000, the population of Carlisle County was 5,351; the population of Bardwell was 799. The racial composition for the state, county, town, and census tracts as released for Census 2000 is shown in Table 2.

TABLE 2 – RACIAL COMPOSITION OF STATE, COUNTY, TOWN, AND CENSUS TRACT

	Kentucky	Carlisle County	Bardwell	Census Tract 9602
One Race:				
White	3,640,889	5,232	756	1,920
African American	295,994	51	24	26
Native American	8,616	22	5	7
Asian	29,744	4	0	2
Native Pacific Islander	1,460	0	0	0
Other Race	22,623	12	5	8
Two or more races	42,443	30	9	13
Hispanic Origin*	59,939	44	22	27
Total Minorities**	400,880	119	43	56
Percent Minority	9.9	2.2	5.4	2.8

**Hispanic Origin is not considered a separate race. The number shown is counted twice, once as Hispanic Origin and once as one of the other four racial groups listed above.*
***This number does not include Hispanic Origin in order to avoid duplication.*
Source: 2000 U.S. Census

Environmental justice concerns related to minority populations are not likely based on Census 2000 data for census tract 9602. The study area, located in census tract 9602, has a minority population of 2.8 percent. This percentage is similar or lower than percentages for Kentucky, Carlisle County, and Bardwell (9.9, 2.2, and 5.4 percent, respectively). A limited site visit of the study area did not indicate evidence of minority populations.

Environmental justice concerns for low-income populations are more likely for areas within Bardwell as opposed to the areas surrounding the town. The site visit of the study area confirmed the presence of some low-income housing, primarily in Bardwell. For the most part, houses beyond the town were not indicative of low-income residents.

Census 2000 information for low-income populations is not currently available. Yet, 1990 census data as shown in Table 3 indicates a higher probability of low-income populations within the town. Percentages for the county and census tract are similar to that of the state.

TABLE 3 – INCOME AND POVERTY STATUS

Region	Median Household Income	Median Family Income	Persons Below Poverty Level	
			Number	Percent
Kentucky	$22,534	$27,028	681,827	16.9
Carlisle County	$19,409	$24,039	921	17.2
Bardwell	$15,938	$18,750	197	24.7
Census Tract 9602	$18,160	$21,875	350	18.0

Source: 1990 U.S. Census

Additional demographic data for the study area are provided in Attachment B. Tables include those for household types, housing units available, populations by selected age groups, and commuting patterns.

Local Economy

Carlisle County has a higher percentage of unemployed persons than does Kentucky or the U.S. The county's unemployment percentage for 2001 was 6.1 compared to the state at 5.5 and the country at 4.8. The county's rate has improved since 1990 when it was 8.0 percent. Data from 1995 to 2000 shows the county's unemployment rate has ranged from a low of 5.1 in 1998 to a high of 6.9 the previous year.

Employment by major industry by place of work for the year 2000 for Carlisle County is shown in Table 4.

TABLE 4 – EMPLOYMENT BY MAJOR INDUSTRY

Carlisle County	Employment	Percent
All Industries	855	100.0
Agriculture, Forestry & Fishing	25	2.9
Contract Construction	51	6.0
Manufacturing	132	15.4
Transportation and Public Utilities	14	1.6
Wholesale Trade	0	0.0
Retail Trade	164	19.2
Finance, Insurance and Real Estate	61	7.1
Services	143	16.7
State and Local Government	35	4.1

Source: Kentucky Economic Development Information System

The major manufacturers for Bardwell for the year 2002 are shown in Table 5.

TABLE 5 – MAJOR MANUFACTURERS

		Employees	Year Established
Carlisle County News	Newspaper publishing	2	1894
Carlisle Manufacturing	Cultured marble sinks, panels, counter tops & products	4	1991
Ford Construction Co.	Ready-mixed concrete & livestock water tanks	5	1957
RBS China Inc.	Lamps (portable lighting)	40	1992

Source: Kentucky Economic Development Information System

Communities and Community Facilities

Typical community facilities are located within Bardwell, *e.g.,* a city hall, a health department, etc. Based on addresses, nine churches appear to exist in Bardwell; most appear to be located on side streets but at least three are located along US 51. Beyond the town, a limited number of churches were observed scattered throughout the study area.

Other than the town of Bardwell, there are no named subdivisions or communities in the study area.

Three additional community facilities were identified in the study area. These community facilities are two cemeteries and a park. Roselawn Cemetery is located on the west side of US 51 at the intersection of route 118 and US 51; Bardwell Cemetery is located directly opposite on the east side of US 51. Carlisle County Park is located on Morgan Road near US 62 in Bardwell. The park includes such facilities as baseball fields, a basketball court, and a playground.

No public schools are located within the study area. One private school, Mayfield Creek Christian Academy, is located in the county; its location however, could not be determined because of insufficient address. The school was not observed during the site visit.

Agricultural Activity and Prime and Unique Farmland

As noted under Land Use, agriculture is predominant throughout the study area outside of Bardwell. Substantial farming operations with significant on-farm investments are evident throughout the study area and are not limited to any one portion or portions of the study area.

Data from the 1997 Census of Agriculture also demonstrate the magnitude of agricultural activities in the county. For example, the average farm in Carlisle County covers 279 acres compared to the state average of 162 acres. Thirteen farms in the county cover between 1,000 and 1,999 acres; seven farms have more than 2,000 acres each. Yet, of Kentucky's 120 counties, in terms of total land covered, Carlisle County ranks 106; it is one of the state's smaller counties. In 1998, this small county ranked 16th in production of corn for grain, soybeans, and winter wheat. Carlisle County was 3rd in dark-fired tobacco production.

The prevalence of agricultural activity in the county and subsequently the study area is in large part attributable to the availability of fertile soils. Of Hickman County's 127,354 acres, 69,752 are considered prime and unique farmland (55.8 percent). Many of the soils considered prime and unique farmland are located in the study area. Prime and unique farmland soils Loring-Adler silt loams and Loring-Memphis soils are the predominant soil types in the study area (USDA 1997).

An informal interview with Todd Templeton, Carlisle County District Conservationist, confirmed the magnitude of agricultural activity in the county as indicated by the Census. He stated that about 60 percent of the land around Bardwell and within the county would be considered prime and unique farmland. Furthermore, he stated that another 30 percent of the land would likely be considered statewide and/or locally important.

Mr. Templeton also confirmed that two agricultural districts plus a portion of another district exists within the study area. Agricultural District 20-05 covers 455 acres to the west and north of Bardwell. Agricultural District 20-04 is south of Bardwell and extends from the railroad east to cross over US 51. A small portion of Agricultural District 20-03 is located in the northeast section of the study area along Webb Road; the entire district covers 1,400 acres.

Underground Storage Tanks/Hazardous Materials

Environmental Data Resources, Inc. (EDR) was contacted to provide a review of their environmental databases. Twenty-six environmental databases were researched covering a 3-mile radius including the study area. The databases revealed five sites. All five sites came from the Underground Storage Tank (UST) database. Information regarding these five sites is summarized below.

Site Address	Name	Database
Intersection of HWY 62 & 51	Bardwell Roseco	UST
HWY 51 & 62	Motts BP	UST
HWY 51 & 62	Hucks 133	UST
HWY 51 & Orchard	Bardwell CITGO	UST
US 51	Bardwell Ashland Station	UST

In addition to the five sites, 35 unmapped orphan sites with inadequate address information were listed; of these, sixteen were eliminated based on listed city. Locating the remaining orphan sites will require detailed site reconnaissance.

A limited site reconnaissance was conducted in conjunction with the site visit for the social and economic baseline. Potential hazardous materials sites, as indicated by the databases searched, are primarily located in and around the urban limits of Bardwell. One other site was noted: Kenneth Rowland's Body Shop is located on US 51 north of the center of Bardwell. For areas outside Bardwell, hazardous materials location considerations are for the most part connected to agricultural activity. As discussed previously, agricultural activity is extensive throughout much of the study area. Large-scale farming operations often store fuel and oil on-site.

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ATTACHMENT A – NATIONAL WETLAND INVENTORY WETLANDS

The following table summarizes the types and members of NWI wetlands within the study area.

TABLE A-1 – NWI WETLANDS IN STUDY AREA

Wetland Type	**Number of Wetlands**
PUBHx	2
PUBHh	96
PUBFh	2
PEM1Ch	2
PEM1A	1
PFO1A	4
POWHh	21
PFO6F	1
PEM1Fh	1
POWH	1
POWHx	6
Total Wetlands	**137**

PUBHx = Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated
PUBHh = Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded
PUBFh = Palustrine, Unconsolidated Bottom, Semi-Permanently Flooded, Diked/Impounded
PEM1Ch = Palustrine, Emergent, Persistent, Seasonally Flooded, Diked/Impounded
PEM1A = Palustrine, Emergent, Persistent, Temporarily Flooded
PFO1A = Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded
POWHh = Palustrine, Open Water/Unknown Bottom, Permanently Flooded, Diked/Impounded
PFO6F = Palustrine, Forested, Deciduous, Semi-Permanently Flooded
PEM1Fh = Palustrine, Emergent, Persistent, Semi-Permanently Flooded, Diked/Impounded
POWH = Palustrine, Open Water/Unknown Bottom, Permanently Flooded
POWHx = Palustrine, Open Water/ Unknown Bottom, Permanently Flooded, Excavated

ATTACHMENT B - DEMOGRAPHIC DATA

The household types for state, county, town, and census tract are shown in Table B-1.

TABLE B-1 – HOUSEHOLD TYPES (2000)

	Percent Total Households				
	Family Households			Non-family Households	
	Total	Married	Female Head, No Husband	Total	Householder Living Alone
Kentucky	69.4	53.9	11.8	30.6	26.0
Carlisle County	71.3	58.5	9.3	28.7	26.3
Bardwell	62.4	42.0	15.3	37.6	34.9
Census Tract 9602	68.1	53.6	10.5	31.9	29.2

Source: 2000 U.S. Census

The numbers of housing units available for state, county, town, and census tracts are shown in Table B-2.

TABLE B-2 – HOUSING UNITS AVAILABLE (2000)

	Total Housing Units	Occupied Housing Units	Vacant Units	Percent	
				Vacant – For Sale	Vacant – For Rent
Kentucky	1,750,927	1,590,647	160,280	12.9	27.6
Carlisle County	2,490	2,208	282	22.3	15.2
Bardwell	425	367	58	34.5	43.1
Census Tract 99602	998	869	129	29.5	22.5

Source: 2000 U.S. Census

The population by selected age groups is shown in Table B-3.

TABLE B-3 – POPULATION BY SELECTED AGE GROUPS (2000)

	Total Population	Percent of Total Population				
		Under 18 years	18 to 24 years	25 to 44 years	45 to 64 years	65 years and over
Kentucky	4,041,769	24.6	9.9	30	23	12.5
Carlisle County	5,351	23.4	7.8	26.4	24.1	18.3
Bardwell	799	23.0	7.3	24.4	21.3	24.0
Census Tract 9602	1,976	21.8	7.0	24.9	26.2	20.0

Source: 2000 U.S. Census

The commuting patterns for Carlisle County in 1990 are shown in Table B-4.

TABLE B-4 – COMMUTING PATTERNS (1990)

	1990	Percent
Residents of Carlisle County		
Working and Residing In County	821	37.8
Commuting Out of County	1,350	62.2
Total Residents	2,171	100.0
Employees in Carlisle County		
Working and Residing In County	821	81.7
Commuting Into County	184	18.3
Total Employees	1,005	100.0

Source: Kentucky Economic Development Information System

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Clifford C. Linkes, P.E.
Deputy Secretary

Paul E. Patton
Governor

December 11, 2002

(See Attached List)
«Mailing_Title» «First_Name» «Last_Name»«Suffix»
«Title»
«Organization»
«Address1»
«Address2»
«City», «State» «Zip»

SUBJECT: Planning Study
Carlisle County
Improvements to US 51 in Bardwell
Item No. 1-183.00

Dear «Letter_Title» «Last_Name»:

We are requesting your agency's input and comments on a planning study to determine the need and potential impacts for a proposed highway project. The Kentucky Transportation Cabinet has assembled a study team to evaluate potential improvements to US 51 in Bardwell, Carlisle County. The study is currently in the initial data-gathering stage.

We ask that you identify specific issues or concerns of your agency that could affect the development of the project. This planning study will include a scoping process for the early identification of potential alternatives, environmental issues, and impacts related to the proposed project. We believe that early identification of issues or concerns can help us develop highway project alternatives to avoid or minimize negative impacts.

We respectfully ask that you provide us with your comments by January 30, 2003, to ensure timely progress in this planning effort.

During the development of this planning study, comments will be solicited from Federal, state, and local agencies, as well as other interested persons and the general public, in accordance with principles set forth in the National Environmental Policy Act (NEPA) of 1969. The Federal Highway Administration is partnering with us in these efforts. A copy of a public notice placed

in state in local newspapers concerning this project is attached.

Other Transportation Cabinet offices or consultants working on behalf of the Transportation Cabinet may also contact you seeking more detailed data or information to assist them in completing their environmental studies for this phase of the project.

We have enclosed the following project information for your review and comment:

- Fact Sheet and Attachment Summary
- Study Area Map
- Preliminary Alternatives Map
- 2002 Average Daily Traffic Volumes
- 2002 Levels of Service
- Crash Data by Severity
- Preliminary Natural Environment Map
- Preliminary Human Environment Map

We appreciate any input you can provide concerning this project. Please direct any comments, questions, or requests for additional information to David Martin of the Division of Planning at 502/564-7183 or at charles.martin@mail.state.ky.us. Please address all written correspondence to Annette Coffey, P.E., Director, Division of Planning, Kentucky Transportation Cabinet, 125 Holmes Street, Frankfort, KY 40622.

Sincerely,

Annette Coffey

Annette Coffey, P.E.
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Division of Planning

AC:CDM:RC

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DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT CORPS OF ENGINEERS
167 NORTH MAIN STREET B-202
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Reply to
Attention of:

January 23, 2003

Regulatory Branch

Ms. Annette Coffey, P. E.
Director, Division of Planning
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, KY 40622

Dear Ms. Coffey:

This is in reference to your letter dated December 12, 2002, concerning early identification of potential environmental issues and impacts related to the project as required during the scoping process.

The Memphis District Regulatory requirements under Section 404 of the Clean Water Act requires a permit to deposit dredged or fill material into waters of the United States and wetlands. These features need to be addressed with each alternative for the US 51 study in the vicinity of Bardwell, Kentucky. Within the study area numerous creeks, streams, ponds, and wetlands exist. Each alternative that crosses one of these features will need to have the impacts addressed and a Section 404 permit for that impact may be required.

The final alternative that is selected must address these issues through the sequencing process of avoidance, minimization, and/or mitigation of environmental impacts.

If you have questions, contact Randy Clark at (901) 544-0735.

Sincerely,

Larry D. Watson

Larry D. Watson
Chief
Regulatory Branch

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention

January 22, 2003

Annette Coffey, P.E.
Director, Division of Planning
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, Kentucky 40622

Dear Ms. Coffey:

This is in response to your letter of December 12, 2002 requesting our agency's input and comments on specific issues or concerns that might affect project alternative development for Planning Studies in Carlisle County, and Improvements to US 51 in Bardwell. We are responding on behalf of the Department of Health and Human Services (DHHS), U.S. Public Health Service.

While we have no project specific comments to offer at this time, we do recommend that the topics listed below be considered during the NEPA process along with other necessary topics, and addressed if appropriate. Mitigation plans which are protective of the environment and public health should be described in the DEIS wherever warranted.

AREAS OF POTENTIAL PUBLIC HEALTH CONCERN:

I. Air Quality
- dust control measures during project construction, and potential releases of air toxins potential process air emissions after project completion
- compliance with air quality standards

II. Water Quality/Quantity
- special consideration to private and public potable water supply, including ground and surface water resources
- compliance with water quality and waste water treatment standards
- ground and surface water contamination (e.g. runoff and erosion control)
- body contact recreation

III. Wetlands and Flood Plains
- potential contamination of underlying aquifers
- construction within flood plains which may endanger human health
- contamination of the food chain

IV. Non-Hazardous Solid Waste/Other Materials
- any unusual effects associated with solid waste disposal should be considered

V. Hazardous Materials/Wastes
- identification and characterization of hazardous/contaminated sites
- safety plans/procedures, including use of pesticides/herbicides; worker training
- spill prevention, containment, and countermeasures plan

VI. Noise
- identify projected elevated noise levels and sensitive receptors (i.e. residential, schools, hospitals) and appropriate mitigation plans during and after construction

VII. Occupational Health and Safety
- compliance with appropriate criteria and guidelines to ensure worker safety and health

VIII. Land Use and Housing
- special consideration and appropriate mitigation for necessary relocation and other potential adverse impacts to residential areas, community cohesion, community services
- demographic special considerations (e.g. hospitals, nursing homes, day care centers, schools
- consideration of beneficial and adverse long-term land use impacts, including the potential influx of people into the area as a result of a project and associated impacts
- potential impacts upon vector control should be considered

IX. Environmental Justice
- federal requirements emphasize the issue of environmental justice to ensure equitable environmental protection regardless of race, ethnicity, economic status or community, so that no segment of the population bears a disproportionate share of the consequences of environmental pollution attributable to a proposed project. (Executive Order 12898)

While this is not intended to be an exhaustive list of possible impact topics, it provides a guide for typical areas of potential public health concern which may be applicable to this project. Any health related topic which may be associated with the proposed project should receive consideration when developing the draft and final EISs. Please furnish us with one copy of the draft document when it becomes available for review.

Sincerely yours,

Paul Joe

Paul Joe, DO, MPH
Medical Officer
National Center for Environmental Health (F16)
Centers for Disease Control & Prevention

Martin, David (KYTC)

From: Greer, Daryl (KYTC)
Sent: Tuesday, January 07, 2003 2:20 PM
To: Martin, Charles
Cc: Siria, Bruce; Wilson, Jimmy
Subject: FW: US 51, Item 1-183.00

-----Original Message-----
From: Combs, Kelvin (KYTC)
Sent: Tuesday, January 07, 2003 1:59 PM
To: Greer, Daryl (KYTC)
Subject:

Daryl,
The Division of Aeronautics has reviewed the planning study for: Improvements to US 51 in Bardwell (Item # 1-183.00) and we have no negative comments pertaining to this study.

Kelvin Combs
Kentucky Airport Zoning Administrator
Division of Aeronautics
(502) 564-4480

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Paul E. Patton
Governor

Clifford C. Linkes, P.E.
Deputy Secretary

MEMORANDUM

TO: Annette Coffey, P.E.
Director
Division of Planning

FROM: Edward Sue Perkins, P.E.
Branch Manager
Permits Branch

DATE: January 24, 2003

RE: Carlisle County Study Team of US 51 in Bardwell - Item No. 1-183.00

The Permits Branch has reviewed the data provided for subject study site and wish to offer the following.

1. We urge the Cabinet to classify this project and all new projects as partially controlled access facilities.

2. Assuming the project is partial control access, we encourage all possible access points be set on the plans in accordance with 603 KAR 5:120, even if they are not to be constructed at that time.

3. When buying R/W for this and all reconstruction routes, assuming the access control is partial control, new deed for all adjoining property owners need to be executed to identify the access control even if no new R/W is acquired,

4. In addition, we would like to make every effort possible to have the design speed to be the same as anticipated posted speed when the project is complete.

5. We would like to see access control fence installed with the project.

6. If the proposed roadway is to be on the N. H. S., early notification of the final line and grade is needed. This enables us to monitor outdoor advertising devices prior to road construction being completed.

7. Please notify this office if the proposed roadway is to be placed on the National Highway System. This information is needed to assist this office in regulating the installation of any outdoor advertising device.

Thank you for the opportunity to verbalize our concerns.

ESP/elc

EDUCATION PAYS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3761 GEORGETOWN ROAD
FRANKFORT, KY 40601

January 27, 2003

Ms. Annette Coffey
Director, Division of Planning
Kentucky Transportation Cabinet
125 Holmes Avenue
Frankfort, Kentucky 40622

Re: FWS #03-0550

Dear Ms. Coffey:

Thank you for your correspondence of December 12, 2002, regarding the Kentucky Transportation Cabinet's (KTC) proposed US Highway 51 Improvements Project (Item Number 1-183.00) in Carlisle County, Kentucky. The KTC proposes to improve as much as three miles of highway by considering several alternative routes as shown on the attachments to your correspondence. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and the following comments are provided in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The Service is concerned that highway projects frequently accelerate erosion and sedimentation in streams, resulting in adverse effects to the aquatic environment. The use of heavy equipment to move earth and existing vegetation disrupts natural drainage patterns and exposes large areas of disturbed soil to erosion. Excessive sedimentation can clog stream channels and contribute to increased flooding. It can also increase water temperatures and cause oxygen demands which can damage or destroy fish and invertebrate populations. Deposition of sediment on the channel bottom also degrades aquatic habitat by filling in substrate cavities, burying demersal eggs, and smothering bottom organisms. In addition, turbidity, as induced by accelerated erosion and sedimentation, results in further damage to aquatic systems. Increased particulate matter suspended in the water column may drive fish from the polluted area by irritating the gills, concealing forage, and/or destroying vegetation that may be essential for spawning and cover habitat for particular species. Turbidity also degrades water quality by reducing light penetration, pH and oxygen levels, and the buffering capacity of the water. Degraded water quality may continue far downstream from the point where the erosion occurs.

Prevention of excessive sedimentation can occur only through application of Best Management Practices during daily construction activities. Rigid application of your agency's construction erosion control standards can preclude most sedimentation problems; however, in some cases additional measures will need to be taken by on-site inspectors and construction representatives.

Upon review of the proposed project, we find that the information provided is insufficient to determine if the proposed actions will require U.S. Army Corps of Engineers' permits. Since permit applications could more thoroughly reveal the extent of construction activities affecting aquatic resources, we will provide additional comments during the 404 review process should the project necessitate Corps' permits. However, we would likely have no objection to the issuance of permits if any necessary stream channel work is held to a minimum and Best Management Practices are utilized and enforced, effectively controlling erosion, sedimentation, and other potential hazards. The following conditions are specifically recommended:

1. Erosion and sediment control measures, including but not limited to the following, should be implemented on all vegetatively denuded areas:

    a. Preventive planning: A well-developed erosion control plan which entails a preliminary investigation, detailed contract plans and specifications, and final erosion and sediment control contingency measures should be formulated and made a part of the contract.

    b. Diversion channels: Channels should be constructed around the construction site to keep the work site free of flow-through water.

    c. Silt barriers: Appropriate use should be made of silt fences, hay bale and brush barriers, and silt basins in areas susceptible to erosion.

    d. Temporary seeding and mulching: All cuts and fill slopes, including those in waste sites and borrow pits, should be seeded as soon as possible.

    e. Limitation of instream activities: Instream activities, including temporary fills and equipment crossings, should be limited to those absolutely necessary.

2. Channel excavations required for pier placement should be restricted to the minimum necessary for that purpose. Overflow channel excavations should be confined to one side of the channel, leaving the opposite bank and its riparian vegetation intact.

3. All fill should be stabilized immediately upon placement.

4. Streambanks should be stabilized with riprap or other accepted bioengineering technique(s).

5. Existing transportation corridors should be used in lieu of temporary crossings where possible.

6. Good water quality should be maintained during construction.

Efficient management practices can minimize adverse impacts associated with construction. It is important that these and other measures be monitored and stringently enforced. This will aid in preserving the quality of the natural environment.

According to our records, the federally endangered Indiana bat (*Myotis sodalis*) may occur in the project impact area. A qualified biologist should assess potential impacts and determine if the proposed project may affect the species. A finding of "may affect" could require initiation of formal consultation. The KTC should submit a copy of its assessment and findings to this office for review and concurrence.

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact me at 502/695-0468 (ext.221) or Wally Brines of our Cookeville, Tennessee, field office at 931/528-6481 (ext. 222).

Sincerely,

Virgil Lee Andrews, Jr.
Field Supervisor

xc: Cookeville Field Office

UNIVERSITY OF KENTUCKY

Kentucky Geological Survey
Research and Graduate Studies
228 Mining and Mineral Resources Building
Lexington, KY 40506-0107
Phone: (859) 257-5500
Fax: (859) 257-1147
www.uky.edu/kgs

Summary information on geologic conditions in the vicinity of U.S. 51 planning studies at Clinton and Bardwell, Kentucky

R. A. Smath and G. A. Weisenfluh

Geologic Summary

There are seven geologic map units present at the surface in the two study areas, however only two have significant surface extent. Both extensive units are unconsolidated Quaternary deposits; Alluvium along stream drainages and loess sediment on upland surfaces. Neither unit presents severe limitations for road construction.

Areas underlain by alluvium require more extensive geotechnical evaluation because they are often sources of groundwater, sites for archeological settings, and may be susceptible to liquifaction during regional earthquakes. Alluvial valleys along major streams in the two study areas are 2000 to 3000 ft wide, a considerable span where special attention to structures is needed.

Loess sediment is susceptible to mass movement and landslides on slopes that are exposed to moisture. Vertical cuts are more stable.

Continental Deposits composed of gravel occur at the headwaters of small tributaries. These gravels may be a local source for road metal, subgrade, and base materials. They may, however, be locally cemented with iron oxide and difficult to excavate.

C-17 Geotech
Blevins

A2

MEMORANDUM

TO: Annette Coffey, P.E.
Director
Division of Planning

FROM: William Broyles P. E.
Geotechnical Engineering
Branch Manager
Division of Materials

BY: Michael Blevins P. G.
Geotechnical Branch

DATE: January 27, 2003

SUBJECT: Carlisle County
STPR 0051 1047
FD52 020 0051 000-000 D
Item 01-183.00
Mars # 6976301D

At your request, the Geotechnical Branch has reviewed the study area and alternates for the project. There are no major geotechnical concerns anticipated within the study area. The branch has no preferred corridor or alignment location.

The study area is underlain by Loess , Continental and Alluvium deposits. These deposits are mainly made up of silt, sands and gravel. Cut and fill slopes will mainly encounter Loess silt throughout the study area.

Cut slopes in this material are usually erosive and may require some type of slope protection to eliminate erosion. Cuts with high water tables may require 3:1 slopes and extra right-of-way may be needed. Ditchlines will require channel lining to prevent erosion.

Embankments in alluvium should be stable on 2:1 fill slopes. Rock and fabric may be needed in soft and wet areas to provide a working platform for construction.

If there are any questions, please advise.

MeadWestvaco Corporation
1724 Westvaco Road
P O Box 278
Wickliffe, KY 42087
tel 270 335 4000
fax 270 335 4110

MeadWestvaco

January 27, 2003

Annette Coffey, P.E.
Director, Division of Planning
Kentucky Transportation Cabinet
125 Holmes St.
Frankfort, KY 40622

SUBJECT: Planning Study
Carlisle County
Improvements to US 51
in Bardwell
Item No. 1-183.00

Planning Study
Hickman County
Improvements to US 51
in Clinton
Item No. 1-182.00

Dear Ms. Coffey:

This letter is in response to your agency's request for input on planning studies of the two projects listed above. With regard to possible improvements to US 51 at Bardwell and at Clinton, our first concern is for the safety of the communities and the safety for trucks that pass through them delivering wood fiber to the MeadWestvaco paper mill in Wickliffe. We promote safety among our wood suppliers and require compliance with the laws and company rules that apply to safety when suppliers are on our property. We are not in a position to enforce the laws on the highway, but have always cooperated with the authorities in applying the law and punishing offenders.

