US 41A/Green Street

Scoping Study

Final Report

Item No. 2-140.00

Henderson County, Kentucky

Prepared for:

Kentucky Transportation Cabinet

Division of Planning

and

District-2, Madisonville, Kentucky

Prepared by:

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EXECUTIVE SUMMARY

Study Background and Purpose

The purpose of the *Scoping Study for US 41A (Green Street)* was to provide information to the Kentucky Transportation Cabinet (KYTC) so that it can investigate options to widen US 41A to provide a continuous, two-way left-turn lane from US 60 (mile point [MP] 13.235) to US 41 (MP 17.390), a distance of about 4.2 miles. A project team approach was used, consisting of representatives from the KYTC Central Office and District 2, the Green River Area Development District (GRADD), and Qk4. Public involvement activities included project team meetings, resource agency coordination, and a meeting with local officials and stakeholders. The study examines this improvement strategy to address both current and future needs of US 41A. This, in turn, will help KYTC make decisions regarding the need for roadway improvements, and to define potential improvements that would increase safety and better serve the Henderson County residents and the traveling public.

Funds for the scoping study were included in the *Enacted Six-Year Highway Plan, FY 2006-2012*, approved May 2006 (Project number 2-140.00). The project is not listed in the current *KYTC 2008 Highway Plan (FY 2008-2014)*.

Study Location and Limits

The study location on US 41A (Green Street) is a 4.2 mile (MP 13.235 – MP 17.390) state-maintained, urban principal arterial within Henderson County. It is located in the City of Henderson; and is on a shared alignment with US 60, west of US 41.

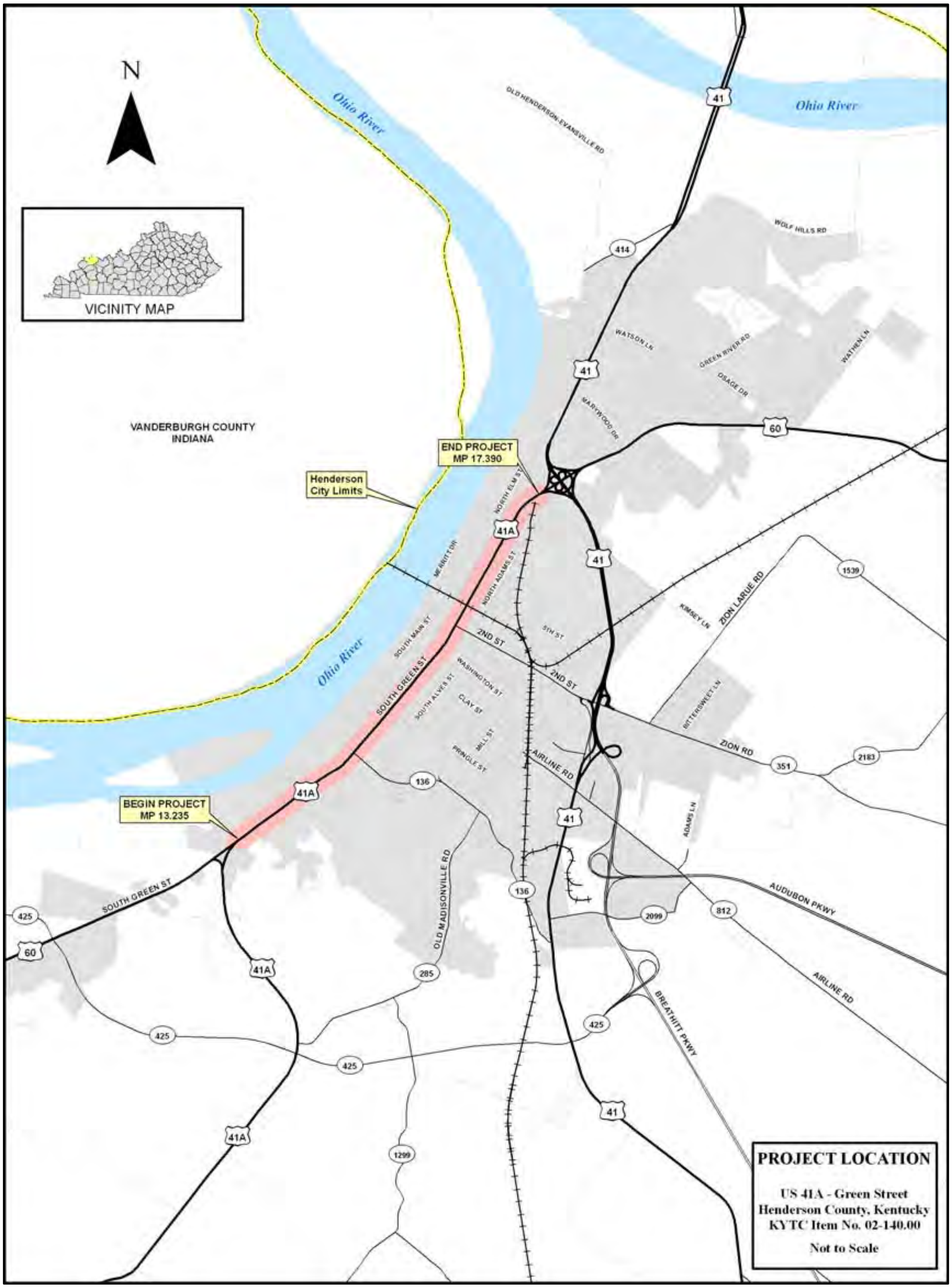


Figure ES 1: Project Location—City of Henderson, Henderson County, Kentucky

Project Issues and Goals

The issues for this project were defined as follows:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 average daily traffic (ADT) volumes ranged from 19,600 to 30,100 vehicles per day (vpd), with 9% trucks.
- In the study area, US 41A exhibits the characteristics of a high crash corridor, with two fatalities from 2003 to 2007.
- Many businesses, homes, and historic properties abut the existing rights-of-way.
- Many utilities are located adjacent to the existing rights-of-way. It was noted that, for Item 2-966, the utility relocation costs for this one intersection improvement totaled $1.1 million, which was more than the cost of construction.
- A railroad track overpass is a major choke point to be addressed.
- There are many misaligned intersections along the corridor in the study area.

The goals for this project are as follows:

- Address highway capacity, growth needs, and congestion in Henderson.
- Improve safety.

Conditions Analysis

Existing conditions on Green Street were compiled from several KYTC databases. Recent (2005-2007) traffic counts were conducted by KYTC at four locations along Green Street. This determined the four study area sections used in the analysis of the existing conditions. These four sections are shown in the figure below.

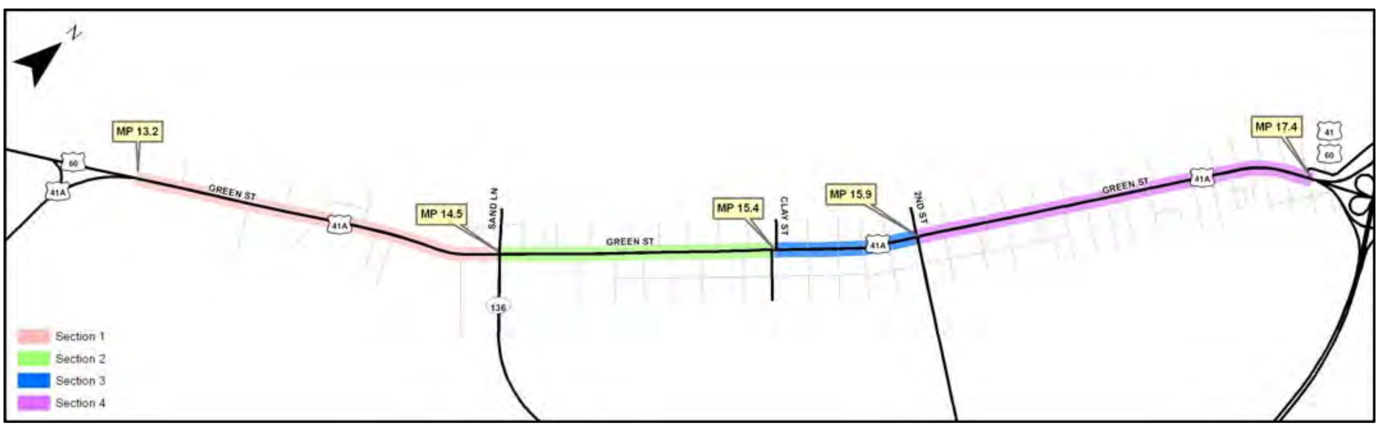


Figure ES 2: Existing Conditions Sections 1–4 of US 41A

Those KYTC counts and build-year projections indicate 2008/2030 ADT volumes, respectively, of:

- 19,600/22,600 vpd between US 60 and KY 136 (Sand Lane).
- 20,800/25,600 vpd from KY 136 near the intersection with Clay Street.
- 25,000/30,300 vpd near the intersection with KY 351 (2nd Street).
- 30,100/34,800 vpd at the junction with US 41 North and US 60 East.

The percentage of single unit and combination trucks in the traffic mix was moderate at 9% and is projected to remain unchanged in 2030.

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). A level of service (LOS) of E exists in the northern portion of the study area, roughly from the intersection with Clay Street to the northern project area terminus at US 60. LOS increases to B in the southern portion of the study area from US 60 to Clay Street. This data is included in the table below.

Table ES-1: Current and Projected ADT and LOS

Beginning MP	Beginning Feature	Ending MP	Ending Feature	2007 ADT	2030 ADT	2007 LOS	2030 LOS
13.235	US 60	14.483	KY 136 (Sand Lane)	19,600	22,600	B	B
14.483	KY 136 (Sand Lane)	15.406	Clay Street.	20,800	25,600	B	D
15.406	Clay Street.	15.884	KY 351 (2nd Street)	25,000	30,300	E	E
15.884	KY 351 (2nd Street)	17.397	to US 41/US 60	30,100	34,800	E	F

The Critical Rate Factor (CRF) for the three-year period from January 1, 2005, to December 31, 2007, is 1.30 for the study area. KYTC defines CRF as the quotient showing the ratio of the crash rate for a roadway spot or segment divided by the critical crash rate for that roadway spot or segment based on roadway type, number of lanes, and median type. A CRF greater than 1.00 indicates that the segment of roadway has had a statistically significant number of crashes that likely had not occurred at random.

Alternatives Development and Evaluation

To better analyze the 4.0-mile section of US 41A in the prescribed study area, the corridor was broken down into five individual sections. These five sections differ from the four sections used to analyze the existing conditions data. The five sections were determined due to the existing roadway conditions, (i.e., five lane section between Washington Street and Third Street, and the railroad overpass between Third Street and Fifth Street). See the section descriptions below. An illustration and brief descriptions of the general conditions of each of the five sections are as follows:

Figure ES 3: Alternatives Evaluation Sections 1–5 of US 41A

Section 1—This 1.3-mile section of US 41A extends from US 60 to KY 136 (Sand Lane) MP 13.2–MP 14.5). It comprises the southernmost section of the study area corridor and terminates at the new US 60 widening project. Right-of-way (ROW) width is 80 feet.

Section 2—KY 136 (Sand Lane) to Washington Street (MP 14.5–MP 15.6). ROW width is 60 feet.

Section 3—Washington Street to 3rd Street (MP 15.6–MP 15.9). This 0.3-mile section is currently a five-lane segment that does not require construction and is not a factor in the purpose of this study. ROW width is 60 feet.

Section 4—3rd Street to 5th Street (MP 15.9–MP 16.2). This 0.3-mile section contains the existing railroad overpass on the cross river CSX line that parallels 4th Street. The piers of the overpass are so close to the driving lanes of US 41A that the existing ROW is not wide enough to accommodate the addition of a center lane without reconstruction of the railroad overpass. The railroad overpass would have to be removed and rebuilt in order for the roadway to be widened in any capacity. ROW width is 60 feet.

Section 5—5th Street to 14th Street (US 60) (MP 16.2–MP 17.0). This 0.8-mile section exhibits some of the highest traffic volume of the study area. There is a lack of channelized access to properties within this section as well. ROW width is 60 feet.

While the portion of the roadway north of the intersection with Harding Avenue has an adequate lane width of approximately 12 feet, the segment southeast of that intersection is only 10 feet wide. Access control appears to be unregulated primarily in the northern segment of the study area.

The posted speed limit is 35 miles per hour (mph) between the intersection at Sand Lane and the intersection at 14th Street, and 45 mph at all other points. Right-of-way widths average 60 to 80 feet except near the interchange with US 41 and US 60, where the width is 250 feet. Sidewalks are present at some locations, but a 1.8-mile-long sidewalk extension between MP 13.2 and MP 15.0 has been proposed through the KYTC Statewide Transportation Planning process. There are seven signalized intersections in the study area.

Alternatives not advanced

In addition to the roadway widening, two other alternative concepts were considered but are not recommended for advancement: one-way couplets and a "road diet" (i.e., reducing the road from four lanes to three). The one-way couplets would require the conversion of Elm Street to a one-way facility. Elm Street is currently a divided roadway with a raised landscaped median through a residential area, and is offset at some intersections. For these reasons it would not provide an optimum configuration for a one-way street. Regarding the road diet, research indicates that only roads with a maximum volume of 850 vph have been successful in improving traffic flow after a reduction of lanes. For US 41A the approximate peak-hour volumes are 1,900 to 3,000 vph. Therefore this option is not recommended.

Recommendations

Recommended Alternatives

Three widening alternatives were identified to achieve the specified five-lane facility on US 41A. The alternatives are to widen to the left (west, towards the river), middle, and right (east). Each of these widening scenarios was reviewed for Section 1, Section 2, Section 4, and Section 5. Section 3 was not considered because it currently is a five-lane section with a center turning lane. The proposed typical section features an 86-foot-wide right-of-way with four 11-foot-wide travel lanes, a 12-foot-wide center turn lane, 2-foot-wide gutter, 2-foot-wide verge, 5-foot-wide sidewalk, and 6-foot-wide utility (see typical section below). Large maps were produced by section detailing each of the three widening scenarios at a 100-foot scale. **These are provided electronically on a compact disk (CD) accompanying this report**

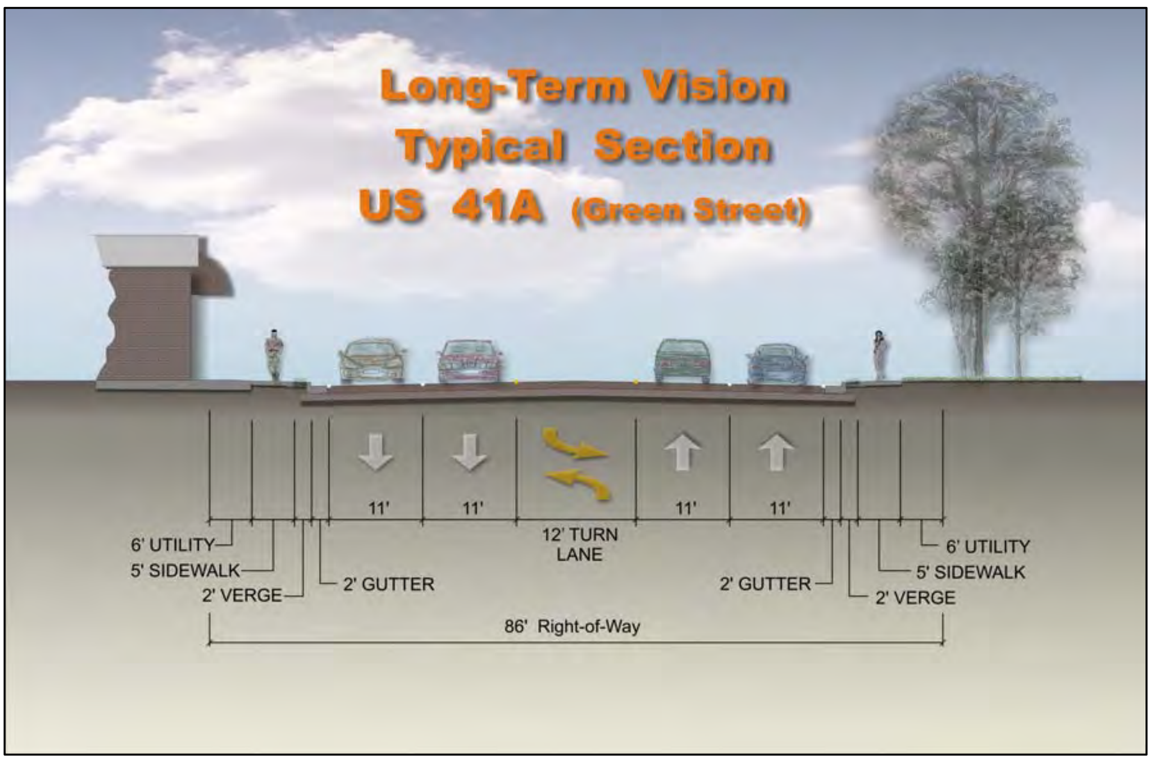


Figure ES 4: Recommended US 41A Typical Section

Phased planning cost estimates and right-of-way impacts were also identified for each widening alternative by section.

Table ES-2: US 41A Widening Alternatives and Cost Itemization

US 41A Widening Alternatives and Cost Itemization						
US 41A: from South to North	Length (Feet)	Construction Cost	R/W Cost	Utility Cost	Engineering Cost	Total Cost
Section 1 (US 60 to Sand Lane						
Alternative L	6780	$3,163,000	$161,000	$2,630,000	$696,000	$6,650,000
Alternative M	6780	$3,163,000	$164,000	$2,630,000	$696,000	$6,653,000
Alternative R	6780	$3,163,000	$162,000	$2,630,000	$696,000	$6,651,000
Section 2 (Sand Lane to Wash Street)						
Alternative L	5330	$2,486,000	$436,000	$2,342,000	$547,000	$5,811,000
Alternative M	5330	$2,486,000	$126,000	$2,441,000	$547,000	$5,600,000
Alternative R	5330	$2,486,000	$426,000	$2,261,000	$547,000	$5,720,000
Section 4 (3rd Street to 5th Street)						
Alternative L	2050	$8,258,000	$784,000	$1,084,000	$1,817,000	$11,943,000
Alternative M	2050	$8,258,000	$172,000	$1,123,000	$1,817,000	$11,370,000
Alternative R	2050	$8,258,000	$1,379,000	$1,003,000	$1,817,000	$12,457,000
Section 5 (5th Street to 14th Street/US 60)						
Alternative L	3900	$1,819,000	$76,000	$1,859,000	$400,000	$4,154,000
Alternative M	3900	$1,819,000	$661,000	$1,937,000	$400,000	$4,817,000
Alternative R	3900	$1,819,000	$2,465,000	$1,924,000	$400,000	$6,608,000

The combined sections comprising the entire project range in cost from $27.7 million to $31.5 million.

Specific widening alternatives (left, middle, and right) were not selected by the project team, as the purpose of this study is to determine the feasibility of reducing crashes, by widening US 41A, in terms of phased cost estimates and right-of-way impacts. However, the segments of US 41A were prioritized for reconstruction. They are listed below in order of priority:

1. **Section 5:** highest traffic volume, most commercial land uses, and high left-turn volume.
2. **Section 1:** provides logical terminus with the current reconstruction of US 60 and no restrictions due to the presence of historic properties.
3. **Section 2:** mostly residential land uses and there are historic property issues to be addressed.
4. **Section 4:** is the lowest priority due to the extremely high cost of the reconstruction of the railroad overpass that is necessary to widen US 41A beneath it.

Additional Considerations

- The rebuilding of the railroad overpass requires the construction of 2,900 feet of parallel track to the west of the existing track. This proposal provides an opportunity to reconstruct the railroad overpass that spans US 41A. This proposal also includes railroad overpasses over Ingram Street and Elm Street. Under this plan, the existing track would be abandoned once the construction of the new overpasses and track is complete. The total cost estimate for this project is $7.3 million.

- Currently, the reconstruction of US 60 south of this project is underway. During this project, previously unknown utilities have been discovered, resulting in a significant increase in project cost as well as added time delay. Because of this discovery, it is reasonable to assume that the possibility exists for a similar situation within the US 41A study area.

- The project team elected to not recommend bike lanes on the widened sections of US 41A for several reasons. Right-of-way is restricted; relocation and right-of-way costs would increase significantly if bicycle lanes were installed. High traffic volumes on this corridor, coupled with the uncontrolled access and numerous curb cuts, make bicycle activity hazardous. In addition, there is an ample parallel streets grid network with significantly less traffic volume that could better accommodate bicycle lanes. The Evansville Metropolitan Planning Organization[1] is the designated Metropolitan Planning Organization (MPO) for the Evansville, Indiana, and Henderson, Kentucky, Urbanized Area. The Evansville MPO produced a bike and pedestrian plan in June of 2003. The *Greater Henderson Bicycle and Pedestrian Plan* (included in Appendix I), identifies the recommended bike and pedestrian route networks for the short and long term. It does not recommend this section of US 41A as a bikeway network in either the short or long term.

[1] The Evansville MPO was formerly known as the Evansville Urban Transportation Study (EUTS).

1.0 INTRODUCTION

In 2004, the Evansville MPO completed a Congestion Management System Study (CMS) for the Evansville-Henderson Transportation Management Area (TMA) as initially required in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and subsequent federal transportation legislation. The purpose of that study was to identify congested areas and devise appropriate strategies to prevent or mitigate congestion. The CMS Study is provided in Appendix I. That study considered the US 41A (Green Street) corridor in Henderson, among others. Although a menu of possible congestion mitigation actions was listed, the study made no corridor-specific recommendations. An earlier Evansville MPO study (Green Street Corridor Study) had evaluated the 2.7-mile stretch of Green Street between US 41 and KY 136 (Sand Lane) and had made a series of recommendations, including one for a continuous, two-way, left-turn lane between 1st Street and 12th Street. The Green Street Corridor Study is provided in Appendix I.

Subsequent articulation of candidate project priorities through the KYTC Statewide Transportation Planning process confirmed the high importance placed by local officials on improvements to Green Street; this candidate improvement has been ranked as a "High" priority at the local, regional, and KYTC district level. The Kentucky *Enacted Six-Year Highway Plan FY 2006-2012* included a Scoping Study for widening Green Street to provide a continuous two-way, left-turn lane from its junction with US 60 West to its termination at the junction with US 41 North/US 60 East as Item No. 02-140.00. KYTC retained the consulting firm of Qk4 to conduct the study.

The purpose of the *Scoping Study for US 41A (Green Street)* was to provide information to KYTC so it can investigate options to widen US 41A to provide a continuous, two-way left-turn lane from US 60 (MP 13.24) to US 41 (MP 17.40), a distance of about 4.2 miles. A project team approach was used, consisting of representatives from the KYTC Central Office and District 2, the Green River Area Development District, and Qk4. Public involvement activities included project team meetings, resource agency coordination, and a meeting with local officials and stakeholders. The study examines this improvement strategy to address both current and future needs of US 41A. This, in turn, will help the KYTC make decisions regarding the need for roadway improvements, and to define potential improvements that would increase safety and better serve the Henderson County residents and the traveling public.

Funds for the scoping study were included in the *Enacted Six-Year Highway Plan FY 2006-2012*, approved May 2006 (Project number 2-140.00). The project is not listed in the current *KYTC 2008 Highway Plan, (FY 2008-2014)*.

Other area projects in or near the study area are:

- KYTC Item # 2-126: Reconstruction of US 60 from KY 425 to US 41A in West Henderson to alleviate traffic flow problems. The project exhibits five lanes with 3-foot-wide bike lanes, curbs and gutters, and sidewalks. This northern end of this project terminates with the southern end of this US 41A study area.

- KYTC Item # 2-966: Widen US 41A at KY 136 (Sand Lane) for left-turn lane construction. This project is currently in the utility relocation phase and will address the turning movement issues on US 41A at KY 136.

1.1 Project Location and Study Area

The City of Henderson is located in northwestern Kentucky (see Figure 1), approximately 10 miles south of Evansville, Indiana. Henderson, the county seat of Henderson County, had an estimated 2007 population of 27,768, according to the Kentucky State Data Center at the University of Louisville, ranking it the eighth largest city in Kentucky. Henderson County's estimated 2007 population was 45,440. Major highways providing access to Henderson include the Audubon and Breathitt Parkways, US 41, and US 60. Figure 2 identifies the study area.

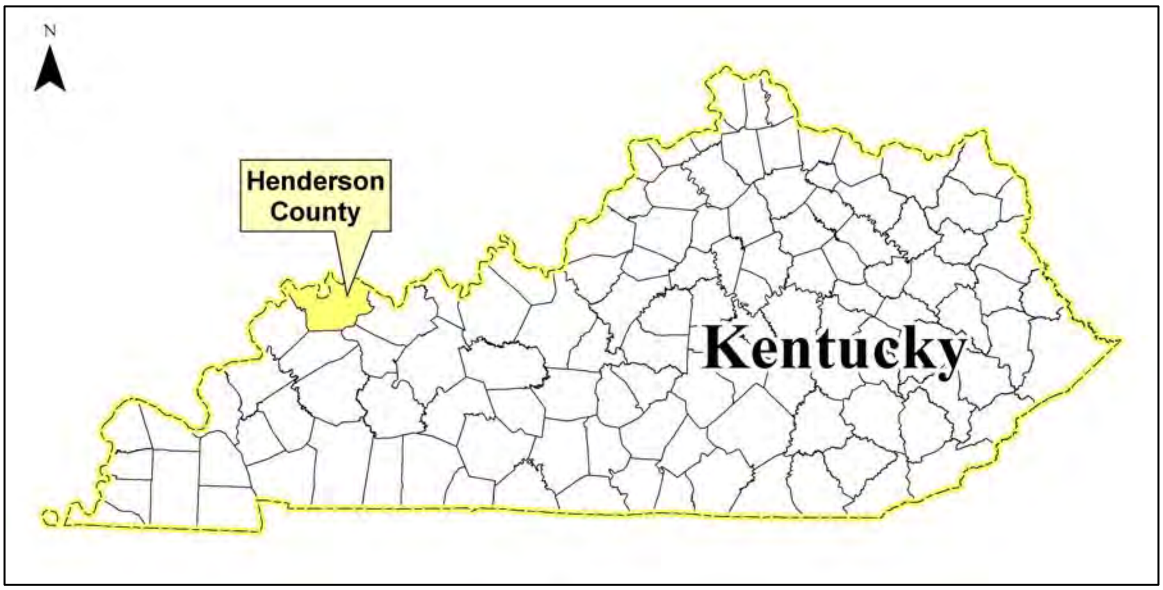


Figure 1: Project Location—Henderson County

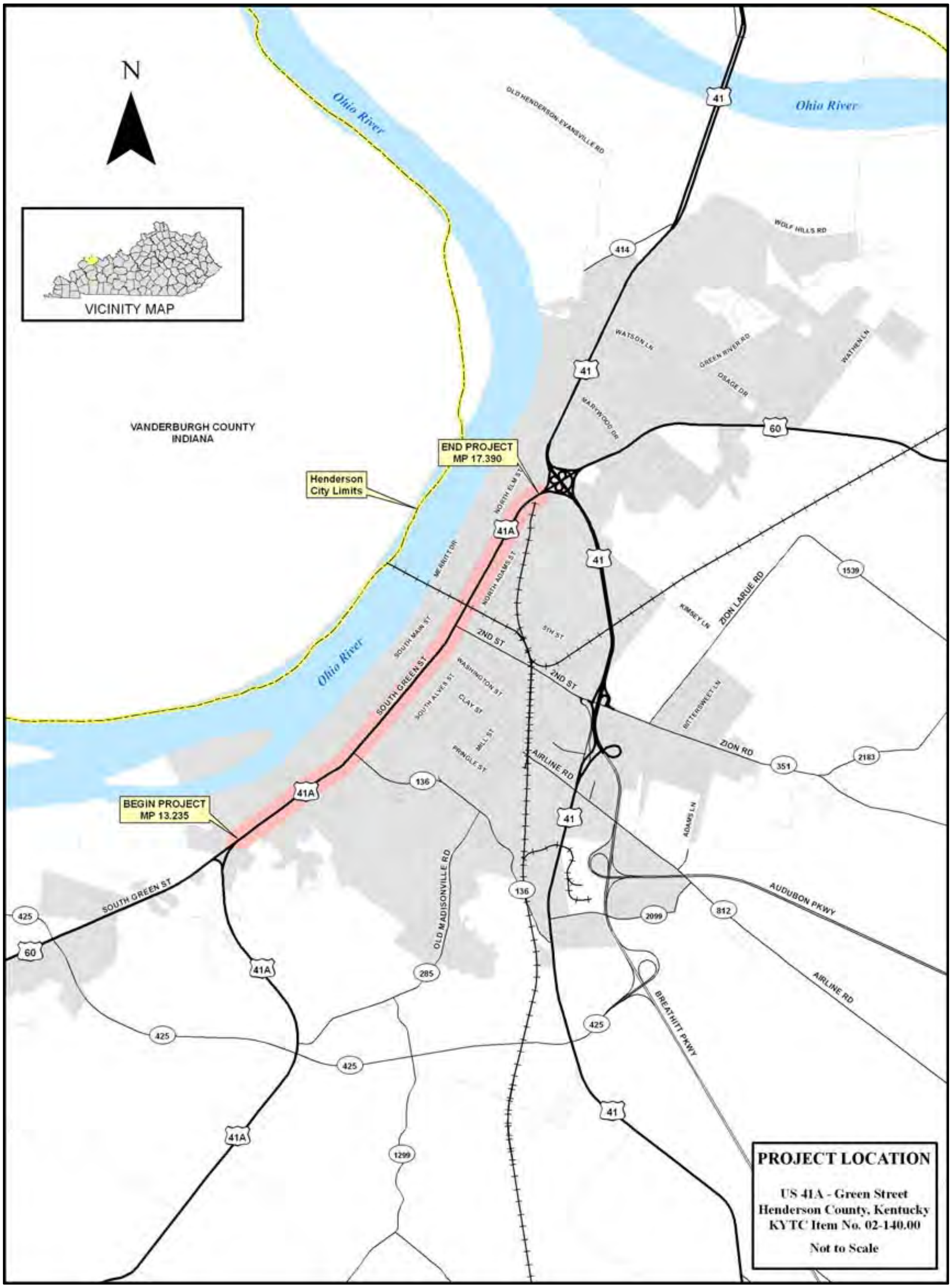


Figure 2: **Project Location—City of Henderson, Henderson County, Kentucky**

1.2 Study Process

As noted, a project team approach was employed for the *US 41A Scoping Study*, consisting of representatives from the KYTC Central Office and District 2, and the project consultant, Qk4. A total of three project team meetings were held: May 30, 2008; February 26, 2009; and August 5, 2009. The minutes for these meetings are included in Appendix C. In addition, a local officials' meeting was held on April 13, 2009 and the meeting minutes are included in Appendix D. The *Scoping Study for US 41A* in Henderson has consisted of four major steps:

- Define the study issues and goals.
- Identify and review existing conditions.
- Develop alternative solutions to the identified transportation issues that reflect the project goals.
- Evaluate the alternatives through discussions with a KYTC Project Team and local officials.
- Recommend alternative solutions.

The subsequent chapters in this report follow these steps.

2.0 STUDY ISSUES AND GOALS

2.1 Project Issues

Discussions were held with the Project Team during which a number of important issues were identified for consideration in examining Green Street. A summary of the issues follows:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks.
- In the study area, US 41A exhibits the characteristics of a high crash corridor, with two fatalities from 2003 to 2007.
- Many businesses, homes, and historic properties abut the existing rights-of-way.
- Many utilities are located adjacent to the existing rights-of-way. It was noted that, for Item 2-966, the utility relocation costs for this one intersection improvement totaled $1.1 million, which was more than the cost of construction.
- A railroad track overpass is a major choke point to be addressed.
- There are many misaligned intersections along the corridor in the study area.

2.2 Project Goals

The project goals to be evaluated in the *Green Street Study* result from the project issues discussed above. These goals were also developed in consultation with the Project Team. The project goals are:

- **Address highway capacity, growth needs and congestion in Henderson County.**
- **Improve safety.**

3.0 EXISTING AND FUTURE NO-BUILD CONDITIONS

3.1 Highway and Traffic Characteristics

Existing conditions on Green Street were compiled from the KYTC Highway Information System (HIS) database and from KYTC crash records. Recent (2005–2007) traffic counts were conducted by KYTC at four locations along Green Street. Based on locations of these KYTC traffic counts, the study area was divided into four sections to analyze the existing conditions data.

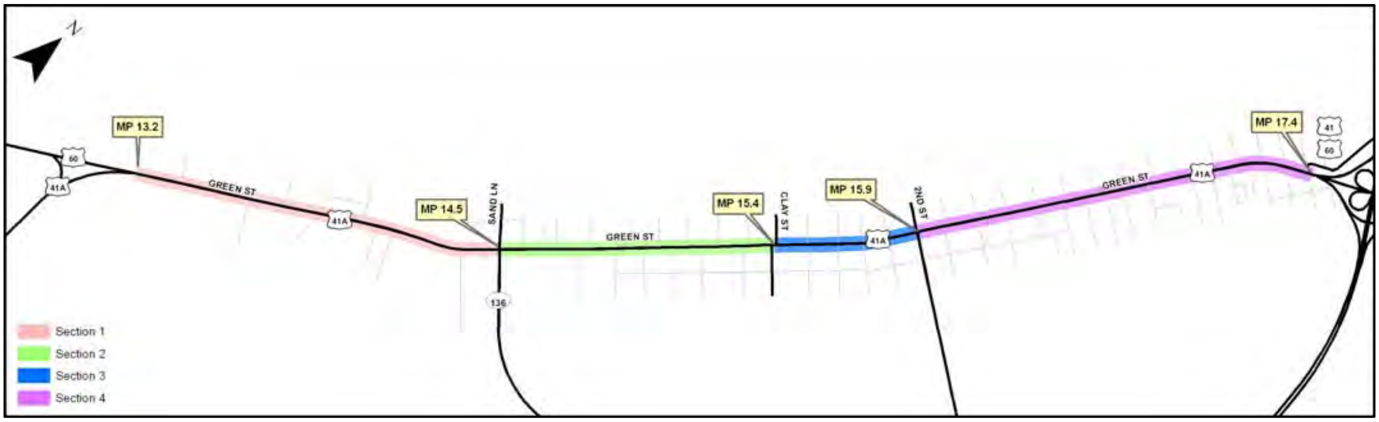


Figure 3: Existing Conditions Sections 1–4 of US 41A

The KYTC counts taken indicate ADT volumes in 2008 of:

- 19,600 vpd at a count station near the intersection with KY 136 (Sand Lane).
- 20,800 vpd near the intersection with Clay Street.
- 25,700 vpd near the intersection with KY 351 (2^{nd} Street).
- 30,100 vpd at the junction with US 41 North and US 60 East.

The percentage of single unit and combination trucks in the traffic mix was moderate (9%). In 2030, ADT volumes at these four count stations are projected to be 22,600, 25,600, 30,300, and 34,800 vpd, respectively.

Some noteworthy points regarding the base data of US 41A are listed below, followed by Table 1, which summarizes Green Street's roadway characteristics.

- Lane widths are adequate at 12 feet wide north of Harding Avenue to the terminus of the study area at the US 60 interchange (MP 17.4). In contrast, the lane widths in the majority of the study area, from US 60 (MP 13.2) to Harding Avenue (MP 16.9) are between 10 and 11 feet wide.
- Access control in the study area is by permit only.

- The posted speed limit is 35 mph between the intersection at Sand Lane and the intersection at 14th Street, and 45 mph at all other points.
- Right-of-way widths average 60 to 80 feet except near the interchange with US 41 and US 60, where the width is 250 feet.
- Sidewalks are present at some locations, however, a 1.8-mile-long sidewalk extension between MP 13.2 and MP 15.0 has been proposed through the KYTC Statewide Transportation Planning process.
- There are seven signalized intersections in the study area.

Table 1: US 41A Roadway Characteristics

Roadway Characteristics	Begin MP 13.235 to End MP 14.483	Begin MP 14.483to End MP 15.406	Begin MP 15.406 to End MP 15.884	Begin MP 15.884 to End MP 17.397
	US 60 to KY 136 (Sand Lane)	KY 136 (Sand Lane) to Clay Street	Clay Street to KY 351 (2nd Street)	KY 351 (2nd Street) to US 41/US 60 Interchange
Driving Lanes	3-4	4	4-5	4-5
Lane Width	10-11	10	10	10-12
Shoulder Type	Paved	Curbed	Curbed	Curbed
Shoulder Width	2	0	0	9
2007 ADT	19,600	20,800	25,700	30,100
Posted Speed Limit	45	35	35	35-45
Average R/W Width	80	60	60	60-250
Type Road	Undivided Highway	Undivided Highway	Undivided Highway	Undivided Highway before Hardin Avenue
Median	None	None	None	Raised Median after Harding Avenue
Functional Class	Urban Principal Arterial Street	Urban Principal Arterial Street	Urban Principal Arterial Street	Urban Principal Arterial Street
State Primary Road System	State Primary	State Primary	State Primary	State Primary
National Hwy System	YES	YES	YES	YES
National Truck Network	NO	NO	NO	NO
Truck Weight Class	AAA	AAA	AAA	AAA
Terrain	Flat	Flat	Flat	Flat

3.2 Intersection Level of Service and Delay

Morning and afternoon (AM and PM) peak-hour traffic operating conditions for both current and future (2030) years were calculated. For each 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 (similar to school grades) 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 the signal or stop control. LOS C is often considered the threshold for desirable traffic conditions in smaller cities such as Henderson. In this study, levels of service below this threshold are noted as undesirable and warrant improvement. LOS C corresponds to less than 35 seconds of delay per vehicle at a signalized intersection and less than 25 seconds of delay at an unsignalized intersection.

Traffic projections were developed for the year 2030 to determine how Green Street would function if no improvements (beyond normal maintenance) were made during that time period. This scenario is referred to as the No-Build Scenario.

Table 2: Current and Projected ADT and LOS

Beginning MP	Beginning Feature	Ending MP	Ending Feature	2007 ADT	2030 ADT	2007 LOS	2030 LOS
13.235	**US 60**	**14.483**	**KY 136 (Sand Lane)**	19,600	22,600	B	B
14.483	**KY 136 (Sand Lane)**	**15.406**	**Clay Street**	20,800	25,600	B	D
15.406	**Clay Street**	**15.884**	**KY 351 (2nd Street)**	25,000	30,300	E	E
15.884	**KY 351 (2nd Street)**	**17.397**	**to US 41/US 60**	30,100	34,800	E	F

3.3 Crash Analysis

The Critical Rate Factor (CRF) for the three year period from January 1, 2005 to December 31, 2007 is 1.30 for the study area. KYTC defines CRF as the quotient showing the ratio of the crash rate for a roadway spot or segment divided by the critical crash rate for that roadway sport or segment based on roadway type, number of lanes, and median type. A CRF greater than 1.00 indicates that the segment of roadway has had a statistically significant number of crashes that likely had not occurred at random. Critical rate factors within the US 41A study area between MP 13.1 and MP 17.3 are listed in the table below. CRF rates greater than 1.00, which indicate a high crash area, are highlighted in yellow.

Table 3: Corridor / Segment Crash Analysis

Beginning MP	Ending MP	Total Number of Crashes	Crash Rate	Critical Crash Rate	Critical Rate Factor
Corridor					
13.100	17.300	1,357	2.01	1.62	1.30
0.3 Mile Spot					
13.100	13.400	43	1.16	1.17	1.00
13.400	13.700	42	1.14	1.80	0.63
13.700	14.000	64	1.73	1.80	0.96
14.000	14.300	21	0.57	1.80	0.32
14.300	14.600	128	2.94	1.76	1.67
14.600	14.900	18	0.41	1.76	0.24
14.900	15.200	57	1.31	1.76	0.74
15.200	15.500	142	3.01	1.74	1.73
15.500	15.800	169	3.58	1.74	2.06
15.800	16.100	150	2.75	1.71	1.61
16.100	16.400	163	2.99	1.71	1.75
16.400	16.700	56	1.03	1.71	0.60
16.700	17.000	237	4.35	1.13	3.84
17.000	17.300	67	1.23	1.13	1.08

Crash Data 2005 – 2007

Yellow highlight indicates a high crash area (CRF greater than 1.00).

The CRF of 3.84 from mile points 16.700 to 17.000 prompted the data for the area to be re-analyzed in closer detail. Of the 324 total crashes, only 17 were single-vehicle crashes. Nearly half (46.6%) were rear end, 16.1% opposing left turn, and 16.0% angle collision (each typical of an urban environment with uncontrolled side access). 13.9% were sideswipe type crashes and 5.6% involved a vehicle entering/leaving entrance. Approximately 72.5% occurred during the daytime which seems to reflect when most traffic is on the road. These CRF patterns appear typical for a heavily traveled type of urban facility with possible stop-and-go traffic characterized by frequent signals, uncontrolled side access, and the lack of a left-turn lane. In addition, it was noted during field visits that the average running speed (in off peak hours) was somewhat higher than the posted speed limit.

4.0 HUMAN ENVIRONMENT OVERVIEW

4.1 Environmental Justice

The *Environmental Justice and Community Impact Issues US 41A, Green Street in Henderson Six Year Plan Item No. 2-140* was prepared for the *Alternatives Planning Study for US41A/Green Street* by the Green River Area Development District (GRADD). The full report is included in Appendix G and is summarized in this chapter.

An *Environmental Justice and Community Impact Report* (EJ Report) is an assessment of community demographics within the study area and a comparison of these demographics with those of the surrounding area, particularly regarding low income, minority, and elderly populations. The goal of such an effort is to ascertain if any of these populations might be disproportionately impacted by improvements to the Green Street corridor.

The defined study area encompasses portions of 10 Block Groups within 8 Census Tracts. The Census Tracts and Block Groups are listed below:

Henderson County

Census Tract: 201 Block Group: 1	Census Tract: 205 Block Group: 2
Census Tract: 202 Block Group: 1	Census Tract: 206.01 Block Group: 2 & 3
Census Tract: 203 Block Group: 1	Census Tract: 206.02 Block Group: 1
Census Tract: 204 Block Group: 1 & 2	Census Tract: 209 Block Group: 3

Comparison of the demographic characteristics of the Block Groups representing the study area to the Block Groups surrounding the study area and to state and national averages revealed the following:

- Minority Population: The percentage of minority populations in Henderson County is below both state and national averages. However, there are six Census Tracts and eight Block Groups within the study area that indicate higher percentages of minority populations than the national, state, and county levels.
- Low-Income Population: Henderson County's poverty level is lower than both the national and state percentages. However, there are six Census Tracts and seven Block Groups within the study area that have higher percentages of the population with income below the poverty level that exceeds county, state, and national averages.
- Population Age 65 and Older: Henderson County's population age 65 and over is higher than the state and national averages. Consequently, seven of the eight Census Tracts have higher percentages than county, state, and national levels.

Based on the minority population percentages and the high percentages of persons 65 and over, a high degree of community cohesion may be present. A subsequent review of data within the affected Census Tracts should be undertaken to determine if particular populations exist in the study area; and if so, proactive measures should be undertaken to insure that these groups are not disproportionately affected by any projects.

4.2 Underground Storage Tanks/Hazardous Materials

The Underground Storage Tank Branch (USTB) of the Division of Waste Management (DWM) of the Department for Environmental Protection (DEP) of the Kentucky Energy and Environment Cabinet (EEC) identified 29 facilities with a total of 99 registered underground storage tanks. Of the 99 registered underground storage tanks, 77 have been closed, 18 are active, and 2 are listed as abandoned. There are 8 facilities currently undergoing corrective actions within the project area due to soil and/or groundwater contamination. The 18 active tanks are at five separate sites: Fast Fuel/Country cupboard # 6, 1773 S. Green Street; Swifty Gas Station # 231, 1605 S. Green Street; Dodge's Store, 301 S. Green Street; Chuckles Food Mart # 32, 202 N. Green Street; and Thornton's Oil # 86, 940 N. Green Street.

4.3 Cultural Archeological and Historic Resources

Archaeological Resources

The *Archaeological Resource Overview Report* prepared for the study noted that three archaeological surveys have been conducted within the study area and an additional twelve surveys have been identified within a 1.24-mile buffer around the study area. One of the three archaeological surveys identified an archaeological and cultural historic site in the study area: The Mt. Zion Cemetery (15HE864/He-67). The Mt. Zion Cemetery is an African-American cemetery dating to the early twentieth century. The cemetery is considered eligible for listing on the National Register of Historic Places (NRHP). No other archaeological sites have been identified within the study area. The full report is in Appendix E.

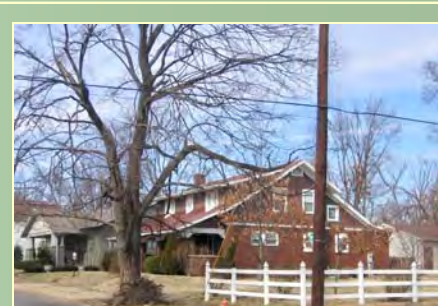
Cultural Historic Resources

The *Cultural Historic Resource Overview* prepared for this study identified two historic districts listed on the National Register of Historic Places (NRHP), six individual properties listed on the National Register and nineteen properties that appear to have potential to be listed on the National Register. The two historic districts that fall within the boundaries of the study area are the South Main and South Elm Streets Historic District, which was listed in 1992; and the Henderson Commercial Historic District, which was listed in 1989. The two historic districts, six properties, and the nineteen potential properties are identified on Exhibit # in Appendix A, and in the large maps provided electronically on CD. The six individual National Register listed structures are identified in detail below.

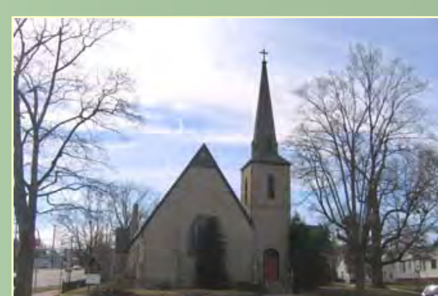
1. Stewart House, 827 S. Green Street (Site Z, HEH-224)
Built in 1951, The house embodies the distinctive characteristics of a type of prefabricated construction, marketed by the Lustron Corporation after World War II as a response to the housing shortage. It developed a mass-produced house with pre-fabricated framing, roof and ceiling panels, with interior and exterior walls made of porcelain enamel-finished steel.

2. Furman House, 334 Powell Street (Site QQ, HEH-119)
This home is a contributing element in the South Main and South Elm Streets Historic District. This was home to Lucy Furman, an author and lecturer, who was born here in 1870. Her first book was published in 1897. She taught in the Hindman Settlement School in Knott County from 1907 until 1927. The house is a two-story, brick, hipped roof dwelling which has an asymmetrical plan.

3. Craig House, 329 Powell Street (Site RR, HEH-432)
This home is a contributing element in the South Main and South Elm Streets Historic District. This house is a one-and-one-half-story, brick bungalow with a shed roofed dormer. The full-width porch is supported by brick posts atop a brick porch railing.



4. St. Paul's Episcopal Church, 338 Center Street (Site YY, HEH-418)
Built in 1859-1860, and a contributing element in the South Main and South Elm Streets Historic District, this Gothic Revival church is based on the cruciform plan. The main facade facing Center Street features a steeply pitched wall gale that is pierced by an equilateral arch window with a low-relief stone hood molding. The main entrance is in a square bell tower on the northwest corner of the building. The tower contains a Tudor arch doorway and is surmounted by an eight-sided spire. The church sanctuary is seven bays deep with buttresses as the only major interruptions of its smooth walls that are stuccoed brick.



5. Wolf's Tavern, 31 N. Green Street (Site BBB, HEH-219)
Built in 1878, and a contributing element in the Henderson Commercial District, it is a two-and-one-half-story, three-bay, brick commercial building. It retains some Mesker steel components including the only surviving elaborate metal cornice pediment in the Henderson Commercial Historic District. Other metal elements include the gabled hood moldings above the windows on the second floor and a metal cornice with side piers.

6. John McAllister House, 839 N. Green Street (Site JJJ, HEH-175)
Built in 1867, is a two-story, three-bay, central passage, brick dwelling with brackets along the eaves of its hipped roof. The McAllister House displays elements from the Greek Revival and Italianate styles.