In both towns in the planning study, the crux of the decision to be made seems to center on whether to make improvements to the existing roadway through town, or to construct some alternative bypass around the town. Again, in both cases our main concern is safety. The local citizens in these towns are most effected by this project and should decide themselves which alternative provides them with the desired balance of safety and business providing traffic for their downtowns. Bypasses would provide some benefits to our wood fiber haulers in terms of speed and time, but at the distances from which most of our fiber comes, the time savings are not very significant.

Traffic counts that are part of this study will show considerable truck traffic hauling wood products through both towns. However, Bardwell will probably show several times the wood hauling traffic than through Clinton. Many of our wood haulers heading west to the mill on US 62 from woodyards and timber tracts in Kentucky stay on US 62 all the way to Bardwell to avoid the narrow roadway on KY 286 and to avoid going through

January 27, 2003
Annette Coffey, P.E.

Wickliffe on KY 121. Most of the trucks from woodyards in Tennessee go through Mayfield and west on KY 121. Much of this traffic also takes US 62 through Bardwell and up US 51 to the mill to avoid going through Wickliffe. The distance is also about the same. Our concern is that all of this traffic has to stop and make a right turn in Bardwell at the intersection of US 62 and US 51. We would lend our support to proposed improvements to this intersection or possibly to that portion of Alternative 5A that bypasses this intersection and provides a connection from US 62 to US 51 north of Bardwell.

Thank you for the opportunity to comment on these studies.

Sincerely,

Sandra Wilson

Sandra S. Wilson
Public Affairs Manager

SSW:pje

United States Department of Agriculture | Forest Service | Daniel Boone National Forest | 1700 Bypass Road Winchester, KY 40391 859-745-3100

File Code: 1950-5
Date: FEB. 3 2003

Annette Coffey, P.E.
Director
Division of Planning
125 Holmes Street
Frankfort, KY 40622

Dear Ms. Coffey:

I am writing in regards to your letter of December 12, 2002, in which you asked for our input on a planning study to determine the need and potential impacts for a proposed highway project on US 51 in Bardwell, Carlisle County.

You asked us to notify you of specific issues or concerns that we may have that could affect the development of the project described in the information enclosed with the letter.

Because this project is located in the western part of Kentucky, it is well outside the proclamation boundary for the Daniel Boone National Forest. It is also not located upstream from the National Forest in any watersheds that drain into or through the National Forest. For these reasons we have no issues or concerns specific to this project.

Thank you for providing this information and giving us the opportunity to comment on your proposed project.

Sincerely,

Kevin W Lawrence

KEVIN W LAWRENCE
Planning Staff Officer

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Clifford C. Linkes, P.E.
Deputy Secretary

Paul E. Patton
Governor

MEMORANDUM

TO: Annette Coffey, Director
Division of Planning

FROM: Michael L. Hill, Director
Division of Multimodal Programs

DATE: February 3, 2003

SUBJECT: Item No. 01-183.00
US 51 improvements
Carlisle County

Thank you for the opportunity to comment on the proposed improvements to US 51 in Carlisle County. The project limits are neither within nor contiguous to a Metropolitan Planning Organization (MPO) or a Small Urban Area (SUA). Therefore, this Division's Urban Planning Branch does not have any valuable comments regarding this project.

The railroad impact of the study should be minimal. There is only one railroad crossing, well north of city limits and out of the project limits. However, there may need to be additional right-of-way considerations from a point just south of Truman's Creek and continuing North approximately 1 mile, at which point a separation begins.

The coordination and connectivity of bicycle and pedestrian facilities is important in the early planning and design stages of projects. Design Guidance from the United States Department of Transportation released in February, 2000, states "bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist."

One of the project goals is to enhance vehicle and pedestrian safety along US 51 in the study area. If any of the preliminary alternatives selected include Alternatives 2, 3, 6, or 7, pedestrian and bicycle facilities must be considered. The high concentration of public facilities, including City Hall, the police station, County Courthouse, and the Carlisle County Park, affected by these alternatives make pedestrian facilities imperative. Bicycle facilities, such as bike lanes or shoulder bikeways, should also be considered.

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If Alternatives 5A or 5B, the Eastern Bypass options, are selected, care must be taken to procure sufficient right-of-way to build a shoulder bikeway (5' paved shoulder) and to include a sidewalk if warranted by future development. Depending on the number and width of lanes, the bypass cross section should include pedestrian islands at intersections. Please contact Paula Nye of this Division for any questions about bicycle and pedestrian concerns.

We look forward to working with your Division to facilitate your study efforts in our SUA and MPO areas, and by increasing awareness of bicycle and pedestrian issues.

MLH/LJS/PEN/AJT

PAUL E. PATTON
GOVERNOR

CABINET FOR WORKFORCE DEVELOPMENT
OFFICE OF THE SECRETARY
CAPITAL PLAZA TOWER, 2nd FLOOR
500 MERO STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-6606 FAX (502) 564-7967

ALLEN D. ROSE
SECRETARY

March 18, 2003
Ms. Annette Coffey, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, Kentucky 40601

Dear Ms. Coffey:

The Cabinet for Workforce Development appreciates the opportunity to comment on:

- planning studies for Hickman County (improvements to US 51 in Clinton) and Carlisle County (improvements to US 51 in Bardwell)
- planning study regarding possible construction of I-66 from 1-24 in Marshall or McCracken Counties in Missouri
- widening/relocation of KY 7 in Elliott and Morgan Counties from KY 711 in Morgan County to KY 32 in Elliott County

At this time, the proposed projects do not affect the Cabinet and its agencies.

Again, thank you for the opportunity to comment.

Sincerely,

Allen D. Rose
Secretary

ADR/SGS

Education, Arts and Humanities Cabinet

JUL 17 1 58 PM '03

KENTUCKY HERITAGE COUNCIL
The State Historic Preservation Office

Paul E. Patton
Governor
Marlene M. Helm
Cabinet Secretary

David L. Morgan
Executive Director and
SHPO

June 28, 2003

Mr. David M. Waldner, Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, KY 40622

Re: Cultural Historic Overview Survey and Determinations of Eligibility for the US 51 Corridor in Bardwell, Carlisle County, Kentucky (1-183.00)

Dear Mr. Waldner:

The State Historic Preservation Office has received for review the above referenced historic overview survey and determinations of eligibility completed by Rebecca Lawlin McCarley of Cultural Resource Analysts, Inc. We concur that Site 14 (CE-B-11), Site 15 (CE-B-21), Site 20 (CE-B-23), Site 22 (CE-B-24), Site 32 (CE-B-5), Site 43 (CE-B-27), Site 45 (CE-B-28), and Site 60 (CE-B-29) are eligible for listing in the National Register of Historic Places.

We are in disagreement, however, with the determination that Site 1 (CE-B-20), Site 16 (CE-B-22), Site 31 (CE-B-25), and Site 37 (CE-B-26) are ineligible for listing. We are highly concerned about potential impacts to these properties and request that pre-coordination continue. Please contact Craig Potts of my staff at 502-564-7005 in order to continue this discussion.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

300 Washington Street
Frankfort, Kentucky 40601
An equal opportunity employer M/F/D

EDUCATION PAYS

Telephone (502) 564-7005
FAX (502) 564-5820
Printed on recycled paper

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Clifford C. Linkes, P.E.
Deputy Secretary

Paul E. Patton
Governor

August 19, 2003

Mr. Frank Slade
Parsons Brinckerhoff Quade & Douglas, Inc.
2333 Alumni Park Plaza, Suite 330
Lexington, Kentucky 40517

Dear Mr. Slade:

SUBJECT: Cultural Historic Overview and Determinations
Of Eligibility US 51 Corridor in Bardwell
Carlisle County, Kentucky
Item No. 1-183.00

Attached please find a copy of the letter from the State Historic Preservation Officer (SHPO) on the above subject survey. The SHPO concurs that Sites 14, 15, 20, 22, 32, 43, 45, and 60 are eligible for the National Register. The SHPO, however, disagrees with the determination that Sites 1, 16, 31, and 37 are not eligible and is concerned about potential effects to those properties. This office is requesting that the historic consultant provide further information concerning Sites 1, 16, 31 and 37. This information will be provided to the SHPO for further review.

Your reply is requested by September 15, 2003. If you have any questions please contact Rebecca Turner or me at 502-564-7250.

Very truly yours,

David M. Waldner, P.E., Director
Division of Environmental Analysis

c: K. Sperry, P. Rawlings, T. Vinegar, D4 (T. Choate), R.H.Turner, FHWA

Education, Arts and Humanities Cabinet

KENTUCKY HERITAGE COUNCIL
The State Historic Preservation Office

Paul E. Patton
Governor
Marlene M. Helm
Cabinet Secretary

David L. Morgan
Executive Director and
SHPO

November 7, 2003

Mr. David M. Waldner, Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
125 Holmes Street
Frankfort, KY 40622

Re: Additional Information for Sites 31, 16 and Historic District; Cultural Historic Overview Survey and Determinations of Eligibility for the US 51 Corridor in Bardwell, Carlisle County, Kentucky (Item No. 1-183.00)

Dear Mr. Waldner:

Thank you for providing this office with additional information regarding the above referenced project. We are in agreement with the recommendation of Dean A. Doerrfeld of Cultural Resource Analysts, Inc. that better examples of the Tudor Revival style exist within the project vicinity than Site 31. Furthermore, we are convinced by the argument regarding the loss of integrity for Site 16 specifically and the potential historic district generally. Therefore, it is the determination of this office that Site 31, Site 16, and the potential historic district are not eligible for listing on the National Register of Historic Places. Should you have any questions regarding these comments, please contact Craig Potts of my staff at 502-564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

Cc: Dean A. Doerrfeld

300 Washington Street
Frankfort, Kentucky 40601
An equal opportunity employer M/F/D

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FAX (502) 564-5820
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Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Clifford C. Linkes, P.E.
Deputy Secretary

Paul E. Patton
Governor

December 12, 2002

Mr. Roger Wiebusch
Bridge Administrator
United States Coast Guard, Bridge Branch
1222 Spruce Street
St. Louis, MO 63103

SUBJECT: Planning Study
Carlisle County
Improvements to US 51 in Bardwell
Item No. 1-183.00

Dear Mr. Wiebusch:

We are requesting your agency's input and comments on a planning study to determine the need and potential impacts for a proposed highway project. The Kentucky Transportation Cabinet has assembled a study team to evaluate potential improvements to US 51 in Bardwell, Carlisle County. The study is currently in the initial data-gathering stage.

We ask that you identify specific issues or concerns of your agency that could affect the development of the project. This planning study will include a scoping process for the early identification of potential alternatives, environmental issues, and impacts related to the proposed project. We believe that early identification of issues or concerns can help us develop highway project alternatives to avoid or minimize negative impacts.

We respectfully ask that you provide us with your comments by January 30, 2003, to ensure timely progress in this planning effort.

During the development of this planning study, comments will be solicited from Federal, state, and local agencies, as well as other interested persons and the general public, in accordance with principles set forth in the National Environmental Policy Act (NEPA) of 1969. The Federal Highway Administration is partnering with us in these efforts. A copy of a public notice placed

Pursuant to the Coast Guard Authorization Act of 1982, it has been determined this is not a waterway over which the Coast Guard exercises jurisdiction for bridge administration purposes. A Coast Guard bridge permit is not required.

1/16/03

ROGER K WIEBUSCH (Date)
Bridge Administrator
Eighth Coast Guard District (obr)

EDUCATION PAYS

in state in local newspapers concerning this project is attached.

Other Transportation Cabinet offices or consultants working on behalf of the Transportation Cabinet may also contact you seeking more detailed data or information to assist them in completing their environmental studies for this phase of the project.

We have enclosed the following project information for your review and comment:

- Fact Sheet and Attachment Summary
- Study Area Map
- Preliminary Alternatives Map
- 2002 Average Daily Traffic Volumes
- 2002 Levels of Service
- Crash Data by Severity
- Preliminary Natural Environment Map
- Preliminary Human Environment Map

We appreciate any input you can provide concerning this project. Please direct any comments, questions, or requests for additional information to David Martin of the Division of Planning at 502/564-7183 or at charles.martin@mail.state.ky.us. Please address all written correspondence to Annette Coffey, P.E., Director, Division of Planning, Kentucky Transportation Cabinet, 125 Holmes Street, Frankfort, KY 40622.

Sincerely,

Annette Coffey

Annette Coffey, P.E.
Director
Division of Planning

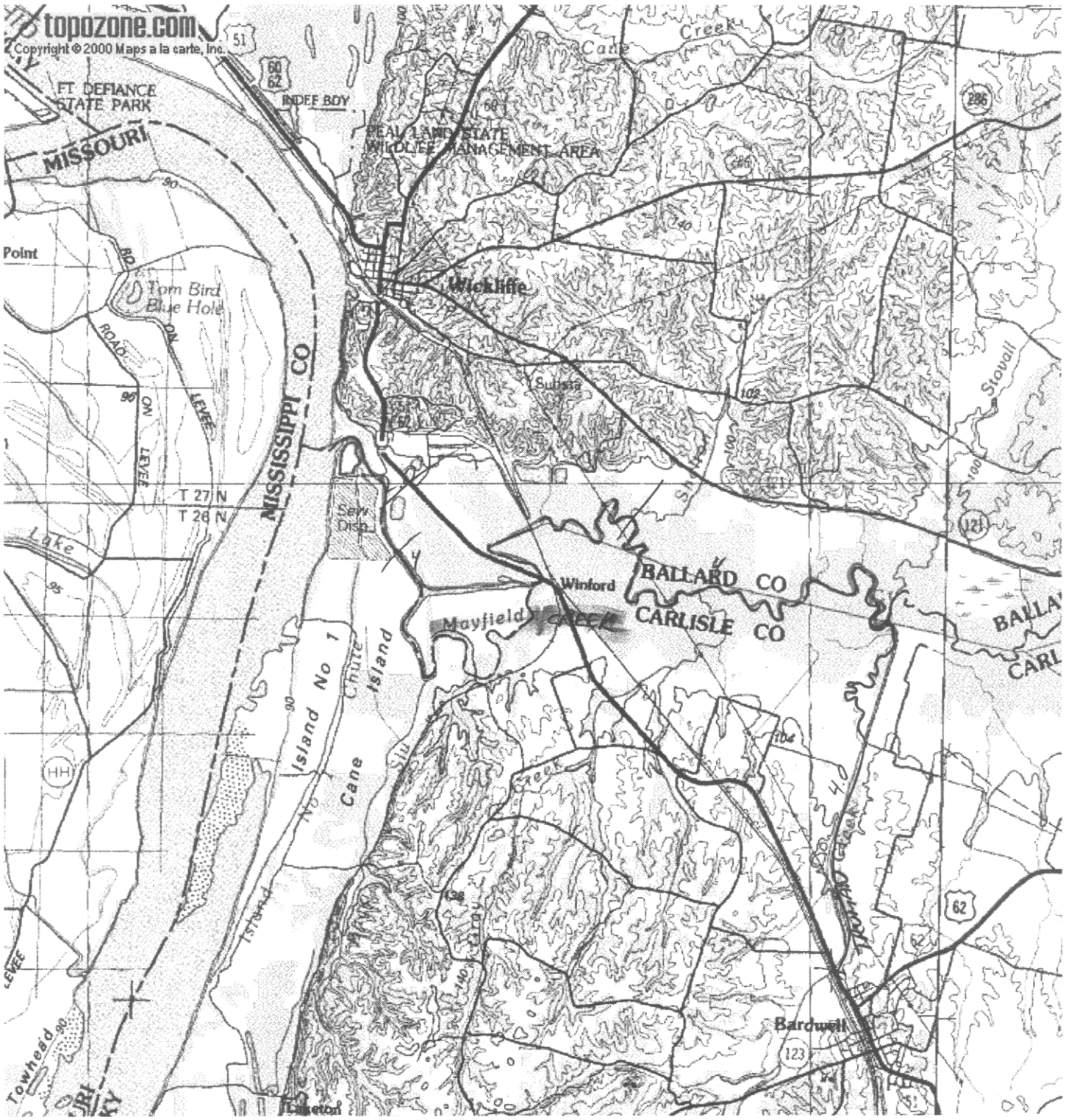
AC:CDM:RC

Enclosures

c: Jose Sepulveda (w/a)
Glenn Jilek (w/a)
Barbara Michael, PB
Robert Frazier, PB
Wayne Mosley
Tim Choate
Allen Thomas
Steve Hoefler
David Waldner
Richard Davis
Stacey Courtney, Purchase ADD

TopoZone.com

Map center is UTM 16 319020E 4088888N - **WICKLIFFE** quad [Quad Info]



United States Department of the Interior

NATIONAL PARK SERVICE
Long Distance Trails Group Office - Santa Fe
P.O. Box 728
Santa Fe, New Mexico 87504-0728

IN REPLY REFER TO:

D18(TRTE)

January 6, 2002

Ms. Annette Coffey
Division of Planning (A-2)
Kentucky Transportation Cabinet
125 Holmes St.
Frankfort, KY 40622

Dear Ms. Coffey:

Thank you for your letter of January 25, 2002, regarding the initiation of a planning study for the proposed Interstate 66 Highway project from McCracken County, Kentucky to Mississippi County, Missouri (KYTC Item #1-23.00). As the National Park Service office responsible for the administration of the Trail of Tears National Historic Trail, we are grateful to the Kentucky Transportation Cabinet for taking into consideration the potential impacts that this highway project might have on the historic trail and its associated resources.

Two variant routes traveled by the Cherokee during their forced migration in 1838-1839 have been designated as the Trail of Tears National Historic Trail. The first, the Water Route, follows the course of the Tennessee River from the Chattanooga area to its confluence with the Ohio River, down that river to the course of the Mississippi River, and then up the Arkansas River to Fort Smith. The second variant, known as the Northern Route, began at the Cherokee Agency, near present day Charleston, Tennessee. This was an overland course that passed through the cities of Nashville, Tennessee; Hopkinsville, Kentucky; Jonesboro, Illinois; Rolla and Springfield, Missouri; Fayetteville, Arkansas; and Tahlequah, Oklahoma. The Trail of Tears National Historic Trail Auto Tour Route closely follows the Northern Route. In addition to these two primary routes, there are several variants that are currently under study for possible designation as part of the National Historic Trail. Among these is a unique route traveled by the John Benge detachment, which left the Wills Valley near Ft. Payne, Alabama, and ran south of the Northern Route, passing through Tennessee, far southwestern Kentucky, southern Missouri, northern Arkansas, and ending near Tahlequah. To assist in your planning process, we've included maps that will give you a better understanding of the route variants through Kentucky.

The proposed Highway project is in the general area of the three trail variants mentioned above. The Water Route follows the main channel of the Mississippi River in western Kentucky. Currently, we are working with the U.S. Army Corps of Engineers to identify the historic river channel, which is likely marked today by old river remnants or oxbow lakes that may be eligible for the National Register of Historic Places based on their association to the Trail of Tears. It appears that the Northern Route is not within the 50-mile corridor you've identified in the Public Notice. Nonetheless, there are several key resources along the route in Kentucky that have either been certified by the National Park Service as a trail component, such as the Whitepath and Fly Smith Graves in Hopkinsville, or may be eligible for the National Register, such as Mantle Rock in Livingston County. The route traveled by the John Benge detachment may enter the 50-mile project corridor. This route is still under study but we have identified it tentatively as crossing Fulton, Hickman, and Carlisle Counties before crossing the Mississippi River at the Iron Banks near Columbus, and traversing Mississippi County, Missouri. Although we have not surveyed this section of the trail, our experience leads us to believe that there are probably extant trail segments in this part of Kentucky that are eligible for the National Register. There is strong public interest in support of adding the Benge Route to the National Historic Trail.

Our principle concerns are directed towards preserving and protecting all historic resources associated with the Trail of Tears, and creating appropriate public recreation and education opportunities along the trail. At this early stage in your planning process, it is impossible to say if and how trail resources will be impacted by this project, but we request that you continue to consider us an interested party as you proceed. We also would like to review any cultural resource reports that are produced associated with this project, and that any archeological testing or historical investigations account for the possibility of Trail of Tears-associated resources.

Feel free to direct any questions or requests for additional information to NPS Historian Aaron Mahr in this office at (505) 988-6736, or at aaron_mahr@nps.gov.

Sincerely,

David M. Gaines
Superintendent

Enclosures

THIRDROCK
CONSULTANTS

2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Ph: 859-977-2000
Fax: 859-977-2001

June 18, 2002

James S. Lane Jr.
Wildlife Biologist II
Kentucky Department of Fish & Wildlife Resources
Environmental Section
#1 Game Farm Road
Frankfort, Kentucky 40601

Re: *US 51 Studies at Clinton & Bardwell*
Hickman & Carlisle Counties
KYTC Item No's 1-182.00/1-183.00

Dear Mr. Lane:

We are gathering data for an environmental overview for the above-referenced project. The project consists of an evaluation of potential improvements to US 51, including possible new roadway alignments, in the vicinity of Clinton, Kentucky (Hickman County) and Bardwell, Kentucky (Carlisle County). At this point, we are interested in obtaining information regarding the following:

- identified natural areas and unique, sensitive, or critical wildlife habitats in the study areas
- any federal or state endangered, threatened, or rare species listed for the study areas

Please note that the Kentucky Transportation Cabinet will contact you in the near future regarding your agency's specific issues and concerns related to the project.

The study area lies within multiple USGS 7.5-minute quadrangles (Cayce, Clinton, Cruthfield, Oakton, Arlington, Blandville, Milburn, and Wickliffe); a map of each study area is enclosed. Thank you for your help.

Sincerely,

Michael A. Floyd, PhD
mfloyd@thirdrockconsultants.com

Enclosures (2)

pc: David Martin, Kentucky Transportation Cabinet
Barbara Michael, Parsons Brinckerhoff Quade & Douglas, Inc.
Robert Frazier, Parsons Brinckerhoff Quade & Douglas, Inc.

1664

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF FISH AND WILDLIFE RESOURCES
C. THOMAS BENNETT, COMMISSIONER

June 24, 2002

Dr. Michael A. Floyd, Ph.D.
ThirdRock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

RE: US 51 Studies at Clinton & Bardwell
Hickman & Carlisle Counties
KYTC Item No's 1-182.00/1-183.00

Dear Dr. Floyd:

I have reviewed the information that was provided on the above-referenced projects. Accordingly, I offer the following information.

Please find attached a list of rare and/or endangered species known to occur from the USGS topographic quadrangles listed in your letter. This list is from our Kentucky Fish and Wildlife Information System (KFWIS) and is located on the web at www.kfwis.state.ky.us. The information provided is the current information known. Changes to this system are made periodically so this information should be updated from time to time.

One other species that is not on these lists but that is known from the area is the Indiana bat (*Myotis sodalis*), a federally endangered species. This area of western Kentucky is known to harbor summer maternity colonies of this species under the loose bark of trees along or adjacent to streams and rivers. Any project should examine the impact on this species.

Finally, there is a great potential for impact to wetlands by both of these projects. The National Wetland Inventory maps should be consulted for preliminary locations and then field studies should be conducted to determine if any alignment would impact this important habitat type.

If you or anyone in your office should have any questions regarding my comments, please feel free to contact me at 502/564-7109, ext. 365.

Sincerely,

Wayne L. Davis
Environmental Section Chief

cc: Environmental Section Files

Kentucky Threatened & Endangered Species Reported from CAYCE Quadrangle

Common Name	Scientific Name	Status Code	Reference
cypress darter	Etheostoma proeliare (Hay, 1881)	223,302,602,999	Reference

KFWIS HOME

Kentucky Threatened & Endangered Species Reported from CRUTCHFIELD Quadrangle

Common Name	Scientific Name	Status Code	Reference
yellow-crowned night-heron	Nyctanassa violaceus (undescribed)	223,121,602	Reference

KFWIS HOME

Kentucky Threatened & Endangered Species Reported from ARLINGTON Quadrangle

Common Name	Scientific Name	Status Code	Reference
hooded merganser	Lophodytes cucullatus (Linnaeus, 1758)	121,601,221	Reference

KFWIS HOME

Kentucky Threatened & Endangered Species Reported from OAKTON Quadrangle

Common Name	Scientific Name	Status Code	Reference
hooded merganser	Lophodytes cucullatus (Linnaeus, 1758)	121,601,221	Reference

KFWIS HOME

Kentucky Threatened & Endangered Species Reported from MILBURN Quadrangle

Common Name	Scientific Name	Status Code	Reference
spotted sandpiper	Actitis macularia (Linnaeus, 1766)	223,121,601	Reference

KFWIS HOME

Kentucky Threatened & Endangered Species Reported from WICKLIFFE Quadrangle

Common Name	Scientific Name	Status Code	Reference
yellow-crowned night-heron	Nyctanassa violaceus (undescribed)	223,121,602	Reference
interior least tern	Sterna antillarum athalassos (undescribed)	223,101,121,601	Reference

KFWIS HOME

THIRD ROCK CONSULTANTS

2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Ph: 859-977-2000
Fax: 859-977-2001

June 18, 2002

Jeff Pratt
Kentucky Division of Water
Ecological Support Section
Water Quality Branch
18 Reilly Road
Frankfort, Kentucky 40601

Re: *US 51 Studies at Clinton & Bardwell*
Hickman & Carlisle Counties
KYTC Item No's 1-182.00/1-183.00

Dear Mr. Pratt:

We are gathering data for an environmental overview for the above-referenced project. The project consists of an evaluation of potential improvements to US 51, including possible new roadway alignments, in the vicinity of Clinton, Kentucky (Hickman County) and Bardwell, Kentucky (Carlisle County). At this point, we are interested in obtaining information regarding the following:

- outstanding resource waters, wild rivers, or wetlands in the study areas
- results of previous biological (macroinvertebrates or fish) and physiochemical sampling from streams within the study areas

Please note that the Kentucky Transportation Cabinet will contact you in the near future regarding your agency's specific issues and concerns related to the project.

The study area lies within multiple USGS 7.5-minute quadrangles (Cayce, Clinton, Cruthfield, Oakton, Arlington, Blandville, Milburn, and Wickliffe); a map of each study area is enclosed. Thank you for your help.

Sincerely,

Michael A. Floyd, PhD
mfloyd@thirdrockconsultants.com

Enclosures (2)

pc: David Martin, Kentucky Transportation Cabinet
Barbara Michael, Parsons Brinckerhoff Quade & Douglas, Inc.
Robert Frazier, Parsons Brinckerhoff Quade & Douglas, Inc.

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16604

JAMES E. BICKFORD
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
FRANKFORT OFFICE PARK
14 REILLY RD
FRANKFORT KY 40601

June 24, 2002

Michael A. Floyd, Ph.D.
Third Rock Consultants, LLC
2514 Regency Road, Suite 104
Lexington, Kentucky 40503

RE: US 51 Studies at Clinton and Bardwell
Hickman and Carlisle counties
KYTC Item Nos. 1-182.00 and 1-183.00

Dear Dr. Floyd:

The Water Quality Branch has reviewed your request for information about the referenced area. There are no Outstanding Resource Waters or Wild Rivers within the proposed corridor. Biological data for both Clinton and Hickman counties are available, but none from within the study boundaries. Physiochemical data is probably not extant, since no major streams occur in the corridor. There are numerous wetlands within the study areas. Detailed wetland maps should be consulted when determining highway alignments.

For future reference, information on Special Use Waters can be found on the Division of Water web site (http://water.nr.state.ky.us/dow/dwhome.htm). Click on Topics and Programs within the Division, then scroll down and click on Special Use Waters. This list is frequently updated as new streams are added.

If you have any questions or need further information on biological communities, ORWs or wetlands, please contact me by phone (502/564-3410) or e-mail (mike.mills@mail.state.ky.us).