The nineteen properties that appear to have potential to meet National Register criteria and listed below and identified on Exhibit 2 in Appendix A:

1. Mt. Zion Cemetery (Site D, HEH-523)
2. 1563 S. Green Street (Site K, HEH-513)
3. St. Louis Cemetery (Site O, HEH -507)
4. 1425 S. Green Street (Site P, HEH-510)
5. Turner House, 1005 S. Green Street (Site U)
6. 1002 S. Green Street (Site W)
7. 818 S. Elm Street (Site AA)
8. 702 S. Green Street (Site BB)
9. 338 S. Green Street (Site JJ)
10. 222 S. Green Street (Site NN, HEH-118)
11. 200 S. Green Street (Site PP, HEH 116)
12. 138 S. Green Street (Site SS)
13. 132 S. Green Street (Site TT, HEH-115)
14. 119 S. Green Street (Site VV, HEH-120)
15. 115 S. Green Street (Site WW)
16. 36 S. Green Street (Site ZZ)
17. First United Methodist Church, 338 Third Street (Site CCC-2)
18. L&N Railroad Ohio River Bridge Approach (Site FFF)
19. McClain House, 804 N. Green Street (Site III, HEH-174)

The *Cultural Historic Resource Overview* also identified buildings in and around the study area that would be documented in a baseline study but appear to be ineligible to meet National Register criteria, as well as structures previously documented but no longer standing. The entire report is included in Appendix F.

4.4 Land Use and Zoning

Within the project corridor, there is a mix of commercial, residential, and institutional land uses. In the northern end of the study area, land use is primarily high-density commercial, which transitions to more residential land uses as the corridor traverses to the south. In addition, some older residences have been converted to commercial uses. There is also limited, less dense commercial development located in the southern section of the study area.

Along the corridor there are several churches, the larger ones of which include Church of Christ, First United Methodist Church, St. Paul's Episcopal Church, and New Race Creek Baptist Church. There are three cemeteries located along the project corridor between US 60 and KY 1136: Fairmont, Mt. Zion, and St. Louis cemeteries.

Appendix B contains selected photographs showing the roadway and land uses along the Green Street study corridor from US 60 to US 60.

5.0 NATURAL ENVIRONMENT OVERVIEW

5.1 Aquatic Ecology

No aquatic macro invertebrate, fishes, or water quality sampling was completed for this ecological overview. The Kentucky Department of Fish and Wildlife Resources (KDFWR) recommended that, should any recommended improvement be implemented, erosion control measures be developed and utilized during any construction to minimize siltation into nearby waterways. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed (See Appendix H).

5.2 Terrestrial Ecology and Threatened & Endangered Species

The U.S. Fish and Wildlife Service was invited to comment on the project and no comment was received. Table 4 identifies the following endangered, threatened, or candidate species as potentially occurring or having known occurrences in Henderson County. The data was obtained from the website provided by the U.S. Fish and Wildlife Service.

Table 4: Federally Protected Species of Henderson County

Federally Protected species that may potentially occur in Henderson County:		
Common Name	**Species**	**Status**
Orangefoot pimpleback	*Plethobasus cooperianus*	Federally endangered
Sheepnose	*Plethobasus cyphyus*	Federal candidate
Clubshell	*Pleurobema clava*	Federally endangered
Rough pigtoe	*Pleurobema plenum*	Federally endangered
Federally Protected species that have known occurrences in Henderson County:		
Common Name	**Species**	**Status**
Indiana Bat	*Myotis sodalis*	Federally endangered
Purple catspaw pearlymussel	*Epioblasma o. obliquata*	Federally endangered
Fanshell	*Cyprogenia stegaria*	Federally endangered
Fat Pocketbook	*Potamilus capax*	Federally endangered
Pink Mucket	*Lampsilis abrupta*	Federally endangered
Ring Pink	*Obovaria retusa*	Federally endangered
Bald Eagle	*Haliaeetus leucocephalus*	Federally threatened
American burying beetle	*Nicrophorus americanus*	Federally endangered

6.0 RESOURCE AGENCY COORDINATION

One agency mailing was prepared during this study. Dated July 31, 2009, the mailing was prepared and distributed after preliminary improvement options had been identified and agreed to by the Project Team. A copy of the mailing and the list of recipients are included in Appendix H for reference.

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 expressed specific concerns or identified issues to be considered in the study. A summary of the substantive responses received is provided below. Similarly, all agency correspondence received is included in Appendix H.

1. U.S. Fish and Wildlife Service, was invited to comment and no comment was received. The data for this report was obtained on the website provided by the agency.
2. Department of Military Affairs: No issues or concerns indicated; the roadway improvements may have a positive impact on the movement of military material.
3. U.S. Coast Guard: No jurisdiction and no permit required.
4. Federal Aviation Administration (FAA): No impacts to the Henderson City-County Airport.
5. U.S. Department of Housing and Urban Development (HUD): Under review of HUD environmental protection specialist.
6. U.S. Department of Agriculture, Natural Resource Conservation Service: No comments regarding this project.
7. Kentucky State Police: The proposed construction is greatly needed in this area.
8. Kentucky Airport Zoning Commission: No adverse effect to air navigation. However, if construction equipment exceeds 200 feet above ground level, a permit will be required.
9. Kentucky Division of Forestry: Does not believe any tree issues would negatively impact the need to correct highway safety concerns. Recommends that KYTC make an effort to replace street trees where possible after the project is complete.
10. Kentucky Department of Fish and Wildlife Resources: Does not expect impacts to listed species due to the location and nature of the project. KDFWR recommends that erosion control measures be developed and utilized during any construction to minimize siltation into nearby waterways.
11. Kentucky State Nature Preserves: No comments regarding potential impacts on rare species and communities.
12. KYTC Division of Operations: Noted that congestion is an issue and that a road diet is an alternative that should be reviewed.
13. KY Education and Workforce Development Cabinet: No comments.
14. Kentucky Energy and Environment Cabinet, Department for Environmental Protection (EEC-DEP), Division of Water (DOW): Best management practices shall be used to reduce runoff from the project.
15. EEC-DEP, Division for Air Quality: Identified two administrative regulations that apply to this project and indicated that this project must meet the conformity requirements of the Clean Air Act.

16. EEC-DEP, Division of Waste Management (DWM): All solid waste generated by this project must be disposed of at a permitted facility.
17. EEC-DEP-DWM, Superfund Branch: Provided a list of superfund sites in Henderson County.
18. EEC-DEP-DWM, Underground Storage Tank Branch: Provided a table that identified 29 facilities with a total of 99 registered underground storage tanks and their status (see Section 4.2, herein).
19. EEC-DEP-DWM, Solid Waste Branch: Attached a map showing the known waste areas of solid waste landfills related to Henderson City; none of which are in the study area.
20. EEC, Department for Natural Resources: Indicated areas of existing mining within the project area as a seam of coal 190 feet below the surface in the vicinity of the US 41A and KY 136 intersection.
21. Kentucky Geological Survey: Indicated that none of the observed geologic features in the field area would preclude improvements on US 41A.
22. Evansville MPO: Supports the necessary improvements that will increase safety and efficiency along the corridor and provided several recommendations.
23. Henderson City-County Planning: This project is addressed in the City-County Comprehensive Plan.
24. Henderson County Schools: Provided comments regarding potential construction concerns.
25. City of Henderson: Agrees with the project goals and needs and assorted suggestions.
26. Henderson Water Utility: There will need to be coordination with HWU.

7.0 ALTERNATIVES DEVELOPMENT AND EVALUATION

7.1 Analysis Sections

To better analyze design options in the 4.0-mile section of US 41A, the corridor was broken down into five individual sections. These five sections differ from the four sections used to analyze the existing conditions data. The five sections were determined due to the existing roadway conditions, (i.e., five lane section between Washington Street and Third Street, and the railroad overpass between Third Street and Fifth Street). See the section descriptions below. An illustration and brief descriptions of the general conditions of each of the five sections are as follows:

Figure 4: Alternatives Evaluation Sections 1–5 of US 41A

Section 1—This 1.3-mile section of US 41A extends from US 60 to KY 136 (Sand Lane) MP 13.2–MP 14.5). It comprises the southernmost section of the study area corridor and terminates at the new US 60 widening project. Right-of-way (ROW) width is 80 feet.

Section 2—KY 136 (Sand Lane) to Washington Street (MP 14.5–MP 15.6). ROW width is 60 feet.

Section 3—Washington Street to 3rd Street (MP 15.6–MP 15.9). This 0.3-mile section is currently a five-lane segment that does not require construction and is not a factor in the purpose of this study. ROW width is 60 feet.

Section 4—3rd Street to 5th Street (MP 15.9–MP 16.2). This 0.3-mile section contains the existing railroad overpass on the cross river CSX line that parallels 4^{th} Street. The piers of the overpass are so close to the driving lanes of US 41A that the existing ROW is not wide enough to accommodate the addition of a center lane without reconstruction of the railroad overpass. The railroad overpass would have to be removed and rebuilt in order for the roadway to be widened in any capacity. ROW width is 60 feet.

Section 5—5th Street to 14th Street (US 60) (MP 16.2–MP 17.0). This 0.8-mile section exhibits some of the highest traffic volume of the study area. There is a lack of channelized access to properties within this section as well. ROW width is 60 feet.

7.2 Alternatives Not Advanced

In addition to the roadway widening, two other alternative concepts were considered but are not recommended for advancement: one-way couplets and a "road diet" (i.e., reducing the road from four lanes to three). The one-way couplets would require the conversion of Elm Street to a one-way facility. Elm Street is currently a divided roadway with a raised landscaped median through a residential area, and is offset at some intersections. For these reasons it would not provide an optimum configuration for a one-way street. Regarding the road diet, research indicates that only roads with a maximum volume of 850 vph have been successful in improving traffic flow after a reduction of lanes. For US 41A the approximate peak-hour volumes are 1,900 to 3,000 vph. Therefore this option is not recommended.

8.0 RECOMMENDATIONS

8.1 Recommended Alternatives

Three widening alternatives were identified to achieve the specified five-lane facility on US 41A. The alternatives are to widen to the left (west, towards the river), middle, and right (east). Each of these widening scenarios was reviewed for Section 1, Section 2, Section 4, and Section 5. Section 3 was not considered because it currently is a five lane section with a center turning lane. The proposed typical section features an 86-foot-wide right-of-way with four 11-foot-wide travel lanes; a 12-foot-wide center turn lane, 2-foot-wide gutter, 2-foot-wide verge, 5-foot-wide sidewalk, and 6-foot-wide utility strip (see typical section below). Large maps were produced by section detailing each of the three widening scenarios at a 100-foot scale. **These are provided electronically as an element of Appendix A, on a compact disk (CD) accompanying this report.** A snapshot of these exhibits is inserted on the next page for illustrative purposes.

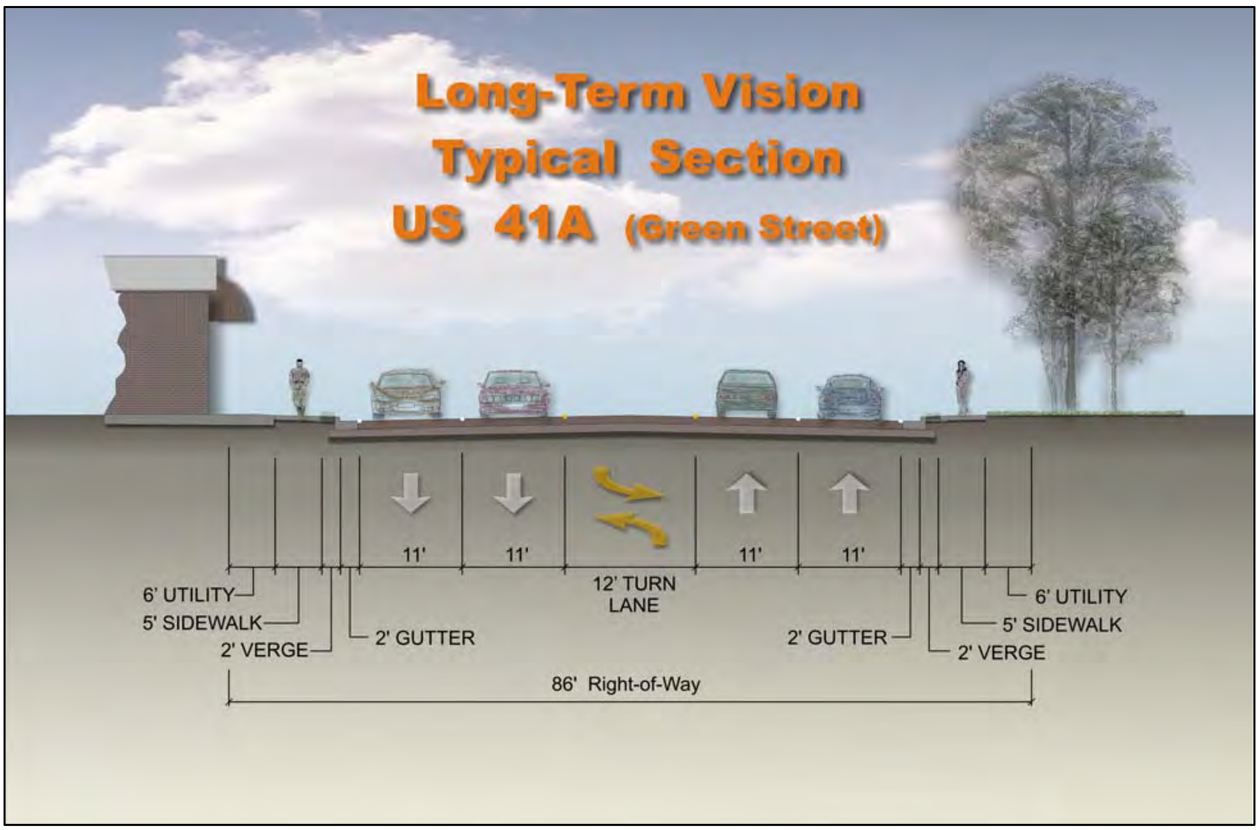


Figure 5: Recommended US 41A Typical Section

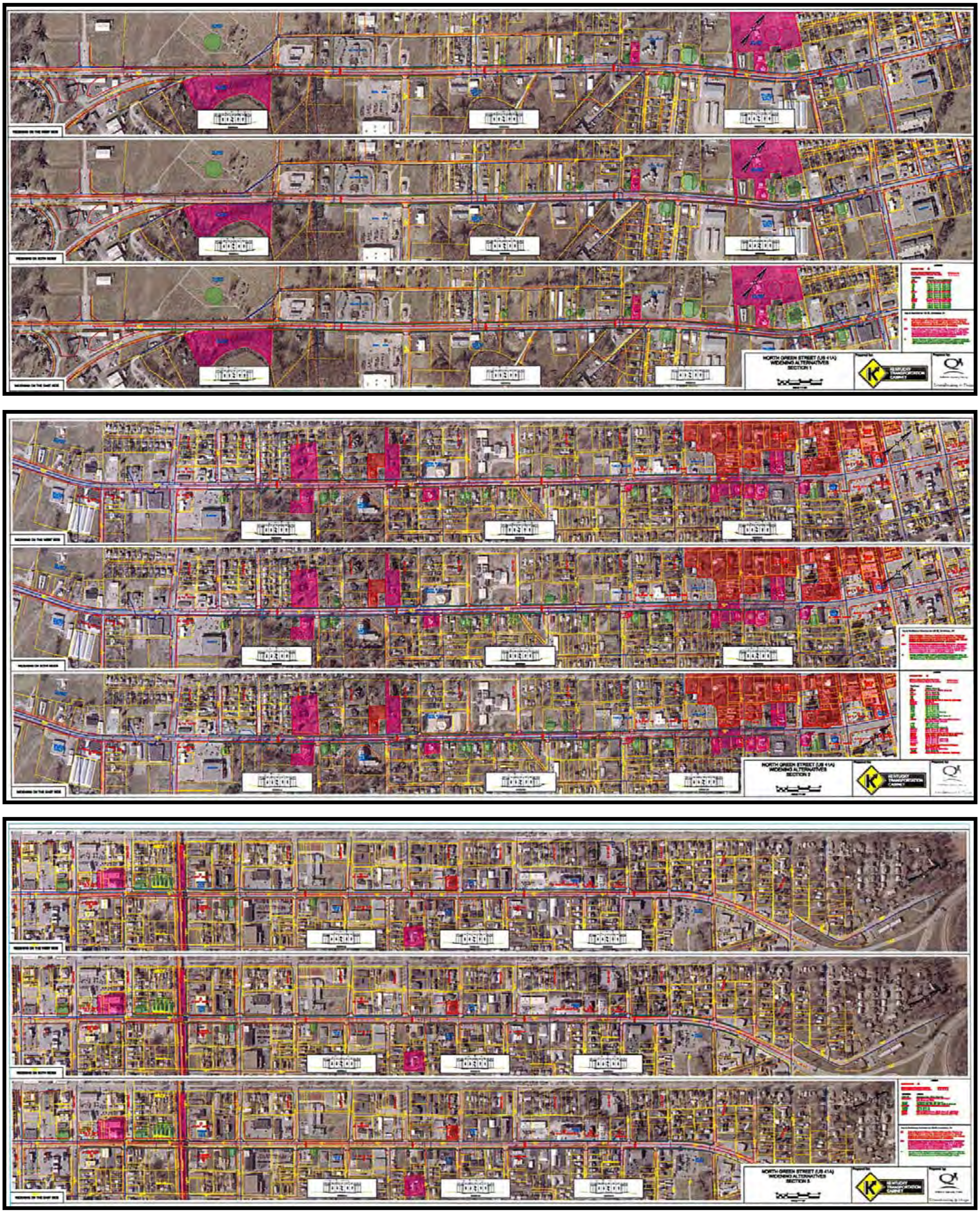


Figure 6: US 41A Widening Alternative Maps provided electronically

Phased planning cost estimates and right-of-way impacts were also identified for each widening alternative by section. This table is included as Exhibit 4 in Appendix A. Table 5 below shows the phased planning level cost estimates, by section, for widening to the left, middle, and right side of the existing alignment.

Table 5: US 41A Widening Alternatives and Cost Itemization

US 41A Widening Alternatives and Cost Itemization						
US 41A: from South to North	Length (ft.)	Construction Cost	R/W Cost	Utility Cost	Engineering Cost	Total Cost
Section 1 (US 60 to Sand Lane)						
Alternative L	6780	$3,163,000	$161,000	$2,630,000	$696,000	$6,650,000
Alternative M	6780	$3,163,000	$164,000	$2,630,000	$696,000	$6,653,000
Alternative R	6780	$3,163,000	$162,000	$2,630,000	$696,000	$6,651,000
Section 2 (Sand Lane to Wash Street)						
Alternative L	5330	$2,486,000	$436,000	$2,342,000	$547,000	$5,811,000
Alternative M	5330	$2,486,000	$126,000	$2,441,000	$547,000	$5,600,000
Alternative R	5330	$2,486,000	$426,000	$2,261,000	$547,000	$5,720,000
Section 4 (3rd Street to 5th Street)						
Alternative L	2050	$8,258,000	$784,000	$1,084,000	$1,817,000	$11,943,000
Alternative M	2050	$8,258,000	$172,000	$1,123,000	$1,817,000	$11,370,000
Alternative R	2050	$8,258,000	$1,379,000	$1,003,000	$1,817,000	$12,457,000
Section 5 (5th Street to 14th Street/US 60)						
Alternative L	3900	$1,819,000	$76,000	$1,859,000	$400,000	$4,154,000
Alternative M	3900	$1,819,000	$661,000	$1,937,000	$400,000	$4,817,000
Alternative R	3900	$1,819,000	$2,465,000	$1,924,000	$400,000	$6,608,000

The combined sections comprising the entire project range in cost from $27.7 million to $31.5 million.

Specific widening alternatives (left, middle, and right) were not selected, as the purpose of this study is to determine the feasibility of widening US 41A, in terms of phased cost estimates and right-of-way impacts. However, the segments of US 41A were prioritized for reconstruction. They are listed below in order of priority:

1. **Section 5:** highest traffic volume, most commercial land uses, and high left-turn volume.

2. **Section 1:** provides logical terminus with the current reconstruction of US 60 and no restrictions due to the presence of historic properties.

3. **Section 2:** mostly residential land uses and there are historic property issues to be addressed.

4. **Section 4:** is the lowest priority due to the extremely high cost of the reconstruction of the railroad overpass that is necessary to widen US 41A underneath.

8.2 Additional Considerations

- In Section 4, the rebuilding of the railroad overpass requires the construction of 2,900 feet of parallel track to the west of the existing track. This proposal provides an opportunity to reconstruct the railroad overpass that spans US 41A. This proposal also includes railroad overpasses over Ingram Street and Elm Street. Under this plan, the existing track would be abandoned once the construction of the new overpasses and track is complete. The total cost estimate for this project is $7.3 million.

- Currently, the reconstruction of US 60 south of this project is underway. During this project, previously unknown utilities have been discovered, resulting in a significant increase in project cost as well as added time delay. Because of this discovery, it is reasonable to assume that the possibility exists for a similar situation within the US 41A study area.

- The project team elected to not recommend bike lanes on the widened sections of US 41A for several reasons: 1) Right-of-way is restricted; relocation and right-of-way costs would increase significantly if bicycle lanes were installed. 2) High traffic volumes on this corridor, coupled with the numerous curb cuts, make bicycle activity hazardous. 3) There is an ample grid network of parallel streets with significantly less traffic volume that could better accommodate bicycle lanes. The Evansville MPO produced the *Greater Henderson Bicycle and Pedestrian Plan* in June of 2003, (included in Appendix I), which identifies the recommended bike and pedestrian route networks for the short and long term. It does not recommend this section of US 41A as a bikeway network in either the short or long term. The Evansville Metropolitan Planning Organization[2] is the designated Metropolitan Planning Organization (MPO) for the Evansville, Indiana and Henderson, Kentucky, Urbanized Area.

[2] The Evansville MPO was formerly known as the Evansville Urban Transportation Study (EUTS).

APPENDIX A
EXHIBITS

Source Citiation
Topographic data, including utilities and imagery and less historic, aquatic and terrestrial courtesy of the Kentucky Office of Geographic Information Systems (KYOGIS).Qk4 makes no claim to the accuracy of that data shown on this map.