Sincerely,

Michael R. Mills

Michael R. Mills, Supervisor
Ecological Support Section

c: File

THIRD ROCK CONSULTANTS

2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Ph: 859-977-2000
Fax: 859-977-2001

June 18, 2002

Sara Hines
Data Manager
Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, Kentucky 40601-1403

Re: *US 51 Studies at Clinton & Bardwell*
Hickman & Carlisle Counties
KYTC Item No's 1-182.00/1-183.00

Dear Ms. Hines:

We are gathering data for an environmental overview for the above-referenced project. The project consists of an evaluation of potential improvements to US 51, including possible new roadway alignments, in the vicinity of Clinton, Kentucky (Hickman County) and Bardwell, Kentucky (Carlisle County). At this point, we are interested in obtaining information concerning endangered, threatened, or special concern plants and animals and exemplary natural communities that may exist in the project areas. Please note that the Kentucky Transportation Cabinet will contact you in the near future regarding your agency's specific issues and concerns related to the project.

The study area lies within multiple USGS 7.5-minute quadrangles (Cayce, Clinton, Cruthfield, Oakton, Arlington, Blandville, Milburn, and Wickliffe); a map of each study area and a completed data license are enclosed. Thank you for your help.

Sincerely,

Michael A. Floyd

Michael A. Floyd, PhD
mfloyd@thirdrockconsultants.com

Enclosures (3)

pc: David Martin, Kentucky Transportation Cabinet
Barbara Michael, Parsons Brinckerhoff Quade & Douglas, Inc.
Robert Frazier, Parsons Brinckerhoff Quade & Douglas, Inc.

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#1664

DONALD S. DOTT, JR.
DIRECTOR

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
KENTUCKY STATE NATURE PRESERVES COMMISSION
801 SCHENKEL LANE
FRANKFORT, KENTUCKY 40601-1403
(502) 573-2886 VOICE
(502) 573-2355 FAX

July 8, 2002

Michael A. Floyd
Third Rock Consultants, LLC
2514 Regency Road
Lexington, KY 40503

Data Request **02-204**

Dear Mr. Floyd:

This letter is in response to your data request of June 19, 2002 for the US-51 Studies at Clinton and Bardwell project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur in the areas shown on the map provided. Based on our most current information, we have determined that five occurrences of the plants or animals and no occurrences of the exemplary natural communities that are monitored by KSNPC are reported as occurring in the Clinton project area. There were no occurrences of plants, animals, or communities that are monitored by KSNPC in the Bardwell project area.

The Bayou de Chien drainage supports the only known relict darter (*Etheostoma chienense)* population in the world. Consequently, we recommend that stream alterations or disturbances be avoided or held to a minimum. All construction activities should be completed during periods of low flow. A written erosion control plan should be developed and implemented that includes stringent erosion control methods (e.g., (?) [i.e.,] straw bales, silt fences and erosion mats, immediate seeding and mulching of disturbed areas) which are placed in a staggered manner to provide several stages of control. All erosion control measures should be monitored periodically to ensure that they are functioning as planned. Heavy equipment should not be used in Bayou de Chien or any of its tributaries. We recommend that you consult the United States Fish and Wildlife Service, Cookeville, Tennessee, field office for additional information.

EDUCATION PAYS

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request over the Internet. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Sara Hines

Sara Hines
Data Manager

smf/SGH

Enclosures: Data Report and Interpretation Key

THIRD ROCK
CONSULTANTS

2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Ph: 859-977-2000
Fax: 859-977-2001

June 18, 2002

Dr. Lee A. Barclay
Department of the Interior
Fish & Wildlife Service
446 Neal Street
Cookeville, Tennessee 38501

Re: *US 51 Studies at Clinton & Bardwell*
Hickman & Carlisle Counties
KYTC Item No's 1-182.00/1-183.00

Dear Dr. Barclay:

We are gathering data for an environmental overview for the above-referenced project. The project consists of an evaluation of potential improvements to US 51, including possible new alignments, in the vicinity of Clinton, Kentucky (Hickman County) and Bardwell, Kentucky (Carlisle County). At this point, we are interested in obtaining information concerning federally endangered and threatened species that may exist in the study areas. Please note that the Kentucky Transportation Cabinet will contact you in the near future regarding your agency's specific issues and concerns related to the project.

The study area lies within multiple USGS 7.5-minute quadrangles (Cayce, Clinton, Cruthfield, Oakton, Arlington, Blandville, Milburn, and Wickliffe); a map of each area is enclosed. Thank you for your help.

Sincerely,

Michael A. Floyd, PhD
mfloyd@thirdrockconsultants.com

Enclosures (2)

pc: David Martin, Kentucky Transportation Cabinet
Barbara Michael, Parsons Brinckerhoff Quade & Douglas, Inc.
Robert Frazier, Parsons Brinckerhoff Quade & Douglas, Inc.

FILE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 23, 2002

Dr. Michael A. Floyd
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Re: FWS# 02-2097

Dear Dr. Floyd:

Thank you for your letter and enclosures of June 18, 2002, concerning the environmental studies for the reconstruction of U.S. 51 (including potential bypasses around Clinton and Bardwell) in Hickman and Carlisle Counties, Kentucky. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and we provide the following comments in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The federally endangered Indiana bat (*Myotis sodalis*) and relict darter (*Etheostoma chienense*) potentially occur in the project impact area. You should assess potential impacts and determine if the proposed project may affect these species. A finding of "may affect" could require initiation of formal consultation. We recommend that you submit a copy of your assessment and finding to this office for review and concurrence.

Thank you for providing us an opportunity to comment on this action. If you have any questions, please contact Rob Tawes of my staff at 931/528-6481, ext. 213.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

xc: Wayne Davis, KDFWR, Frankfort, KY

THIRD ROCK CONSULTANTS
Environmental Planning, Analysis and Restoration
www.thirdrockconsultants.com

US 51 STUDY AT BARDWELL
CARLISLE COUNTY
STUDY AREA MAP

Filename: p1200111664-hickman-eolmapping\gis\wetlands.apr Layout: Agency_Carlisle-Map By: las On: June 12, 2002

APPENDIX E:
MEETING MINUTES
(Project Team Meetings, Stakeholder and Other Meetings, Project Work Group Meetings, and Public Meetings)

Meeting Minutes

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Project Team Meeting No.1 and Field View

DATE & TIME: February 7, 2002 - 7:30 AM (CST)

LOCATION: KYTC District 1 Conference Room - Paducah, Kentucky

ATTENDEES:

NAME	AGENCY/COMPANY	E-MAIL ADDRESS
Carl Dixon	KYTC - Central Office Planning	carl.dixon@mail.state.ky.us
Bruce Siria	KYTC - Central Office Planning	bruce.siria@mail.state.ky.us
David Martin	KYTC – Central Office Planning	charles.martin@mail.state.ky.us
Bryan Stewart	KYTC - District 1 Planning	bryan.stewart@mail.state.ky.us
Tim Choate	KYTC – District 1 Pre-Construction	tim.choate@mail.state.ky.us
Stephen Hoefler	KYTC - Central Office Highway Design	steve.hoefler@mail.state.ky.us
Mary Murray	FHWA – Planning and Environment	mary.murray@fhwa.dot.gov
Stacey Courtney	Purchase Area Development District	stacey.courtney@mail.state.ky.us
Glenn Anderson	KYTC - Intelligent Transportation Sys.	glenn.anderson@mail.state.ky.us
Charles Cunningham	KYTC - Intelligent Transportation Sys.	charles.cunningham@mail.state.ky.us
Barbara Michael	Parsons Brinckerhoff, Inc.	michael@pbworld.com
Steve Slade	Parsons Brinckerhoff, Inc.	slade@pbworld.com
Robert Frazier	Parsons Brinckerhoff, Inc.	frazierr@pbworld.com
Stuart Kearns	Jordan Jones, & Goulding	skearns@jjg.com

NOTE ON JOINT MEETING:

The Kentucky Transportation Cabinet (KYTC) is conducting two separate studies along US 51 in Western, Kentucky: the US 51 Study at Clinton and the US 51 Study at Bardwell. The Parsons Brinckerhoff Team is providing consultant services for both studies.

Joint Project Team Meetings were held for the two studies on the above date. However, because the studies are independent, meeting minutes have been prepared for each study. This is to provide the documentation necessary to maintain separate project records. For information on the Clinton study, please refer to the corresponding meeting minutes.

MEETING SUMMARY:

Introductions

Those present introduced themselves and their roles on the project. After introductions, Bruce Siria stated that while one consulting team was selected for both the US 51 Study at Clinton and the US 51 Study at Bardwell, the two studies would be treated separately.

Bruce also stated that there is not a predetermined solution for these two studies. Specifically, the studies will emphasize looking at all alternatives ranging from doing nothing to upgrading existing facilities to new construction including bypasses.

David Martin with the Kentucky Transportation Cabinet (KYTC) Central Office Planning will be the new project manager for KYTC on both studies.

Study Scope/Schedule and 1995 Planning Study

Barbara Michael reviewed the major scope elements (including purpose and need, existing conditions analysis, development of a full range of alternatives, evaluation of the alternatives, and recommendations) and the proposed 12-month study schedule.

Carl Dixon and Bruce Siria discussed the previous scoping study completed in 1995. The 1995 study recommended the "Do Nothing" alternative for rebuilding or widening all of US 51 through Hickman and Carlisle Counties between Fulton and Wickliffe. However, it recommended consideration of bypasses around both Clinton and Bardwell.

Traffic and Highway Data for the Bardwell Study Area

Robert Frazier presented the proposed Bardwell study area as well as traffic, crash, truck percentage, highway facility characteristics, and population data.

Traffic volumes on US 51 in the Bardwell study area range from 2,670 to 5,180 vehicles per day with truck percentages as high as 15.3 percent. The KYTC HIS data was reviewed including functional classification, right-of-way, lane width, shoulder width, speed limits, and other key data elements (please refer to the handout for details). Historic traffic data for Bardwell indicates that traffic volumes have been fairly level over the last 20 years.

The crash data shows a cluster of crashes between the US 51 / US 62 intersection and the US 51 / KY 123 intersection near downtown Bardwell.

The current population of Bardwell is approximately 800 and the population of Carlisle County is just over 5,000. The County population has decreased somewhat from over 6,000 in 1970.

Further Discussion

Bruce Siria stated that, based on an initial review of the historic data, traffic volumes have not increased substantially in the Bardwell study area, but that truck percentages have increased.

The possible need for origin / destination information for trucks was discussed. The truck weigh stations at Wickliffe and Fulton may be able to provide some of that data. US 51 is not on the National Highway System. There is a bicycle route running through Bardwell on KY 123 (Ramblin' River Tour).

Study Issues

There was general discussion regarding a range of issues in the Bardwell study area. (These are presented below.)

Bardwell Study Area	Potential adjustments to the Bardwell study area were discussed. For example, it could be enlarged to include the proposed Carlisle County industrial park site just to the north of the study area. Conversely, the study area appears very large and any bypasses running from one end to the other would be long and therefore are expected to be relatively expensive. However, at present the proposed study area boundary will be maintained with the exception that the Carlisle County industrial site will be included within the boundary.
Roadway Facilities and Safety	There are a number of roadway deficiencies on US 51 in the Bardwell study area, including poor lines of sight, narrow lanes, narrow shoulders, steep grades, curves, and angled intersections. The poor condition of many curbs and sidewalks was also discussed. Potential high accident locations were discussed.
Truck Traffic	Truck traffic is an issue in Bardwell. Truck percentages are high and include trucks carrying full loads of logs headed to Westvaco to the north. One potential reason for the high truck volumes is that the next major river crossing to the south is near Dyersburg, TN (I-155) and Union City in Northwest TN is a major generator of truck traffic. This traffic likely does not backtrack to Dyersburg but heads north on US 51 to cross at Wickliffe.
School Access	School access was deemed an important issue for local roadway planning. In Carlisle County, the schools are located outside of the study area to the east on KY 1377, near the geographic center of the County.
Regional Access / Economic Linkages	A key issue for many Bardwell leaders and residents may be improved access to the northeast to Paducah. For example, some residents seem to support improvements to US 62 toward Paducah.
Railroad	The railroad and railroad crossings present important physical constraint and safety issues. The railroad line is the Illinois Central Railroad. Amtrak provides service over this line.
Traffic Operations	Improving travel times through the study area on US 51 was mentioned as an important issue. Some local leaders in Bardwell have indicated to

	the District that they would like to have the one traffic signal in the town removed.
Emergency Access	Emergency access could be an issue as there is no 24-hour emergency medical care center in Bardwell, therefore good high-speed medical emergency access is needed to facilities in nearby communities such as Parkway Regional Hospital in Fulton and Jackson Purchase Medical Center in Mayfield.
Land Use / Zoning / Future Development	Carlisle County does not have local zoning. Carlisle County owns land north of Clinton to develop as an industrial park. There are a number of large existing uses that should be avoided as far as practical.
Cultural Resources	Cultural resource issues may be significant in Bardwell. There are many potentially historic properties in the study areas. The PB Team will document potentially historic districts and properties as part of the study. It was also noted that the area is part of the Mississippi Delta region.
Community Issues	In addition to cultural and historic issues, the presence of significant minority, low income, and senior populations were discussed. PB was requested to provide a demographic analysis. This is part of the current scope of work.
Previous Studies	The 1995 KYTC study was mentioned previously. The consulting firm of H.E. Rudy also developed plans for a bypass to the west of Bardwell in the 1980s in conjunction with a proposed industrial park west of the town. Contacts will be made to see if these can be located.
Pedestrians	Pedestrian safety is a possible issue in the center of the town.
Other Facilities	The potential need for improvements on other roadways related to US 51 (such as at intersections) was discussed.

Public Participation

Barbara Michael discussed the proposed public involvement plan, which will include public officials meetings, project work group meetings, public meetings, and other stakeholder meetings. Four project work group meetings and four public meetings are currently planned. The public officials meetings will be held first to brief the County Judge, Mayor, and possibly the State Representative and State Senator for the area. The Project Work Group will be asked to provide input on the public participation program. The members of the Project Work Group should include a range of individuals representing the following: residents, political leaders, agriculture, trucking, other businesses, social organizations, development agencies, schools, emergency services, and others.

Bardwell has a number of civic, social, and business groups that will be included in the public participation program (representatives of some of these may serve on the Project Work Group). PB was asked to look at the demographics of the study areas. Barbara Michael indicated that this would be part of the socioeconomic review.

Other Items Discussed

Tad Long of the Kentucky League of Cities has offered to serve as a resource for the Project Work Group. The Kentucky League of Cities is interested in helping towns and cities maintain their community character. Specifically, they would like to work with communities where new bypass projects are planned.

There was also discussion of the use and enforcement of truck routes and ITS applications for the study including the use of vehicle surveillance for determining when trucks route through the town.

FOLLOW UP ACTIONS:

1. KYTC and Purchase Area Development District (PADD) staff will schedule a meeting with local officials (i.e., County Judge, Mayor, and maybe the State Representative or Senator) to brief them on the study. [Subsequently, Stacey Courtney of the Purchase Area Development District scheduled a meeting for February 22, 2002.]
2. A draft list of Project Work Group members will be developed. Input for these lists from KYTC District 1 and PADD staff should be sent to Robert Frazier at frazierR@pbworld.com or fax# (502) 456-1323.
3. Upon finalization of the project contract, the PB Team will advance the existing conditions data collection effort (i.e., traffic, environment, and other key subject areas).
4. The PB Team will begin drafting a Preliminary Statement of Project Purpose and Need.
5. KYTC Central Office Planning will determine how to proceed with the agency coordination effort.
6. KYTC Central Office Planning will issue the public notice for initiation of the National Environmental Policy Act (NEPA) process.
7. KYTC Central Office Planning will follow-up on whether US 51 is part of the National Truck Network
8. District 1 staff will see if they have information on the previous H.E. Rudy plans. PB will also work with local officials/staff to see if they have any further information.

FIELD VIEWS:

Following the meeting at District 1, the meeting attendees (with the exception of the KYTC Central Office ITS staff) drove to Bardwell for a field view. The field view confirmed many of the items presented above in the issues discussion.

US 51 Scoping Study
Local Officials Meeting Minutes
Bardwell, Kentucky
02-22-02

Attendees:

Joe Ross	Mayor of Bardwell
Alan Wilson	Bardwell Deposit Bank
Greg Terry	Carlisle Co. Road Department
Burley Mathis	Carlisle Co. Magistrate
Carl Dixon	KYTC (Planning)
Bruce Siria	KYTC (Planning)
Jeff Thompson	KYTC (Planning, District 1)
Bryan Stewart	KYTC (Planning, District 1)
Linda Boatwright	KYTC (Public Relations, District 1)
Stacey Courtney	Purchase ADD
Shawn Dikes	Parsons Brinckerhoff
Robert Frazier	Parsons Brinckerhoff
Barbara Michael	Parsons Brinckerhoff

Meeting Summary:

After initial greetings and introductions were made, the meeting began with a discussion of the *study scope* and the *proposed study area*.

Carl Dixon began by describing the purpose of the study saying that it needs to examine and will in fact examine a range of improvements, not just a bypass. In fact, the study will examine improvements in-town as well as all other options (i.e. do nothing, something along existing road, spot improvements, as well as a bypass).

While the Cabinet's 1995 Study recommended a bypass, input from public officials and the public at large will be solicited in the alternatives screening process for this study and a bypass will NOT looked at exclusively.

Barbara Michael discussed the purpose of the study improvements. Input from the community will be sought during the study process. Existing conditions, such as the current socio-economic as well as an overview of the transportation conditions and the existing natural environment will all be examined.

The goal of the study will be to identify alternatives that will satisfy the needs and problems as identified through the study process and its participants. The consultant team is entering the process with no pre-conceived notions, and is currently expecting the study to follow a one-year schedule.

The initial identification of a range of alternatives will be undertaken to solve identified problems and issues. A first level screening followed by refinement and further screening will lead to a recommendation.

Robert Frazier gave an overview of the preliminary study area of the project. The area stretches past the existing railroad to the north and includes a large area to the south, including the proposed industrial park.

All agreed that the study area was generally consistent and feasible for the study. It does include the proposed industrial park and take into account the old bypass alignment proposed by H.E. Rudy in ’88 or ’87.

Bryan Stewart in KYTC District One will try and locate a copy of this study.

Robert further discussed an initial analysis of existing traffic data. Basically, there is between 2,000 and 5,000 vehicles per day on existing roadways in the study area. The next step will be to forecast these traffic volumes to a horizon year and to look at high accident locations.

The intent of the Public Involvement Program is to establish a Project Work Group and to have these folks act as a principal advisory body. They would meet prior to all public meetings.

The Work Group and the KYTC / consultant group will together with the Work Group find the best location and format(s) for the public meetings.

The series of public workshops will begin with an initial “blank slate” meeting. The public will be given information regarding existing conditions and future traffic numbers. The KYTC and the Consultant will solicit input on the goals, issues, problems, etc. that the study should focus on.

The purpose of the public meetings will serve as departure points for dialogue between the public and the project team. The public involvement program should help the community understand any implications of the proposed improvements. Public involvement will be accomplished early and often during the course of the study.

Stacey Courtney furnished a draft list of potential members. The initial reaction was that the names seemed adequate. Those present would work with Stacey to identify alternate and/or additional members.

The KYTC and/or the Consultant will brief other elected officials prior to the public meetings. The Bardwell City Council meets the 2nd Tuesday of the month at 5:00 p.m. The Fiscal Court meets the 1st and 3rd Tuesday at 1:00 p.m. There will be a meeting scheduled to brief both within the next month. Letters to state and federal resource agencies will be going out soon as well.

Carl indicated that a special effort will be made with regard to “environmental justice”, i.e., to make sure that a proposed project will not have a disportionate impact on minorities, those with low-income, or the elderly. It appeared that there are no environmental justice issues are identified at this point based on a consensus from those present.

Bruce Siria stated that environmental issues can be met within the project goals and needs. A solution should be obtained that makes for a “win/win” situation.

Other highway needs discussed were:

- Caution light at nursing home on US 62
- Shoulders added/widened on US 62 all the way to Paducah
- Add passing lanes along US 51
- Redo Bridge at US 62 and SR 121

Other issues include:

- The trains on the existing tracks owned by the Illinois Central Gulf (ICG) railroad travel at 40 to 50 MPH. Typically, longer trains have 150 to 170 cars. Amtrak also uses the tracks for the Crescent Service from Chicago to New Orleans.
- An absentee trucking company owns the large parcel north on US 51.
- There is a park off US 62.

Possible meeting sites include:

- City Hall on Front St. (Seats 50)
- Court House
- Fire Station
- Gym
- Outreach Christian Center

Meeting Minutes

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Carlisle County Fiscal Court Presentation

DATE & TIME: April 2, 2002 - 1:00 PM (CST)

LOCATION: Carlisle County Courthouse - Bardwell, Kentucky

DATE OF MINUTES: April 5, 2002

Carlisle County Judge/Executive John Roberts introduced Bryan Stewart (KYTC District 1 Planning) and Robert Frazier (Parsons Brinckerhoff) and indicated that they were going to make a presentation regarding a planning study that was being initiated by the Kentucky Transportation Cabinet (KYTC). Bryan Stewart introduced Stacey Courtney of the Purchase Area Development District.

Bryan Stewart (KYTC) then introduced the study, indicating that KYTC was initiating this study as a follow-up to a 1995 study of US 51 from Wickliffe to Fulton. He explained that the Cabinet does not have a predetermined solution for the area. The study will explore what improvements are most appropriate. He also stated that one of the reasons for our presentation was to inform them regarding the study so that they would be able to answer questions from their constituents. The KYTC will continue to keep them informed as the study moves forward. Robert Frazier (PB) then presented a brief overview of the study approach including the study area, major study tasks, potential public involvement activities, and the initial project work tasks. An outline of the presentation is attached. Mr. Frazier emphasized again that the KYTC has not predetermined a recommended improvement alternative. In fact, the KYTC has not even fully determined all of the problems to be addressed by the proposed improvements. Mr. Frazier emphasized the role of public involvement in the study. He outlined a number of ways in which the public will be asked to be involved. He reviewed the concept of a project work group and requested input from the Judge and Magistrates regarding potential committee members. The Judge indicated that he would forward suggestions to KYTC District One.

A few questions and clarifications followed, including a question regarding the impetuous for the study. It was stated that the study was an outgrowth of the previous 1995 study, which indicated future congestion in the vicinity of Bardwell. Another question was whether this study was related to the proposed extension of US 62 from US 51 to KY 123. It was explained that this study would look at that previous proposal but that the US 62 extension project was not directly related to this study. The Judge closed by expressing interest in this study getting started.

[NOTE: The official Fiscal Court minutes will be included in the file when available.]

Cc: Project File - 17023H

Attachments

Meeting Minutes

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Carlisle County City Council Presentation

DATE & TIME: April 9, 2002 - 5:00 PM (CDT)

LOCATION: Bardwell City Hall - Bardwell, Kentucky

DATE OF MINUTES: April 22, 2002

Bardwell Mayor Joe Ross introduced Bryan Stewart (KYTC District 1 Planning), Jeff Thompson (KYTC District 1), Stacey Courtney (Purchase Area Development District), and Robert Frazier (Parsons Brinckerhoff).

Bryan Stewart informed the Council that the Kentucky Transportation Cabinet (KYTC) was initiating a planning study of US 51 in the vicinity of Bardwell. The study was in response to a previous 1995 study. The 1995 study indicated that widening US 51 from Wickliffe to Fulton was not warranted, but future improvements may be needed in Bardwell and Clinton. Mr. Stewart stated that KYTC had contracted with Parsons Brinckerhoff (PB) to perform the current study. He also stated that one of the first steps in the study process was to inform the local elected officials regarding the study so that they would be able to answer questions from their constituents.

Robert Frazier (PB) then presented a brief overview of the study approach including the study area, major study tasks, potential public involvement activities, and the initial project work tasks. An outline of the presentation is attached. Mr. Frazier emphasized that the KYTC has not predetermined a recommended improvement alternative. In fact, the KYTC has not even fully determined all of the problems to be addressed by the proposed improvements. Mr. Frazier emphasized the role of public involvement in the study. He outlined a number of ways in which the public will be asked to be involved. He reviewed the concept of a project work group and requested input from the Mayor and Council regarding potential committee members.

A short discussion followed regarding topics such as the project schedule (approximately one year), the date and location for the first project work group meeting (6:00 PM on April 29, 2002 at Bardwell City Hall), and the study phases. The Mayor thanked the project team for the presentation.

Cc: Project File - 17023H

Attachment

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Project Work Group Meeting No.1

DATE & TIME: April 29, 2002 - 6:00 PM (CDT)

LOCATION: Bardwell City Hall - Bardwell, Kentucky

ATTENDEES: See Attached Sign-in Sheet

MEETING SUMMARY:

Introductions

David Martin, the Kentucky Transportation Cabinet (KYTC) Project Manager, introduced the study and requested that everyone present introduce themselves and whom they represent. Mr. Martin stated that this study was a follow-up study to a 1995 KYTC study that addressed US 51 from Wickliffe to Fulton. The 1995 study indicated that future improvements would be needed in Clinton and Bardwell but widening the entire length of US 51 in Kentucky to four lanes was not warranted. Mr. Martin indicated that KYTC has selected Parsons Brinckerhoff (PB) to complete the current US 51 studies for the two towns. He introduced Barbara Michael and Robert Frazier, both with PB, to make a presentation to the work group. Barbara Michael reviewed the Work Group meeting rules and the major discussion items for the meeting.

Study Process

Barbara Michael presented the four-phase study process, showing that we are at the first phase: Definition of Project Issues and Goals. The work group will meet at critical points during the process. Public meetings will also be held at key points during the process. The study will take approximately 12 months and will be completed by next Spring. Ms. Michael also presented the KYTC's "Road Building Steps", which shows the activities involved in constructing or improving a road in Kentucky.

Public Involvement

Ms. Michael presented the important aspects and elements of a draft Public Involvement Program for the US 51 Study in Bardwell. Proposed activities included: work group meetings; stakeholder meetings; public meetings; and use of an informational table or flyers. She asked for input on specific public involvement activities that should be considered for this study. Input included: having a booth at the County Fair (August 12-16); having a business stakeholders meeting (to be held the following morning); having a church or non-profit stakeholders meeting (to be scheduled for May); involving the Chamber of Commerce and the Lions Club; using flyers (such as flyers in bags at the grocery store); advertising in the newspapers and on radio (such as on 96 FM). The Chamber of Commerce president said they would be willing to make the US

51 Study a special project for the Chamber this year and help promote study events and encourage participation.

Ms. Michael discussed the role of the work group as an advisory and representative body. She stated that additional meetings will be held with stakeholders (such as the business owners stakeholder meeting the following morning) and the public at large, but the work group's role is to represent the broad interests of the community and help involve others at the appropriate times (i.e., the public meetings). The work group members present were asked to inform the Project Team if they felt that some critical portion of the community was not currently represented on the work group so that they can be contacted and involved in the future.

Study Background Information

Robert Frazier presented the proposed Bardwell study area as well as preliminary traffic, crash, truck percentage, highway facility characteristics, and population data. Additional detailed data will be collected in the next few months to support the study.

Traffic volumes on US 51 in the Bardwell study area range from 2,670 to 5,180 vehicles per day with truck percentages as high as 15.3 percent. The KYTC HIS database was reviewed including functional classification, right-of-way, lane width, shoulder width, speed limits, and other key data elements (please refer to the handout for details). Historic traffic data for Bardwell indicates that traffic volumes have been fairly level over the last 20 years.

The crash data shows a cluster of crashes between the US 51 / US 62 intersection and the US 51 / KY 123 intersection near downtown Bardwell.

The current population of Bardwell is approximately 800 and the population of Carlisle County is just over 5,000. The County population has decreased somewhat from over 6,000 in 1970.

Discussion of Project Issues and Goals

Ms. Michael presented some example issues to spur discussion of the issues related to US 51 in the vicinity of Bardwell. She also presented example project goals from another study to show the types of goals that might be set for this project.

Following this, the work group discussed important issues and goals to be considered in the study. The issues discussed by the work group are summarized below, followed by a summary of the potential project goals.

<u>Roadway Safety and Design Issues</u>

There are a number of roadway deficiencies on US 51 through the Bardwell study area, including poor lines of sight, narrow lanes, narrow shoulders, steep grades, curves, poor drainage, lack of turn lanes, limited right-of-way, and angled intersections. Specific locations mentioned as safety concerns included US 51 / US 62 (currently unsignalized – truck rollover crashes occur at this intersection); the curves and hills south of town; and locations along US 51 where turn lanes may be warranted now or in the future for safety (such as at Flegles north of town). Speeding (cars and trucks) was also highlighted as an issue in the study area.

<u>Utilities</u>

Utilities are an important issue in Bardwell because they may affect proposed improvements along US 51 through the town. Utility relocations may be required for certain improvement alternatives. There are also a number of issues or problems with the current systems such as drainage issues along US 51 and storm water infiltration to the local sewer system.

Pedestrian Safety

There are sidewalk and crosswalk deficiencies at locations along US 51 through Bardwell. This is a particularly important issue for senior citizens and residents without cars.

Economic Development

The need for economic development in the study area was highlighted. The focus for this economic development was in the areas of tourism, recreation, hunting, and fishing.

Quality of Life

The work group indicated that maintaining and preferably improving the character and quality of life in Bardwell was important. Avoiding major adverse affects on the community is an important issue.

Traffic Flow and Traffic Operations

Traffic signals were discussed, including the possibility of upgrading the current signal at US 51 and US 62.

Truck Traffic

Truck traffic was presented both as a problem and as a part of the local economic picture. Noise impacts to residents along US 51 is one negative issue with trucks, as well as safety related issues.

Senior Citizens and Auto Ownership

According to the Work group, there is a high population of senior citizens in the study area. (According to the socioeconomic analysis, approximately 18 percent of the County population, or 980 individuals, were age 65 or older in 1999.) Many of the senior citizens do not own cars and they need improved sidewalks and crosswalks.

Great River Road Scenic Byway

Enhancements of the Great River Road Scenic Byway and bike routes (such as the Ramblin' River Tour bike route) were discussed. This included a brief discussion of bike lanes and an improved streetscape in town. The Great River Road Scenic Byway runs south through the western portion of Carlisle County (west of Bardwell). The Ramblin' River Tour bike route runs east-west through Bardwell on KY 123.

Historic Preservation

Preservation of the historic Methodist church on US 51, as well as the two cemeteries, is an issue.

Regional Access / Economic Linkages

Connections both within the County as well as from the County to other regional roadways was presented as an important issue for this study. This includes regional connections at the Purchase Parkway (which could become I-69 in the future) as well as north toward the potential new I-66 corridor.

The study goals discussed by the work group included the following:

Potential Project Goals

- Improve mobility
- Enhance vehicular and pedestrian safety
- Encourage future development and growth
- Future connectivity with I-69 / I-66 (Do not preclude future options)
- Maintain and improve community character and quality of life

Vision Statement

Ms. Michael asked the work group members to put forth their vision for the community for the next 25 years. Comments included: a retirement community that has a self-sustaining business community; community where people can move safely (by car, bicycle, or on foot); and a community that has amenities here so you do not have to go away to obtain them. The combined draft vision statement for the community was as follows: "A self-sufficient community where people can move about safely (by car or foot), which offers a quality of life attractive to both retirees and young families."

Other Items Discussed

Participation at upcoming meetings was encouraged.

Next Steps in the Study Process

Mr. Frazier reviewed the next steps in the study, which will include detailed data collection and analysis of the existing and future transportation conditions in the study area, environmental studies, and preparation of a draft statement of Project Issues and Study Goals. The project team will also hold additional stakeholder meetings (including a business owners meeting the following morning at City Hall) and a public meeting over the next two months. Information from all of these activities (including the draft Issues and Goals) will be presented at the next work group meeting. The next work group meeting will also include a discussion of the full range of potential improvement alternatives, including upgrades to US 51 and potential bypass alternatives, with a goal of developing a range of alternatives to be studied.

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Business Stakeholders Meeting

DATE & TIME: April 30, 2002 - 7:30 AM (CDT)

LOCATION: Bardwell City Hall - Bardwell, Kentucky

ATTENDEES: See Attached Sign-in Sheet

MEETING SUMMARY:

Introductions

David Martin, the Kentucky Transportation Cabinet (KYTC) Project Manager, introduced the study and requested that everyone present introduce themselves and whom they represent. Mr. Martin stated that this study was a follow-up study to a 1995 KYTC study that addressed US 51 from Wickliffe to Fulton. The 1995 study indicated that future improvements would be needed in Clinton and Bardwell but widening the entire length of US 51 in Kentucky to four lanes was not warranted. Mr. Martin indicated that KYTC has selected Parsons Brinckerhoff (PB) to complete the current US 51 studies for the two towns. He introduced Barbara Michael and Robert Frazier, both with PB, to lead a discussion on the study process and critical study issues.

Study Process, Public Involvement, Study Background Information

Robert Frazier presented the four-phase study process (Definition of Project Goals and Issues, Alternatives Development, Alternatives Evaluation, and Recommendations). The process will take approximately 12 months. There will be public involvement throughout the process. The entire road building process can take up to 10 years (shorter for smaller less involved projects).

There was a discussion of the representative advisory work group and public involvement. It was stated that the project team had tried to provide adequate representation for the business community on the work group (5 out of approximately 18 people). It was stated that if anyone felt that they, their business, or some other portion of the community was not represented adequately, they should let the project team know and recommend someone else to sit on the work group.

There was a discussion regarding why the study was being conducted. The response given was that the study was on the KYTC's Six-Year Highway Plan and the previous 1995 study indicated future traffic problems in Bardwell.

Robert Frazier presented the proposed Bardwell study area as well as a brief overview of key highway, traffic, crash, and population data. He indicated that the project team will collect

additional data and will prepare detailed engineering studies in a parallel track with the public involvement activities. The discussion then turned to a discussion of issues in the study area.

Discussion of Project Issues

The issues discussed by the group are summarized below:

Safety (Pedestrian and Vehicular)

A number of safety issues were raised including:

- Unsafe curve south of town. A fatal crash occurred on this curve. An accident occurred on this curve just three weeks ago.
- Lack of turn lanes on US 51 (such as north of town near Flegles or at US 62)
- US 51 / KY 123 intersection (truck crashes)
- US 51 / US 62 intersection
- Curve and steep hill at the Methodist Church (issue for trucks – they run off the road)
- Curve at the Fire Station – poor sight distance
- Lack of adequate lighting
- Road width / shoulder width
- Missing or deficient curbs
- Excessive speeds from the cemeteries in the south, north to Flegles – 55 mph too high (issue for both cars and trucks)
- Pedestrian / vehicle conflicts - Pedestrian crossings and a lack of adequate sidewalks
- Farm equipment – large equipment moved across the county on narrow roads

Utilities and Drainage

The water main along US 51 is going to be upgraded, as are other portions of the local water system such as the tower, plant, and other water lines. The estimated cost of the project is $1 million. The sanitary sewer system has storm water infiltration problems. The cost of improving this system is estimated at $0.5 million. Storm sewer facilities in town may also need repairs. There are drainage issues on US 51 from the Methodist Church north to US 62. This includes issues at US 51 / KY 123 near the Baptist Church. The electric utilities are currently above ground. It would be desirable to put them underground in the future.

Traffic Operations

The current traffic signal was raised as an issue.

Sidewalks and Bicycle Facilities

The importance of sidewalks, trails, and bicycle facilities was highlighted. There was discussion of the Great River Road and the bike route (Ramblin' River Tour) through the town. There was also discussion of the importance of connecting the senior housing, post office, and bank with sidewalks and crosswalks.

Community Character, Growth, and Beautification / Amenities

Enhancing the community's current assets was emphasized. There was a sentiment for keeping the community the way it is and enhancing it (but not losing it). Improving the town

visually was an important issue. New residential development is occurring in Cunningham, with little new residential development in Bardwell. Cunningham is closer to Paducah.

Trucks and RVs

Truck traffic begins early in the morning. It creates a noise issue for residents along US 51. However, the trucks are necessary for deliveries and local shipping. Truck speed is an issue worthy of studying. Logging truck traffic is an important traffic flow to consider in the project (safety and speeds). There are recreation vehicles on US 51 going to and from Columbus-Belmont State Park. Seniors drive many of these vehicles. This traffic should be considered in the study.

Economic Development

The local emphasis for economic development is on the tourism and recreation industry. There is only a moderate amount of local business in this arena at present (outside of Columbus-Belmont State Park) but the desire is to increase this business sector. The community has never had a large manufacturing / industrial base and they do not necessarily desire it now. The industrial emphasis is regional in nature as shown by the new eight county industrial park. Those present wanted to see the area made attractive as a family oriented community and a retirement community. They feel that it has positive characteristics in these two areas and they would like to build on these. There is a desire to attract jobs to allow people to stay and work in the community. The jobs would be related to the tourism and recreation industries as well as in support of a family oriented / retirement community (such as retail and small business jobs).

Earthquake Potential

The potential for earthquakes in the region should be taken into account in the planning process.

Seniors

Not only are there many seniors who walk in Bardwell, there are also many senior drivers and the study should take this issue into account.

Next Steps in the Study Process

Mr. Frazier reviewed the next steps in the study, which will include detailed data collection and analysis of the existing and future transportation conditions in the study area, and environmental studies. The project team will also hold additional stakeholder meetings (including a meeting with non-profit organizations in the town) and a public meeting over the next two months. Future meetings will address a discussion of the full range of potential improvement alternatives, including upgrades to US 51 and potential bypass alternatives, with a goal of developing a range of alternatives to be studied.

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Church and Civic Organizations Meeting

DATE & TIME: May 14, 2002 - 10:00 AM (CDT)

LOCATION: Bardwell City Hall - Bardwell, Kentucky

ATTENDEES: See Attached Sign-in Sheet

MEETING SUMMARY:

Introductions

Bruce Siria of the Kentucky Transportation Cabinet (KYTC) introduced the study and requested that everyone present introduce themselves and whom they represent. Mr. Siria then discussed the general purpose of the study and the fact that a similar study was being conducted in Clinton, KY. He made it clear that the Cabinet will examine a range of options and has not made a decision on the project already. Mr. Siria also emphasized that this was an informal meeting and the attendees should feel free to ask questions at any time. He introduced Robert Frazier, with Parsons Brinckerhoff, to lead a discussion on the study process and issues.

Study Process, Public Involvement, Study Background Information

Mr. Frazier presented the 12-month four-phase study process (Definition of Project Goals and Issues, Alternatives Development, Alternatives Evaluation, and Recommendations). The process will take approximately 12 months. There will be public involvement throughout the process. Mr. Frazier also indicted that a full range of alternatives will be examined in the study from small sidewalk and crosswalk improvements to new roadways to determine which best meets the needs in the study area. It was later pointed out by David Martin (KYTC) that the no-build scenario will also be considered. Mr. Siria and Mr. Frazier also presented the road building process timeframe (in response to a question), noting that the entire road building process can take up to 10 years (depending on the project's issues, size and complexity).

Mr. Frazier presented the four major elements of the public involvement program including the project work group, stakeholders meetings, public meetings, and special events and publicity. There was general discussion regarding the representative and advisory nature of the project work group, the fact that a business owners stakeholder meeting had been held a few weeks previous, and that the first public meeting would likely be held in June. Regarding special events and publicity, the church representatives indicated that they could include notices in their church bulletins. A stand at the county fair, the posting of flyers, and various other publicity methods were discussed. Also, an offer was made to discuss the work group composition to make sure the non-profit interests were represented.

Robert Frazier presented the proposed Bardwell study area as well as a brief overview of key highway, traffic, crash, and population data. He indicted that the project team will collect additional data and will prepare detailed engineering studies in a parallel track with the public involvement activities. Bruce Siria explained that the study was being conducted, in part in response to a previous 1995 study, which indicated future traffic problems in Bardwell.

Discussion of Study Issues

One of the attendees specifically requested to know what was discussed at the business owners meeting. Mr. Frazier reviewed the main issues raised at that meeting. Mr. Teeters also discussed issues he and others raised at the meeting including his view regarding the negative consequences to his business and the town at large if traffic is rerouted on a bypass around the town. The issues raised by the church / civic organizations are summarized below:

Drainage

There are drainage issues along US 51 in various locations including by the Senior Center, on the hill near the traffic signal, and across from the Dollar Store. The representative from the Methodist Church indicated that he was not familiar with drainage problems at their property but he was aware of other locations and would send information on them to the project team.

Traffic Volumes and Operations

Overall traffic volumes were not a concern for those present. In fact, the lack of traffic appeared to be more of a concern. The location of the current traffic signal was discussed. It may be more appropriately located at US 51 and US 62.

Safety

A number of safety issues were discussed including the curve at the Methodist Church (especially an issue for trucks), the small radii at the US 51 / KY 123 intersection (difficult for large vehicles), and the US 51 / US 62 intersection.

Sidewalks

Sidewalk deficiencies were discussed.

Trucks, Noise and Vibration

Truck traffic was not a particularly significant issue for the attendees. Noise from trucks was also not a particularly concern. However, the issue of vibration from the trucks and potential for impact to the structure of the Methodist church was discussed. It was however stated by members of the project team that it is unlikely that vibrations from the trucks are damaging the church structural elements. Neither noise nor vibration was a major issue during church services.

Those present were thanked for attending and encouraged to attend both the I-66 public meeting that night and the first US 51 public meeting in Bardwell in late June.

Meeting Minutes

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Project Work Group Meeting No. 2

DATE & TIME: August 22, 2002 - 4:00 PM

LOCATION: Bardwell City Hall - Bardwell, Kentucky

MEETING SUMMARY:

Introductions and Review of Meeting Minutes for Previous Meeting

David Martin, the Kentucky Transportation Cabinet (KYTC) Project Manager, introduced the study. Those present introduced themselves. Attendees were asked to sign-in. There were no comments on the minutes of the previous meeting. There was discussion regarding the impetus for this current study as well as the 1995 study.

Review of Work Completed to Date

Work completed to date was reviewed including: Project Work Group Meeting No. 1, Business Owners Stakeholder Meeting, Non-Profit / Church Stakeholder Meeting, Traffic Data Collection, Environmental Data Collection, and Other Field Work.

Existing Conditions Data

A brief summary of the existing conditions data was presented including an overview of current traffic volumes, levels of service, and crash statistics. The environmental features maps were also discussed briefly. Graphics illustrating the existing conditions findings were included in the presentation handout materials.

Review of Draft Issues and Goals

The draft issues and goals were part of the mail out to each Project Work Group participant. The Work Group members present were asked for comments on the issues and goals. From the perspective of the Work Group members present, key issues included economic development / regional access; vehicular safety and highway design; pedestrian safety; and beautification / amenities / community character. Speed enforcement was also discussed in relation to safety. The Work Group members present supported the draft project goals.

Discussion of Potential Project Alternatives

The five preliminary conceptual alternatives were presented and discussed with the Work Group. They include the 1) Do-Nothing; 2) Spot Improvements; 3) Reconstruction of US 51 as a Two-Lane Highway with Turn Lanes and Sidewalks; 4) US 51 Realignment (south of town); and 5) Eastern Bypass. There was general discussion on each of the alternatives.

It was suggested that the study consider an alternative of reconstructing the highway as two-lanes without turn lanes. There was discussion of widening the highway through town and making it look better. Bardwell would like the Mississippi River Scenic Byway designation to come down US 51 through town. However, Bardwell and Arlington were circumvented thus far due to aesthetic issues. Highway beautification and the possibility of bike lanes and sidewalks are strongly supported in connection with the local emphasis on this scenic byway designation and the pursuit of tourism related economic development.

The bypass option did not receive any support at the meeting (nor has it received support in prior meetings in the town). The intersection of US 51 and US 62 received considerable discussion, including detailed discussion of potential improvements. Improving this intersection is a high priority from the view of the local community as well as the trucking community.

There was some discussion regarding the merits of realigning US 51 south of Bardwell (from the Methodist Church to between KY 1377 and KY 1181). There are fewer businesses on the southern section of US 51. The realignment would also remove the bad curve at the Methodist Church. There was also discussion regarding the benefits and drawbacks of a one-way street system using US 51 and Front Street.

Potential utility relocations are a major issue in Bardwell. There is one major local municipal utility company. Local residents are concerned that the cost of utility relocations may exceed the municipal utility company's (and local population's) financial resources. This issue will be addressed to extent possible in this planning level study.

Regarding advertising for the upcoming meetings, use of the local newspapers, church bulletins, and the radio were encouraged.

Conclusions

All of the options presented to the Work Group will be presented at the public meeting. The one-way street option will also be discussed at the public meeting. The comments and modifications regarding reconstruction or improvements to the existing US 51 alignment will be taken into consideration.

Public Workshop Summary

Tuesday, September 10, 2002

Public Workshop #1

US 51 Planning Study in Bardwell
Carlisle County
Item Number 1-183.00

A Public Workshop was held on Tuesday, September 10, 2002. The workshop was held at the Bardwell Lion's Club from 4 p.m. to 7p.m. A total of 44 citizens and seven staff members signed in at the meeting. A sign-in sheet was posted, a short presentation was given and handouts were provided. The handouts included the following information:

- Information about the Study Process, Schedule, Issues and Goals
- A fact sheet from the Kentucky Transportation Cabinet (KYTC) explaining the Planning Study and Road Building Process
- A fact sheet explaining the scope of the project
- A map of the project study area
- A map illustrating conceptual improvements options
- A fact sheet explaining each of the conceptual alternatives

The main purpose of the workshop was to 1) inform the public regarding the study; 2) obtain feedback from the public on the study goals and issues, and 3) receive input on the alternatives to be evaluated.

The workshop began with a brief introduction by Allen Thomas, Kentucky Transportation Cabinet - District One, Planning Engineer. Mr. Thomas then turned the presentation over to Barbara Michael and Robert Frazier of Parsons Brinckerhoff (PB). The presentation addressed the following topics:

- Explanation of the project study process and schedule, as well as an explanation of the project development process;
- Review of the project study area;
- Presentation of the environmental features and traffic information;
- Discussion of the project goals, issues and evaluation process;
- Overview of the initial conceptual alternatives;
- Explanation of the public role at the workshop; and
- Contact information for the study.

The remainder of the meeting was conducted in an "open house" format. The attendees were given the opportunity to view exhibits and ask questions about each of the subjects listed above. This included a set of boards regarding: 1) the study and road building process; 2) existing traffic and environmental conditions; 3) the study objectives and project issues and goals; and 4) preliminary alternatives for improving US 51.

Regarding the preliminary alternatives, five initial alternatives were shown on aerial photos and members of the public were asked to both comment on those shown and help develop other alternatives that might be appropriate for evaluation in this study. Blank maps (aerial

photos and USGS maps) as well as small handout maps were available for this purpose. The members of the public were engaged to discuss issues related to the study and the possible improvement alternatives.

The attendees were each given a comment form, which they were asked to complete at the meeting. For those who did not complete the forms at the meeting, postage-paid envelopes were provided for returning them to the Division of Planning. Summaries of the public comments received are presented on the following pages.

The meeting was adjourned at 7 p.m.

US 51 Study in Bardwell
Public Workshop #1
Public Comment Form Results Summary

The purpose of the first public workshop for the US 51 planning study was to gain public input on the study's goals and issues as well as possible solutions. A survey was distributed during the meeting to record this input. 35 completed surveys were received. A summary of the results is presented below.

***Question 1**: What issues do you think are important for the study to consider?* The respondents were asked to identify all that apply.

Issue	Percent of Respondents
Vehicular Safety and Highway Design	69%
Truck Traffic	69%
Traffic Flows and Traffic Operations	54%
Property Impacts and Historic Preservation	43%
Economic Development and Regional Access	37%
Utilities and Drainage	37%
Pedestrian Safety	26%
Community Character and Beautification/Amenities	20%
Low-Income and Senior Populations	14%
Environmental Issues	11%
Bicycle/Pedestrian Facilities and Streetscape Improvements	9%

***Question 2**: Of the following seven draft project goals, which three do you think are most important?*

Project Goal	Percent of Respondents
Mitigate the negative impact of heavy truck traffic on US 51, while maintaining an efficient through route	66%
Preserve downtown business, and community character	46%
Avoid, minimize, and/or mitigate property takings as well as other community and environmental impacts	43%
Maintain appropriate traffic controls and traffic flow conditions	43%
Improve highway geometry and drainage	29%
Enhance vehicle and pedestrian safety	29%
Enhance the visual aspects of the community infrastructure and provide improved recreation (bicycle/pedestrian) facilities	14%

***Question 3**: What impacts (positive or negative) would result from improvements to US 51 in Bardwell?*

Response	Percent of Respondents*
Improved safety and traffic flow	39%
Bypass would cause negative economic impacts	22%
Improvements would enhance aesthetics and may bring economic development	17%
US 51 improvements would benefit truck traffic flows	13%
Bypass would help by eliminating truck traffic in Bardwell	9%
Improvements may cause environmental impacts	4%
Improvements to existing US 51 could generate more through traffic within Bardwell (positive effect)	4%
Bypass may generate additional economic development	4%

* Percentages are based on the number of respondents that answered the question. 34% of respondents did not answer. The total does not add to 100% as some respondents gave multiple responses.

***Question 4**: Are there impacts (positive or negative) from doing nothing to improve the highway?*

Response	Percent of Respondents*
Better traffic flow is needed, there would be a negative impact to doing nothing	57%
There are no negative impacts to doing nothing	43%

* Percentages are based on the number of respondents that answered the question. 60% of respondents did not answer.

***Question 5**: If improvements are to be made to US 51 in Bardwell, do you have any suggestions for what should be done and where?*

Response	Percent of Respondents*
Alternative 2 (Spot Improvements)	50%
Intersection improvements at US 62	43%
Move Signal from Jennings to US 51 / US 62	33%
Intersection improvements at KY 123	10%
Intersection improvements at Jennings	7%
Alternative 3 (Improve Existing US 51)	37%
Specifically Opposed to Alternative 5 (Bypass)	27%
Alternative 4 (Southern US 51 Realignment)	20%
Alternative 5 (Bypass)	17%
Highway Beautification	10%
One-Way Street System (US 51 - North, Front St - South)	7%
Drainage System Improvements	7%
Sidewalks Improvements	7%
Specifically Opposed to Alternative 4	3%
Alternative 1 - Do Nothing	3%
Re-route Truck Traffic	3%
Safety Improvements	3%
Raise Speed Limit	3%

* Percentages are based on the number of respondents that answered the question. 14% of respondents did not answer. The total does not add to 100% as some respondents gave multiple responses.

***Question 6**: Do you know of any especially sensitive environmental features in the study area of which we should be aware?*

The following responses were received.

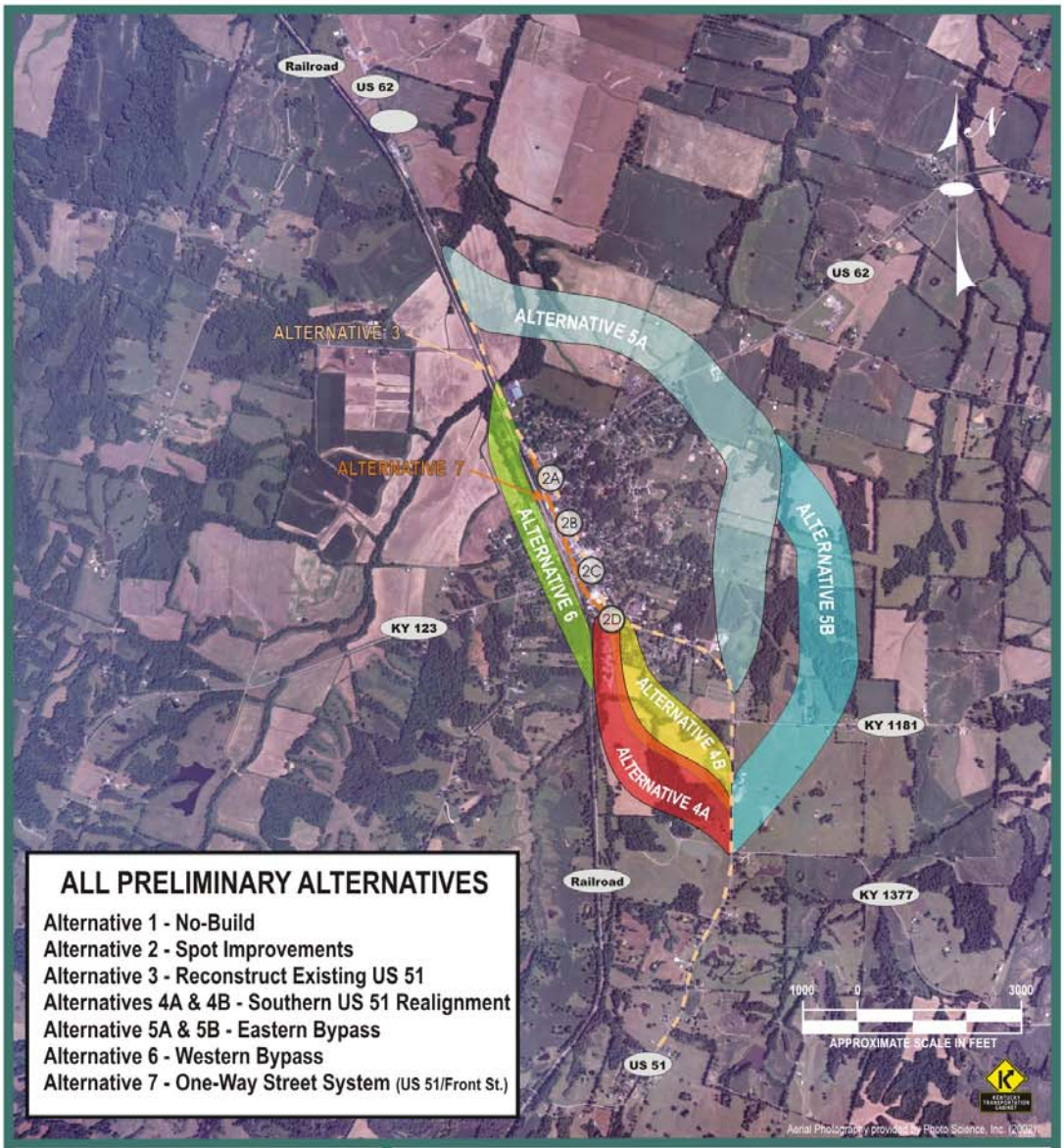
- A Native American Campsite at KY 339 and US 51
- An unmarked cemetery adjoining Bardwell Cemetery
- Other unmarked cemeteries
- An African American cemetery

Additional Comments Received

- It is important to evaluate the utility impacts and relocation costs when improving the existing roadway. (2 comments)
- Water over southbound lane of US 51, 1.5 miles south of CR 1202 (drainage problem)

New Alternatives Added by the Public

The attached map shows all of the preliminary corridors and alternatives to be studied. Alternatives 5B, 6 and 7 were put forward by members of the public for further study. Alternative 4 was also divided into two alternative corridors – 4A and 4B.