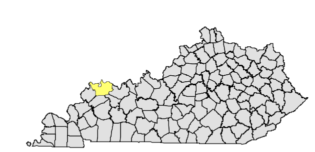
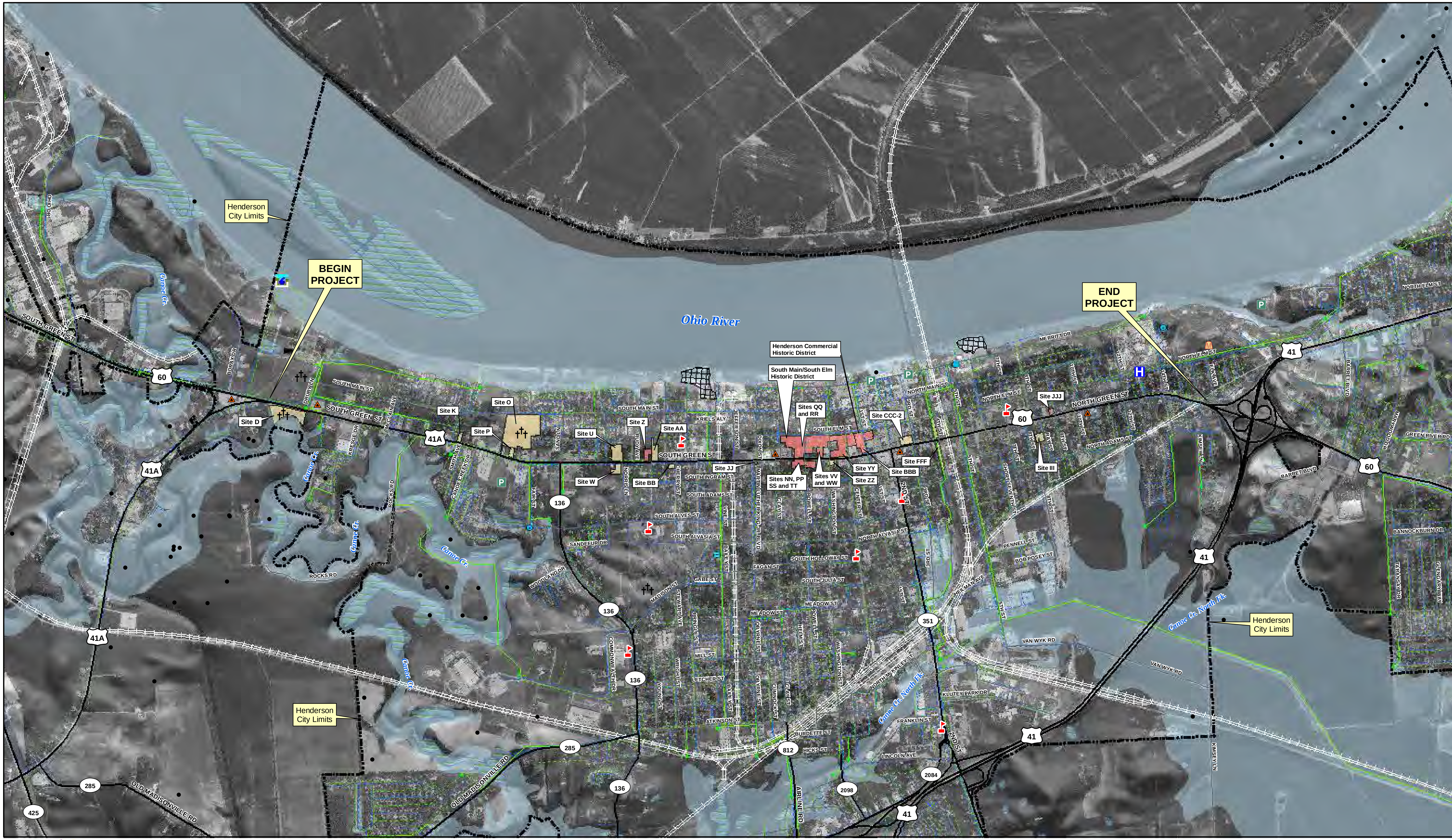


Exhibit 1

2004 Aerial Photography

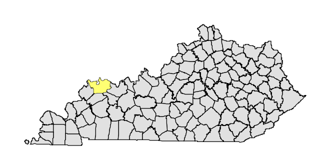
US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00



Airport
Cemetery
Park
School
Hospital
Abandoned Railroad
Landfill
HAZMAT Location
Gas/Oil Well
Sewer Outfall
Lift Station
Sanitary Treatment Plant
Force Main Sewer
Gravity Sewer
Water Treatment Plant
Water Pump Station
Water Tank
Existing Waterline
Quarry
Wetlands
100 Year Flood Potential
National Register Potential
National Register Property/District

Division of Planning

Source Citation
Topographic data, including utilities and imagery and less historic, aquatic and terrestrial courtesy of the Kentucky Office of Geographic Information Systems (KYOGIS). Qk4 makes no claim to the accuracy of that data shown on this map.



VICINITY MAP

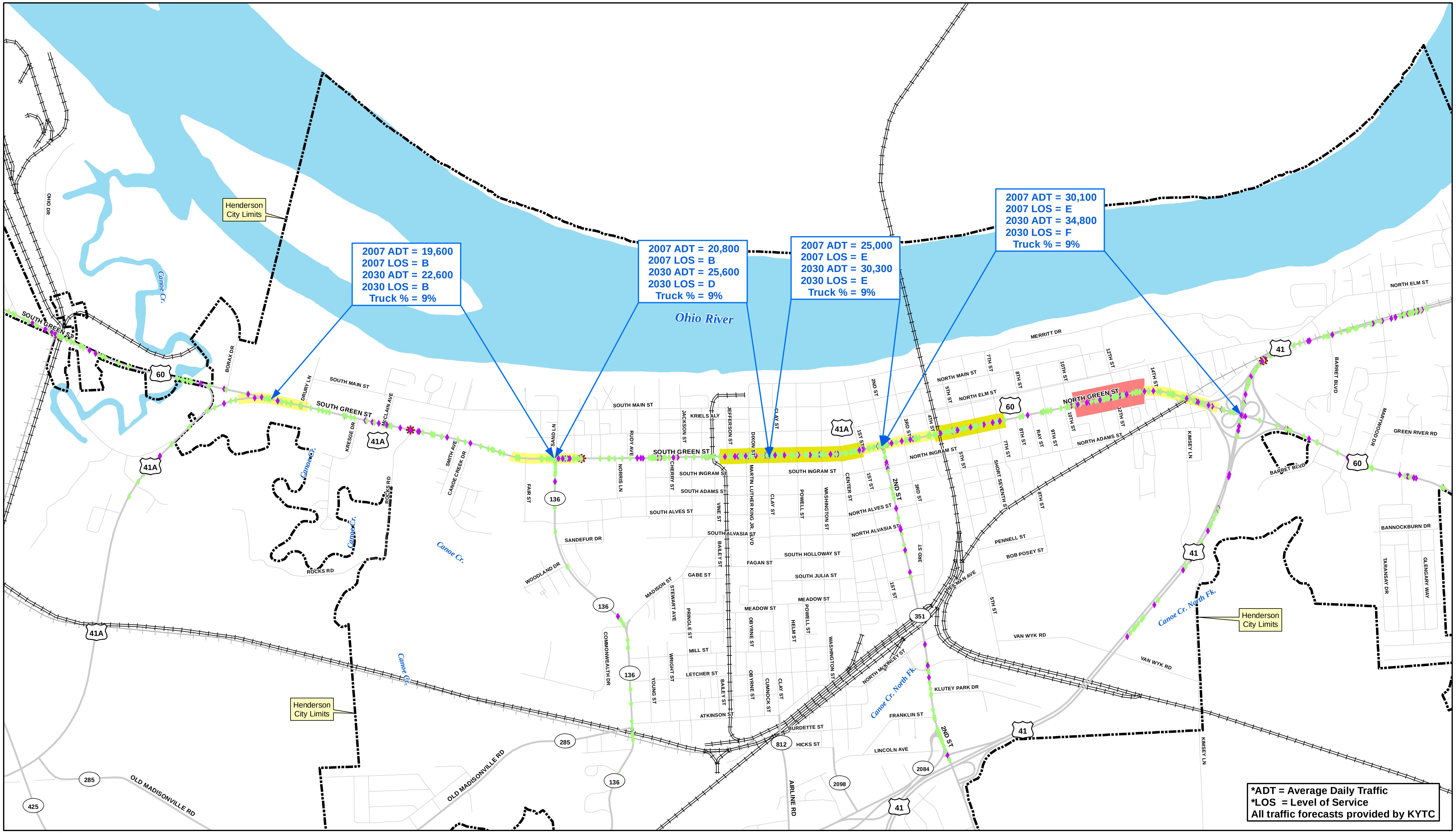
N

Feet
0 1,000 2,000

Exhibit 2

Environmental Constraints

US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00



Source Citation
Topographic data, including utilities and imagery and less historic, aquatic and terrestrial courtesy of the Kentucky Office of Geographic Information Systems (KYOGIS).Qk4 makes no claim to the accuracy of that data shown on this map.

Crash Types	Critical Rate Factor
Fatal	1 - 1.70
Injury	1.70 - 2.4
PDO	2.4 - 3.1
	3.1 - 3.8

VICINITY MAP

Feet: 0, 1,000, 2,000

Exhibit 3

Existing and Projected No-Build Traffic, Functional Class and, Crashes

US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00

US 41A Widening Alternative Impacts and Cost Itemization

US 41A: from South to North	Length (ft.)	Construction: Pavement Width New (ft.)	Pavement Width Overlay (ft.)	Pavement Area New (SY)	Pavement Area Overlay (SY)	Pavement Cost New ($60/SY)	Pavement Cost Overlay ($8/SY)	Pavement Cost Total	C&G $17/LF	Sidewalk $30/SY	RR Overpass	Misc. (@70%)	Total Construction Cost
Section 1 (US 60 to Sand Lane)													
Alt. L	6,780	26	38	19,587	28,627	$1,175,220	$229,016	$1,404,236	$230,520	$226,000	$0	$1,302,529	$3,163,000
Alt. M	6,780	26	38	19,587	28,627	$1,175,220	$229,016	$1,404,236	$230,520	$226,000	$0	$1,302,529	$3,163,000
Alt. R	6,780	26	38	19,587	28,627	$1,175,220	$229,016	$1,404,236	$230,520	$226,000	$0	$1,302,529	$3,163,000
Section 2 (Sand Lane to Wash St.)													
Alt. L	5,330	26	38	15,398	22,504	$923,880	$180,032	$1,103,912	$181,220	$177,667	$0	$1,023,959	$2,486,000
Alt. M	5,330	26	38	15,398	22,504	$923,880	$180,032	$1,103,912	$181,220	$177,667	$0	$1,023,959	$2,486,000
Alt. R	5,330	26	38	15,398	22,504	$923,880	$180,032	$1,103,912	$181,220	$177,667	$0	$1,023,959	$2,486,000
Section 4 (3rd St. to 5th St.)													
Alt. L	2,050	26	38	5,922	8,656	$355,320	$69,248	$424,568	$69,700	$68,333	$7,302,000	$393,821	$8,258,000
Alt. M	2,050	26	38	5,922	8,656	$355,320	$69,248	$424,568	$69,700	$68,333	$7,302,000	$393,821	$8,258,000
Alt. R	2,050	26	38	5,922	8,656	$355,320	$69,248	$424,568	$69,700	$68,333	$7,302,000	$393,821	$8,258,000
Section 5 (5th St. to 14th St./US 60)													
Alt. L	3,900	26	38	11,267	16,467	$676,020	$131,736	$807,756	$132,600	$130,000	$0	$749,249	$1,819,000
Alt. M	3,900	26	38	11,267	16,467	$676,020	$131,736	$807,756	$132,600	$130,000	$0	$749,249	$1,819,000
Alt. R	3,900	26	38	11,267	16,467	$676,020	$131,736	$807,756	$132,600	$130,000	$0	$749,249	$1,819,000

Total Cost Range	
Least Costly	**$27.7M**
Most Costly	**$31.5M**

US 41A: from South to North	Length (ft.)	Right-of-Way: Parcels Lt	Parcels Rt	Area ($50k/Ac.) Lt. (sq.ft.)	Area Rt. (sq.ft.)	Area R.R. (sq.ft.)	Area Total (Ac.)	Relocations ($300,000) Residential	Relocations Commercial	Total R/W Cost	Utilities: Sewer	Water	Gas	Overhead	Total Utility Cost	Engineering: Total Engineering Cost	Total Project Cost
Section 1 (US 60 to Sand Lane)																	
Alt. L	6,780	43	24	120,297	19,598	0	3.2	0	0	$161,000	$1,000,000	$600,000	$830,000	$200,000	$2,630,000	$696,000	$6,650,000
Alt. M	6,780	44	28	61,474	81,331	0	3.3	0	0	$164,000	$1,000,000	$600,000	$830,000	$200,000	$2,630,000	$696,000	$6,653,000
Alt. R	6,780	9	28	18,047	123,355	0	3.2	0	0	$162,000	$1,000,000	$600,000	$830,000	$200,000	$2,630,000	$696,000	$6,651,000
Section 2 (Sand Lane to Wash St.)																	
Alt. L	5,330	39	12	113,656	5,196	0	2.7	0	1	$436,000	$400,000	$1,022,000	$770,000	$150,000	$2,342,000	$547,000	$5,811,000
Alt. M	5,330	40	62	62,414	47,330	0	2.5	0	0	$126,000	$405,000	$1,022,000	$860,000	$153,750	$2,441,000	$547,000	$5,600,000
Alt. R	5,330	33	62	9,770	100,330	0	2.5	1	0	$426,000	$389,000	$1,020,000	$738,000	$113,750	$2,261,000	$547,000	$5,720,000
Section 4 (3rd St. to 5th St.)																	
Alt. L	2,050	22	0	15,685	0	145,000	3.7	0	2	$784,000	$314,000	$433,000	$287,000	$50,000	$1,084,000	$1,817,000	$11,943,000
Alt. M	2,050	11	3	4,442	113	145,000	3.4	0	0	$172,000	$311,000	$435,000	$348,000	$28,750	$1,123,000	$1,817,000	$11,370,000
Alt. R	2,050	2	27	276	10,744	145,000	3.6	0	4	$1,379,000	$303,000	$438,000	$233,000	$28,750	$1,003,000	$1,817,000	$12,457,000
Section 5 (5th St. to 14th St./US 60)																	
Alt. L	3,900	32	4	65,644	475	0	1.5	0	0	$76,000	$462,000	$622,000	$625,000	$150,000	$1,859,000	$400,000	$4,154,000
Alt. M	3,900	35	19	35,667	17,296	0	1.2	0	2	$661,000	$472,000	$696,000	$619,000	$150,000	$1,937,000	$400,000	$4,817,000
Alt. R	3,900	17	32	9,392	47,414	0	1.3	3	5	$2,465,000	$467,000	$688,000	$619,000	$150,000	$1,924,000	$400,000	$6,608,000

Division of Planning

Kentucky

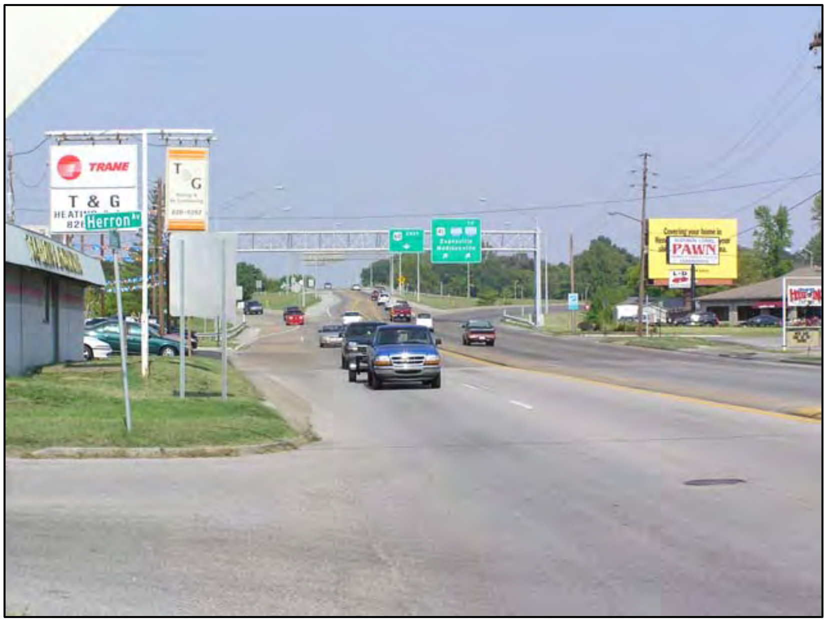
Exhibit 4

US 41A Widening Alternative Impacts and Cost Itemization

US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00

APPENDIX B
PHOTOGRAPH LOG

US 41A (Green Street) Photo Log



Looking northbound on US 41A at the US 41/US 60 intersection from Herron Avenue.

Looking southbound on US 41A at the 14th Street intersection.

Looking northbound on US 41A from the 13th Street intersection

Looking southbound on US 41A from the 13th Street intersection

Looking southbound on US 41A at the Harding Street intersection. The signals in the background are at the 12th Street intersection.

Looking northbound on US 41A at the 12th Street intersection from Gene's Restaurant (1095 N. Green St.)

Looking southbound on US 41A towards the 10th Street intersection.

Looking northbound on US 41A from the 9th Street intersection.

Looking southbound on US 41A from just south of the 9th Street intersection.

Looking southbound on US 41A at the 7th Street intersection.

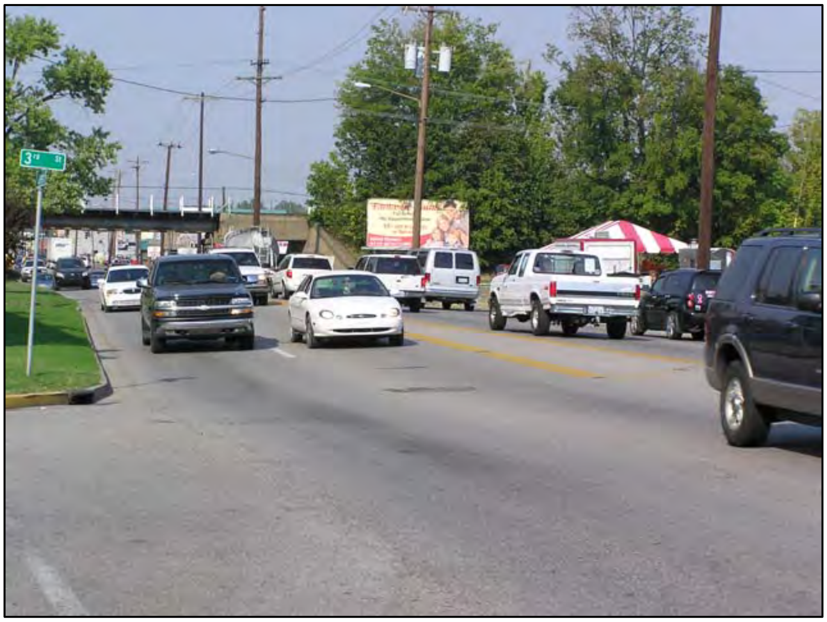
Looking northbound on US 41A at the 5th Street intersection.

Looking southbound on US 41A at the 4th Street intersection and the L&N (now CSX) Railroad overpass.

The north side of the CSX Railroad overpass as viewed from southbound US 41A.

The south side of the CSX Railroad overpass as viewed from northbound US 41A.

Looking southbound on US 41A towards the 3rd Street intersection.



Looking northbound on US 41A from the 3rd Street intersection with the Railroad overpass in the background.

Looking southbound on US 41A towards the 2nd Street intersection from abeam the First United Methodist Church.

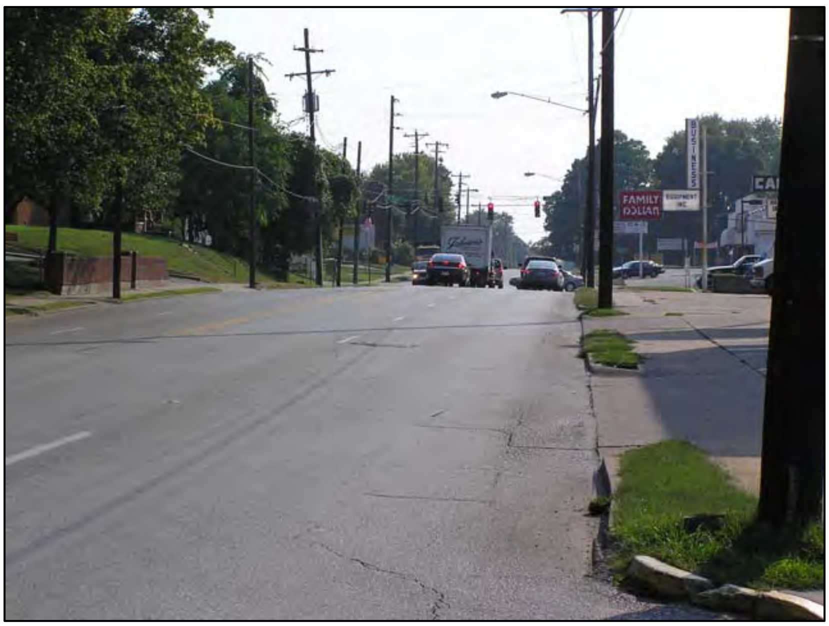
Looking northbound on US 41A at the 2nd Street intersection.

Looking southbound on US 41A at the 1st Street intersection.

Looking northbound on US 41A at the Center Street intersection.

Looking northbound on US 41A at the historic fence and sidewalk on the northeast corner of the Washington Street intersection.

Looking southbound on US 41A at the Clay Street intersection.



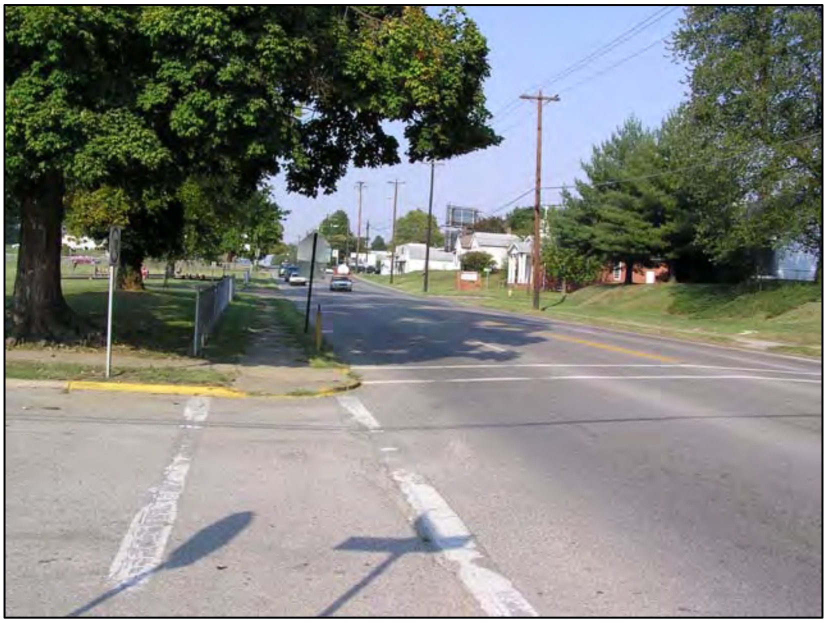
Looking southbound on US 41A from the Clay Street intersection.

Looking northbound on US 41A at the Dixon Street intersection.

Looking northbound on US 41A at the potentially historic Pure Oil Service Station (Site JJ in the Historic Report) on the northeast corner on the US 41A intersection with MLKing Jr. Avenue.

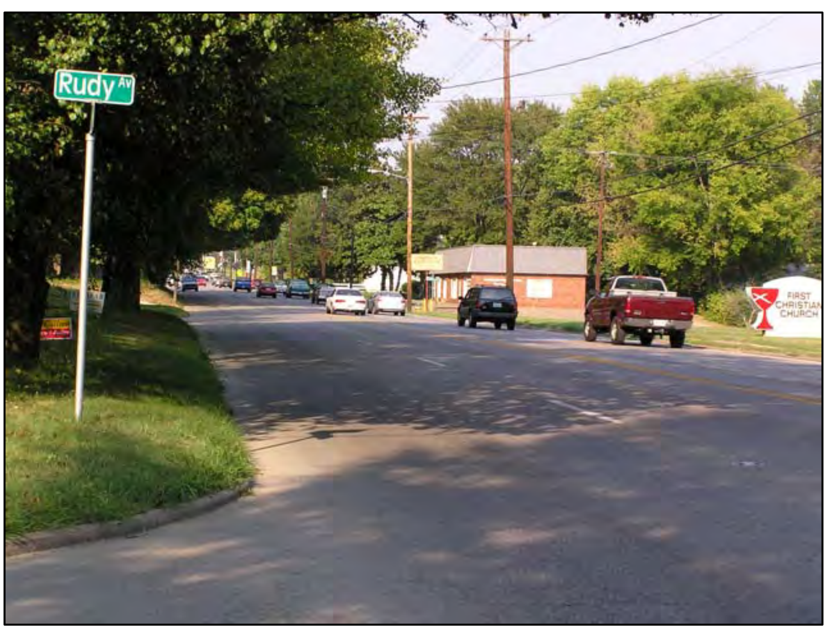
Looking southbound on US 41A towards the Jefferson Street intersection.

Looking southbound on US 41A towards the Jackson Street intersection.



Looking northbound on US 41A from the Jackson Street intersection.