Railroad
US 62
ALTERNATIVE 3
ALTERNATIVE 5A
US 62
ALTERNATIVE 7
2A
2B
2C
2D
ALTERNATIVE 6
ALTERNATIVE 5B
KY 123
ALTERNATIVE 4B
ALTERNATIVE 4A
KY 1181
Railroad
KY 1377
US 51
1000
0
3000
APPROXIMATE SCALE IN FEET
ALL PRELIMINARY ALTERNATIVES
Alternative 1 - No-Build
Alternative 2 - Spot Improvements
Alternative 3 - Reconstruct Existing US 51
Alternatives 4A & 4B - Southern US 51 Realignment
Alternative 5A & 5B - Eastern Bypass
Alternative 6 - Western Bypass
Alternative 7 - One-Way Street System (US 51/Front St.)
Alternatives Legend
New Corridor
Improve Existing Road
2A
Spot Improvement
Corridor:
Approximately 500 to 1,000 foot wide bands to be studied for the potential placement of the roadway. Actual Right-of-Way width will be much less than 500 to 1,000 feet.
No-Build:
Alternative 1 is the No-Build scenario in which no new construction would be planned as a result of this study.
10/04/02
US 51 Study at Bardwell
Figure 2: All Preliminary Alternatives

PROJECT: US 51 STUDIES IN CLINTON AND BARDWELL

MEETING: Preliminary Alternatives Evaluation Meeting

DATE & TIME: January 30, 2003 – 1:00 PM (EST)

LOCATION: State Office Building Annex, 1st Fl. Conf. Room, Frankfort KY

DATE OF MINUTES: January 31, 2003

ATTENDEES:

NAME	AGENCY/COMPANY	E-MAIL ADDRESS
Bruce Siria	KYTC - Central Office Planning	bruce.siria@mail.state.ky.us
David Martin	KYTC – Central Office Planning	charles.martin@mail.state.ky.us
Daryl Greer	KYTC – Central Office Planning	daryl.greer@mail.state.ky.us
Barbara Michael	Parsons Brinckerhoff	michael@pbworld.com
Robert Frazier	Parsons Brinckerhoff	frazierr@pbworld.com
Lindsay Walker	Parsons Brinckerhoff	walkerli@pbworld.com
Stuart Kearns	Jordan, Jones, & Goulding	skearns@jjg.com
Rebecca Colvin	Third Rock Consultants	rcolvin@thirdrockconsultants.com

MEETING SUMMARY

Introduction

Those present introduced themselves and their role on the project. Following introductions, handouts were given to the attendees regarding the study evaluation process and project goals. Barbara Michael indicated that the project is on schedule, with a target date of four to six weeks for completion of the Level 3 (final) evaluation.

Project Goals

There was a general discussion of the project goals for the two studies. Daryl Greer emphasized the need to focus the project goals around the need for the project. Specifically, he said the goals should support a future purpose and need statement that would be part of an environmental document. However, PB pointed out that the project goals for these studies were developed in close partnership with Project Work Group and the general public. The current goals reflect this public input and have been shown to the public at public meetings as a way of demonstrating that the Project Team is

listening to them and taking their concerns seriously. We agreed that in the future the goals should be tied to the need for the project, but in this case, given the nature of the studies and the communities we decided collectively that the goals could be maintained with some re-writing. Any goals not tied to the project need will be explained as being separate from the main goals supporting the purpose and need for the project. In addition, text would be added to the goals developed in response to input from, and emphasized by, local residents. There was also specific discussion of rewording the regional connectivity goal in Clinton, which mentions improving connections to I-66 (which may or may not ultimately be constructed).

Existing Conditions Reports

Overall progress in addressing the Cabinet's comments was discussed. The Existing Conditions Reports will be revised and resubmitted in the next few weeks. JJG is completing the requested spot analysis of accident clusters in both towns and the results of the analysis will be included in the revised report.

Bardwell Alternatives and Evaluation

There was a general discussion regarding the nature of the Bardwell study area issues and characteristics. PB then presented the alternatives developed for the Bardwell study area and the process by which they were developed. A total of nine alternatives were developed in Bardwell including: Do Nothing, Spot Improvements, Upgrade of Existing US 51, Southern Realignment Options (two), Eastern Bypass Options (two), Western Bypass, and a One Way Street Option.

Bardwell Level 1 Evaluation

The Level 1 evaluation matrix for the nine Bardwell alternatives was presented. This matrix included a qualitative assessment of each alternative in five evaluation categories: Implementation / Construction Feasibility, Project Goals, Community Impacts, Environmental Impacts, and Public Support. Based on the results of the evaluation PB proposed to eliminate from further consideration the western bypass, the longer of the eastern bypass options, and the one-way street option.

In the initial draft Level 1 evaluation report, PB had also proposed to drop the second eastern bypass (Alternative 5A). However, after further consideration, PB determined it would be beneficial to keep Alternative 5A for further examination in Level 2. Advancing Alternative 5A maintains one bypass option in Level 2. It will provide quantitative data for the bypass alternative to allow for more meaningful comparisons with the no-build, upgrade of existing, and realignment options. Those present agreed with keeping Alternative 5A. The Level 1 report will be modified to reflect the change.

Bardwell Level 2 Evaluation

PB then presented the draft Level 2 evaluation matrix for the Bardwell alternatives. The conclusion of the Level 2 evaluation was that the No-Build, Spot Improvement, and Upgrade of Existing US 51 alternatives should be studied in detail in Level 3. One of the realignment options (Alternative 4B) was also recommended for further study. Alternatives 4A (southern realignment near the railroad tracks) and 5A (eastern bypass) were recommend for elimination. The main reasons for eliminating Alternative 4A were potential environmental impacts and expected high costs. Alternative 4A also did not compare well to Alternative 4B, therefore it was dropped and 4B was kept for more detailed study in Level 3. The major reasons for eliminating Alternative 5A were potential environmental impacts, a high cost, strong public opposition, and modest traffic volumes.

Level 3 Evaluation and Other Issues

The issue of drainage was brought up during the course of the Bardwell discussion. The public in Bardwell raised drainage problems in town as an issue. The in-town improvement alternatives assume that the current rural cross-section will be replaced with a curb and gutter cross-section. Daryl Greer requested that the Level 3 analysis determine whether positive drainage could be obtained with a curb and gutter system in the town.

Concerns about the effectiveness of curb and gutter were noted (particularly if there was enough of a drop to get the water out of the roadway), and it was suggested that further analysis be performed to determine if curb and gutter will solve drainage issues through town.

It was also suggested that in Level 2 a spot improvement could be added to provide some quick fixes for drainage throughout the study area.

Other issues identified for Bardwell include cross sections, unmarked historic sites, and streetscape enhancements. It was determined that sidewalks through town with bike lanes on the rural sections would be appropriate cross sections of US 51 through Bardwell. The concern of an unmarked archaeological site in the north end of the study was brought up regarding Alternative 5A. At the location that 5A would connect with the existing US 51, it would go directly through this area. It was suggested that since 5A was being recommended to advance to Level 2, further analysis of the site would be warranted such as determining if the site is currently being investigated or if examination is complete. Depending on the outcome of this analysis, Alternative 5A may not be feasible. Finally, the possibility of burying overhead wires through town was discussed. While this would dramatically improve the aesthetics of town, it was determined that anything above and beyond what was necessary to perform roadway work would be an enhancement. As a result, it was determined that costs should be developed for this work and analyzed for practicality.

Aside from further suggestions for refining the existing alternatives, everyone was in agreement about the general assessment and advancement of all proposed alternatives in both Level 1 and Level 2. It was also decided that JJG would review Alternative 5A and estimate traffic volumes for this alternative. For Level 3, itemization of costs was proposed for each of the remaining alternatives.

Clinton Level 1 and 2

It was stated that the analysis of improvements for Clinton is not as straightforward as Bardwell. This town has a more traditional layout with the main street in the center of town. Concerns related to preserving the main street and in particular the Court House square were noted. However, unlike Bardwell, there was some support for a bypass, and as a result more consideration was give to keeping some bypass alternatives.

The focus of the discussion on Clinton involved gathering input regarding the advancement of 4A or 9 and 5A or 6A. Each alternative has a mix of benefits and impacts which made further discussion regarding advancement imperative to selecting the best choice(s). The discussion of 4A versus 9 yielded 9 as the preferable alternative. Alternative 4A was less desirable because of more stream relocation, almost two miles of roadway in the floodplain, and Environmental Justice issues.

For Alternatives 5A and 6A, the differences were not as distinct, and as a result, the recommendation of the preferable alternative was not as clear. While 6A is a longer route, it will have minimal non-economic community impacts. Alternative 5A will have a direct impact to residential neighborhoods on the east side of Clinton, and will in fact isolate neighborhoods with a roadway between them. It was determined that to build the roadway through the residential areas, up to eleven homes may need to be relocated. Because of these detrimental effects to the community, it was determined that 6A would be the preferable eastern bypass for advancement. However, it was mentioned by David Martin that estimated costs for construction of each of these alternatives would be helpful in confirming the final decision for advancement of Alternative 6A.

There was also some discussion related to the Spot Improvements 2D, 2E, and 2F. It was proposed by the PB team to drop these three spot improvements based on the low traffic volume of the cross streets and the anticipated high cost of intersection realignments. To further support this conclusion, it was noted that crash data would be documented in the areas of these proposed spot improvements to support eliminating them.

At the end of the presentation of the alternatives and matrices for both Level 1 and 2, everyone was in agreement regarding the alternatives that were proposed for advancement. For Level 3, itemization of costs was proposed for each of the remaining alternatives.

Upcoming Public Meetings

Bruce Siria began the discussions about scheduling upcoming public meetings by stating the requirement of six weeks notice prior to any public meetings. This is necessary to provide enough advance notice to the public to ensure maximum participation. It was determined that a meeting in both Clinton and Bardwell with the District 1 office would be necessary. This would be the first of the meetings scheduled to discuss the final recommended alternative(s). Based on an estimated completion time of Level 3 as four to six weeks from this meeting (January 30, 2003), a tentative meeting date was selected as the first week of March. It was also determined that another project work group meeting should be held in Clinton and Bardwell to provide them with a chance to comment on the final recommendation. The third week of March was selected as the tentative meeting date to allow for comments to be made and addressed by the district prior to the project work group meeting. The final public meeting for Bardwell could be scheduled the third week of March as well to reduce the number of trips to Bardwell and Clinton. To give ample time between the project work group meeting and the public meeting in Clinton, it was determined to schedule the final public meeting in Clinton in April, approximately the third week of the month (six weeks after the project work group meeting).

FOLLOW UP ACTIONS

1. Existing Conditions Report for Clinton will be finalized and submitted. The Existing Conditions Report for Bardwell will be adjusted to reflect any changes made to the Existing Conditions Report for Clinton and the draft version submitted.
2. The Level 1 Report for Bardwell will be updated and resubmitted to include Alternative 5A. Revisions will also be made to Level 1 in Clinton with the final version submitted to the Central Office Planning, District 1, and PADD.
3. Level 2 Draft Reports for both Clinton and Bardwell will be completed and submitted in approximately 1 to 2 weeks to Central Office Planning, District 1, and PADD.
4. Level 3 analyses will be completed within approximately 4 to 6 weeks with the draft version submitted within the same timeframe.
5. District 1 meetings will be scheduled in Bardwell and Clinton the first week of March. A project work group meeting in Bardwell and Clinton will be scheduled the third week of March, along with the final public meeting in Bardwell. The final public meeting in Clinton will be scheduled approximately six weeks after the project work group meeting. It was decided that Parsons Brinckerhoff would assist KYTC in preparing flyers for the upcoming public meetings.

Meeting Minutes

PROJECT: US 51 STUDIES IN CLINTON AND BARDWELL

MEETING: Historic and Community Issues Meeting

DATE & TIME: March 4, 2003 – 1:00 PM (EST)

LOCATION: State Office Building Annex, 1st Fl. Conf. Room, Frankfort KY

DATE OF MINUTES: March 5, 2003

ATTENDEES:

NAME	AGENCY/COMPANY	E-MAIL ADDRESS
Bruce Siria	KYTC - Central Office Planning	bruce.siria@mail.state.ky.us
David Martin	KYTC – Central Office Planning	charles.martin@mail.state.ky.us
?	KYTC – Central Office Planning	?
Barbara Michael	Parsons Brinckerhoff	michael@pbworld.com
Robert Frazier	Parsons Brinckerhoff	frazierr@pbworld.com
Lindsay Walker	Parsons Brinckerhoff	walkerli@pbworld.com
Steven Creasman	Cultural Resource Analysts, Inc.	creasman@crai-ky.com

MEETING SUMMARY

Introduction

Those present introduced themselves and their role on the project. Following introductions, handouts were given to the attendees regarding the location and description of sites located within the study area in Bardwell that are potentially eligible for the National Register of Historic Places.

Bardwell Historic Issues

The attendees discussed the concerns regarding historic issues within the study area for Bardwell first. Robert Frazier outlined the potential historic sites in Bardwell emphasizing the belief that most of the proposed improvements to US 51 through Bardwell should be within the existing right-of-way thereby not impacting the three northernmost potentially historic sites. There are two sites near the curve and hill in town that are likely to cause significant issues with regard to alternative selection. One site is number 36, a Tudor Revival house, and the other site is number 37, the First United Methodist Church. Specific reasons for potential eligibility are not fully known at

this time other than both sites are eligible based on age requirements, and the Tudor Revival house most likely has some form of distinct architectural style. Emphasis was placed on the belief that to perform any physical improvements to the curve and hill, one or both sites would be impacted. Alternative 2D involves realigning the curve, which would require the taking of the Tudor Revival house but would not impact the church property. The other proposed alternative, 4B, would realign the roadway to the east of the church, requiring the taking of the house as well as a mobile home located on the church property. An alternative suggestion was put forth by PB to align the roadway to the west of the church utilizing a portion of Alternative 4B to reconnect to US 51. This proposal would miss the Tudor Revival house and the church property, but would likely require the taking of several businesses and possibly some homes. At this point in the meeting, input was requested for suggestions on what to do about these potentially historic sites.

Bruce Siria stated that if the properties, the house especially, were determined to be eligible for the National Register of Historic Places, it would seem that it is not prudent or feasible to perform any structural improvements to the curve and hill. A suggestion put forth to perform an improvement in the area without physical construction would be to sign the curve as 25 mph since the speed limit is only 25 mph in town. Another potential means for improvement would be to close Front Street at US 51 and put more super elevation into the curve for trucks.

Another potential issue with regard to historic sites in Bardwell was identified by PB to be two houses located south of town. Improvements have been suggested to perform some grading to the hill. Most likely the houses would not be affected, but some right-of-way acquisition may become necessary to perform the site work. Because of property acquisition, it was noted that if the houses are eligible for the National Register of Historic Places, this would be a 4f issue. However, if no property outside the existing right-of-way was affected, then there would be no 4f issue, but potential community issues would still exist.

It was determined by those present that the next step in selecting a workable or preferable alternative would be to determine site eligibility and boundaries. In order to do so, Steven Creasman indicated that a site visit would be necessary. Most of the cost would result from travel to and from the site, therefore it was determined that rather than look at only the sites that are thought to impact alternatives, all potentially historic sites within the area should be surveyed. Once boundaries are located and inspections performed, the documentation would be presented to the State Historic Preservation Office for review which could take up to 30 business days. While this would delay the overall completion of the Bardwell study, it was deemed necessary by those present to determine the status of these sites in order to make an alternative selection. To perform the additional work in Bardwell, a scoping study for the work was requested by the KYTC from PB and CRA Inc.

Clinton Historic Issues

At the beginning of the Clinton discussion of historic issues, handouts detailing the location and description of listed and potentially eligible historic sites were distributed. Those present engaged in a general discussion regarding the impacts that alternative proposals may have with regard to these sites. Robert Frazier briefly outlined the areas of particular concern, including the Cresap Street area, the Hickman County Courthouse, and the Beeler Hill area. All buildings are believed to be set back far enough from the roadway to avoid direct impact, and it is also believed that the existing right-of-way of fifty feet should be sufficient to accommodate any of the proposed improvements. The only identified concerns are possible retaining wall construction near Cresap Street, and the exact location of site boundaries at the court house. If boundaries for the court house are shown to extend into the roadway, issues with right-of-way could occur. It was recommended by PB that the potential for impacts to historic sites in Clinton is not sufficient enough to require further study of site boundaries and eligibility. Those present agreed that no further action would be taken with regard to the historic issues in Clinton for this level of study. However, it was recognized that any selected alternative that was in the vicinity of the listed and potentially eligible sites would be subjected to a baseline study at a later date.

Clinton Environmental Justice Issues

Presented by Robert Frazier was a figure representing the distribution of minority populations in the town of Clinton. Discussion focused on the uncertainty of the definition of a minority population. From the figure, approximately three-quarters of the town of Clinton is a minority population. In order to determine the boundaries of the population, further research was proposed by PB.

Other Study Issues

For the study of US 51 in Bardwell, the status of the archeological site located in the northern section of the study area was discussed. As requested in the Preliminary Alternatives Evaluation meeting with KYTC on January 30, 2003 additional information about the site was gathered. Further analysis revealed that it was discovered by a volunteer and is apparently not disturbed. Robert Frazier then stated that any alternatives that impacted this site had been discarded from consideration, and there should be no further need for site assessment.

A discussion regarding public acceptance of parking removal in Clinton for Alternative 2B improvements also took place. The concern is that there will be significant opposition by the public if parking is removed from town. However, Robert Frazier noted that provisions have been made to provide alternate means of parking including purchasing an empty lot from the city and turning it into a parking lot. Also, it was emphasized that the community currently underutilizes the current available parking, therefore all of the

current parking options would be highlighted to make residents aware of additional parking.

FOLLOW UP ACTIONS

A scope of work and schedule will be submitted to request authorization for potentially historic site evaluations in Bardwell.

PROJECT: US 51 STUDY IN BARDWELL

MEETING: Project Team Meeting No.2

DATE & TIME: April 17, 2003 – 2:00 PM CDT

LOCATION: Crisp Center – Paducah, KY

ATTENDEES:

NAME	AGENCY/COMPANY	Telephone	E-MAIL ADDRESS
David Martin	KYTC - Central Office Planning	502-564-7183	charles.martin@mail.state.ky.us
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Wayne Mosley	KYTC – Dist. 1	270-898-2431	wayne.mosley@mail.state.ky.us
Allen W. Thomas	KYTC – Dist. 1	270-898-2431	allen.thomas@mail.state.ky.us
Tim Choate	KYTC – Dist. 1	270-898-2431	tim.choate@mail.state.ky.us
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Chris Kuntz	KYTC – Dist. 1	270-898-2431	chris.kuntz@mail.state.ky.us
Stephen C. Hoefler	KYTC – Division of Hwy Design	502-564-3280	steve.hoefler@mail.state.ky.us
Stacey Courtney	PADD	270-251-6146	stacey.courtney@mail.state.ky.us
Barbara Michael	Parsons Brinckerhoff	502-479-9301	michael@pbworld.com
Robert Frazier	Parsons Brinckerhoff	502-479-9309	frazierR@pbworld.com
Shawn Dikes	Parsons Brinckerhoff	502-479-9312	dikes@pbworld.com
Stuart Kearns	Jordan, Jones and Goulding	859-224-7776	skearns@jjg.com
Gerry Fister	Third Rock	859-977-2000	gfister@thirdrockconsultants.com

MEETING SUMMARY:

This meeting was held immediately following the Project Team Meetings for the I-66 Corridor Study and the US 51 Study in Clinton. As the meeting for US 51 in Clinton reviewed a number of key background items, these items were not discussed extensively in the Bardwell meeting.

REVIEW OF PROJECT STUDY AREA AND GOALS

At the outset of the meeting, a brief review of the project background information was presented including a review of the study area, study objectives, and project goals.

LEVEL 1 EVALUATION – INITIAL REVIEW

The initial nine alternatives developed for this study were presented. During the Level 1 analysis, six of the nine alternatives were advanced to Level 2 for further study. Those dismissed included Alternative 5B (Eastern Bypass Option B), Alternative 6 (Western Bypass), and Alternative 7 (One-Way Street Option). The primary reasons for dismissing these alternatives were discussed, including expected community and environmental impacts, construction complexity and cost, traffic and safety issues, minimal public support, and comparison to other alternatives that were being retained for further study.

LEVEL 2 AND 3 EVALUATIONS

Next, the six alternatives advanced from Level 1 were presented. Alternative 4A was not recommended for further study because of potential environmental impacts including stream relocation. Also, when compared to Alternative 4B, Alternative 4A was determined to have similar benefits, but with a higher construction cost and with more potential environmental impacts. Therefore, Alternative 4B was retained for further study.

The Project Team then discussed the benefits and drawbacks of Alternative 5A. It was mentioned that Alternative 5A does not alleviate problems with the high crash section in town. It also has potential community impacts due to the shift of through traffic away from town. There are potential environmental impacts including an archeological site and stream crossing at the north end of the proposed corridor. The apparent public opposition to a bypass was also mentioned.

The benefits of the bypass were also discussed such as diversion of truck traffic, decreasing traffic in town, and economic development opportunities. Questions were raised regarding the traffic forecasts and the relationship of the project to the proposed I-66 and I-69 projects. Specifically, the Project Team wanted to know whether the forecasts included the proposed I-66 highway and if not, how I-66 would change the forecasts. It was stated that they did not include I-66. The travel time assumptions and traffic volume forecasts were also questioned. The potential inclusion of traffic signals and the affect of these on the bypass were also discussed. Further information will be developed in response to these questions.

The remaining alternatives proposed were briefly presented and discussed, including 1) Do-Nothing; 2) Spot Improvements; 3) Reconstruction of US 51 as a Two-Lane Highway with Turn Lanes and Sidewalks (Includes Alternative 2 – Spot Improvements); and 4A) US 51 Realignment (south of town). These four are to be analyzed more in Level 3. There was general discussion of the alternatives, looking at the four primary evaluation categories: Transportation, Environment, Community, and Construction / Implementation.

Alternative 2A has a number of key benefits. It is expected to improve traffic operations, increase the turning radii for trucks, and improve safety. The cost estimate for this alternative is the highest of the spot improvements, but it has the greatest potential benefits.

Alternative 2B is also expected to benefit the town as it will remove an unwarranted traffic signal, eliminate unnecessary stops, and can be implemented quickly. There are no known disadvantages.

The expected benefits from the implementation of Alternative 2C are moderate. Increasing the turn radius at the intersection corners of US 51 and KY 123 would benefit turning truck movements, and the estimated construction cost for this improvement is low.

Alternatives 2D and 4B were developed to address the curve and hill on US 51 at the southern end of the town. Alternative 2D involves realigning the curve near the Methodist Church and reducing the grade on the hill leading into the curve. Implementation of this alternative would maintain the existing visibility of businesses in Bardwell at a lower estimated cost than Alternative 4B. Alternative 4B consists of realigning US 51 from the curve by the Methodist Church to between KY 1181 and KY 1377 in the south. This alternative eliminates the curve and hill from the primary through route, and diverts most truck traffic to the realignment. However, it has a high estimated construction cost.

Alternative 3 consists of the reconstruction of US 51 through Bardwell. This project would benefit the town with an improved cross section and new sidewalks and would maintain the visibility of downtown businesses. However, truck traffic will remain in town. There could also be significant utility impacts and the estimated construction cost is high.

The possibility of short-term and long-term recommendations was considered. Following this meeting additional work on the traffic forecasts and documentation is to be assembled. The advantages and disadvantages for each particularly with regard to cost and potential 4f issues will also be examined in more detail before a recommendation is made.

FOLLOW-UP ACTIONS AND NEXT STEPS

A third (and final) Project Work Group meeting is planned for May 2003 to present the Level 3 evaluation results and request feedback regarding the preliminary findings and recommendations. Following the Project Work Group meeting, a second (and final) public workshop will be held. After gathering feedback from the public, a project team meeting will be held to finalize the recommendation(s) for improvements in Bardwell.

Meeting Minutes

PROJECT: US 51 STUDY AT BARDWELL

MEETING: Project Work Group Meeting No. 3

DATE & TIME: May 12, 2003 - 6:30 PM

LOCATION: Old City Hall - Bardwell, Kentucky

MEETING SUMMARY:

Introductions

David Martin, the Kentucky Transportation Cabinet (KYTC) Project Manager, introduced the study. Those present introduced themselves. Attendees were asked to sign-in.

Review of Background Study Information and Existing Conditions Data

Study objectives and project goals were reviewed at the beginning of the presentation. Also highlighted were the study process / schedule and the evaluation process.

A brief summary of the existing conditions data was presented including an overview of current traffic volumes, levels of service, and crash statistics. Graphics illustrating the existing conditions findings were included in the presentation handout materials.

Level 1 and 2 Analysis Findings

Initially, nine alternatives were developed for study in Level 1. Of those nine, six were advanced to Level 2 for further study. Those dismissed included Alternative 5B (Eastern Bypass Option B), Alternative 6 (Western Bypass), and Alternative 7 (One-Way Street Option). Primary reasons for dismissal included expected community / environmental impacts, construction complexity, safety issues, and minimal public support.

Next, the six alternatives advanced from Level 1 were presented. The presentation focused on the two alternatives that were dismissed at this level, Alternatives 4A and 5A. Alternative 4A was not recommended for further study because of potential environmental impacts including stream relocation. Also, when compared to Alternative 4B, Alternative 4A was determined to have similar benefits with less potential impacts. Alternative 5A was not advanced to Level 3 because it does not address safety issues in town, there is an archeological site at the north end of the proposed corridor, and there is significant public opposition for a bypass.

Everyone present seemed to be in agreement to the dismissal of these alternatives.

Presentation / Discussion of Level 3 Analysis Findings

The four remaining alternatives were then presented and discussed with the Work Group. They include 1) Do-Nothing; 2) Spot Improvements; 3) Reconstruction of US 51 as a Two-Lane Highway with Turn Lanes and Sidewalks; and 4A) US 51 Realignment (south of town). To facilitate the discussion, the major advantages and disadvantages associated with each alternative were presented. Also, detailed evaluation matrices were distributed that compared the alternatives in key areas such as Transportation, Environment, Community, and Construction / Implementation. There was general discussion on each of the alternatives.

It was generally agreed that Alternative 2A was a beneficial project since some improvements were warranted at the intersection of US 51 and US 62. The advantages the Alternative 2A improvements include improved traffic operations, increased turning radii for trucks, and improved safety. Some disadvantages for implementing Alternative 2A include limited access to development around the intersection and the relocation of a utility pole. Alternative 2A has the highest estimated cost of spot improvements, but also has the greatest anticipated benefits.

Alternative 2B was also regarded favorably by the Work Group since the removal of the traffic signal is expected to eliminate unnecessary stops in town and can be implemented quickly. There were no known disadvantages associated with this alternative.

Alternative 2C received moderate support. It was recognized that increasing the turn radius at the intersection corners of US 51 and KY 123 would benefit turning truck movements. As a result of low estimated construction cost, the Work Group generally agreed that this was a worthwhile project.

To address the identified high crash section in Bardwell two alternatives remain, Alternatives 2D and 4B. Alternative 2D involves realigning the curve near the Methodist Church and lowering the hill leading into the curve. Implementation of this alternative would maintain the visibility of most businesses in Bardwell at a lower estimated construction cost than Alternative 4B. Alternative 4B consists of realigning US 51 from the curve by the Methodist to between KY 1181 and KY 1377 in the south. This alternative eliminates the curve and hill from the primary through route, and diverts most truck traffic to the realignment. However, it has a high estimated construction cost and public support has been low.

Another option to improving US 51 in Bardwell is Alternative 3 (Reconstruction of US 51). The benefits associated with this project include overall streetscape improvements as well as the maintenance of the visibility of downtown businesses. However, truck traffic will remain in town, there are major utility impacts, and the estimated construction cost is high.