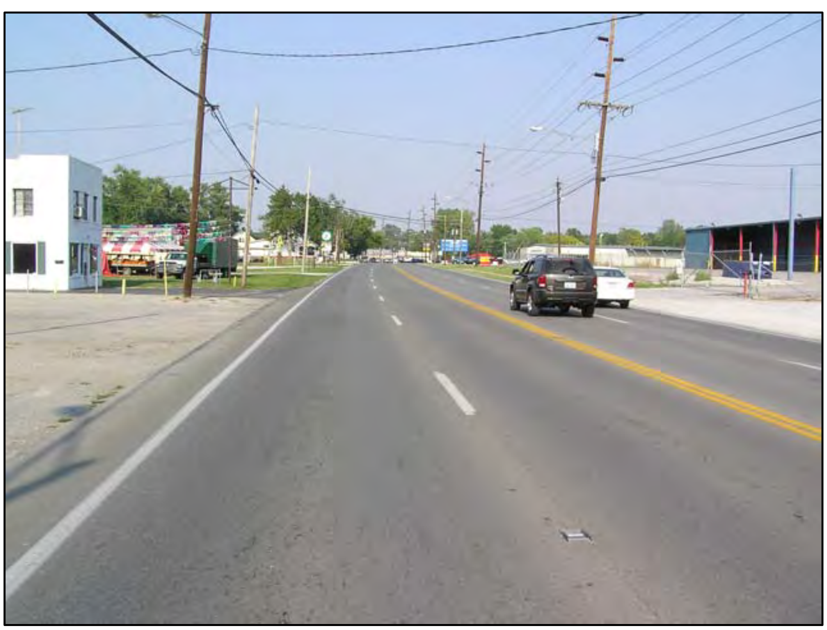
Looking southbound on US 41A towards the Cherry Street intersection on the south side of the roadway.



Looking northbound on US 41A from the Rudy Avenue intersection.

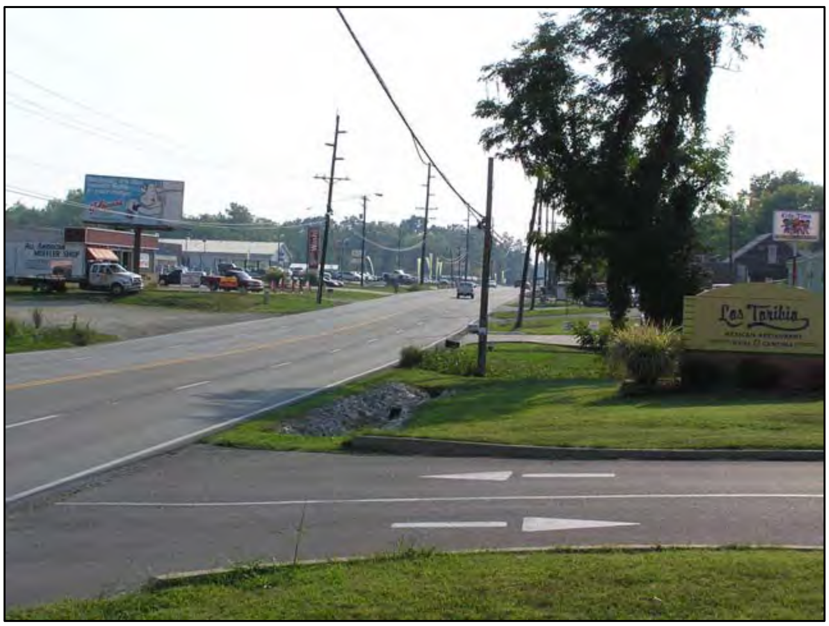
Looking northbound on US 41A towards the Turner Avenue intersection, across the road from the Sureway store.

Looking southbound on US 41A at the Sand Lane intersection.

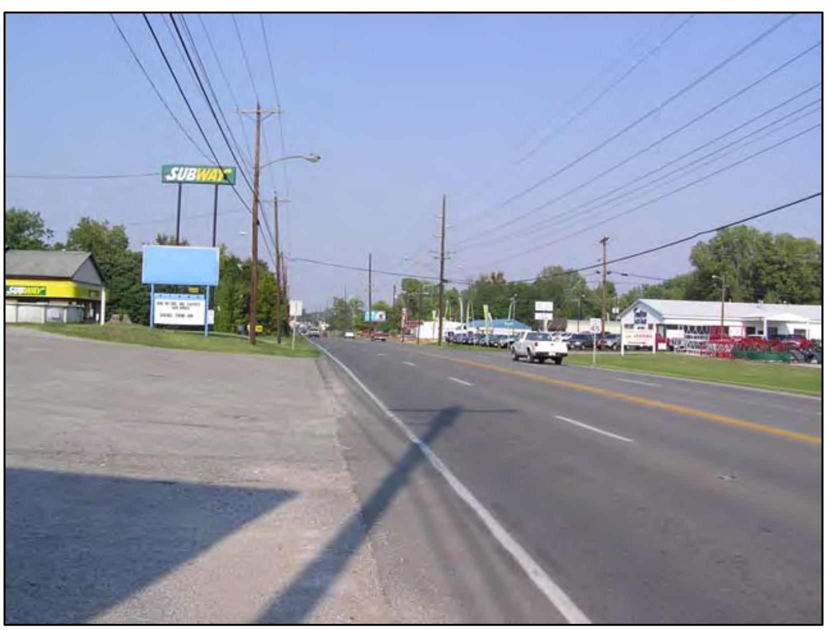


Looking northbound on US 41 from just north of the Canoe Creek Drive intersection.

Looking southbound on US 41A from the Canoe Creek Drive intersection.



Looking southbound on US 41A towards the McClain Avenue intersection.



Looking northbound on US 41A towards the Kresge Drive intersection.

Looking northbound on US 41A from just north of the intersection of US 60. Fairmont Cemetery is on the north side of the road and Mt. Zion is on the south side.

Looking northbound on US 41A from just north of the intersection of US 60. Fairmont Cemetery is on the north side of the road and Mt. Zion is on the south side.

Looking northbound on US 41A at the intersection with Green Street.

APPENDIX C
PROJECT TEAM MEETING MINUTES

Architecture

Engineering

Construction

MEETING MINUTES

Project:	US 41A (Green Street) Scoping Study
Item Number	02-140.00
Purpose:	Project Team Meeting #1,
Place:	Kentucky Transportation Cabinet (KYTC) District 4 Conference Room, Elizabethtown, Kentucky
Meeting Date:	May 30, 2008 10:30 am EST
Prepared By:	Doug Heberle
In Attendance:	Kevin McClearn KYTC – D2
	C.D. Palmer KYTC – D2
	Nick Hall KYTC – D2
	J.R. Ham KYTC – CO
	Greg Curtis Qk4
	Tom Springer Qk4
	Doug Heberle Qk4

INTRODUCTIONS: Tom Springer opened the first Project Team Meeting by asking the attendees to introduce themselves. An agenda and a folder containing handouts were given to all the attendees.

STATUS OF STUDY: Tom Springer and Doug Heberle then presented a power point and provided descriptions of the project study area, scope of work, and schedule. The project proposes a two way left turn lane on US 41A from US 60 to US 41 in Henderson, a distance of about 4 miles. The study will examine alternatives to address both current and future safety needs and congestion issues.

OTHER PROJECTS: Two projects in the study area were acknowledged as were their relationships to this project. These other projects are KYTC Items Nos: 2-126 (currently under construction) and 2-966 (under construction in approximately 12-15 months). 2-126 is reconstruction of US 60 from KY 425 to US 41A in West Henderson to alleviate traffic flow problems. The design of 2-126 is a 5-lane section with on-road designed 3-foot wide bike lanes, and curb and gutter with sidewalks. 2-966 is to widen US 41A at KY 136 for a left turn lane. KYTC provided Qk4 with the plans sheets for these two projects and the available as-built sheets for US 41A.

EXISTING CONDITIONS: Doug reviewed the handouts describing the existing conditions of the area. The study area is a high crash corridor. Maps of the study area portraying the existing conditions such as Average Daily Traffic (ADT) counts, crash data, roadway conditions, and environmental conditions were provided to the Project Team members. Doug Heberle and Tom Springer presented a photo tour of the study area, which illustrated the character of the downtown, parking situations, and some potential problem areas. Other similar studies done in Henderson were the Green Street Corridor Study in 1999 and the Evansville Congestion Management System Study in July 2004. The recommendations proposed in the Green Street Corridor Study were reviewed and it was determined that most likely they were not implemented. KYTC will check and advise at the next Project Team Meeting whether or not these recommendations have been addressed.

PROJECT ISSUES AND GOALS: The issues for this project were defined as:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks.
- In the study area, US 41A exhibits the characteristics of a high crash corridor, with two fatalities from 2003 to 2007.
- Many businesses, homes, and historic properties abut the existing rights-of-way
- Many utilities are located adjacent to the existing rights-of-way. It was noted that for Item 2-966, the utility relocation costs for this one intersection improvement were $1.1 million, which was more than construction.
- Railroad track overpass is a major choke point to be addressed
- There are many misaligned intersections along the corridor in the study area.

The Project Goals were defined as:

- Address highway capacity and growth needs and congestion in Henderson County
- Improve safety

ALTERNATIVES

In addition to studying adding a center turn lane to US 41A, Qk4 was also requested to identify low-cost, practical solutions to the corridor that would be implemented cheaper and easier than adding a 5th lane.

Because bicycle lanes have been included in the design of Item 2-126; therefore, they will be considered for the US41A corridor.

Within the final report, long-term concepts, such as one-way couplets with Elm Street, bypasses, and others need to be addressed even if they are not advanced.

Design options to allow left-turn storage at an intersection may be considered. One example in Evansville was provided, which shifts all traffic to the right lane, and then left-turn traffic can enter into a protected area and wait to turn without blocking through traffic.

NEXT STEPS:

- Develop alternative concepts

- Send Resource Agency Coordination material to David Martin at KYTC CO, with an email carbon copy to J.R. Ham.

- KYTC will contact Green River ADD regarding the EJ report.

- KYTC will provide Qk4 with signal timing information.

- Qk4 will contact EMPO regarding the availability of traffic forecasts, and if none are available from them, then Qk4 will contact Scott Thompson at Division of Planning.

END OF MINUTES

File Id: 07403.000
File Name: PTM 1 Meeting Minutes 5-30-08

Agenda
US 41A (Green Street)
Item # 02-140.00
Scoping Study
Project Team Meeting # 1

Date: **May 30, 2008**
Time: **10:30 a.m.**
Location: **KYTC District 4, Elizabethtown, KY**

1. Introductions

2. Status of Study
   a. Study Area
   b. Scope of Work
   c. Schedule

3. Other Projects in Area
   a. 2-126 (Reconstruct US 60 from KY 425 to US 41A to alleviate traffic flow problems)
   b. 2-966 (Widening of US 41A at KY 136 in Henderson to construct left turn lane)

4. Existing Conditions
   a. Photo Tour of Area
   b. Review Traffic, Crash, and HIS Information
   c. Other Studies:
      - Evansville Congestion Management System Study, July 2004
      - Green Street Corridor Study

5. Discuss Project Goals and Issues

6. Next Steps
   a. Develop Preliminary Alternative Concepts
   b. Resource Agency Coordination
   c. Preliminary alternatives to be presented at next Project Team Meeting

US 41A Green Street, Scoping Study
Project Team Meeting 1
Item No. 02-140.00
May 30, 2008
KYTC, D4 Conference Room, Elizabethtown, KY

NAME	REPRESENTING	PHONE #	EMAIL
KEVIN McCLEARN	KYTC-D2	270-824-7080	Kevin.McClearn@ky.gov
C.D. PALMER	KYTC-D-2	270-824-7080	CHAD.PALMER@KY.GOV
Nick Hall	KYTC-D2	270-824-7080	nick.hall@ky.gov
Greg Curtis	QK4	812-454-3097	gcurtis@qk4.com
J.R. Hann	KYTC - CO	502-564-7183	James.HAN@ky.gov
DOUG HEBERLE	QK4	502-992-2929	dheberle@qk4.com
Tom Springer	QK4	502-992-2891	tspringer@qk4.com

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Architecture

Engineering

Construction

MEETING MINUTES

Project:	US 41A (Green Street) Scoping Study
Item Number	02-140.00
Purpose:	Project Team Meeting #2,
Place:	Kentucky Transportation Cabinet (KYTC) District 4 Conference Room, Elizabethtown, Kentucky
Meeting Date:	February 26, 2009 10:30 am EST
Prepared By:	Doug Heberle

In Attendance:

George Phelps	KYTC – D2
Everett Green	KYTC – D2
Nick Hall	KYTC – D2
David Martin	KYTC – CO
Jill Asher	KYTC – CO
Bruce Siria	Qk4
David Kratt	Qk4
Kirk Reinke	Qk4
Tom Springer	Qk4
Doug Heberle	Qk4

INTRODUCTIONS: Doug Heberle opened the second Project Team Meeting by asking the attendees to introduce themselves and sign the sign-in-sheet. An agenda and handouts were given to all the attendees. The project proposes a two way left turn lane on US 41A from US 60 to US 41 in Henderson, a distance of about 4 miles. The study examines alternatives to address both current and future safety needs and congestion issues.

PROJECT ISSUES AND GOALS: The issues for this project were defined as:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks
- In the study area, US 41A is a statistically high crash corridor, with two fatalities from 2003 to 2007
- Many businesses, homes, and historic properties abut the existing rights-of-way
- Many utilities are located adjacent to the existing rights-of-way
- Railroad track overpass is a major choke point to be addressed
- There are many offset intersections along the corridor in the study area

The Project Goals were defined as:

- Address highway capacity and growth needs and congestion in Henderson County
- Improve safety

STATUS OF STUDY: Doug Heberle then presented an overview of the existing conditions of the study area and described the five sections into which the project has been divided. The five sections of the study area are as follows:

Section 1: US 60 to KY 136 (Sand Lane): (MP 13.2 – MP 14.5)
Section 2: KY 136 (Sand Lane) to Washington Street: (MP 14.5 – MP 15.6)
Section 3: Washington Street to 3rd Street: (MP 15.6 – 15.9)
Section 4: 3rd Street to 5th Street: (MP 15.9 – MP 16.2)
Section 5: 5th Street to 14th Street: (MP 16.2 – MP 17)

The proposed 86' wide typical section was presented and reviewed. The typical section matches the adjacent section of US 41A to the south that has been recently let for construction, and includes four 11-foot travel lanes, 1 14-foot wide center turn lane, 3-foot bikes lanes on both sides and a 2-foot gutter, and 5-foot sidewalks on both sides. A matrix was also presented that showed the phased costs of the widening alternatives for the left, middle, and right, with respect to the existing alignment.

ALTERNATIVES: Only three of the five sections of the study area were considered to be widened. Those sections are 1, 2, and 5. Section 3 is currently five lanes and Section 4 contains a railroad overpass that would have to be rebuilt in order to widen the roadway underneath. Maintenance of rail traffic would be problematic and very costly; therefore reconstruction of this section is not recommended at this time. Phased planning cost estimates and ROW impacts were presented for widening to the left, middle, and right of Sections 1, 2, and 5. Large maps of the project study area that highlighted widening alternatives (left, middle, and right) as well as historic and potentially historic properties. Elements of the proposed typical section were discussed. KYTC District 2 indicated that they were willing to consider making modifications to reduce costs and impacts if and when more detailed studies of the these alternatives are warranted.

In addition to studying the addition of a center turn lane to US 41A, Qk4 also identified low-cost, practical solutions to the corridor that could be implemented more expeditiously and cost effectively than adding a center turn-lane lane. The primary focus for these improvements is at several project area intersections.

1) **MLK Ave. /Dixon St. at Green Street:** Currently there are no left-turn lanes on MLK or Dixon to facilitate left turns onto Green Street. The traffic signal is a single phase. The CRF is 2.7.

   Recommendation: Consider split phase signal at this offset intersection.

2) **Clay Street at Green Street:** This unsignalized and offset intersection has a high critical crash rate factor (2.9) with a higher-than-normal occurrence of "angle" crashes.

   Recommendation: Conduct warrant study for possible signal at this offset intersection. If warranted, consider split phase timing.

3) **Washington Street at Green Street:** Both approaches of Washington Street have left-turn lanes, but no left-turn signal phases. Washington Street is slightly offset, but a left-turn signal is preferable to a split-phase signal. The CRF is 2.7

   Recommendation: Evaluate traffic signal timing for consideration of a left-turn signal phase.

4) **First Street at Green Street:** All four approaches have a left-turn lane. This is not an offset intersection. Currently, only northbound Green Street has a left-turn phase at this intersection. The CRF is 2.75.

   Recommendation: Evaluate traffic signal phasing/timing for possible additional left-turn signal phases on the other three approaches.

5) **Second Street at Green Street:** Southbound Green Street has a left-turn lane and signal phase; northbound Green Street has a left-turn lane and signal head, apparently for left turns, but no left-turn phase (at 11:30 a.m.). Also, westbound Second Street has a left-turn lane and phase, but eastbound Second has a "left-and-thru" lane with no left-turn signal phase. The CRF is 3.6.

   Recommendation: Evaluate traffic signal timing to identify if there is a need for a left-turn phase at eastbound Second Street, which would necessitate restriping "left-and-thru" lane to "left only", but through volumes may be too high to justify a left only. The signal timing evaluation should include analysis of whether Green Street gets too much green time relative to Second Street.

6) **Fifth Street at Green Street:** Fifth Street has left-turn lanes, but no left-turn signal phase. The CRF is 3.9.

   Recommendation: Evaluate traffic signal timing for consideration of a left-turn signal phase.

7) **Tenth Street at Green Street:** This unsignalized and offset intersection has a high critical crash rate factor (2.2). In addition, there is a significant lack of channelized access east of 10th Street.

   Recommendation: Conduct warrant study for possible signal at this offset intersection. If warranted, consider split phase timing.

8) **Twelfth Street at Green Street:** Twelfth Street currently has both split phase signal and left-turn arrows, but there are no left-turn lanes on either Twelfth Street approach at Green Street. This intersection is significantly offset (70' from centerline to centerline).

   Recommendation: Determine the reasoning for the synchronized dual combination structure of the split phase signal and left-turn green arrow.

9) **Fourteenth Street at Green Street:** It appears that 14th Street may be a "backdoor exit" to Green Street and access for hospital traffic. There are currently no turning lanes on any approaches at this intersection.

   Recommendation: A signal warrant analysis at 14th Street may be advisable (unless KYTC has done one in the last year or so).

Running speed on Green Street appears to be free flow of about 40 mph. Currently, the posted speed limit is 35 mph. The free flow speed of 40 mph on Green Street should be reduced due to the abundance of un-channeled side access. This might also help mitigate crash problems in the vicinity of the railroad underpass.

Recommendation: Reduce the posted speed limit to 30 mph, and enforce it.

Miscellaneous immediate and low cost applications:
- Utility pole delineation with reflective tape
- Speed limit markings on the pavement
- Electronic Speed Displays

ALTERNTIAVE CONCEPTS CONSIDERED BUT NOT ADVANCED: It was noted that two other alternative concepts were considered but are not recommended for advancement: one-way couplets and a "road diet" (i.e., reducing the road from four lanes to three). The one-way couplets would require the conversion of Elm Street to a one-way facility. Elm Street is currently a divided roadway with a raised landscaped median through a residential area, and is offset at some intersections. For these reasons it would not provide an optimum situation to be a one way street. Regarding the road diet, research indicates that only roads with a maximum volume of 850 vph have been successful in improving traffic flow after a reduction of lanes. For US 41A the approximate peak hour volumes are 1,900 to 3,000 vph. Therefore this option is not recommended.

NEXT STEPS: First, the District 2 staff, including Kenny Potts, Branch Manager for Engineering Support, will review the low-cost, practical solutions recommendations from QK4. After this internal review, the project team will present the preliminary alternatives (widening options and short-term options) with the proposed typical sections to the stakeholders and public officials in Henderson, tentatively planned for Monday, April 13, 2009. A preliminary list of stakeholders will be developed by Qk4 and forwarded to KYTC to complete and/or review at their discretion. The goal of this meeting is to discuss the goals of the project, existing conditions, both long-term and short-term options, and to get the stakeholders input on the long term options, and their prioritization of the short-term options. In the meantime, KYTC District-2 will review the cost estimate assumptions Qk4 developed. QK4 will also provide digital copies of the widening alternatives to George Phelps in District 2.

It was also determined that after the initial meeting with local officials, KYTC will initiate coordination with Resource Agencies.

END OF MINUTES

Agenda
US 41A (Green Street)
Project Team Meeting # 2
Item No. 02-140.00
February 26, 2009
KYTC D4 Conference Room, Elizabethtown, KY

Date:	**February 26, 2009**
Time:	**10:30 a.m.**
Location:	**KYTC District 4, Elizabethtown, KY**

1. Introductions

2. Status of Study
   a. Preliminary Widening Alternatives and Constraints

3. Project Recommendations
   a. Long-Term Widening Recommendations
      a. 5 Sections
      b. Typical Section
      c. 3 Options
   b. Short-Term Improvements
      a. Priority Sections
      b. Spot Improvements
      c. Operational Improvements

4. Other Projects in Area
   a. 2-126 (Reconstruct US 60 from KY 425 to US 41A to alleviate traffic flow problems)
   b. 2-966 (Widening of US 41A at KY 136 in Henderson to construct left turn lane)

5. Next Steps
   a. Resource Agency Coordination
   b. 2 meetings with local officials

US 41A (Green Street) Scoping Study
Project Team Meeting # 2
Item No. 02-140.00
February 26, 2009
KYTC D4 Conference Room, Elizabethtown, KY

NAME	REPRESENTING	PHONE #	EMAIL	INITIAL
Tom Springer	QK4	502/585-2222	tspringer@qk4.com	THS
Doug Heberle	QK4	" "	dheberle@qk4.com	DAH
Bruce Siria	QK4	" "	bsiria@qk4.com	BSS
Kirk Reinke	QK4		KREINKE@QK4.COM	KR
George B. Phelps III	KYTC-D2 Design	(270) 824-7080	George B.Phelps@ky.gov	GP
Nick Hall	KYTC-D2 Planning	(270) 824-7080	nick.hall@ky.gov	NH
David Martin	KYTC-CO Planning	502-564-7183	charles.martin@ky.gov	CAM
Jill Asher	KYTC-CO Planning	"	jill.asher@ky.gov	JA
Everett T. Green	KYTC D-2	270 824-7080	Everett.Green@ky.gov	ETG
David Kratt	QK4	502/585-2222	dkratt@qk4.com	DK

Architecture

Engineering

Construction

MEETING MINUTES

Project:	US 41A (Green Street) Scoping Study	
Item Number	02-140.00	
Purpose:	Project Team Meeting #3,	
Place:	Kentucky Transportation Cabinet (KYTC) District 2 Conference Room, Madisonville, Kentucky	
Meeting Date:	August 5, 2009 10:00 am CST	
Prepared By:	Doug Heberle	
In Attendance:	Kevin Gentry	KYTC – D2
	George Phelps	KYTC – D2
	Kevin McClearn	KYTC – D2
	Kenny Potts	KYTC – D2
	Everett Green	KYTC – D2
	J.R. Ham	KYTC – CO
	Tom Springer	Qk4
	Doug Heberle	Qk4

INTRODUCTIONS:

Doug Heberle opened the third Project Team Meeting by reviewing the outcomes of the last project team meeting and the local officials meeting. An agenda and handouts were given to all the attendees. The project proposes a two way left turn lane on US 41A from US 60 to US 41 in Henderson, a distance of about 4 miles. The study examines alternatives to address both current and future safety needs and congestion issues.

PROJECT ISSUES AND GOALS:

The issues for this project were defined as:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks
- In the study area, US 41A is a statistically high crash corridor, with two fatalities from 2003 to 2007
- Many businesses, homes, and historic properties abut the existing rights-of-way
- Many utilities are located adjacent to the existing rights-of-way
- Railroad track overpass is a major choke point to be addressed
- There are many offset intersections along the corridor in the study area

<u>STATUS OF STUDY:</u>

Tom Springer and Doug Heberle presented an overview of the study area and described the five sections into which the project has been divided, as follows:

Section 1: US 60 to KY 136 (Sand Lane): (MP 13.2 – MP 14.5)
Section 2: KY 136 (Sand Lane) to Washington Street: (MP 14.5 – MP 15.6)
Section 3: Washington Street to 3rd Street: (MP 15.6 – 15.9), existing 5 lane section
Section 4: 3rd Street to 5th Street: (MP 15.9 – MP 16.2), railroad overpass
Section 5: 5th Street to 14th Street: (MP 16.2 – MP 17)

Section 4 contains the rail road overpass. Since the last meeting, Qk4 was asked to produce a planning level cost estimate to rebuild the railroad overpass over US 41A near the intersection of 4th Street. A schematic and profile was presented that illustrated the necessary run-around track that would run parallel to the existing track 2,900 feet, thereby providing an opportunity to reconstruct the railroad overpass that spans US 41A. This plan also includes two other railroad overpasses over Ingram Street and Elm Street. Under this plan, the existing track would be abandoned once the construction of the new overpasses and track was complete. The total cost estimate for this project is $7,300,000.