Conclusions

The meeting concluded with a discussion of the potential for a short term and long term recommendation. It was generally agreed by those present that Spot Improvements 2A – 2C could be implemented in a reasonable amount of time and could be considered short term recommendations. Alternatives 2D, 3 and 4B all require more extensive construction, and therefore would be good candidates as potential long term recommendations. All of the Level 3 options presented to the Work Group will be presented at the public meeting with feedback requested as to short term and long term recommendations.

Public Workshop Summary

Tuesday, July 1, 2003

Public Workshop #2

US 51 Planning Study in Bardwell
Carlisle County
Item Number 1-183.00

A Public Workshop was held on Tuesday, July 1, 2003. The workshop was held at the Bardwell Civic Center (Lion's Club) from 4 p.m. to 7 p.m. A total of 21 citizens and twelve staff members signed in at the meeting. A sign-in sheet was posted, a short presentation was given, and handouts were provided. The handouts included the following information:

- A fact sheet explaining information about the study purpose, schedule, alternatives, and how the public could give feedback on the alternatives;
- A map illustrating the refined alternatives;
- A comment form; and
- A brochure from the Kentucky Transportation Cabinet (KYTC) explaining the Road Building Process

The main purpose of the workshop was to 1) provide information about the refined project alternatives; and 2) obtain feedback from the public on the refined alternatives.

The workshop began with a brief introduction by Allen Thomas, Kentucky Transportation Cabinet - District One, Planning Engineer. Mr. Thomas then turned the presentation over to Barbara Michael of Parsons Brinckerhoff (PB). The presentation addressed the following topics:

- Review of the project study area;
- Review of the project study objectives, goals, schedule, evaluation process, and project development process;
- Review of the project traffic information;
- Presentation of the full range of project alternatives, as well as the Level 1 and Level 2 evaluation results;
- Introduction of the Level 3 alternatives;
- Explanation of the public role at the workshop; and
- Contact information for the study.

The remainder of the meeting was conducted in an "open house" format. The attendees were given the opportunity to view exhibits and ask questions about each of the subjects listed above. The exhibits included the following sets of

boards: 1) the study objectives, goals, schedule, evaluation process, and project development process; 2) existing and future traffic conditions, existing environmental conditions, and existing cultural / historic conditions; 3) the study area and the Level 1 and 2 alternatives; and 4) refined (Level 3) alternatives for improving US 51.

The six refined alternatives were displayed on boards and members of the public were engaged to discuss them. The public was also asked to comment on the alternatives using the comment forms provided.

Attendees were asked to complete the comment forms at the meeting. For those who did not complete the forms at the meeting, postage-paid envelopes were provided for returning them to the Division of Planning. Summaries of the public comments received are presented on the following pages.

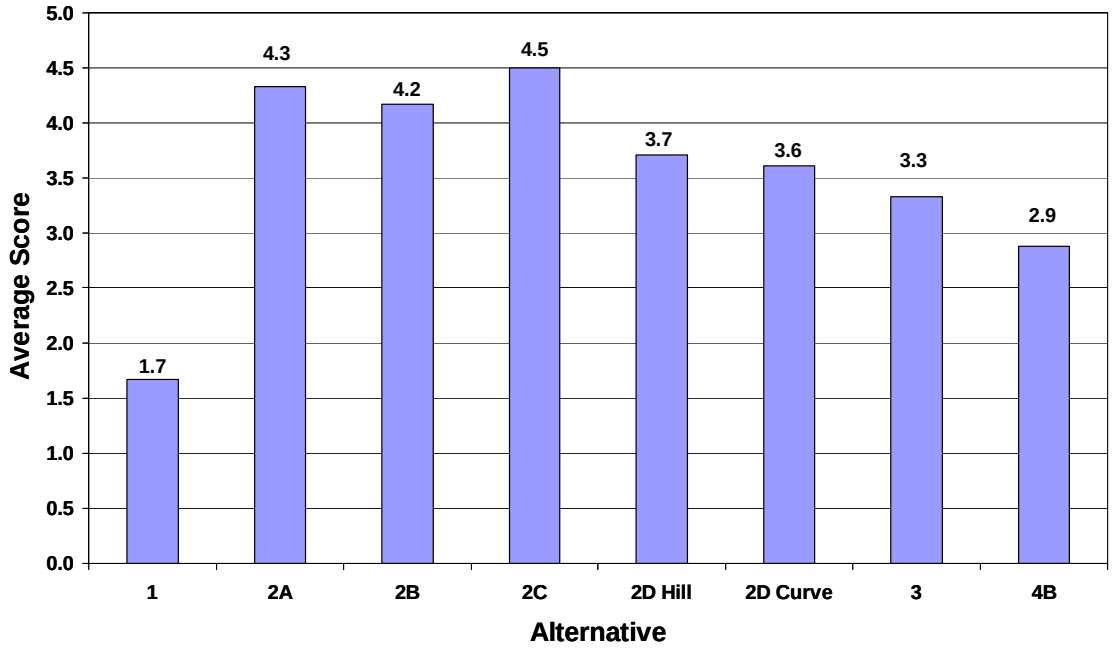
The meeting was adjourned at 7 p.m.

US 51 Study in Bardwell
Public Workshop #2
Public Comment Form Results Summary

The purpose of the second public workshop for the US 51 planning study in Bardwell was to gain public feedback regarding the refined project alternatives to help the Cabinet make decisions about possible future improvements. Comment forms were distributed to all attendees to provide a written record of this feedback. (Comment forms were also mailed out to all work group members not in attendance at the meeting.) A total of 18 completed comment forms were received. A summary of the completed comment form results is presented below.

***Question 1**: Please score the Refined Alternatives.*
The respondents were asked to circle the appropriate number (Between 1 and 5 with 1 corresponding to a score of POOR and 5 corresponding to a score of GOOD).

Average Score of Refined Alternatives



***Question 2**: The Eastern Bypass Alternative was dismissed during the Study's Evaluation Process. In your opinion should a bypass alternative still be considered for Bardwell?*

The respondents were asked to circle only one.

Yes	No
7	11

Note: Based on responses to other comment form questions and comments made in person at the meeting, it is not clear that everyone answering this question understood the question fully.

***Question 3**: THINKING SHORT-TERM (5+ Years) – Which alternative is the best?*
The respondents were asked to circle only one.

Alternative	Number of Respondents	Percentage of Total Respondents
Alternative 1	0	0
Alternative 2A	4	22
Alternative 2B	3	17
Alternative 2C	0	0
Alternative 2D Curve	1	5.5
Alternative 2D Hill	2	11
Subtotal: Alternative 2	**10**	**55.5**
Alternative 3	7	39
Alternative 4B	1	5.5
Total: All Alternatives	**18**	**100**

Note: One respondent put stars next to all of the spot improvements (Alternatives 2A – 2D) and Alternative 3. Because Alternative 3 encompasses all of these alternatives, this response was included with the other Alternative 3 responses for a total of 7 responses.

***Question 4**: WHY is this the best short-term alternative?*
The respondents were asked to check all that apply. Only the alternatives that were circled in Question 3 are shown below (Alternatives 1 and 2C were not circled).

	Alternative					
Issues	**2A**	**2B**	**2D Curve**	**2D Hill**	**3**	**4B**
Improved Vehicle Safety	4	1	1	2	5	1
Improved Traffic Flow	4	3	1	0	7	0
Improve Truck Traffic Operations in Town	4	2	1	2	7	1
Economic Development and/or Opportunities for New Businesses	0	0	0	0	4	0
Least Impact on Existing Businesses	1	2	1	1	3	1
Fewest Property Impacts	1	2	1	1	3	1
Improved Pedestrian Safety	2	0	0	0	5	0
Improved Community Character	2	0	1	0	5	0
Preserves Historic Character	0	1	1	0	2	1
Minimal Utility Impacts	1	1	0	1	1	1
Improves Highway Geometry	2	0	1	1	3	0
Most Benefit for the Cost	1	2	1	0	5	1
Improved Highway Connections	2	0	0	0	4	0
Other	1	0	0	0	0	0
Total Number of Respondents	***4***	***3***	***1***	***2***	***7***	***1***

Note: The issues checked for Question 4 by the respondent that put stars next to all of the spot improvements (Alternatives 2A – 2D) and Alternative 3 as the best short-term alternative are included with the responses for Alternative 3 since Alternative 3 encompasses all of these alternatives.

For Alternative 2A, the respondent that checked "Other" wrote, "Just makes more sense".

Alternative 2A Summary

Four respondents selected Alternative 2A as the best short-term alternative. The top reasons given for the selection of Alternative 2A are:

- Improved Vehicle Safety
- Improved Traffic Flow
- Improve Truck Traffic Operations in Town

Alternative 2B Summary

Three respondents selected Alternative 2B as the best short-term alternative. The top reasons given for the selection of Alternative 2B are:

- Improved Traffic Flow
- Improve Truck Traffic Operations in Town
- Least Impact on Existing Businesses
- Fewest Property Impacts
- Most Benefit for the Cost

Alternative 2D Curve Summary

Only one respondent selected Alternative 2D Curve as the best short-term alternative. The reasons given are listed in the previous table.

Alternative 2D Hill Summary

Two respondents selected Alternative 2D Hill as the best short-term alternative. The top reasons given for the selection of Alternative 2D Hill are:

- Improved Vehicle Safety
- Improve Truck Traffic Operations in Town

Alternative 3 Summary

Seven respondents (including the respondent who put stars next to all of the spot improvements and Alternative 3) selected Alternative 3 as the best short-term alternative. The top reasons given for the selection of Alternative 3 are:

- Improved Traffic Flow
- Improve Truck Traffic Operations in Town

Alternative 4B Summary

Only one respondent selected Alternative 4B as the best short-term alternative. The reasons given are listed in the previous table.

***Question 5**: THINKING LONG-TERM (20+ YEARS) – Which alternative is the best?*

The respondents were asked to circle only one.

Alternative	Number of Respondents	Percentage of Total Respondents
Alternative 1	0	0
Alternative 2A-D	7	39
Alternative 3	6	33
Alternative 4B	5	28
Total: All Alternatives	**18**	**100**

Note: One respondent put stars next to both Alternative 2A-D and Alternative 3. Because Alternative 3 encompasses all of these alternatives, this response was included with the other Alternative 3 responses for a total of 6 responses.

***Question 6**: WHY is this the best long-term alternative?*

The respondents were asked to check all that apply. Only the alternatives that were circled in Question 5 are shown below (Alternative 1 was not circled).

	Alternative		
Issues	**2A-D**	**3**	**4B**
Improved Vehicle Safety	5	4	3
Improved Traffic Flow	7	4	3
Improve Truck Traffic Operations in Town	6	4	4
Economic Development and/or Opportunities for New Businesses	5	5	2
Least Impact on Existing Businesses	6	2	2
Fewest Property Impacts	4	1	2
Improved Pedestrian Safety	3	4	1
Improved Community Character	2	4	0
Preserves Historic Character	1	4	3
Minimal Utility Impacts	1	2	3
Improves Highway Geometry	2	3	1
Most Benefit for the Cost	3	4	1
Improved Highway Connections	1	4	2
Total Number of Respondents	***7***	***6***	***5***

Note: The issues checked for Question 6 by the respondent that put stars next to Alternative 2A-D and Alternative 3 as the best long-term alternative are included with the responses for Alternative 3 since Alternative 3 encompasses all of these alternatives.

Alternative 2A-D Summary

Seven respondents selected Alternative 2A-D as the best long-term alternative. The top reasons given for the selection of Alternative 2A-D are:

- Improved Traffic Flow
- Improve Truck Traffic Operations in Town
- Least Impact on Existing Businesses

Alternative 3 Summary

Six respondents (including the respondent who put stars next to Alternatives 2A-D and 3) selected Alternative 3 as the best long-term alternative. The top reasons given for the selection of Alternative 3 are:

- Economic Development and/or Opportunities for New Businesses
- Improved Vehicle Safety
- Improved Traffic Flow
- Improve Truck Traffic Operations in Town
- Improved Pedestrian Safety
- Improved Community Character
- Preserves Historic Character
- Most Benefit for the Cost
- Improved Highway Connections

Alternative 4B Summary

Five respondents selected Alternative 4B as the best long-term alternative. The top reasons given for the selection of Alternative 4B are:

- Improve Truck Traffic Operations in Town
- Improved Vehicle Safety
- Improved Traffic Flow
- Preserves Historic Character
- Minimal Utility Impacts

***Question 7**: Which alternative is the worst (regardless of timeframe)?*
The respondents were asked to circle only one.

Alternative	Number of Respondents	Percentage of Total Respondents
Alternative 1	9	53
Alternative 2A	0	0
Alternative 2B	1	6
Alternative 2C	0	0
Alternative 2D Curve	0	0
Alternative 2D Hill	1	6
Alternative 3	1	6
Alternative 4B	5	29
Total: All Alternatives	**17**	**100**

Note: One response to this question was not included. Based on responses to other questions, the respondent was clearly confused about this question. This respondent had circled Alternative 3 as the worst alternative, and wrote in the 'Others' box for Question 8, "The bypass would be terrible for existing business within Bardwell".

***Question 8**: WHY do you think it is the worst alternative?*
The respondents were asked to check all that apply. Only the alternatives that were circled in Question 7 are shown below (Alternatives 2A, 2C, and 2D Curve were not circled).

	Alternative				
Issues	**1**	**2B**	**2D Hill**	**3**	**4B**
Property Impacts	1	0	1	1	4
Business / Economic Impacts	3	1	0	1	3
Traffic Impacts	7	1	0	0	0
Utility Impacts	3	0	0	1	1
Truck Traffic Impacts	7	1	0	0	0
Access Control Impacts	4	0	1	0	0
Community Character Impacts	4	0	0	1	1
Other Community Impacts	1	0	0	0	0
Environmental Impacts	3	0	0	0	4
Historic Property Impacts	1	0	0	1	2
Few Safety Benefits	6	1	1	1	2
Few Traffic Flow Benefits	6	1	1	0	2
Few Opportunities for New Businesses	4	0	1	1	1
High Cost / Low Benefit	0	0	0	0	1
Farmland Impacts	1	0	0	0	5
Others	2	0	1	0	0
Total Number of Respondents	***9***	***1***	***1***	***1***	***5***

Note: For Alternative 1, one respondent wrote, "Needs to be done" in the 'Others' box. Another respondent wrote, "Ignores problems!" in the 'Others' box for Alternative 1. For Alternative 3, one respondent wrote, "What's the point?" in the 'Others' box.

Alternative 1 Summary

Nine respondents selected Alternative 1 as the worst alternative. The top reasons given for the selection of Alternative 1 are:

- Traffic Impacts
- Truck Traffic Impacts

Alternative 2B Summary

Only one respondent selected Alternative 2B as the worst alternative. The reasons given are listed in the previous table.

Alternative 2D Hill Summary

Only one respondent selected Alternative 2D Hill as the worst alternative. The reasons given are listed in the previous table.

Alternative 3 Summary

Only one respondent selected Alternative 3 as the worst alternative. The reasons given are listed in the previous table.

Alternative 4B Summary

Five respondents selected Alternative 4B as the worst alternative. The top reasons given for the selection of Alternative 4B are:

- Farmland Impacts
- Property Impacts
- Environmental Impacts

Question 9: *Additional comments on any of the alternatives?*

Numerous additional comments were received. These comments are included in the full public meeting documentation. A few of the pertinent comments include:

- Hwy 51 Needs! improvements especially thru Bardwell and all the towns on 51 from Illinois to Tennessee state line.
- Would like to see all done and in a "phased-in" manner. Start with 2A – D spot improvements then Alternative 3 and 4 longer term.
- US 51 through Bardwell definitely needs improvements. Could favor 4B as second choice. Alternative 3 would enhance visual impact of town resulting in pride of ownership not just in Bardwell, but county as a whole.
- I would like to see more than one stop light in town because of the trucks. It would slow trucks down to reasonable speed.
- Any improvement would be great that would keep the traffic flow traveling past the businesses within Bardwell. Good luck with the development.
- Repair and improve on what is there.
- There seems to be no need for major work / bypass etc. for our traffic.
- Thank goodness the eastern bypass alternative was eliminated.

Supplemental Public Comment Form Responses

A supplemental comment form was available at the meeting. It was also mailed out to the project work group members not in attendance at the meeting. This supplemental form gave respondents the opportunity to provide additional comments on each of the refined alternatives. Three supplemental forms were returned. The comments given on these forms are listed below.

Alternative 1 Comments Summary

- No
- It has been obvious in Bardwell for over 20 years (actually 35+) that the sidewalks need fixing, adding, or building; storm drains don't work and 51 floods; the stoplight needed moving when 62 was built! With the number of auto accidents and pedestrian accidents occurring – something must be done.

Alternative 2A Comments Summary

- Good first phase – but still need more improvement.
- Agree, move current stoplight to this location.
- Great start! With the 5-way access at this point, entering 51 is dangerous from any location. Limited access, traffic light and a wider turn for the "huge" log trucks is needed. If you are on 62 and a truck turns left from 51 you must back up or get hit. (Usually there is someone behind you!)

Alternative 2B Comments Summary

- Bardwell needs traffic light somewhere.
- Agree
- Should have been done 20+ years ago!

Alternative 2C Comments Summary

- Needed – but not enough to achieve all needed improvements.
- Agree
- Mostly farm trucks. Pulling out onto 51 becomes a problem when cars park on either side of 123 and block the view. When vehicles are traveling 25 mph on 51 you have time to react; at 45 mph and higher (usually found) you can easily pull out and get hit.

Alternative 2D Curve Comments Summary

- If included with Alternative 3.
- Agree, if possible.
- This does not address blind pullouts on top of hill.

Alternative 2D Hill Comments Summary

- If included with Alternative 3.
- Not sure what this will accomplish!
- The business on this hill, and homeowners that I spoke to would rather not have the traffic on their part of the road. Most of the VFW and Lions are older and less traffic would increase the safety of the drivers.

Alternative 3 Comments Summary

- Best alternative for traffic flow improvements and economic stability in the town.
- Add a middle turn lane to Hwy 51 through town.
- Phase 1 of Alternative 3 needs to be combined with 4B. Through town to Methodist Church – this would be essential to improve traffic safety in town. Drop Phase 2.

Alternative 4B Comments Summary

- No Bypass
- Possible if funds are available.
- Yes, this bisects farmland – but opens up the south end of Bardwell to potential new business sites. This would impact Bardwell less during the building phase than Alternatives 4D or 3.

Parsons Brinckerhoff Quade & Douglas, Inc.

Meeting Minutes

PROJECT: US 51 STUDY IN BARDWELL

MEETING: Project Team Meeting No.3

DATE & TIME: July 2, 2003 – 11:00 AM CDT (12:00 PM EDT)

LOCATION: KYTC District 1 Conference Room – Paducah, KY

ATTENDEES:

NAME	AGENCY/COMPANY	E-MAIL ADDRESS
David Martin	KYTC – Central Office Planning – Project	charles.martin@mail.state.ky.us
Wayne Mosley	KYTC – District 1 Chief District Engineer	wayne.mosley@mail.state.ky.us
Allen Thomas	KYTC – District 1 Planning Branch Manager	allen.thomas@mail.state.ky.us
Tim Choate	KYTC – District 1 Pre-Construction Branch	tim.choate@mail.state.ky.us
Jeff Thompson	KYTC – District 1 Planning	jeffc.thompson@mail.state.ky.us
Chris Kuntz	KYTC – District 1 Pre-Construction	chris.kuntz@mail.state.ky.us
Robert Brown	KYTC – Central Office Planning	
Stacey Courtney	Purchase Area Development District	stacey.courtney@mail.state.ky.us
Tom Creasey	Jordan, Jones and Goulding	tcreasey@jjg.com
Stuart Kearns	Jordan, Jones and Goulding	skearns@jjg.com
Barbara Michael	Parsons Brinckerhoff	michael@pbworld.com
Robert Frazier	Parsons Brinckerhoff	frazierR@pbworld.com
Lindsay Walker	Parsons Brinckerhoff	walkerli@pbworld.com

MEETING SUMMARY:

Immediately following the final Project Team Meeting for the US 51 Study in Clinton, the Project Team reconvened for the final meeting for the US 51 Study in Bardwell. As these were separate meetings, being held together for convenience, there are two sets of meeting minutes. Please refer to the corresponding meeting minutes for information on the Clinton study.

Barbara Michael (PB) stated that the purpose of this meeting was for the Project Team to review the project alternatives and evaluation, and agree upon a final recommendation for the US 51 Study in Bardwell.

REVIEW OF ALTERNATIVE EVALUATION LEVELS 1 AND 2

Barbara Michael briefly reviewed the Level 1 and Level 2 evaluations. A total of 9 preliminary alternatives were analyzed in the Level 1 evaluation. A qualitative analysis was used to determine which alternatives would be recommended for advancement to Level 2. Of the 9 preliminary alternatives, six were advanced to the second level of evaluation.

The Level 2 analysis procedure consisted of a combination of qualitative and quantitative measures designed to further reduce the list of alternatives to the most promising alternatives. Four of the six remaining alternatives analyzed at this level were recommended for advancement to the third and most detailed level of evaluation (Alternative 2 – Spot Improvements included five separate elements).

The bypass alternatives proposed at the outset of the study were not recommended to proceed to the detailed Level 3 evaluation. Some of the reasons for setting aside the eastern bypass alternative in Level 2 were low traffic volumes on the bypass, a small travel time savings, public and political opposition, potential community and economic impacts, and a need to address safety issues on US 51 in the town. Therefore, no bypass alternatives were advanced to the Level 3 evaluation. The alternatives put forth for Level 3 included upgrades and realignments of the existing highway (as listed below).

LEVEL 3 EVALUATION – REFINED ALTERNATIVES

Robert Frazier presented the refined alternatives to be considered for recommendation. The alternatives to be considered included:

- Alternative 1 – No-Build
- Alternative 2A – Improve US 51 / US 62 intersection with turn lanes and install new traffic signal
- Alternative 2B – Remove traffic signal at the intersection of US 51 and Jennings Street
- Alternative 2C – Improve US 51 / KY 123 intersection to better accommodate turning truck movements
- Alternative 2D Curve – Realign curve by Methodist Church on US 51
- Alternative 2D Hill – Reduce grade on hill south of town by the Bardwell Civic Center (Lions Club)
- Alternative 3 – Reconstruct US 51 as a two-lane highway from north of town to the vicinity of KY 1377, with access control in town
- Alternative 4B – Realign US 51 between the Methodist Church and the vicinity of KY 1181 and KY 1377

During the presentation of each alternative, a brief description of the improvements was given as well as the advantages and disadvantages of each alternative.

FINAL RECOMMENDATIONS

To facilitate the meeting, a discussion regarding a recommendation for each alternative was held after each alternative was introduced. The spot improvements were identified as potential short-term recommendations with Alternatives 3 and 4B as potential long-term recommendations. There was a general understanding among those present that any of the alternatives or a combination of alternatives could be recommended.

At the outset of the discussion, a question was raised regarding the decision to remove a bypass from consideration in the Level 2 evaluation. There was discussion that a bypass could facilitate traffic flow from US 51 to US 62 by redirecting the through traffic away from Bardwell. However, the alternative analysis in Level 2 showed that the current and future levels of service for US 51 were adequate, and the projected traffic volumes on the bypass were very low. Instead there was found to be a need to fix US 51 through town due to the high crash rate

(which was not necessarily related to through truck traffic). There was also vocal opposition to the project among both local leaders and the public. Based on this analysis, the construction of a bypass around Bardwell was not justified. The majority of the Project Team agreed with this conclusion. The remainder of the discussion focused on the proposed improvement alternatives presented in Level 3. The comments related to each alternative are presented below.

Alternative 1

There was agreement that improvements to US 51 are required and that the No-Build alternative is inadequate given the known deficiencies.

Spot Improvements 2A – C

The Project Team members agreed that Spot Improvements 2A – C were all improvements that should be made regardless of any other recommendation. They are warranted and important.

Spot Improvement 2D and Alternative 4B

The Project Team discussed the safety problems associated with the curve at the Methodist Church and the hill near the Lions Club building and agreed that improvements to fix them were warranted. The benefits and drawbacks of fixing the current alignment versus building a new highway (Alternative 4B) were discussed.

The benefits of fixing the current alignment were identified as less right-of way required, lower project costs if only the curve and hill are fixed, and the ability to phase the improvements. Disadvantages included maintenance of traffic issues, construction complexity, and potential impacts to several houses located along US 51 as well as the Lions Club and a chiropractic office. The residential impacts would be similar for 2D and 4B. Alternative 4B would be easier to construct than Alternative 2D. However, it was viewed by the Project Team as requiring too much property, and being too costly without really bypassing anything. It was decided that it was more appropriate to fix the existing highway than to build a new highway south of the town.

Alternative 3

The reconstruction of US 51 was identified as offering important safety benefits. It would also improve drainage and the poorly maintained sidewalks through town, essentially upgrading the road to a modern two-lane urban arterial. It does not offer significant level of service improvements other than at US 51 / US 62. However, the majority of Project Team members agreed that some Alternative 3, fixing the current highway, should be recommended.

To form a group consensus, each member was asked to voice his or her opinion on the alternative(s) he/she recommended. After all the Project Team members spoke, the final recommendation for improvements to US 51 in Bardwell was determined to be a phased improvement program beginning with Alternative 2 spot improvements A-C, followed by a phased implementation of Alternative 3.

Final Meeting Minutes

PROJECT: US 51 STUDY IN BARDWELL

MEETING: Cultural Historic Resource Meeting

DATE & TIME: September 11, 2003 at 2:00 PM

LOCATION: KYTC State Office Bld. Annex, 1st Fl. Conf. Room – Frankfort, KY

ATTENDEES:

NAME	AGENCY/COMPANY
David Martin	KYTC Central Office Planning – Project
Daryl Greer	KYTC Central Office Planning
David Waldner	KYTC Division of Environmental Analysis
Rebecca Turner	KYTC Division of Environmental Analysis
Amelia Armstrong	KYTC Division of Environmental Analysis
Craig Potts	Kentucky Heritage Council
Barbara Michael	Parsons Brinckerhoff
Robert Frazier	Parsons Brinckerhoff
Steve Creasman	Cultural Resource Analysts
Dean Doerrfeld	Cultural Resource Analysts

MEETING SUMMARY:

David Martin initiated the meeting, indicating the purpose of the meeting was to address cultural historic property issues related to the US 51 Study in Bardwell, KY. Subsequently, everyone present introduced themselves.

PROJECT REVIEW

Robert Frazier gave a brief overview of the study background, study purpose, key issues and the alternatives considered in the study. The alternatives included both in-town and bypass options. He presented the alternative recommended by the project team, which is a phased upgrade of the existing highway to meet current design criteria for a two-lane highway. In town, the current rural cross section would be replaced by a curb and gutter cross section with sidewalks.

DISCUSSION OF CULTURAL HISTORIC PROPERTIES

Discussion then turned to the specific properties examined in Cultural Resource Analysts' report "Cultural Historic Overview Survey and Determinations of Eligibility for the US 51 Corridor in Bardwell, Carlisle County, KY", prepared in April 2003. (The report addressed 65 sites, 48 of which were previously unidentified cultural historic sites. It then examined 12 sites in more

detail to make recommendations regarding a determination of eligibility for each site. Eight of the sites were recommended as eligible and four as ineligible for the National Register of Historic Places.) The four sites recommended as ineligible in the report were discussed first (Sites #31, #1, #16, and #37).

Discussion regarding Site #31, a brick Tudor Revival house, centered on the fact that it was not an outstanding example of the Tudor Revival style. There was another property a short distance up the street that was viewed as a better example and was recommended as eligible for the National Register of Historic Places (NRHP). Site #31, would be impacted by the recommended alternative, which would flatten the horizontal curve on US 51 at that location. If the property is eligible for the NRHP, then a competing resources situation would exist. The alternatives avoiding this property include bypassing the town, realigning the roadway significantly south of town (with other potential environmental issues) or doing nothing to fix the deficient curve at this location. Directly across US 51 from this house is a Methodist Church (Site #32) that is recommend as eligible, restricting improvements on the other side of the highway.

Site #1 is a one and a half story, frame, T-plan house that was recommended as ineligible (it was not viewed as an outstanding example, has been altered, and is a common style in the area). It was discussed that the recommended alternative is not expected to affect Site #1 unless the site boundary extends to the current highway right-of-way (ROW) and it is determined that the railroad ROW abuts the highway ROW on the west side. In this case Site #1 could become an issue for the project.

Site #16 is a two-story three-bay brick commercial structure located on US 51. It was recommended as ineligible. The building appears to be built up to the current highway ROW, with only a narrow sidewalk separating it from the travel lanes. It was discussed that if the property were deemed eligible for the NRHP, that the site boundary would be the building itself.

Site #37 is a one-story, eight-bay, brick commercial structure. The site was recommended as ineligible (for the reasons outlined in the study). However, this site will not be impacted by the currently proposed project because it is located on Front Street. There was little further discussion regarding this property.

Site #15 was discussed because it fronts US 51 in town in an area where some new ROW may be required. (It is diagonally across the street from Site #16 discussed above.) The site was recommended as eligible with a proposed boundary extending to the current highway ROW. It was agreed that if the project required a small portion of the front yard of this property for adding urban section improvements (such as a sidewalk) then this would be viewed as “no adverse effect”. This was agreed because the improvements would benefit the property. It was decided that this house was made to be close to the street and a sidewalk would be a benefit.

In the course of the discussion, the Kentucky Heritage Council (KHC) representative stated that they would prefer not to see the town bypassed. He indicated that he would send a letter supporting an in-town alternative. It is probable that an in-town alternative would be determined to have “no adverse effect”; however more information and evaluation will be required to make this determination. Overall, a determination of effect cannot be made until all of the information has been considered and there is consensus between the KYTC Division of Environmental Analysis and the State Historic Preservation Office.

KHC also requested further documentation on why the downtown Bardwell area should not be considered a historic district. CRA indicated that it lacks continuity and integrity, with many missing buildings that are now vacant lots or paved areas. KHC requested further information supporting this recommendation.

FOLLOW-UP ACTIONS AND NEXT STEPS

- It was agreed that Cultural Resource Analysts (CRA) would assemble and examine all available information sources regarding the four properties recommended as ineligible and especially Site #31. This could include pictures of the buildings and surrounding areas. CRA will provide further documentation supporting any recommendations of ineligibility. CRA will also provide information on why the downtown area should not be considered a historic district. CRA will send this updated information to the KYTC Division of Environmental Analysis (DEA) for review.

- DEA will forward the information from CRA to the Kentucky Heritage Council for re-evaluation.

- The Kentucky Heritage Council will send a letter supporting the in-town alternative.

- Staff from DEA and the KHC may view the site on September 23, 2003 for additional background for the evaluation.

- The KYTC Division of Planning will be copied on all correspondence. David Martin, P.E., the project manager, is the appropriate contact.

APPENDIX F:
EVALUATION METHODOLOGY

Level 1 Evaluation Methodology

The initial screening analysis seeks to apply a few qualitative evaluation measures to all alternatives at the top of the pyramid in order to eliminate from further consideration those alternatives that are infeasible or do not adequately address the project's goals and issues. Sometimes referred to as a "Fatal Flaw" screening, this first level of analysis relies mainly on qualitative criteria. The focus of the analysis is a matrix designed to compare the alternatives in five key areas.

- **Implementation / Construction Feasibility –** How does an alternative compare to the other alternatives with regard to expected costs and constructability?
- **Project Goals –** How does the alternative compare to the other alternatives in terms of addressing the key project goals and issues identified by the public and in the technical analysis?
- **Community Impacts –** How does the alternative compare with regard to community impacts including anticipated property impacts, business impacts, environmental justice issues, traffic impacts, community facility impacts, etc.?
- **Environmental Impacts –** How does the alternative compare to other alternatives with regard to environmental impacts (i.e. does it cross wetlands, floodplains, or other sensitive areas)?
- **Public Support –** How does the alternative compare with regard to public and political support? This includes the results of the first public meeting as well as the Project Work Group and stakeholder meetings held for the project.

In each evaluation area, a qualitative assessment was completed for each alternative. This included answering the above questions qualitatively and comparing the alternatives to each other. The result of this assessment was the assignment of a rating of "Good", "Fair", or "Poor" to each alternative for each category. A rating of "Good" indicates that the alternative is expected to have more positive impacts and/or fewer negative impacts for that evaluation criterion, especially in comparison to the other alternatives. A rating of "Fair" indicates that an alternative will be about average in that category. A "Poor" rating indicates that the alternative is expected to have more negative impacts and/or fewer positive impacts for that evaluation criterion, especially in comparison to other alternatives.

Based on an alternative's ratings across the five categories, a recommendation was made regarding the need for further study in Level 2. The No-Build was used as the benchmark rating. If on average, across the categories, an alternative rated approximately as well as, or better than, the No-Build it was recommended for further study. If, when all five categories were considered it fell below the No-Build, then it was generally not recommended for further study in Level 2.

Level 2 Evaluation Methodology

The focus of this analysis is similar to that used in Level 1 since it uses the same basic analysis categories. However, many subcategories are introduced to provide a detailed comparison of the alternatives. The evaluation categories and subcategories include:

Traffic Operations

1. *Traffic Benefits* – How does the alternative compare to other alternatives with regard to improving traffic flow and travel time (none, low, medium, high)?
2. *2002 and 2030 Average Daily Traffic (ADT)* – How many vehicles per day will use the highway (Refer to the Traffic Forecast Section in Appendix F)?
3. *Truck Traffic Benefits* – How does an alternative compare to other alternatives with regard to providing improvements for truck traffic flow on US 51 (none, low, medium, high)?
4. *Vehicle/Pedestrian/Bicycle Safety Benefits* – How does the alternative compare to other alternatives with regard to providing safety benefits (none, low, medium, high)?

Environment

1. *Natural Environment* – How many streams, wetlands, floodplains, threatened and endangered species are potentially impacted?
2. *Human Environment* – How many potential archeological sites, historic sites, agricultural districts/farmlands, and hazardous material sites are impacted?

Community

1. *Economic Development Impacts* – How does an alternative compare to the other alternatives in affecting the businesses located on the current US 51 and how does an alternative compare with regard to opportunities for new development (good, fair, poor)?
2. *Buildings Impacted* – How many homes, businesses, or other miscellaneous outbuildings will be removed for construction?
3. *Community Impacts* – How does the alternative compare to the other alternatives with regard to potential property impacts, parking impacts, mobility, and land use disruption (good, fair, poor)?
4. *Community Character* – How does the alternative compare to other alternatives with regard to enhancing the community such as providing walking/bicycling paths, or preserving/enhancing community character (good, fair, poor)?

Public Support

1. *Public Support* – Based on input from the first public meeting, Project Work Group meetings, and stakeholder meetings, what percentage of the community favors an alternative or type of alternative?

Implementation / Construction

1. *Construction Feasibility* – For each alternative, what is the level of difficulty for construction (good, fair, poor)?
2. *Construction Length* – What is the total estimated length of construction (in miles) for both in-town and bypass alternatives?
3. *New Right-of-Way Required* – For each alternative, how much new right-of-way (in acres) will need to be acquired?
4. *Potential Utility Impacts* – For each alternative what is the level of potential impact to the existing utilities (good – minimal impact, fair – moderate impact, poor – major impact)?
5. *Cost Estimate* – For each alternative, how does the order of magnitude cost estimate compare to the other alternatives? For this evaluation criterion, two scales are used to compare the costs. Rankings assigned to the Alternative 2 Spot Improvements are: Low < \$500,000 ≤ Medium < \$1 million ≤ High. For the rest of the alternatives, the following scale is applied: Low < \$ 3 million ≤ Medium < \$6 million ≤ High.

Level 3 Evaluation Methodology

The purpose of the Level 3 evaluation is to complete a more detailed examination of the alternatives remaining after the Level 2 evaluation, leading to the recommendation of a preferred alternative or set of alternatives. Additional data is available at this level for a more definitive comparison of the alternatives. The Level 3 analysis uses the same basic analysis categories as the Level 1 and 2 evaluations, with some further refinement of the subcategories. The detailed Level 3 evaluation criteria include:

Traffic Operations

- Average Daily Traffic (ADT) on US 51 in Town
- Level of Service (LOS)
- Truck Traffic Benefits
- Estimated 2030 Truck Volumes in Town
- Vehicle/Pedestrian/Bicycle Safety Benefits

Environment

- Number of Streams Impacted
- Wetlands Impacted
- Floodplain Impacts
- Threatened and Endangered Species
- Number of Potentially Historic Sites that May be Impacted
- Potential Agricultural District/Farmland Impacts
- Potential Hazardous Material Sites

Community

- Economic Development Impacts
- Buildings / Property Impacts
- Community Impacts

- Community Character
- Public Support

Implementation / Construction

- Construction Length
- Constructability Issues
- New Right-of-Way Required
- Cost Estimate

APPENDIX G:
TRAFFIC FORECAST SUMMARY

Future Traffic Scenarios

Traffic forecasts were developed to evaluate the six alternatives that advanced beyond the Level 1 screening process. The alternatives are grouped into three traffic forecast scenarios as shown below in Table 1, because a number of them have similar alignments and functional characteristics (such as travel time and length). Even though they were grouped for forecasting purposes, the traffic operations characteristics (e.g. level of service) for each alternative were evaluated separately when applicable.

Table 1: Alternative Traffic Forecast Group

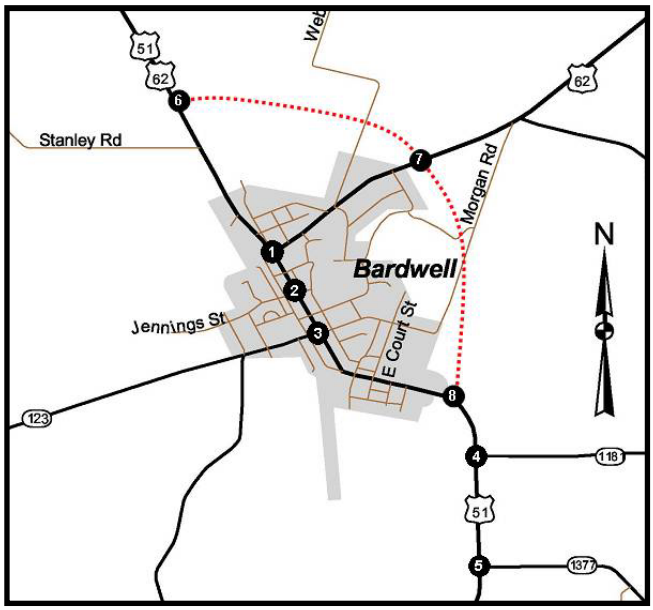
Traffic Forecast Scenario	Alternatives
Group 1	Alternative 1 – No-Build Alternative 2 – Spot Improvements Alternative 3 – Reconstruct US 51 as 2-Lane Roadway with Turn Lanes
Group 2	Alternative 4A – US 51 Realignment West of the Methodist Church Alternative 4B – US 51 Realignment East of the Methodist Church
Group 3	Alternative 5A – US 51 Eastern Bypass

For each scenario, average daily traffic (ADT) and design hourly volume (DHV) forecasts were developed for US 51 for the following years: 2002 (the base year), 2010, 2020, and 2030 (the design year). For 2002, the "forecast" is an estimation of traffic volumes assuming the conceptual alternatives were already constructed.

In addition to mainline estimates for US 51, ADT and DHV turning movement forecasts were developed for the intersections listed below and shown on Figure 1.

1. US 51 and US 62
2. US 51 and Jennings St.
3. US 51 and KY 123
4. US 51 and KY 1181
5. US 51 and KY 1377
6. US 51 North and Bypass *(Alt. 5A only)*
7. US 62 and Bypass *(Alt. 5A only)*
8. US 51 South and Bypass *(Alt. 5A only)*

Figure 1: Intersection LOS Locations



Traffic Forecast Methodology

The traffic forecasts were developed manually, based on historic traffic volumes, growth projections, estimated origin / destination patterns, and travel times. For Alternatives 1, 2, and 3 this meant applying a growth factor to the current 2002 volumes to estimate the future volumes. For the realignment and bypass alternatives, a manual gravity diversion analysis was used to estimate the percentage of diverted traffic. Existing turning movements were estimated at major intersections to approximate origins and destinations of vehicles in the study area. For Alternatives 4A and 4B the major movement was shifted to the realigned US 51 and only local access traffic was retained on the old US 51.

For the bypass alternative (Alternative 5A), traffic volumes were diverted based on manual gravity distribution calculations, employing the California diversion curves to determine the percentage of diverted traffic. The bypass forecasts were developed based on the assumption that land use will remain constant. Redevelopment of land within the bypass corridor would serve to attract more traffic on the bypass. However, economic development projections as a result of land use changes along the bypass were not part of the forecasting scope of work.

As discussed for the No-Build traffic forecasts in Section 3.7, historic count data for the study area was analyzed to project a future traffic growth rate. Between 1985 and 2002, the average growth rate of traffic volumes on US 51 was 0.6 percent per year. (Traffic on US 51 has actually declined by about 20 to 25 percent since 1976 due in part to traffic shifting to Interstate 55 in Missouri.) The population growth rate for Carlisle County is less than the statewide average, with the town of Bardwell showing a slight decline in the 2000 Census. Overall, a growth rate of 1.5 percent per year was used to forecast future traffic volumes.

Future Traffic Volumes

Traffic forecasts are expected to be similar for Alternatives 1, 2, and 3 since the alignment of US 51 does not change. Therefore, the traffic forecasts for Alternative 1 shown in Figure 11 in Appendix B also apply for Alternatives 2 and 3. The traffic projections show a peak volume of 8,500 vehicles per day on US 51 just south of US 62. Truck traffic percentages for the year 2030 for Alternatives 1, 2, and 3 are shown on Figure 2. Truck traffic in town is estimated at approximately 700 to 750 vehicles per day. The volume of truck traffic just north of town however reaches nearly 1,000 vehicles per day because of the added truck traffic from US 62.

For Alternatives 4A / 4B and Alternative 5A, the forecasts are presented in Figures 3 and 5 respectively with truck percentages for the year 2030 shown in Figures 4 and 6, respectively. The Alternative 4A / 4B forecasts show 4,900 vehicles per day and nearly all of the trucks shifting to the realigned US 51 in 2030. Approximately 600 – 1,800 vehicles per day remain on the old US 51 for local access in 2030.