The existing (2007) and future (2030) ADT, LOS, and percentage of truck traffic on US 41A in the study area were also discussed.

<u>ALTERNATIVES:</u>

Phased planning cost estimates and ROW impacts were presented for widening to the left, middle, and right of Sections 1, 2, 4, and 5. Large maps of the project study area that highlighted widening alternatives (left, middle, and right) as well as historic and potentially historic properties. Elements of the proposed typical section were discussed.

<u>Points discussed regarding the cost estimates:</u>

The current reconstruction project of US 60, that ties into the southern terminus of the study area, is experiencing increased utility costs due to unknown utilities in the ROW that are being encountered during the construction. It is therefore recommended to increase the utility cost for this project (the specific amount will be provided by KYTC D2) because similar conditions are anticipated of US 41A reconstruction.

It was decided that engineering costs be increased from 10% to 22% of construction cost.

The project team revisited why bicycle lanes are not practical on US 41A: ROW is restricted, relocation and ROW costs would increase significantly if bicycle lanes were installed, high traffic volumes on this corridor, coupled with the un-controlled access and numerous curb cuts, make bicycle activity hazardous, and there is an ample parallel streets grid network with significantly less traffic volume that could better accommodate bicycle lanes. Qk4 was asked to research if there is a local bicycle plan for the community of Henderson, and what, if anything, it says about the US 41A corridor.

The segments of US 41A were prioritized for reconstruction. They are listed below in order of priority:

1. Section 5: highest traffic volume, most commercial land uses, high left turn volume.
2. Section 1: provides logical terminus with the current reconstruction of US 60, no restrictions due to the presence of historic properties.
3. Section 2: mostly residential land uses and there are historic property issues to be addressed.
4. Section 4: is the lowest priority due to the extremely high cost of the reconstruction of the rail road overpass that is necessary to widen US 41A underneath.

ALTERNTIAVE CONCEPTS CONSIDERED BUT NOT ADVANCED:

It was noted that two other alternative concepts were considered but are not recommended for advancement: one-way couplets and a "road diet" (i.e., reducing the road from four lanes to three). The one-way couplets would require the conversion of Elm Street to a one-way facility. Elm Street is currently a divided roadway with a raised landscaped median through a residential area, and is offset at some intersections. For these reasons it would not provide an optimum situation to be a one way street. Regarding the road diet, research indicates that only roads with a maximum volume of 850 vph have been successful in improving traffic flow after a reduction of lanes. For US 41A the approximate peak hour volumes are 1,900 to 3,000 vph. Therefore this option is not recommended.

In addition to studying other alternatives to widening US 41A, Qk4 also identified low-cost, solutions to the corridor that could be considered to improve the flow and safety of US 41A. Such options included adjustment to the existing traffic standards. Upon KYTC review, it was recommended that these short term improvements be provided to District 2 staff for further consideration and not included in the Final Report.

NEXT STEPS:

Qk4 will obtain utility costs from Kevin McClearn and distribute the updated cost spreadsheet, and provide it to Kevin to have D2 staff review and finalize the figures.

END OF MINUTES

Agenda
US 41A (Green Street)
Project Team Meeting # 3
Item No. 02-140.00
August 5, 2009
KYTC D2, Madisonville, KY

Date: **August 5, 2009**
Time: **10:00 a.m.**
Location: **KYTC District 2, Madisonville, KY**

1. Introductions
2. Future ADT and LOS
3. Status of Resource Agency Coordination Feedback
4. Recommended Alternatives:
   a) Review of Railroad Overpass Reconstruction
   b) Select Preferred Short-Term Alternatives
   c) Select Recommendations for the Planning Study

Handouts:

Current and Future ADT & LOS

Railroad Relocation Estimate Sheet

Widening Alternatives Cost Estimates

Ranked Short Term Alternatives from Local Officials Meeting

US 41A (Green Street) Scoping Study
Project Team Meeting # 3
Item No. 02-140.00

August 5, 2009

KYTC D2, Madisonville, KY

NAME	REPRESENTING	PHONE #	EMAIL	INITIAL
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KEVIN McCLEARN	D-2 C.D.E	" "	Kevin.McClearn@ky.gov	JKM
KENNY POTTS	D-2 Engineering Support	" "	Kenny.potts@ky.gov	KKP
EVERETT T. Green	D-2 PD	"	Everett.Green@ky.gov	ETG
J.R. HAM	CO KYTC	502-564-7183	James.Ham@ky.gov	JRH
	PLANNING			
DOUG HEBERLE	QK4	(502) 585-2222	dheberle@qk4.com	DAH
TOM SPRINGER	QK4	(502) 585-2222	dheberle@qk4.com	TS

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APPENDIX D
LOCAL OFFICIAL MEETING MINUTES

MEETING MINUTES

Project:	US 41A (Green Street) Scoping Study	
Item Number	02-140.00	
Purpose:	Local Officials Meeting	
Place:	City Office Building, 1990 Barrett Court, Henderson, Kentucky	
Meeting Date:	April 13, 2009 2:00 pm CST	
Prepared By:	Doug Heberle	
In Attendance:	George Phelps	KYTC – D2
	Everett Green	KYTC – D2
	Nick Hall	KYTC – D2
	J.R. Ham	KYTC – CO
	Laura Lamb	EMPO
	Doug Boom	City of Henderson, Engineer
	John Straud	City of Henderson, Code Administrator
	Bill Hubiak	Henderson County Engineer
	Buzzy Newman	City of Henderson, Asst. City Manager
	Earl Brandon	City of Henderson, Police Department
	X.R. Royster	City of Henderson, Public Works Department
	Terry Lewis	City of Henderson, Fire Department
	Larry Koerber	Henderson EMA
	Pam Moran	Methodist Hospital
	Bruce Siria	Qk4
	Tom Springer	Qk4
	Doug Heberle	Qk4

INTRODUCTIONS: Nick Hall, KYTC Project Manager, opened the Local Officials Meeting by thanking everyone in attendance, providing a project overview, and asking the attendees to introduce themselves and sign the sign-in-sheet. An agenda and handouts were given to all the attendees. Doug Heberle then presented the power point presentation to the attendees. The project proposes a two way left turn lane on US 41A from US 60 to US 41 in Henderson, a distance of about 4 miles. The study examines alternatives to address both current and future safety needs and congestion issues.

PROJECT ISSUES AND GOALS: The issues for this project were defined as:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks
- In the study area, US 41A is a statistically high crash corridor, with two fatalities from 2003 to 2007
- There are many offset intersections along the corridor in the study area

- Many businesses, homes, and historic properties abut the existing rights-of-way
- Many utilities are located adjacent to the existing rights-of-way
- Railroad track overpass is a major choke point to be addressed

The Project Goals were defined as:

- Address highway capacity and growth needs and congestion in Henderson County
- Improve safety

STATUS OF STUDY: Doug Heberle then presented an overview of the existing conditions of the study area and described the five sections into which the project has been divided. The five sections of the study area are as follows:

Section 1: US 60 to KY 136 (Sand Lane): (MP 13.2 – MP 14.5)
Section 2: KY 136 (Sand Lane) to Washington Street: (MP 14.5 – MP 15.6)
Section 3: Washington Street to 3rd Street: (MP 15.6 – 15.9)
Section 4: 3rd Street to 5th Street: (MP 15.9 – MP 16.2)
Section 5: 5th Street to 14th Street: (MP 16.2 – MP 17)

The proposed 86' wide typical section was presented and reviewed. The typical section matches the adjacent section of US 41A to the south that is currently under construction, and includes four 11-foot travel lanes, 1 14-foot wide center turn lane, 3-foot bikes lanes on both sides and a 2-foot gutter, and 5-foot sidewalks on both sides. A matrix was also presented that showed the phased costs of the widening alternatives for the left, middle, and right, with respect to the existing alignment.

ALTERNATIVES: Only three of the five sections of the study area were considered to be widened. Those sections are 1, 2, and 5. Section 3 is currently five lanes and Section 4 contains a railroad overpass that would have to be rebuilt in order to widen the roadway underneath. Maintenance of rail traffic would be problematic and very costly; therefore reconstruction of this section is not recommended at this time. Phased planning cost estimates and ROW impacts were presented for widening to the left, middle, and right of Sections 1, 2, and 5. Large maps of the project study area that highlighted widening alternatives (left, middle, and right) as well as historic and potentially historic properties. Elements of the proposed typical section were discussed.

In addition to studying the addition of a center turn lane to US 41A, Qk4 also identified a preliminary list of low-cost, practical solutions to the corridor that could be implemented more expeditiously and cost effectively than adding a center turn-lane lane. The primary focus for these improvements is at several project area intersections.

US 41A (Green Street) PRELIMINARY Short – Term Recommendations

1) **MLK Ave. /Dixon St. at Green Street:** Currently there are no left-turn lanes on MLK or Dixon to facilitate left turns onto Green Street. The traffic signal is a single phase. The Critical Rate Factor (CRF)* is 2.7.

Recommendation: Consider split phase signal at this offset intersection.

2) **Clay Street at Green Street:** This unsignalized and offset intersection has a high CRF of 2.9 with a higher-than-normal occurrence of "angle" crashes.

Recommendation: Conduct warrant study for possible signal at this offset intersection. If warranted, consider split phase timing.

3) **Washington Street at Green Street:** Both approaches of Washington Street have left-turn lanes, but no left-turn signal phases. Washington Street is slightly offset, but a left-turn signal is preferable to a split-phase signal. The CRF is 2.7

Recommendation: Evaluate traffic signal timing for consideration of a left-turn signal phase.

4) **First Street at Green Street:** All four approaches have a left-turn lane. This is not an offset intersection. Currently, only northbound Green Street has a left-turn phase at this intersection. The CRF is 2.75.

Recommendation: Evaluate traffic signal phasing/timing for possible additional left-turn signal phases on the other three approaches.

5) **Second Street at Green Street:** Southbound Green Street has a left-turn lane and signal phase; northbound Green Street has a left-turn lane and signal head, apparently for left turns, but no left-turn phase. Also, westbound Second Street has a left-turn lane and phase, but eastbound Second has a "left-and-thru" lane with no left-turn signal phase. The CRF is 3.6.

Recommendation: Evaluate traffic signal timing to identify if there is a need for a left-turn phase at eastbound Second Street, which would necessitate restriping "left-and-thru" lane to "left only", but through volumes may be too high to justify a left only. The signal timing evaluation should include analysis of whether Green Street gets too much green time relative to Second Street.

6) **Fifth Street at Green Street:** Fifth Street has left-turn lanes, but no left-turn signal phase. The CRF is 3.9.

Recommendation: Evaluate traffic signal timing for consideration of a left-turn signal phase.

7) **Tenth Street at Green Street:** This unsignalized and offset intersection has a high critical crash rate factor (2.2). In addition, there is a significant lack of channelized access east of 10th Street.

Recommendation: Conduct warrant study for possible signal at this offset intersection. If warranted, consider split phase timing.

8) **Twelfth Street at Green Street:** Twelfth Street currently has both split phase signal and left-turn arrows, but there are no left-turn lanes on either Twelfth Street approach at Green Street. This intersection is significantly offset (70' from centerline to centerline).

Recommendation: Determine the reasoning for the synchronized dual combination structure of the split phase signal and left-turn green arrow.

9) **Fourteenth Street at Green Street:** It appears that 14th Street may be a "backdoor exit" to Green Street and access for hospital traffic. There are currently no turning lanes on any approaches at this intersection.

Recommendation: A signal warrant analysis at 14th Street may be advisable.

10) Four signs appear to be "too close" to the driving lanes on Green Street and may be both physically unforgiving fixed objects as well as psychological barriers from which drivers may subconsciously "swerve" to get further away:

    a) Gene's Restaurant (1095 N. Green St.)

    b) Car Quest Auto Parts (400 N. Green St.)

    c) First United Methodist Church (338 Third St.)

    d) Southside Animal Hospital (1415 S. Green St.)

Recommendation: Approach these businesses with the suggestion of relocating these signs further from the roadway.

11) Running speed on Green Street appears to be free flow of about 40 mph. Currently, the posted speed limit is 35 mph. The free flow speed of 40 mph on Green Street should be reduced due to the abundance of un-channeled side access. This might also help mitigate crash problems in the vicinity of the railroad underpass.

Recommendation: Reduce the posted speed limit to 30 mph, and enforce it.

Miscellaneous immediate and low cost applications:

- Utility pole delineation with reflective tape
- Speed limit markings on the pavement
- Electronic Speed Displays

* A Critical Rate Factor (CRF) greater than 1.0 indicates a high crash area.

<u>COMMENTS:</u> The following comments were made by the meeting attendees regarding the indicated suggestions.

Section 1 widening: This section includes Sand Lane and would terminate with the US 60 widening project to the south, so it is recommended to be the highest priority.

Section 3 widening: Since Section 3 would not be reconstructed, there would most likely not be bike lanes constructed there. Bike lanes could potentially be relocated off of US 41A, for the duration of Section 3.

Section 4 widening: It was suggested to further excavate the bed of US 41 A further north and south under the Railroad overpass to prevent trucks getting stuck under the overpass.

Short- Term # 8) The split phase signal at 12th St. and Green St. was installed about 8 months ago and has reduced crashes.

Short- Term # 10) The comment was made at the meeting to include Ralph's Restaurant (739 N. Green St.) to the list of businesses with signs in the right-of -way.

Signal synchronization would not be recommended due to speeding.

Signal warrant studies to be done would most likely be completed by KYTC District 2.

After the short-term options were presented, Doug Heberle asked the meeting attendees to prioritize these projects from highest to least importance. Eight (8) comments were submitted on the handout list of the short-term projects. The results are below:

Project #	**Group Rank**
5 - Second St. at Green St.	1 (Highest Priority)
6 - Fifth St. at Green St.	2
3 - Washington St. at Green St.	3
1 - MLK Ave. /Dixon St. at Green St.	4
9 - Fourteenth St. at Green St.	5
4 - First St. at Green St.	6
7 - Tenth St. at Green St.	7
2 - Clay St. at Green St.	8
8 - Twelfth St. at Green St.	9
10 - Signage Relocation	10
11 - Speed Limit Reduction	11 (Lowest Priority)

<u>NEXT STEPS:</u> The next step will be to schedule a third project team meeting to finalize and discuss alternative prioritization.

END OF MINUTES

Agenda
US 41A (Green Street) Scoping Study
Local Officials Meeting # 1

Date: **April 13, 2009**
Time: **2:00 p.m.**
Location: **City Office Building, 1990 Barrett Court, Henderson, KY**

1. Introductions
2. Project Goals & Issues
3. Existing Conditions: Highway Information
4. Alternative Concepts:

a. Long-Term Widening Recommendations
- 5 Sections
- Typical Section
- 3 Options

b. Short-Term Improvements
- Priority Sections
- Spot Improvements
- Operational Improvements

5. Your Input

<u>Handouts:</u>
Study Purpose, Issues, and Project Goals
Project Location Map
Typical Section
US 41 A Widening Alternatives
Short-Term Preliminary Recommendation List

US 41A (Green Street) Scoping Study
Local Officials Meeting

April 13, 2009

NAME	REPRESENTING	PHONE #	EMAIL
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APPENDIX E
ARCHAEOLOGICAL OVERVIEW

10 November 2008

Mr. Tom Springer
Qk4, Inc.
815 West Market Street
Louisville, KY 40202

Re: Archaeological Resource Overview for an Alternative Study of US41A (Widen Green Street from US 60 to US41), Henderson, Henderson County, Kentucky
Item No. 2-140.00
AMEC Project No. 02-4124-2100

Dear Mr. Springer:

Attached please find AMEC Earth & Environmental's letter report for the archaeological resource overview for the scoping study. Our reviews indicated that three archaeological surveys have been conducted within the study area and an additional twelve surveys have been identified within a 1.24-mile (mi) (2-kilometer (km)) buffer around the study area (see **Figure 1**). Of the three archaeological surveys (Schock 1998, Moldenhauer et al 2001, and Koeppel and Lence 2002) only one (Moldenhauer et al 2001) identified an archaeological and cultural historic site (15HE864/He-67). The Mt. Zion Cemetery, Site 15HE864/He-67, is an African-American cemetery dating to the early twentieth century (see **Figure 2**). The cemetery is considered eligible for listing on the National Register of Historic Places (NRHP). The Mt. Zion Cemetery is located in the study area. No other archaeological sites have been identified within the study area.

ARCHAEOLOGICAL RESOURCE OVERVIEW

This archaeological resource overview identifies potential archaeological issues likely to require consideration during the scoping study of US 41A. The US 41A study area is approximately 4.2 miles (6.8 km) long approximately 300 ft (91 meters) wide and encompasses an approximate area of 152 acres (61.5 hectares). This overview summarizes the results of archaeological resource research, based upon available archival literature, the Office of State Archaeology site files, National Park Service and Kentucky Heritage Council databases, as well as historic map research. No fieldwork was conducted in association with this overview. This archaeological resource overview is for planning purposes only and does not provide a detailed analysis or assessment of any potential impacts to archaeological resources.

AMEC Earth & Environmental, Inc.
108 Esplanade Ave.
Suite 310
Lexington, Kentucky 40507
Phone: (859) 231-0070
Fax: (859) 231-1177

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10 November 2008
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TOPOGRAPHY AND GEOLOGY

Henderson County lies in the Western Coalfields Region of Kentucky which encompasses approximately 4,500 square miles (11,656 square km) and is separated from the Pennyroyal Region by low sandstone ridges. The area is a hilly upland of low to moderately high relief that is divided by streams that occupy wide, poorly drained and swampy valleys or numerous types of bottomland hardwood forests. The uplands and wetlands are both characterized by oak forests, although the species of these ecosystems are substantially different. Coal has been surface mined over vast areas in the region. The Western Coalfields are drained by the Green River and its tributaries and by the Tradewater River. The Ohio River forms valleys on its northern border.

PREHISTORIC AND HISTORIC CONTEXTS

The Paleoindian period (12,000-8,000 BC) of the southeastern prehistory is probably the least understood due to the paucity of archaeological sites with good context that have been systematically excavated. This period begins with the introduction of humans into Kentucky at the end of the Pleistocene epoch. Though the time of this introduction is uncertain, recent excavations indicate they took place prior to 12,000 BC (Bense 1994; Broster and Norton 1996). Paleoindian components in this area are characterized by Clovis and related fluted points, including Cumberland, Greenbriar, and Quad types (Broster and Norton 1996; Justice 1987). Also included in the tool kit is the Paleolithic blade/core technology.

The Early Archaic period occurs between 8,000-6,000 BC and is characterized by projectile points such as Kirk variants, Thebes, LaCroy, and Kanawaha points (Justice 1987). Early Archaic tool kits also include ground stone tools. The Middle Archaic (6,000-3,700 BC) is characterized by Morrow Mountain, Sykes-White Springs and Big Sandy points as well as the increase in intensity of settlements. The Late Archaic (3,700-450 BC) consists of three phases: Benton (3,700-3,000 BC) Ledbetter (3,000-1,200 BC), and Wade (1,200-450 BC). Wade phase sites are a transitional period between the Late Archaic and Early Woodland periods. The Late Archaic is marked by increased intensity of habitation areas as evidenced by the increased use of large storage pits and the first evidence of shelters (Bentz 1998; Stallings et al 2001).

The Early Woodland period extends from 450 BC to AD 0, and the appearance of pottery marks the beginning of the period of ceremonial mound building. The influence of Adena culture is seen in point styles, sand-tempered ceramics, and cord-marked and fabric impressed ceramics at the end of the period. Camps and small villages form the bulk of sites during this period and the large numbers indicate an increase in the population during the period. The Middle Woodland period extends from AD 1 to 500. This period is characterized by a flourishing interregional exchange network and a complex social system. This complexity allowed elites of the period to call together populations to construct large numbers of mounds and mound complexes (Bentz 1998). The Late Woodland period (AD 500-1000) forms a transitional period between the Middle Woodland and the Mississippian period. Late Woodland continues the transition of mobile bands into sedentary groups with an increased reliance on local resources (Stallings et al 2001).

The Mississippian period (AD 1000-1500) is marked by the appearance of platform mounds and plazas, the adoption of more exotic and diverse pottery styles, and Madison, Fort Ancient, Levanna, and Nodena points (Justice 1987). Planned villages and the intensive use of cultigens allowed for a large increase in localized sedentary population. By AD 1500, Mississippian culture was in sharp decline.

The earliest documented European exploration of what was to become Kentucky was by the Frenchmen Marquette and Joliet, who passed by the mouth of the Ohio and western Kentucky in 1673 during their exploration of the Mississippi River (Alvord 1920:63-64). Other French, English, and Spanish traders and explorers may have passed through the territory in the late seventeenth century to mid-eighteenth century as well (McBride and McBride 1990:583). Early contact of Native Americans with Europeans in what is now Kentucky may have been indirect, with European trade goods and information about Europeans spread through the existing exchange systems. During the early part of the Contact period, access to the region by Europeans was almost exclusively from the south from Spanish Florida, (which extended into present-day Georgia and Alabama), and later from the north by the French in Illinois, who wrote of the Shawnee living on the Ohio River. The few surviving descriptions of inhabitants are indirect and vague.

Native American inhabitants of the Kentucky region during the Contact period probably consisted of diverse Algonquian or Iroquoian speaking groups that based their economies on a combination of horticulture, fishing, hunting, and gathering. Small encampments at scattered locations coalesced into larger villages on floodplains in the spring for the cultivation of corn, beans, squash, and a few other select plants, like tobacco. Typically during this period, the native cultures underwent acculturation, a virtual breakdown of their former way of life through replacement by or approximation of the cultural norms of the dominant culture. Traditional technologies such as lithic stone tool manufacture and clay ceramic manufacture were abandoned and replaced by European items such as metal knives, pots, and other trade goods. In addition, disease increasingly reduced native populations all over the central and eastern parts of the continent during this period. In this region, epidemics are documented from the last decades of the 1500s and into the mid-1600s.

The signing of the Greenville Treaty in 1795 marks the end of the Contact period. This document, signed by 1,100 Native American tribal chiefs, ceded virtually all land claims to the United States government in return for promises of territorial boundaries and other rights (Niles 1996:217). Native Americans were removed to small reservations to the north and west, leaving no Native American communities in Kentucky (Henderson et al. 1986:1-17).

Henderson County, the thirty-eighth county in order of formation of the state of Kentucky, is located in western Kentucky along the Ohio River. It is bordered by Daviess, McLean, Webster, and Union Counties and has an area of 438 square miles. A change in the Ohio River's course has isolated a small portion of the county on the opposite shore of the Ohio River from the rest of the county. The county was formed in 1798 from a section of Christian County and named to honor Col. Richard Henderson, founder of the Transylvania Company. In 1778 the heirs to Henderson's company were granted 200,000 acres of land in what would become Henderson

County by the Virginia House of Delegates. Members of the company were among the area's first settlers beginning in 1798. The seat of Henderson County is the city of Henderson.

The topography of Henderson County varies from level floodplain to gently rolling land. Mineral resources include oil and coal. The county is very productive farming area with leading crops of corn, soybeans, wheat, and tobacco in addition to livestock production. In addition to the Ohio and Green rivers, there are numerous small streams that bisect the county including Lick, Canoe, Beaverdam, and Pond Creeks.

The first settlement in the county occurred around 1791 at what was then called Red Banks, the future site of the city of Henderson. Settlement of the area was slowed by the threat of Indians and later by outlaws. With the establishment of Henderson County in 1798 and a county court system the next year, the area became generally peaceful. By 1800 the population of the county had increased substantially, and numerous grist and carding mills were built. In 1801 Henderson was designated one of the state's tobacco inspection points, and much of the tobacco exported from the Green River Valley passed through there. A second inspection house was built in 1805 to handle the quantities of beef, pork, flour, and hemp that were shipped out. The 1837 construction of a dirt turnpike through the county, connecting Henderson with Hopkinsville, also helped to stimulate economic growth. The city of Henderson grew rapidly as a trading center amid scattered agricultural communities and river landings.

During the Civil War, no major battles took place in Henderson, although the county was subject to raids by Confederate partisan rangers and lawless guerrilla bands. Union forces occupied the county seat on at least two occasions. After the war, development of the county's resources began in earnest. In 1866 the Henderson and Union Petroleum Company struck oil on the headwaters of Highland Creek. Coal, which had been dug in small amounts since the 1820s, was extracted and shipped down the river in ever-increasing quantities.

The promise of economic growth attracted railroads to the county. In 1871 the Evansville, Henderson and Nashville Railroad (now part of CSX Transportation) completed a line through the county, and was followed by the Louisville, St. Louis and Texas Railroad in 1889. The railroads and other industrial activity accounted for rapid growth of some of the small villages in the county such as Corydon, Smith Mills, Zion, and Baskett.

On July 4th, 1932, the Audubon Memorial Bridge, also known as the Henderson-Evansville Bridge, was dedicated. Henderson County became a gateway to the south via U.S. 41, which was known as the Dixie B-Line, a main north-south road before the advent of interstate highways. With the increase in tourist traffic, county residents in 1934 began the establishment of what eventually became the John James Audubon State Park. In 1938 a museum was dedicated there to honor the painter and naturalist, who spent time in the area from 1808 to 1819.

The city of Henderson experienced industrial growth during World War II and the years afterward, while the rest of the county was engaged in oil or coal production or remained agricultural. By 1989, bituminous coal and lignite mining was a leading employer in the county. Crude oil production in 1989 was 817,648 barrels by 1990, Henderson County and the town of Henderson had a diversified economic base that included farm products, coal, and oil along with

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the manufacture of chemicals, aluminum, food products, automotive accessories, furniture, and clothing (Kleber 1992).

ARCHAEOLOGICAL RESOURCES

Document and database research revealed one previously recorded historic archaeological site (15HE864/He-67) adjacent to the study area. Site 15HE864/He-67 is an African-American Cemetery named the Mt. Zion Cemetery that dates to the early twentieth century (see **Figure 2**). The Mt. Zion Cemetery is considered eligible for listing on the NRHP as an archaeological site and has been assigned both an archaeological (15HE864) and cultural historic (He-67) site designations. The northern boundary of site 15HE864/He-67 is defined by the US 60 right-of-way. The graves face to the north.

The Mt. Zion Cemetery is the oldest African-American cemetery in Henderson County. Over 900 persons are buried in the cemetery. The majority of the cemetery's population was victims to the 1918-1919 influenza epidemics. Of the headstones recorded, the oldest interment death was in 1898. Several veterans of the Civil War, a veteran of the Spanish-American War, and a Buffalo soldier are buried in the cemetery. The Mt. Zion Cemetery is an important symbol of Henderson's African-American community as well as a source of ethnic pride and identity.

The Kentucky Transportation Cabinet and the State Historic Preservation Office determined in 2001 that the site is eligible for listing on the NRHP under the four following criteria:

- Criteria A: the evolution of burial practices of the Henderson African-American community from 1890 to 1960, especially during the influenza epidemic of 1918-1919.
- Criteria B: the last resting place of individuals who contributed to the defense of the Union in the Civil War, Indian Wars, and the Spanish-American War. The cemetery is considered a Traditional Cultural Property.
- Criteria C: the presence of over 900 interments and potentially a large number of grave markers suggest that the site embodies the distinctive characteristics of the community's attitude toward the death and the means by which the community remembers those who came before.
- Criteria D: a sample of the over 900 interments supports a determination that the cemetery has a great potential for containing scientific data, which may be employed in studying funerary practices and biological anthropology.

Fifteen previous surveys have been completed within the 1.24 (2 km) buffer around the study area, resulting in the location of nine additional archaeological sites, four prehistoric, one historic, and four archaeological sites with unknown affiliations (see **Figure 1**). The prehistoric sites consist of one Middle Archaic period (6,000-3,000 BC) to Woodland period (200 BC- AD 500) lithic scatters (a scatter of stone tools), a Mississippian period (AD 900-1700) village (a locus of settlement that is more permanent than an encampment) and two unidentified lithic scatters. One historic archaeological site (He-H-224), the Stewart House, a twentieth century residence (e.g. nails, window glass, and standing structures) was also documented. This site is located at 827 South Green Street (see **Figure 2**). The residence embodies the distinctive characteristics of a type of construction, known as pre-fabricated, that was manufactured by the

Lustron Corporation between the late 1940s and early 1950s. Historic archaeological sites relating to this residence may be possible. It should be noted that archaeological sites may be present within the study area that have not been documented at this time.

CULTURALLY SENSITIVE LOCATIONS

Review of historic mapping revealed the following culturally sensitive locations in the study area: the previously mentioned Mt. Zion Cemetery, a second cemetery directly north of the Mt. Zion Cemetery, and one school (see **Figure 3**). No churches were present on the historic maps. However, since small family cemeteries are common throughout the state, additional unmarked cemeteries may be located within the study area associated with former structures and farms.

A review of the National Park Service database identified one site listed on the NRHP, the Stewart Residence (He-H-224). The Stewart Residence is located at 827 S. Green Street in Henderson, Kentucky. It was listed in 1998 and may have associated historic archaeological sites within its NRHP boundaries.

These culturally sensitive locations may have local or regional community significance and could also be protected by state and/or federal regulations. Future proposed projects in the study area should consider potential impacts to these cultural resources.

PREHISTORIC ARCHAEOLOGICAL RESOURCE PROBABILITY

Various factors must be considered when assessing the potential of an area to contain prehistoric and/or historic archaeological sites. Among these are topographic setting; proximity to water; location along major routes of transportation; and the extent of ground disturbances within the area resulting from erosion, construction, maintenance, or farming activities. While only three archaeological investigations have occurred within the study area, the study area has been assessed for the potential to discover prehistoric and/or historic archaeological sites. Various factors are considered in evaluating the potential for archaeological sites including topographic or landform setting (e.g., floodplains, hillsides); proximity to water; location along major routes of transportation; and the extent of ground disturbances within the area resulting from erosion, construction, or agricultural activities. The close proximity of the study area to the Ohio River, a major water way, suggests that this area is an ideal location for seasonal prehistoric archaeological sites and long term prehistoric habitations.

The study area has a high potential to contain significant prehistoric archaeological sites (**Appendix Figure 4**). Criteria for determining a high probability of archaeological sites included areas that have close proximity to water (Ohio River), are in close proximity to transportation routes (roads and navigable waterways), and exhibit moderate to level elevation ranges. The criteria for determining a low probability of discovering archaeological sites included areas with steep elevation ranges and areas not in close proximity to water (streams) or transportation routes. Medium probability areas are those areas that did not fall within the high or low probability areas.

HISTORIC ARCHAEOLOGICAL RESOURCE PROBABILITY

The study area has a high potential to contain significant historic archaeological sites (**Appendix Figure 4**). Additionally, the long historic occupation of the county suggests the possible presence of historic archaeological sites relating to farmsteads and associated agricultural activities. Additionally, South Green Street (US 41) is a historic transportation route, thus suggesting a higher probability to locate historic archaeological resources along its course.

An examination of historic maps of the proposed alternative was conducted to determine if any extant historic structures depicted on the maps are still present. Historic map review (1950 Highway and Transportation Map of Henderson County) (see **Figure 3**) indicated approximately 25 historic structures with the potential for associated historic archaeological sites. In addition, the Sanborn Fire Insurance Maps from 1885, 1892, 1897, 1901, 1906, and 1913 were also consulted. Adjacent to the study area are cemeteries, historic structures and resources that could be eligible for listing on the NRHP and these cemeteries and structures/resources could have associated archaeological sites. Due to the documented Civil War activities in Henderson County, the potential exists for historic archaeological sites relating to Civil War raids or camp sites.

RECOMMENDATIONS

Even though a potential for intact archaeological sites has been projected, the study area has not been subjected to a Phase I archaeological investigation and the presence of currently unidentified archaeological sites within sections of the proposed alternatives are highly likely. As future projects are developed in the US 41A study area, a Phase I archaeological survey should be conducted when federal funds or a federal permit is involved. The Phase I survey will identify archaeological sites and help determine whether a site is eligible for listing on the NRHP to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended), 16 U.S.C. 470(f), and Presidential Executive Order 11593, Protection and Enhancement of the Cultural Environment. A Section 4(f) evaluation should be conducted and avoidance options considered if the right of way overlaps any NRHP listed or eligible for listing archaeological sites requiring preservation in place (e.g., a burial site or areas of a Civil War battlefield).

If you have any questions or would like additional information, please contact Hank McKelway or Marty Marchaterre at (859) 231-0070.

Mr. Tom Springer
10 November 2008
Page 8

Sincerely,

John A. Hunter RPA
Project Archaeologist

Henry S. McKelway Ph.D. RPA
Cultural Resource Manager

Enclosures

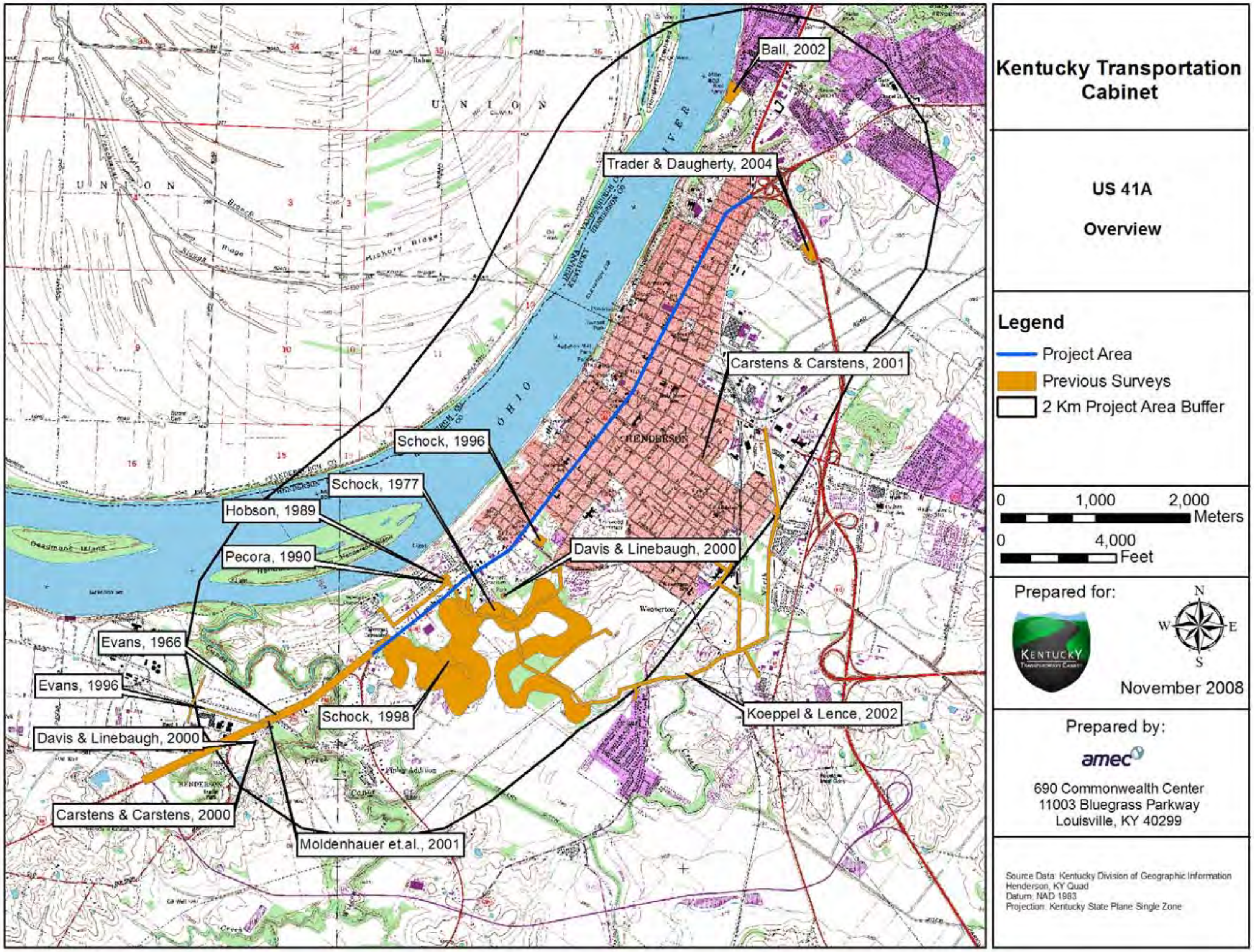

Figure 1. Previous Archaeological Surveys Within the Project Area.

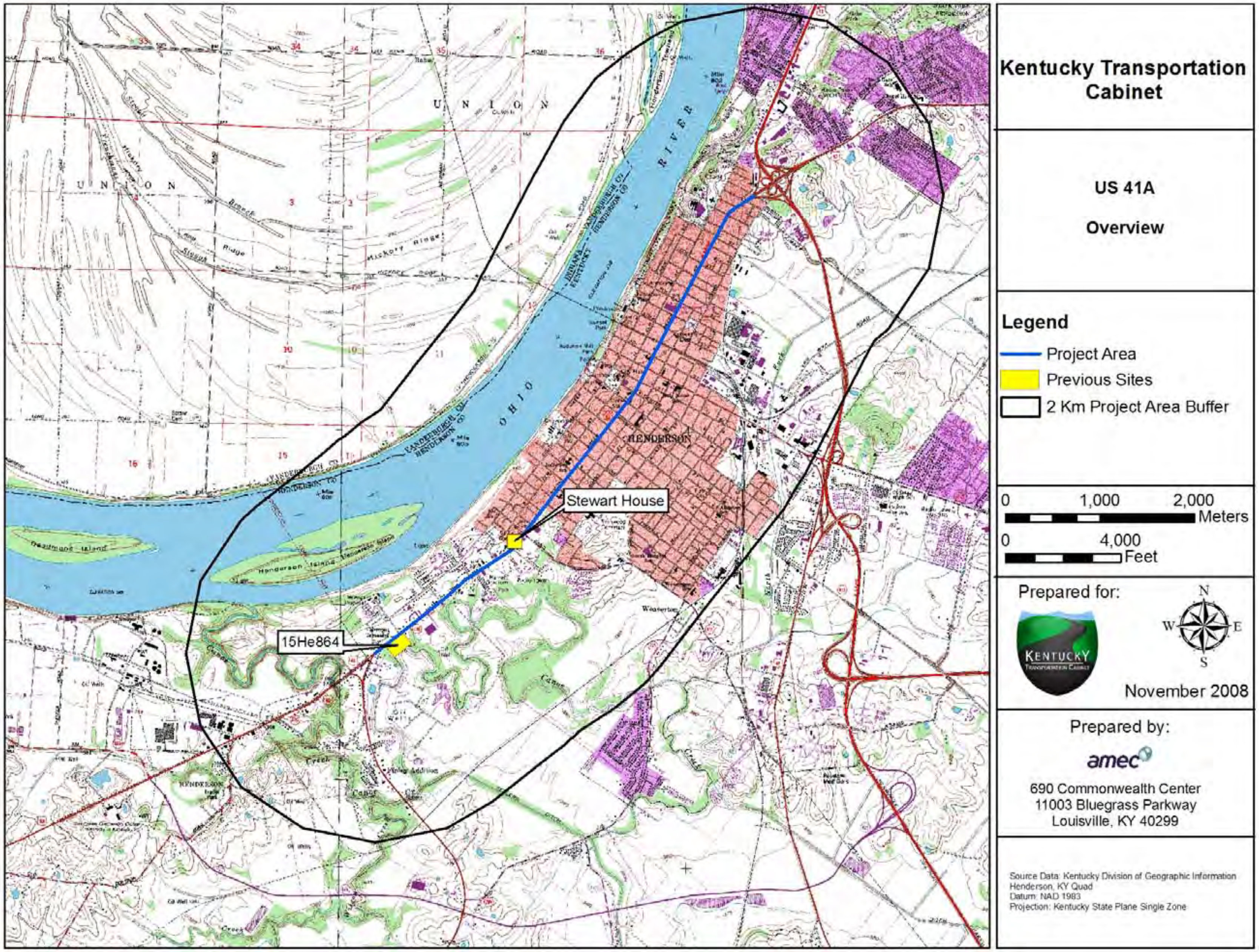

Figure 2. Location of the Historic Mt. Zion Cemetery (15He864) and Stewart House

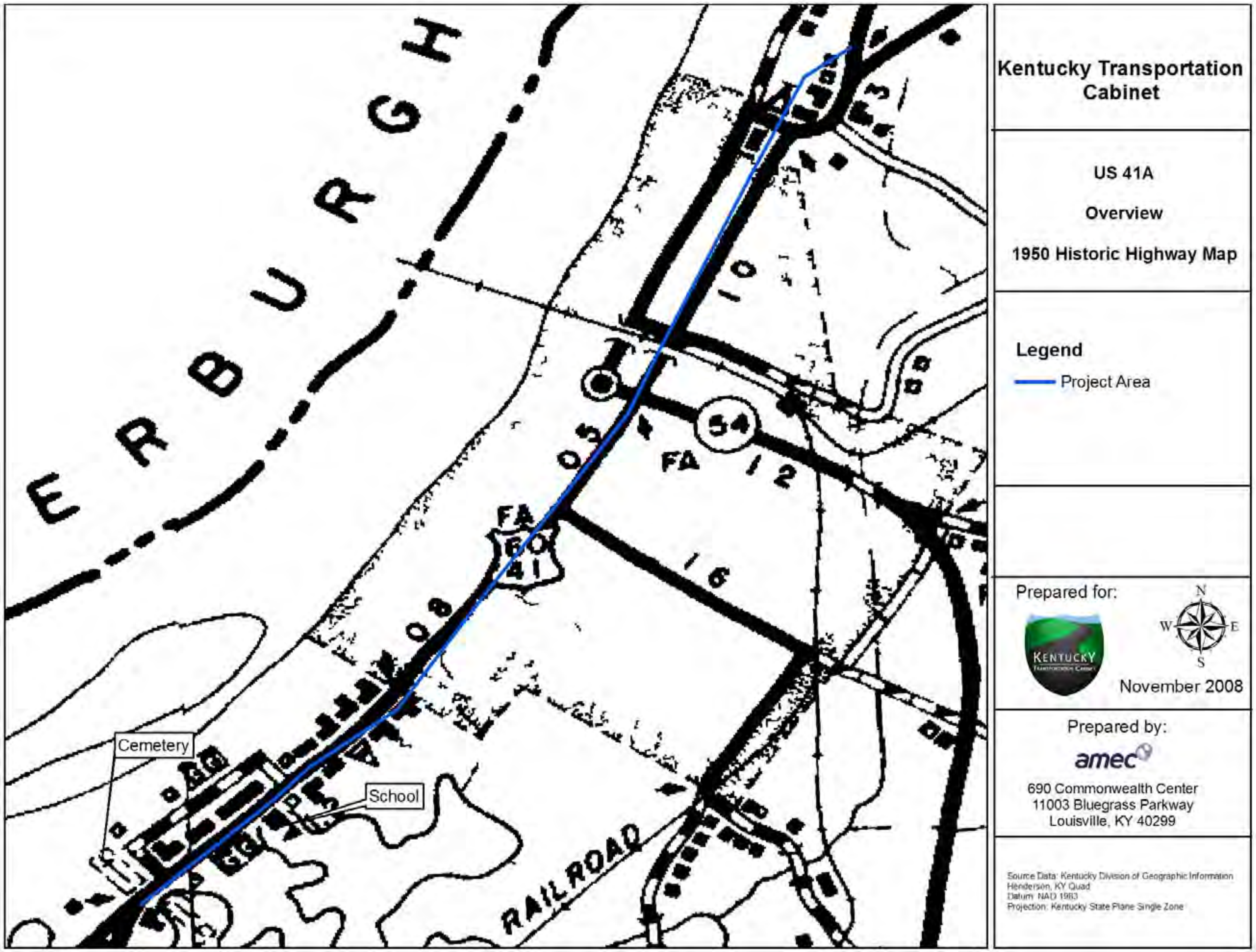

Figure 3. 1950 Kentucky Highway Map.

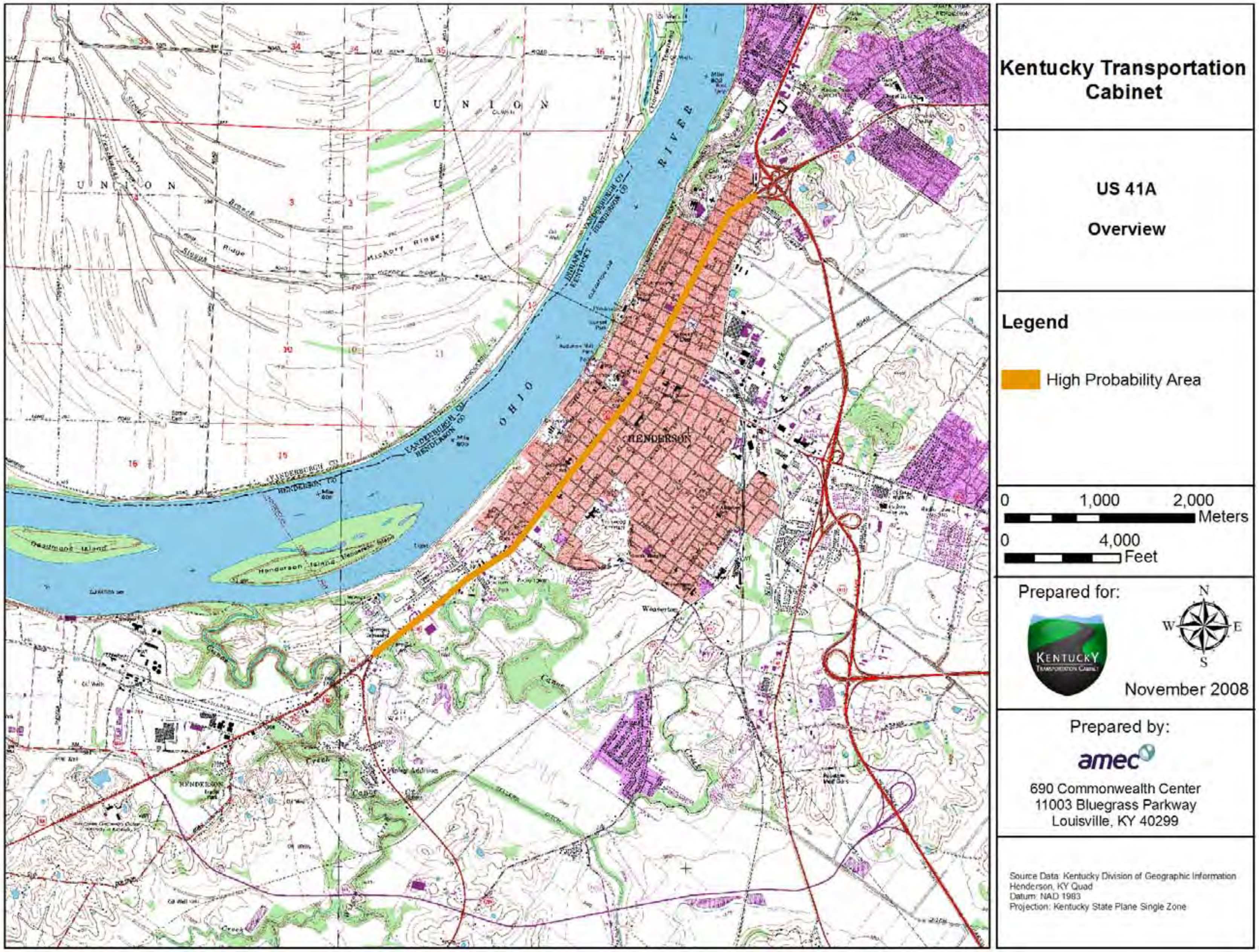

Figure 4. Map Showing Area of High Probability

APPENDIX F
HENDERSON
HISTORIC REPORT

A CULTURAL HISTORICAL RESOURCE OVERVIEW FOR US 60/ US 41 HENDERSON HENDERSON COUNTY, KENTUCKY

KTYC Item No. 2-140
SHPO No. FY08-0373

by

Helen C. Powell

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Helen Powell - Principal Investigator
March 2009

Lead Agency
Department of Transportation

Abstract: Overview of US 60/ US 41 Planning Study
Henderson, Henderson County, KYTC Item No. 2-140

Within the proposed planning study area for US 60/ US 41 in Henderson, Kentucky are the following two historic districts and three individual properties which are listed on the National Register:

Henderson Commercial Historic District
    Wolf's Tavern, 31 N. Green St. (Site BBB, HEH-219)
South Main and South Elm Streets Historic District
    Lucy Furman House, 334 Powell St. (Site QQ. HEH-116)
    Craig House, 329 Powell St. (Site RR, HEH-432)
John E. McCallister House, 839 N. Green Street (Site JJJ, HEH-175)
St. Paul's Episcopal Church, 338 Center Street (Site YY, HEH-418)
Stewart House, 827 S. Green Street (Site Z, HEH-224)

After a windshield survey, the following 19 properties appear to have potential to meet National Register criteria:

Site D: Mt. Zion Cemetery (HEH-523)
Site K: 1563 S. Green St. (HEH-513)
Site O: St. Louis Cemetery (HEH-507)
Site P: 1425 S. Green St. (HEH-510)
Site U: Turner House, 1005 S. Green St.
Site W: 1002 S. Green St.
Site AA: 818 S. Elm St.
Site BB: 702 S. Green St.
Site JJ: Service Station, NE corner Martin Luther King/ S. Green St.
Site NN: 222 S. Green St. (HEH-118)
Site PP: 200 S. Green St. (HEH-116)
Site SS: 138 S. Green St.
Site TT: 132 S. Green St. (HEH-115)
Site VV: 119 S. Green St. (HEH-120)
Site WW: 115 S. Green St.
Site ZZ: 36 S. Green St.
Site CCC-2: First United Methodist Church, SW corner of N. Green/ N. Third
Site FFF: L&N Railroad Ohio River Bridge Approach
Site III: William McClain House, 804 N. Green St. (HEH-174)

For the location of these sites with National Register potential, see the oversize project maps (Figure III-1). A final determination of National Register eligibility will require additional research, photography, physical examination of the structures, an evaluation of these sites relative to the integrity standards established by similar properties in Henderson, Kentucky which are currently listed on the National Register, and consultation with the State Historic Preservation Officer (SHPO) at the Kentucky Heritage Council in Frankfort.