Figure 2: Year 2030 No-Build and Alternatives 2 and 3
Truck Traffic Percentages

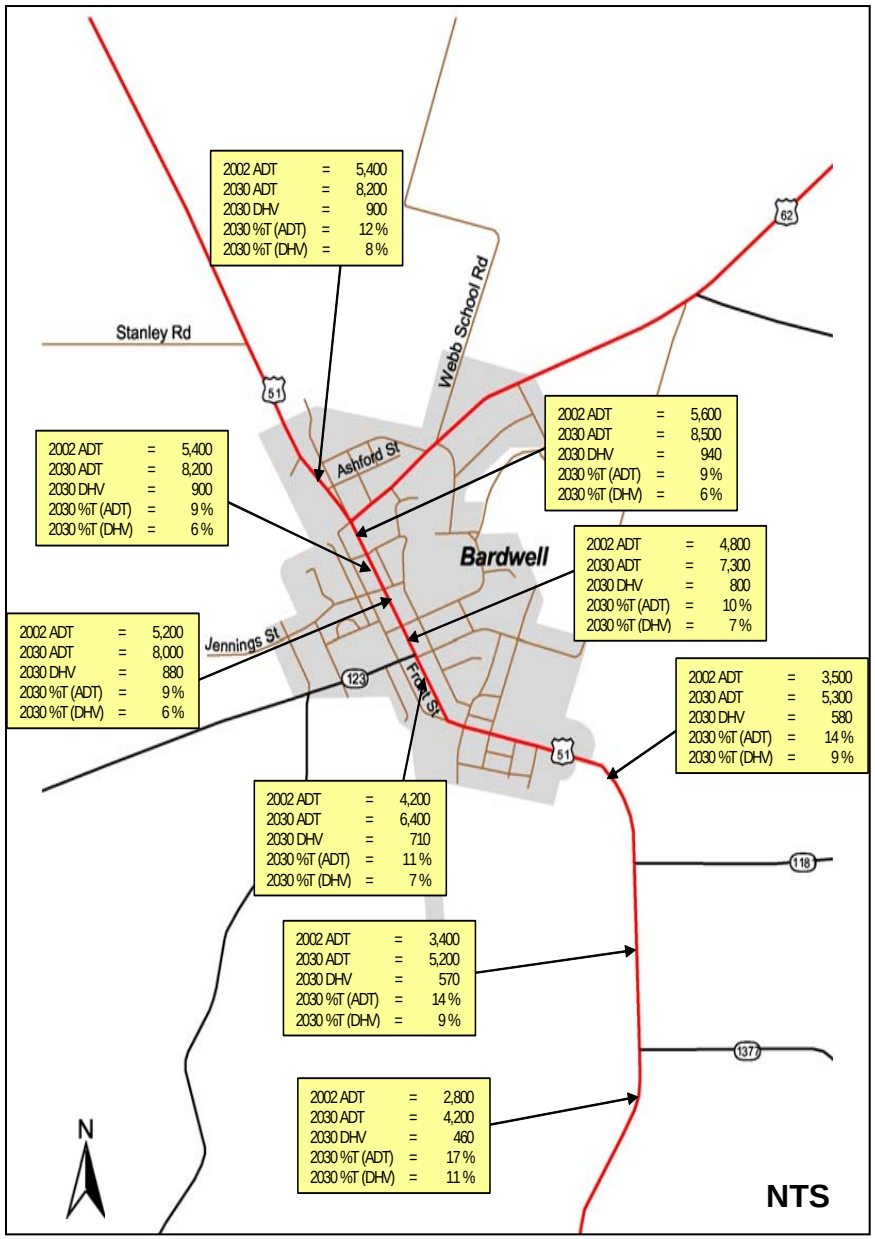


Figure 3: Alternatives 4A and 4B Traffic Forecasts

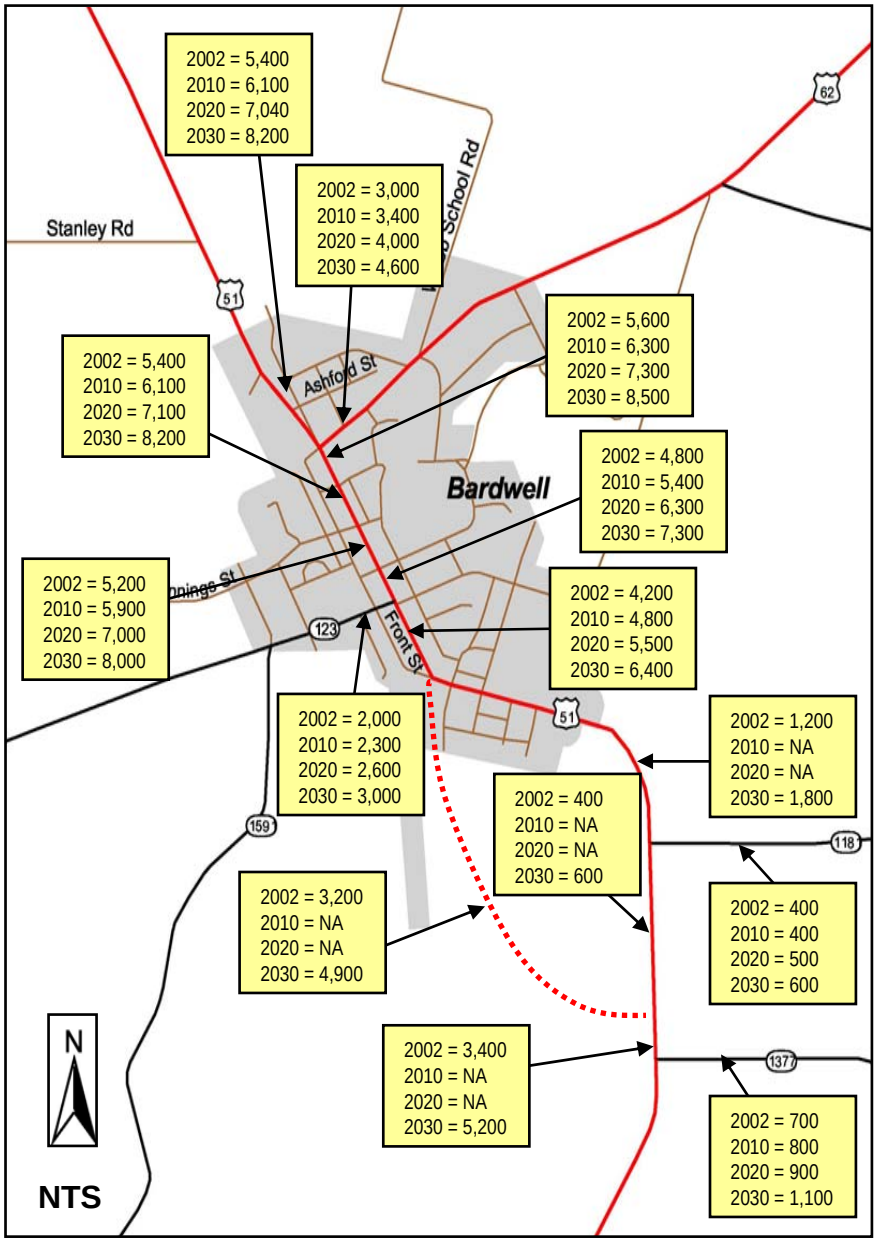


Figure 4: Year 2030 Alternatives 4A and 4B Truck Traffic Percentages

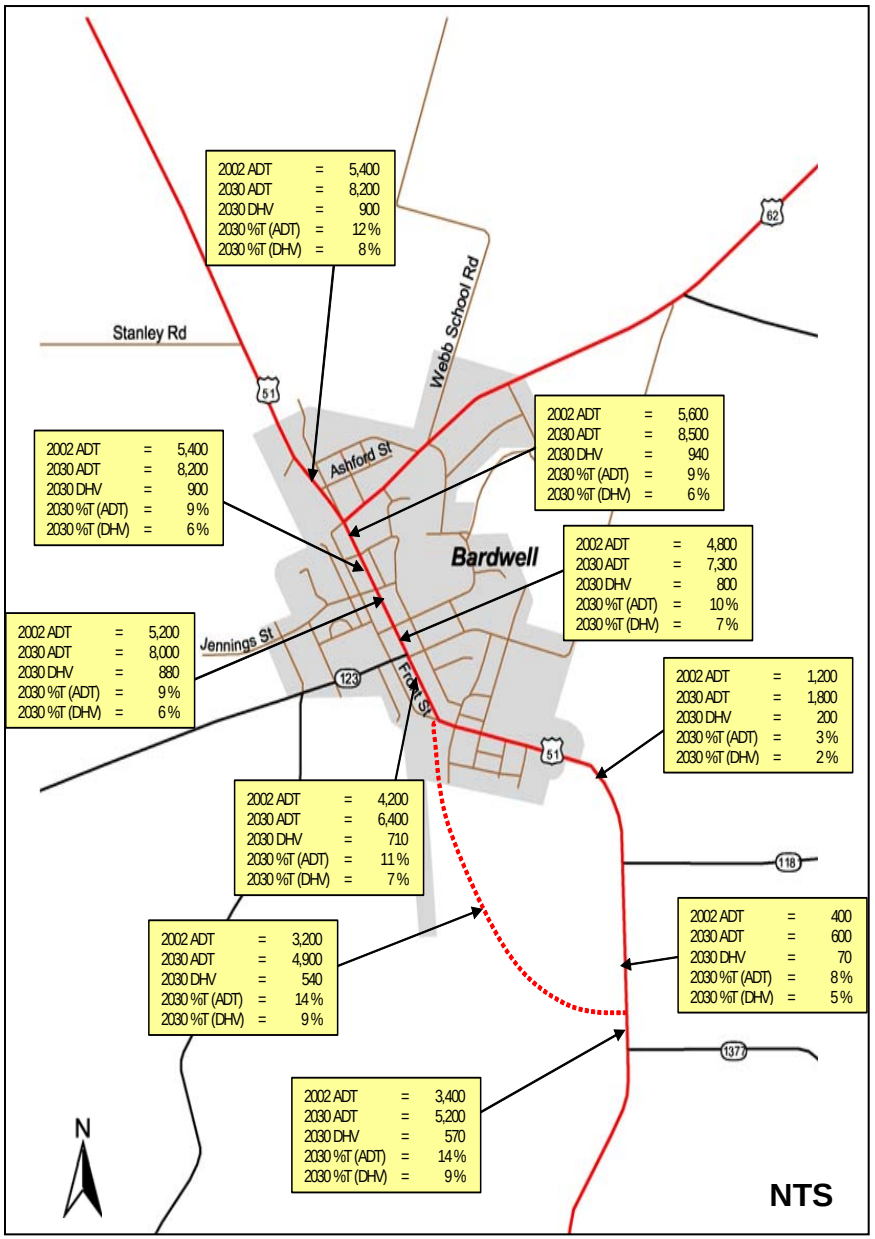


Figure 5: Alternative 5A Traffic Forecast

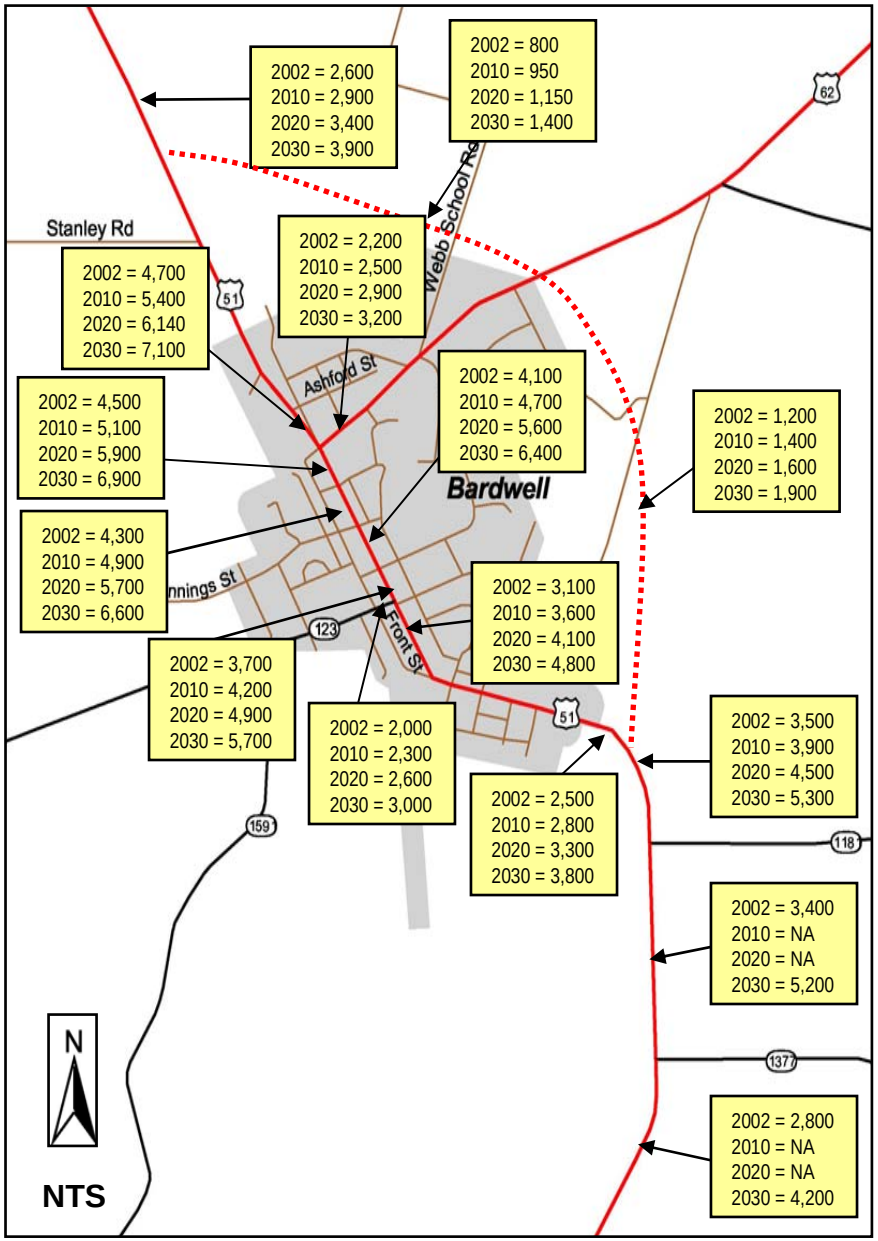
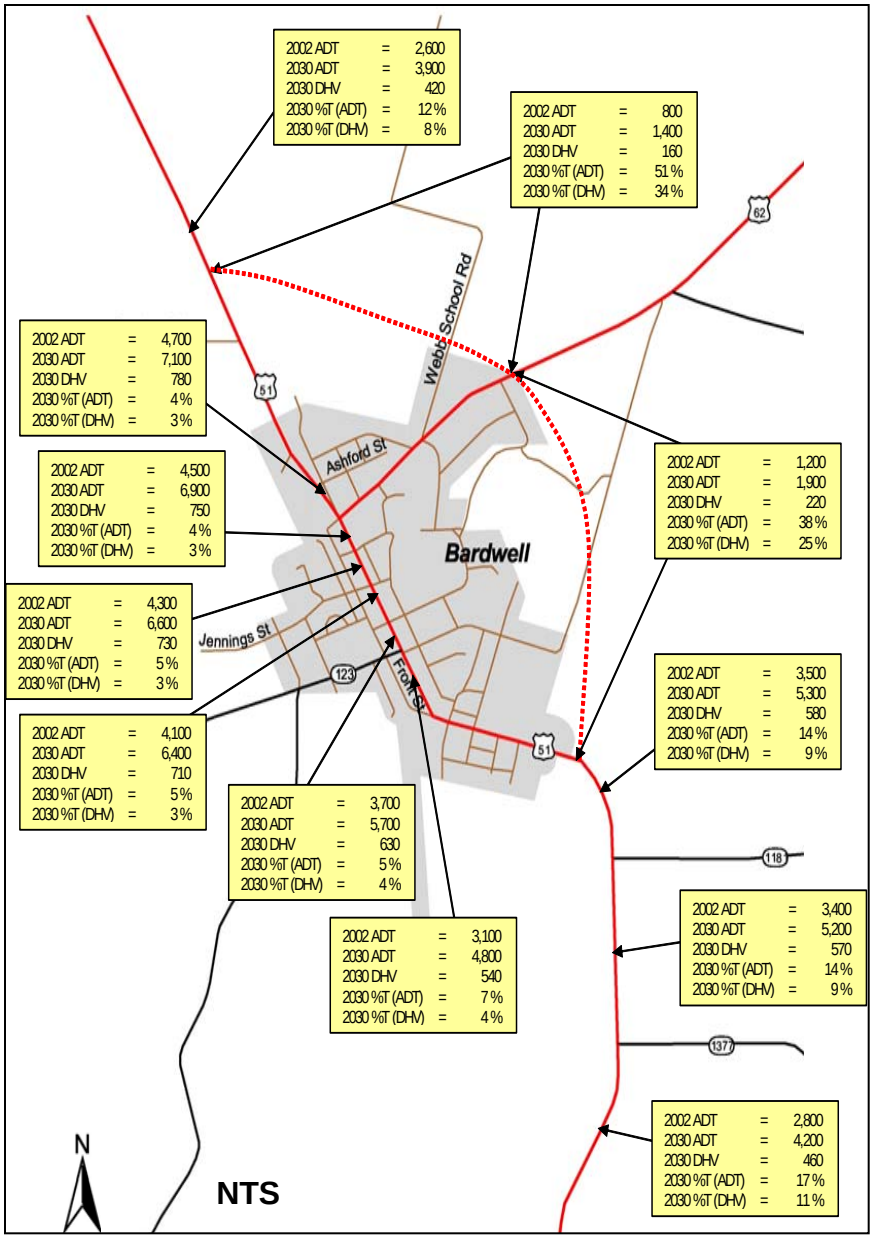


Figure 6: Year 2030 Alternative 5A Truck Traffic Percentages



The Alternative 5A eastern bypass is estimated to carry approximately 1,400 to 1,900 vehicles per day in 2030 depending on the location. It diverts a large portion of the truck traffic, with mainly local access truck traffic remaining in town. The 2030 traffic volumes in town range from 5,000 to about 7,000 depending on location. The reason for the relatively low volume of traffic on the 5A bypass is due in part to a low through volume on US 51 in general.

Intersection Levels of Service

Levels of service (LOS) were evaluated for each of the five study intersections as well as the three new Alternative 5A intersections for each of the build alternatives. The analysis years were 2002 (existing conditions only), 2010, 2020, and 2030. The analysis results are shown in Table 2. The table lists the PM peak hour average delay and LOS for each movement at each intersection. Only the PM peak is shown, as it generally represents the highest peak of the day. The levels of service for the No-Build Alternative (Alternative 1) are included in this table for comparison purposes.

Alternatives 2, 3, 4A, and 4B

The Alternative 2 Spot Improvements directly address the poor operating conditions at the key study intersections. Alternative 2A includes installation of a traffic signal and construction of northbound and southbound left turn lanes at the US 51 / US 62 intersection. It is estimated that the intersection will meet one or more signal warrants in 2010. These improvements will provide more than sufficient capacity at the intersection through 2030.

At the US 51 / KY 123 intersection, no capacity enhancements are proposed until between 2020 and 2030, because traffic volumes do not warrant any modifications beyond minor turning radius improvements until that time. The 2020 LOS D applies only to the eastbound approach (140 vehicles) and is not sufficient to require improvements. The intersection is also not expected to meet one or more signal warrants until 2020, based on the current projections. With a traffic signal in place in 2030 the intersection will operate at LOS C. (Without the signal the eastbound side street would fall to LOS F with unacceptable delays.)

In addition to the capacity improvements discussed above, Alternative 2B would remove the signal at US 51 and Jennings Street. This is recommended because the signal is unwarranted and possibly a safety hazard. The side street volumes at this location are low and the change can be made without a significant LOS impact as shown in Table 2.

Table 2: PM Peak Hour Intersection Levels of Service

Int. #	Intersection	Type (Future)	Approach	2002		2010						2020						2030					
				Existing Conditions		ALT 1		ALT 2, 3, 4A,		ALT 5A		ALT 1		ALT 2, 3, 4A,		ALT 5A		ALT 1		ALT 2, 3, 4A,		ALT 5A	
				Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS	Ave. Delay	LOS
1	US 51 / US 62	Varies	Eastbound	13.1	B	26.7	D	15.9	B	18.9	C	29.8	D	15.9	B	22.3	C	41.7	E	15.9	B	27.9	D (1)
			Westbound	12.9	B	45.7	E	17.8	B	18.4	C	100.2	F	18.3	B	24.5	C	774.5	F	18.8	B	42.2	E (1)
			Northbound	7.6	A	8.0	A	18.9	B	7.9	A	8.1	A	22.4	C	7.9	A	8.2	A	29.8	C	8.0	A
			Southbound	8.1	A	9.1	A	13.9	B	8.5	A	9.2	A	14.8	B	8.8	A	9.6	A	16.5	B	9.1	A
			Intersection	-	-	-	-	16.8	B	-	-	-	-	18.8	B	-	-	-	-	22.6	C	-	-
2	US 51 / Jennings St.	2-Way STOP (2)	Eastbound	16.4	B	16.3	B	15.3	C	13.8	B	16.6	B	17.0	C	16.0	C	16.6	B	21.1	C	16.0	C
			Westbound	15.8	B	16.1	B	17.0	C	14.1	B	16.3	B	19.0	C	15.1	C	16.3	B	24.2	C	18.1	C
			Northbound	13.4	B	18.2	B	8.2	A	8.0	A	21.2	C	8.3	A	8.1	A	28.0	C	8.6	A	8.3	A
			Southbound	12.7	A	16.4	B	8.4	A	8.1	A	17.6	B	8.6	A	8.3	A	20.9	C	8.9	A	8.5	A
			Intersection	13.4	B	17.3	B	-	-	-	-	19.2	B	-	-	-	-	24.1	C	-	-	-	-
3	US 51 / KY 123 (Elsey Ave.)	2-Way STOP	Eastbound	10.3	B	21.7	C	21.7	C	14.8	B	31.1	D	31.1	D	18.0	C	61.5	F	19.4	B	23.3	C
			Westbound	12.9	B	17.4	C	17.4	C	11.8	B	21.2	C	21.2	C	15.2	C	23.9	C	16.3	B	16.2	C
			Northbound	7.8	A	8.3	A	8.3	A	8.0	A	8.4	A	8.4	A	8.2	A	8.7	A	28.2	C	8.3	A
			Southbound	7.8	A	8.2	A	8.2	A	7.8	A	8.4	A	8.4	A	7.9	A	8.6	A	19.2	B	8.1	A
			Intersection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.2	C	-	-
4	US 51 / KY 1181	1-Way STOP	Westbound	9.9	A	10.8	B	10.8	B	10.8	B	12.0	B	12.0	B	12.0	B	12.8	B	12.8	B	12.8	B
			Southbound	7.5	A	7.8	A	7.8	A	7.8	A	7.9	A	7.9	A	7.9	A	8.1	A	8.1	A	8.1	A
5	US 51 / KY 1377	1-Way STOP	Westbound	8.8	A	10.1	B	10.1	B	10.1	B	10.1	B	10.1	B	10.1	B	10.4	B	10.4	B	10.4	B
			Southbound	7.6	A	7.9	A	7.9	A	7.9	A	7.9	A	7.9	A	7.9	A	8.1	A	8.1	A	8.1	A
6	US 51N / Bypass	1-Way STOP (4)	Westbound	-	-	-	-	-	-	10.5	B	-	-	-	-	11.0	B	-	-	-	-	11.6	B
			Southbound	-	-	-	-	-	-	8.2	A	-	-	-	-	8.3	A	-	-	-	-	8.4	A
7	US 62 / Bypass	2-Way STOP (4)	Eastbound	-	-	-	-	-	-	11.1	B	-	-	-	-	11.6	B	-	-	-	-	13.0	B
			Westbound	-	-	-	-	-	-	11.6	B	-	-	-	-	12.3	B	-	-	-	-	13.9	B
			Northbound	-	-	-	-	-	-	7.7	A	-	-	-	-	7.7	A	-	-	-	-	7.8	A
			Southbound	-	-	-	-	-	-	7.8	A	-	-	-	-	7.8	A	-	-	-	-	7.8	A
8	US 51S / Bypass	2-Way STOP (4)	Eastbound	-	-	-	-	-	-	8.2	A	-	-	-	-	8.2	A	-	-	-	-	8.4	A
			Southbound	-	-	-	-	-	-	12.4	B	-	-	-	-	13.6	B	-	-	-	-	15.4	C

Notes:
(1) Installation of a traffic signal will result in LOS C or better for all movements and LOS B for the intersection overall
(2) Removal of the traffic signal at Jennings is included in all of the build scenarios
(3) The eastbound approach to intersection #3 operates at LOS F without the signal
(4) Signals may be required at major new intersections on the bypass for safety reasons

Alternatives 3, 4A, and 4B all assume the spot improvements will be in place, resulting in similar levels of service at the key intersections. One exception is the US 51 / KY 1181 intersection because the 4A and 4B Alternatives will shift traffic away from that intersection, actually causing it to operate better than shown. For the design year of 2030, the intersection levels of service for Alternatives 2, 3, 4A and 4B are shown on Figure 7.

Alternative 5A

Alternative 5A addresses the LOS deficiencies on US 51 by diverting traffic around the town. The traffic diversion results in acceptable levels of service at all of the study intersections until 2030. In 2030 the eastbound and westbound approaches to the US 51 / US 62 intersection will fall to LOS D and E respectively. Installation of a signal at that time however, would improve the intersection to LOS C, correcting the LOS problem. The 2030 volumes at the intersection are projected to meet one or more signal warrants. For the design year of 2030, intersection levels of service are shown on Figure 8.

Two-Lane Level of Service

The traffic analysis also examined levels of service on US 51 north and south of town and on the proposed 5A bypass. For two-lane highways, level of service is a measure of the average travel speed and the percent time, on average, that a driver will spend following another vehicle. The seven analysis segments were:

1. Ashford Street to Stanley Road
2. Stanley Road to KY 1203
3. KY 1203 to Ballard County Line
4. Bob Brown Road to KY 1377
5. KY 1377 to KY 1181
6. Alternative 5A bypass from old US 51 (north) to US 62 (northern segment)
7. Alternative 5A bypass from old US 51 (south) to US 62 (southern segment)

Similar to the intersection analysis, there are similarities between many of the build alternatives. In fact, Alternatives 1, 2, 3, 4A, and 4B have all been grouped together because they have similar traffic volume and operating characteristics north of Ashford Street and south of KY 1181. The bypass alternative however was examined separately because of the substantially different alignment. The two-lane LOS results are summarized in Table 3 and Figures 7 and 8.

Figure 7: Alternatives 2, 3, 4A and 4B 2030 Intersection and Segment LOS

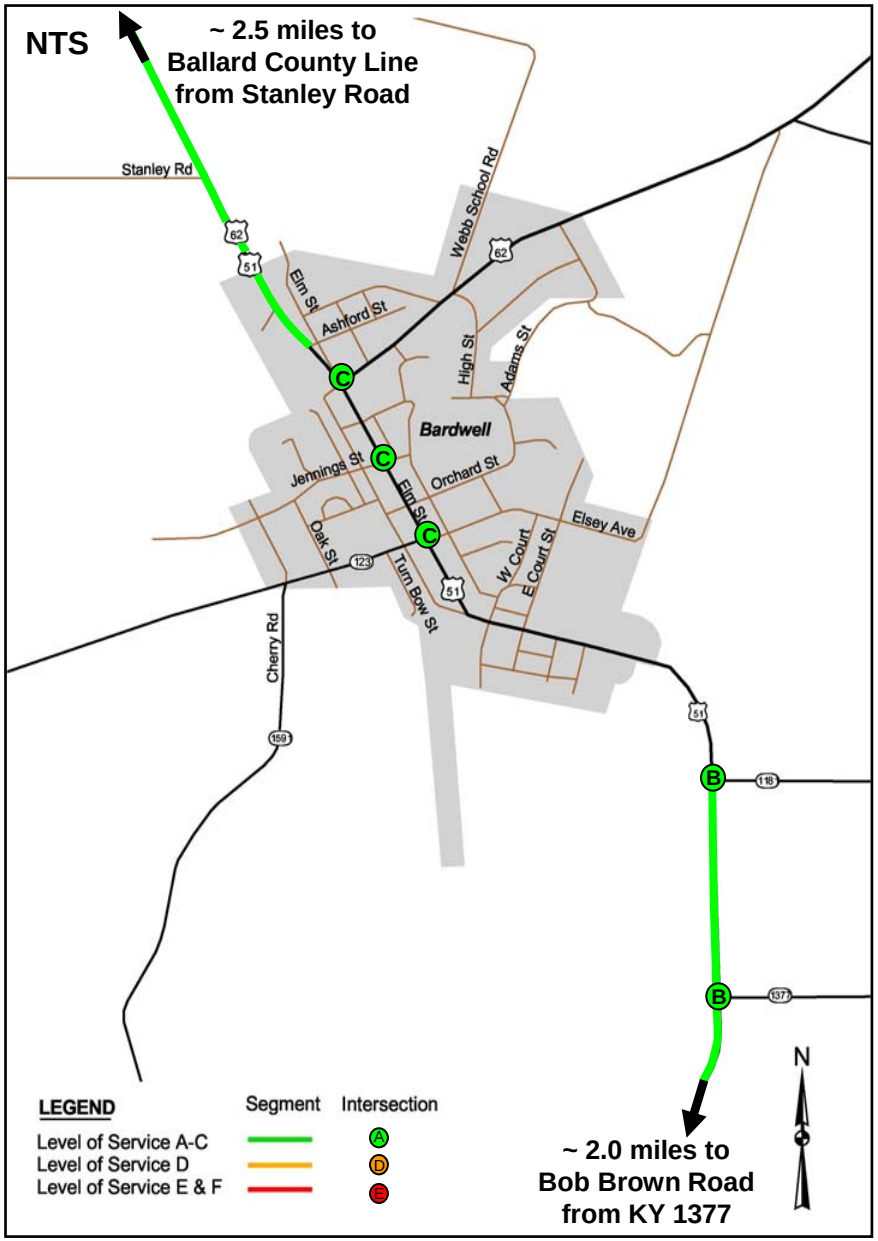


Figure 8: Alternative 5 2030 Intersection and Segment LOS

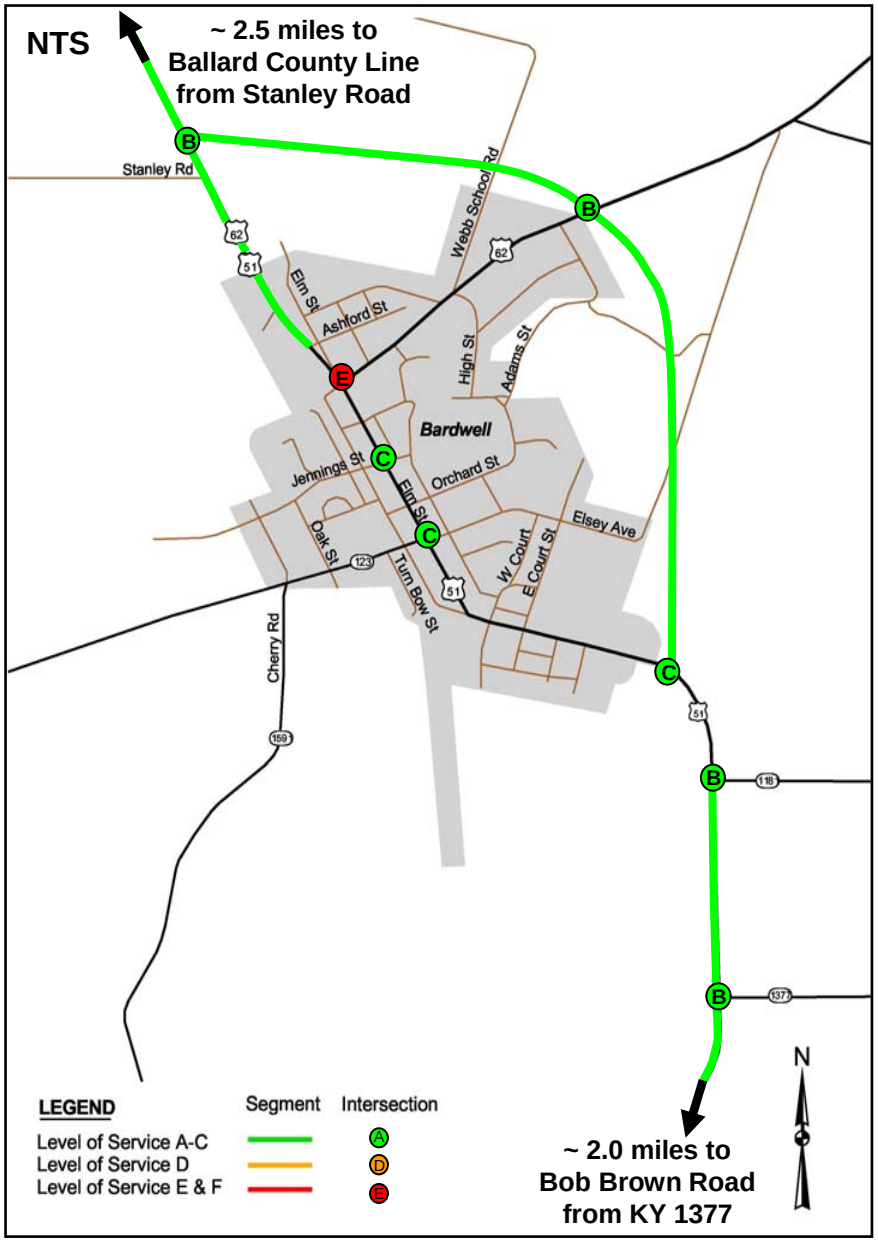


Table 3: Two-Lane Level of Service Analysis

Segment	2002		2010		2020		2030	
	Alts. 1 to 4B	Alt. 5	Alts. 1 to 4B	Alt. 5	Alts. 1 to 4B	Alt. 5	Alts. 1 to 4B	Alt. 5
Stanley Road to KY 1203	C	C	C	C	C	C	C	C
KY 1203 to Ballard County Line	C	C	C	C	C	C	C	C
Bob Brown Road to KY 1181	C	C	C	C	C	C	C	C
US 51 N to US 62 (northern segment)	-	B	-	B	-	B	-	C
US 51 S to US 62 (southern segment)	-	B	-	B	-	B	-	B

The two-lane analysis showed that nearly all of the existing segments operate at LOS C and will continue to operate at LOS C through 2030 without improvements. The only exception is Ashford Street to Stanley Road, which is projected to drop to LOS D in 2020. This segment is on the LOS C/D threshold for speed and drops to LOS D because of the percent time spent following (73% compared to a 65% threshold for LOS C/D). However, improvements are not deemed to be warranted for this segment because 1) it is close to the LOS C threshold; 2) the segment is short (less than half a mile); and 3) it is not projected to be an issue until 2020. The two-lane analysis showed that the bypass segments will also operate at LOS C or better through 2030.

Impact of I-66 and I-69 on US 51 Traffic Volumes

Due to the proximity to the study area of the proposed Interstate 66 and Interstate 69 highways, the project team investigated the possible impact of these highways on future US 51 traffic volumes. Regarding I-69 in the vicinity of the study area, the Kentucky Transportation Cabinet is considering the possibility of designating the Purchase Parkway as I-69 from the Tennessee State Line to Interstate 24. From there, I-69 will run concurrent with I-24 to the Western Kentucky Parkway.

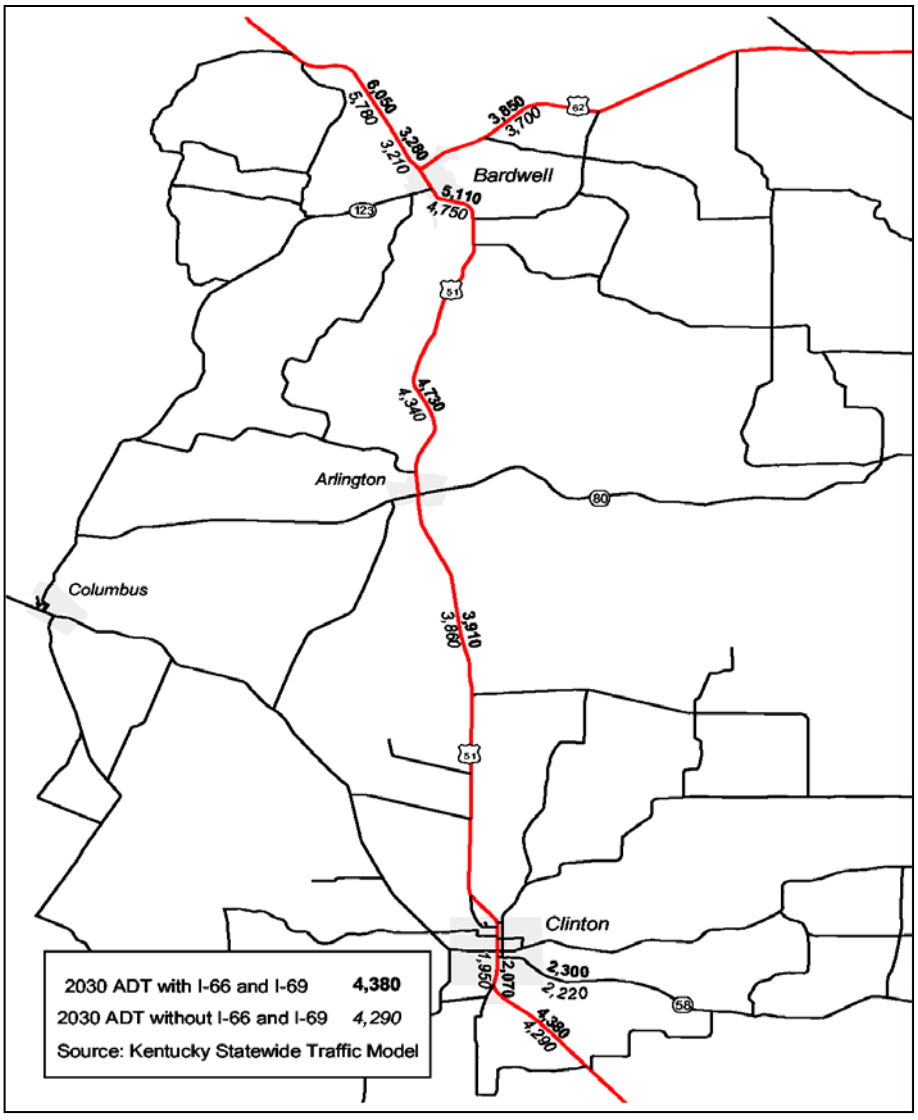
The final recommendation for I-66 in Western Kentucky is currently a no-build approach. However, the Kentucky Statewide Traffic Model (KYSTM) was reviewed to determine whether or not a proposed I-66 and I-69 highways would significantly increase traffic volumes on US 51. Year 2030 KYSTM assignments were examined both with and without the proposed new interstates in place. The results of these two runs are illustrated in Figure 9. As shown, the increase in traffic is not significant in the study area when I-66 and I-69 are added to the model. This is likely due to two factors:

1. The US 51 corridor is in a rural, sparsely populated area of the state. There are not a lot of trips in the corridor to begin with and even the addition of I-66 and I-69 will not generate enough growth in the corridor to cause a significant increase in traffic. The KYSTM version that contains I-66 and I-69 also includes

projections for population and employment growth in these corridors as a result of their construction.

2. On a system-wide level, I-55/I-57 to the west and US 45 to the east are parallel north-south alternatives to US 51, which connect population centers of considerably larger size. US 51 connects Fulton at its south end to Wickliffe and Cairo, Illinois at its northern terminus.

Figure 9: Traffic Impacts of I-66 and I-69



Traffic Forecast Summary

Traffic volumes on US 51 in Bardwell are not expected to increase significantly by the year 2030. However, even with modest traffic growth, the future level of service for some intersection approaches may begin to decline. These intersection LOS issues can be addressed through implementation of spot improvements and/or more extensive highway improvements. No major segment LOS issues are expected in the study area through 2030, with or without the proposed 5A bypass. The proposed 4A and 4B realignments will divert most of the traffic from the current US 51 just south of town, but will not affect traffic volumes through town. The proposed 5A bypass will divert approximately 1,400 to 1,900 vehicles per day in 2030 from US 51 (including most heavy trucks). One reason these volumes are relatively low is that overall through volumes on US 51 are projected to be low. The potential addition of I-66 and I-69 in Western Kentucky is not expected to have a significant impact on future US 51 traffic in the area.