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I. INTRODUCTION

Records Search

To determine if there were individual sites or districts on the National Register within the study area for the US 60/ US 41 Planning Study in Henderson in Henderson County, Kentucky, the consultant reviewed the survey files for the Henderson County at the Kentucky Heritage Council in Frankfort. Figure I-1 shows the extent of the corridor which is one tier of houses on each side of US 60/ US 41, which is also known as North and South Green Streets, in Henderson.

National Register Nominations

To determine if there were individual sites or structures on the National Register within the Study Area for the US 60/ US 41, a GIS search was conducted by Lynn Webb, staff member of the Kentucky Heritage Council and the appropriate files at the Kentucky Heritage Council in Frankfort were reviewed.

As of October 2008, the following five districts and seventeen individual properties were listed on the National Register in Henderson, Kentucky.

Property	Location/ Date of Listing
Alves Historic District.	Bounded by Green, Center, S. Alvisa, Powell, S. Adams, and Washington Sts./ 1989
Audubon School	1400 Clay St./ 1998
John James Audubon Park	US 41/ 1988
Barret House	204 S. Elm St./ 1978

Barret-Keach Farm	1586 KY 136 West/ 2001
Delano-Alves House	536 Chestnut/ 1993
E.L., Ehlen Livery Stable	110 First St./ 1989
Geibel House	327 N. Main St./ 1998
Henderson Armory	735 N. Elm St./ 1998
Henderson Commercial Historic District	Bounded by Main, Third, Elm, and First Sts.
Henderson Cotton Mill Workers Housing District	Bounded by Washington, Letcher, Powell, and Rankin
Henderson, Louisville, and Nashville Railroad Depot	300 Clark St./ 1980
Jackson-James Farm	Address restricted/ 2001
Klee Funeral Parlor	13-17 S. Main St./ 1989
John E. McCallister House	839 N. Green St./ 1982
North Main St. Historic District	N. Main from Fifth to Eighth Sts./ 1990
John O'Byrne House	317 N. Main St./ 1990
Prichett House	311 N. Main St./ 1998
William Soaper Farm	2323 Zion Rd./ 2001
South Main and South Elm Sts. Historic District	Bounded by Washington, Center, S. Green, Jefferson, S. Main, and Water Sts./ 1992
St. Paul's Episcopal Church	338 Center St./ 1978
Stewart House	827 S. Green St./ 1998

Of these listed sites, the following lie within the corridor for US 60/ US 41: Henderson

Commercial Historic District; South Main and South Elm Streets Historic District; John E. McCallister House, 839 Green Street; St. Paul's Episcopal Church, 338 Center Street; and Stewart House, 827 Green Street

Literature Search

A literature search on the project vicinity was conducted in the Library of the Kentucky Historical Society in Frankfort. All of the references consulted are listed in the bibliography.

Other Studies and Publications

"The Pennyrile Cultural Landscape" was written by Charles E. Martin 1988 for the U.S. Department of the Interior and the Kentucky Heritage Council. It is an incredible compendium of census information on the 38 counties of Kentucky's Pennyroyal Region including Henderson County. The detailed statistical analysis provides new insights on the history of the entire area and the property types to be expected during the five general historic periods: Exploration and Settlement (1750-1820); Antebellum and Regional Agriculture (1820-1865); Regional Industrialization (1917-1945); and the Modern Period (1945-1988).

Kentucky's Historic Farms: 200 Years of Agriculture was published by the Kentucky Heritage Council and the Kentucky Department of Agriculture in 1994. It identifies specific farms in Kentucky counties with historic interest, but also provides overviews of the history of agriculture in Kentucky's distinctive regions. The section entitled "Pennyroyal Region" by C. Ardell Jarratt and "The Jackson Purchase Region" by Durwood W. Beatty provide framework for a historic context for agriculture in

Henderson County.

Compliance Reports in SHPO Library

In 2002, Helen Powell wrote "Cultural Resource Survey for I-69 South in Henderson County, Kentucky (2-69.00)". After documenting 151 sites, 7 sites and one district were determined to meet National Register criteria. The L&N Railroad Bridge and the Riverdale Historic District are located within the city limits of Henderson, but are outside of the study corridor for the US 60/ US 41 project. Sites 71 through 90 in the report are located within the US 60/ US 41 corridor and are addressed in Section III.

Historic contexts used in the Powell report include "Agriculture In Henderson County 1850-1940" summarized from the "Henderson County Historic Farms Survey" by Janet Johnson. According to Johnson, agriculture has been Henderson County's primary industry since its earliest settlement. Henderson County's topography, soil fertility, and geographic location along the two major rivers have contributed to its history of agricultural prosperity. Henderson County was a statewide leader in the production of tobacco, corn, beef, and pork in the nineteenth and twentieth centuries. Within the county's boundaries are approximately 100 square miles of bottom lands. The topography is well-suited to agriculture. Its level flood plains and gently rolling terrain have been managed to create a high percentage of improved farmland.

Another context in the Powell report was "Henderson County Coal Production (1890 to 1940)" due to Henderson County's location in the Western Kentucky Coal Field. Coal produced in western Kentucky has a higher sulphur content and higher content of ash than coal produced in the Appalachian Basin Coal Fields. In recent decades, Henderson's coal production has increased due to the market for coal utilized in electric power generation. The Tennessee Valley Authority (TVA) used more than half of the coal produced in western Kentucky. Within the project Area of Potential Effect (APE) was the community of Baskett. In 1888, the Baskett Coal Company opened a coal mine and purchased ten additional acres to build a town to house its employees. In 1889, the Louisville, Henderson, and St. Louis Railroad (later L&N Railroad) established a train station here.

In "Cultural Resource Survey of US 60 from KY 425 to US 41A (2-126.00)" in 2001 , authors Kristie Baynard and James T. Kirkwood described six previously unidentified historic resources located within the Area of Potential Effect. None of the sites appeared to meet National Register criteria. Site 5 from this report lies within the study corridor for the US 60/ US 41 corridor and is addressed in Section III.

Field Work

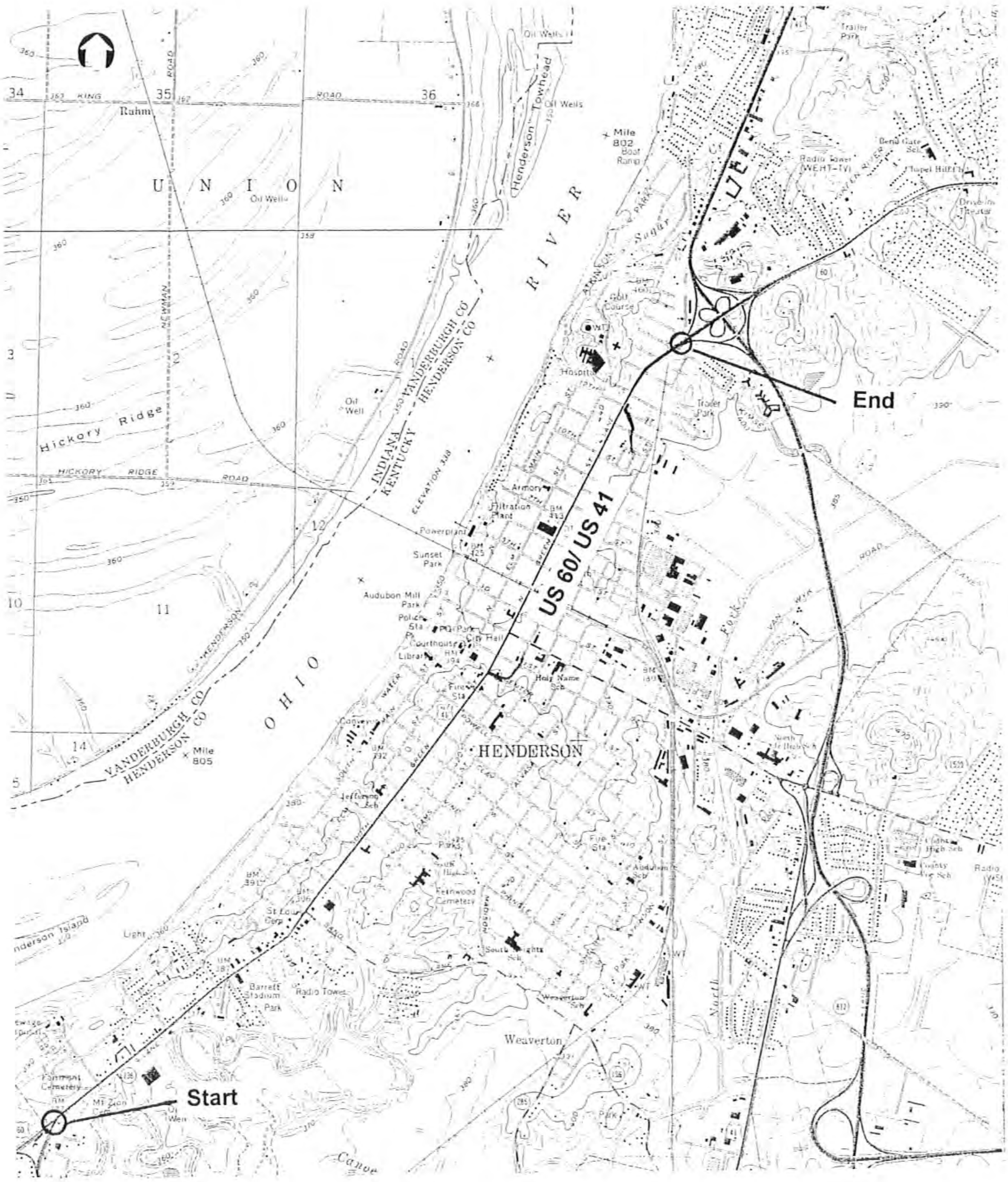
In the winter of 2008-2009, the consultant did a windshield survey of US 60/ US 41 corridor in Henderson. Included in the windshield survey were buildings visible from public roads. Buildings which were not accessible were not included. Buildings which appeared to have potential to meet National Register criteria were noted on the project map (Figure III-1) and were given a preliminary National Register evaluation, based primarily on Criterion C, architecture.

For the overview, no buildings were inspected in detail. A final determination of National Register eligibility relative to criteria A, B, and C will require additional research, photography, physical examination of the structures, evaluation of each site relative to the integrity standards established by similar property types in Henderson County which are currently listed on the National Register, and consultation with the

State Historic Preservation Officer at the Kentucky Heritage Council in Frankfort.

Figure I-1
Overview Study Area
US 60/ US 41 Corridor
Henderson County, 2008

The Study Corridor for US 60 in Henderson includes one tier of buildings on the east and west sides of US 60 (South and North Green Street).



II. OVERVIEW OF THE PROJECT AREA

Henderson County is located in northwestern part of Kentucky, along the Ohio River. The county is bordered by Daviess, McLean, Webster, and Union counties and covers 438 square miles. Henderson County was formed in 1798 from a section of Christian County and named to honor Col. Richard Henderson, the founder of the Transylvania Company. In 1778, the heirs to Henderson's company were granted 200,000 acres of land in present-day Henderson County.

The topography of Henderson County varies from level flood plain to gently rolling terrain. Henderson, the county seat on the Ohio River, has an elevation of 401 feet above sea level, but ridge elevations to the southeast and southwest rise to approximately 550 feet above sea level. Large areas of alluvial lands are found in the creek and river bottoms particularly in the northern part of the county. In addition to the Ohio and Green rivers, other numerous small streams, Canoe, Lick, Beaverdam, and Pond creeks, bisect the county.

Mineral reserves include coal and oil. Henderson County farm land is very fertile. During the nineteenth and twentieth centuries, Henderson County was a leading producer of corn, soybeans, wheat, tobacco, hemp, beef, and pork.

In 1791, the first permanent white settlements in the area occurred in the vicinity of Red Banks, the site of present-day Henderson. By the end of the first decade of the nineteenth century, the increased population supported numerous grist and carding mills.

Henderson's location along the Green and Ohio Rivers provided direct access to available markets and trade to New Orleans. Henderson was designated as a state tobacco inspection point in 1801 and much of the tobacco exported from the Green River valley passed through the community. A second inspection house was built in 1805 for the beef, pork, and flour produced in the surrounding area.

During the Civil War no major battles occurred in Henderson County. The area was plagued by raids from Confederate partisans and guerilla bands. Union forces occupied the county seat twice.

After the end of the Civil War, the Henderson and Union Petroleum Company struck oil on the headwaters of Highland Creek. Coal, extracted in small amounts in the early nineteenth century, was produced in increased quantities in the twentieth century and transported by barge down the Ohio River.

In 1871, the Evansville, Henderson, and Nashville Railroad (part of the present-day CSX Railroad) completed a line through Henderson County. In 1889, the Louisville, St. Louis, and Texas Railroad provided a link to Henderson. The arrival of the railroads stimulated significant growth in the villages in the county such as Corydon, Smith Mills, Zion, and Baskett.

The Henderson-Evansville Bridge, also known as the Audubon Memorial Bridge, was completed in 1932. Henderson County became a gateway to the south via US 41, also known as the Dixie B-Line, used as a main north-south road before the completion of the interstate highways. Increased tourist traffic aided in the establishment of the John James Audubon Park in 1934. A museum was completed in 1938 to honor, Audubon, the painter and naturalist who lived in the Henderson area from 1808 to 1819.

City of Henderson

The town of Henderson was laid out by Gen. Samuel Hopkins and Col. Thomas Allen in 1797. See Figure II-1 for a copy of the original town plat. Its geographic location on the Ohio River below its confluence with the Green River made the community an important river port in the nineteenth century. The first steamboat arrived at Henderson in 1811. Henderson's site on a bluff has protected it from the flood damage inflicted on other Kentucky river towns over the decades. In the massive flood of 1937, Henderson was the only city between Pittsburgh and Cairo, Illinois which was not inundated.

Henderson's proximity to a rich agricultural region made it a significant tobacco market. For its first ninety years, Henderson's industries were dependent upon the nearby rivers for trade. Dams on the Green River made it navigable on a year-round basis, but summer droughts limited the use of the Ohio River to shallow-draft boats. A jetty dam built south of Henderson resulted in a loss of several hundred acres of fertile farmland, but did not increase the depth of the Ohio River.

In March 1869, the Evansville, Henderson, and Nashville Railroad was completed to Nashville. By 1871, trains were running between Henderson and Nashville. The railroad bridge connecting Henderson to Evansville, Indiana was completed in 1885. In 1889, a second railroad, the Louisville, St. Louis, and Texas reached Henderson from the east.

With the completion of the railroads to Henderson in the 1880s, local manufacturers were no longer subject to the vagaries of river navigation. By the early 1890s, Henderson was considered the western Kentucky terminal for both the Illinois Central and the Louisville and Nashville branch lines. The railroad bridge across the

Ohio River gave access to northern markets. The Henderson area supported 51 tobacco factories with 18 of them in the city of Henderson and the remainder scattered throughout the county. See Figure II-2 for a map of the city of Henderson in 1880. By the early 1920s, in the peak years of production, Henderson County shipped 40 million pounds of dark tobacco annually.

Most of the tobacco factories merely packaged tobacco for shipment, but a few processed the tobacco to create specialized tobacco products. In 1883, the Robards-Kitchell Manufacturing Company, later known as J.D. Robards and Co., was established. It used high quality tobacco to make the Greenville brand of chewing tobacco. In 1884, a larger operation was started by the Hodge Tobacco Manufactory. Tobacco trash was used by the Tobacco Extraction Works to make insecticides.

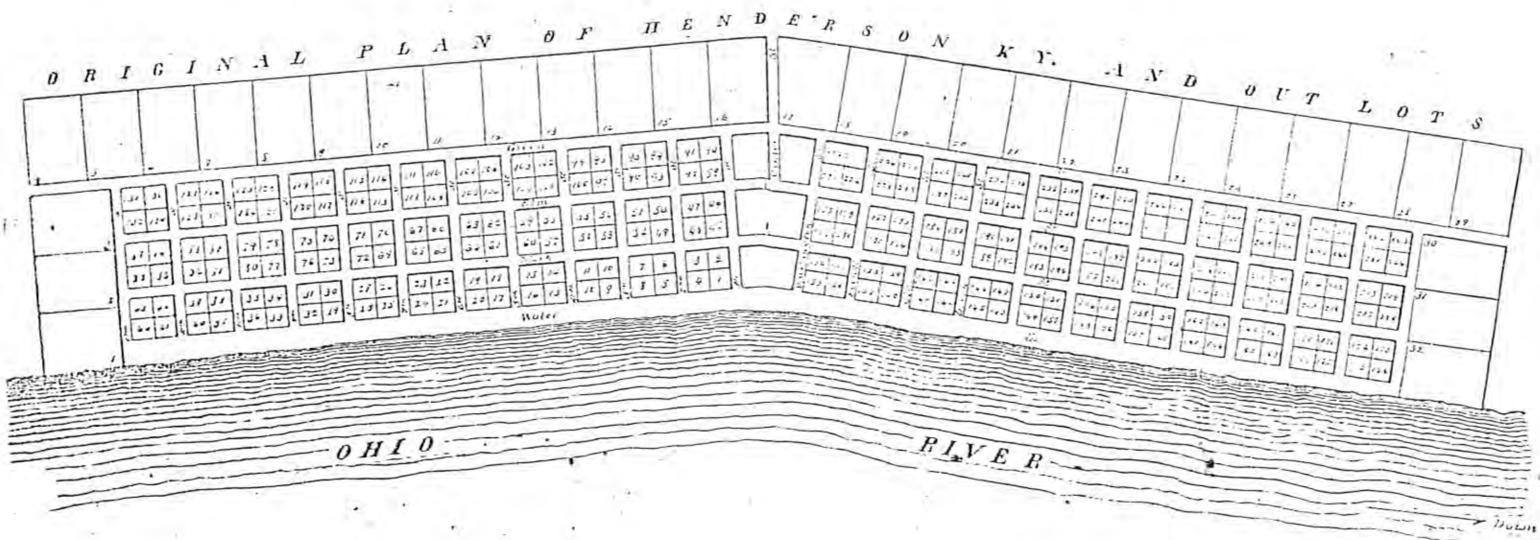
Before the Civil War, the Henderson Brewery was established in Henderson by Reutlinger and Klauder. In 1880, Hill and Winstead remodeled the former Henderson Car Works for use as a distillery. The product, "Silk Velvet", a sour mash whiskey, was made in Henderson until the beginning of World War I. E.W. Worsham and J.B. Johnson founded the E.W. Worsham Company in 1881 to produce the "Peerless" brand of whiskey.

The Henderson Buggy Company was in business as early as 1863. By 1913, the Henderson City Directory listed three companies which made horse-drawn vehicles: Delker Brothers, George Delker Carriage Factory, and the Henderson Wagon Works.

During the 1880s, two textile mills, financed by New England interests, opened in Henderson. The Henderson Woolen Mill, organized in 1882, had 60 looms and employed 140 people. A pant-making department was added in 1886. It had 42 power-operated sewing machines and employed 50 people to make “Kentucky Jeans”. Henderson Cotton Mills, the city’s largest industry in the nineteenth century, employed 200 people and produced 160,000 yards of sheeting on a weekly basis. The mill was sold to the Consolidated Textile Corporation which operated in Henderson until 1913.

Figure II-1: Original Plat of the City of Henderson

C



LOTS GIVEN MEN WHO SETTLED BEFORE 1794

Lot No.	Location	First Owner	Present Owner (Resident)
3	SW Cor. 2nd & Main	Eneas McCallister	Soaper Hotel (Audubon Inn)
4	SE Cor. 2nd & Water	John McCallister	Greyhound Bus Station
5	NE Cor. 2nd & Water	James Worthington	Plaza Bar
6	NW Cor. 2nd & Main	John McComb	Temporary City Bldg.
7	SW Cor. 3rd & Main	William Lawrence	Old Y.M.C.A.
8	SE Cor. 3rd & Water	Hugh Knox	Imperial Building
9	NE Cor. 3rd & Water	John Walker	C.B.S. Dress Co.
10	NW Cor. 3rd & Main	Jacob Barnett	Elk's Club
11	SW Cor. 4th & Main	Dunn's Heirs	Dave Hart
15	SW Cor. 5th & Main	Elias Griffith	Herman Sheffer
16	SE Cor. 5th & Water	John Knight	Ohio Valley Provision
17	NE Cor. 5th & Water	Jacob Upp	S.W. Langley
20	SE Cor. 6th & Water	Michael Sprinkle, Sr.	Henderson Water Works
21	NE Cor. 6th & Water	Michael Sprinkle, Jr.	Vacant lot
50	SE Cor. 2nd & Elm	Mathew Dobbin	Quinn's Corner Store
51	SW Cor. 3rd & Elm	Jonathan Anthony	Henderson Home Federal
52	SE Cor. 3rd & Main	John Simpson	Electrolux Sales & Service
53	NE Cor. 3rd & Main	Joseph Sorthington	Big Rivers RECC
54	NW Cor. 3rd & Elm	Humphrey Barnet	Gibson's Automotive
55	SW Cor. 4th & Elm	Samuel Bradley	Residential
60	SE Cor. 5th & Main	John Hewitt (Assignee for Husband)	Mrs. J.T. Armstrong
61	NE Cor. 5th & Main	Michael Heay	Vacant (Ray Preston)
62	NW Cor. 5th & Elm	Willis Oldham	Trinity Lutheran Ch.

Sponsored by
EATON AXLE DIVISION EATON CORP.

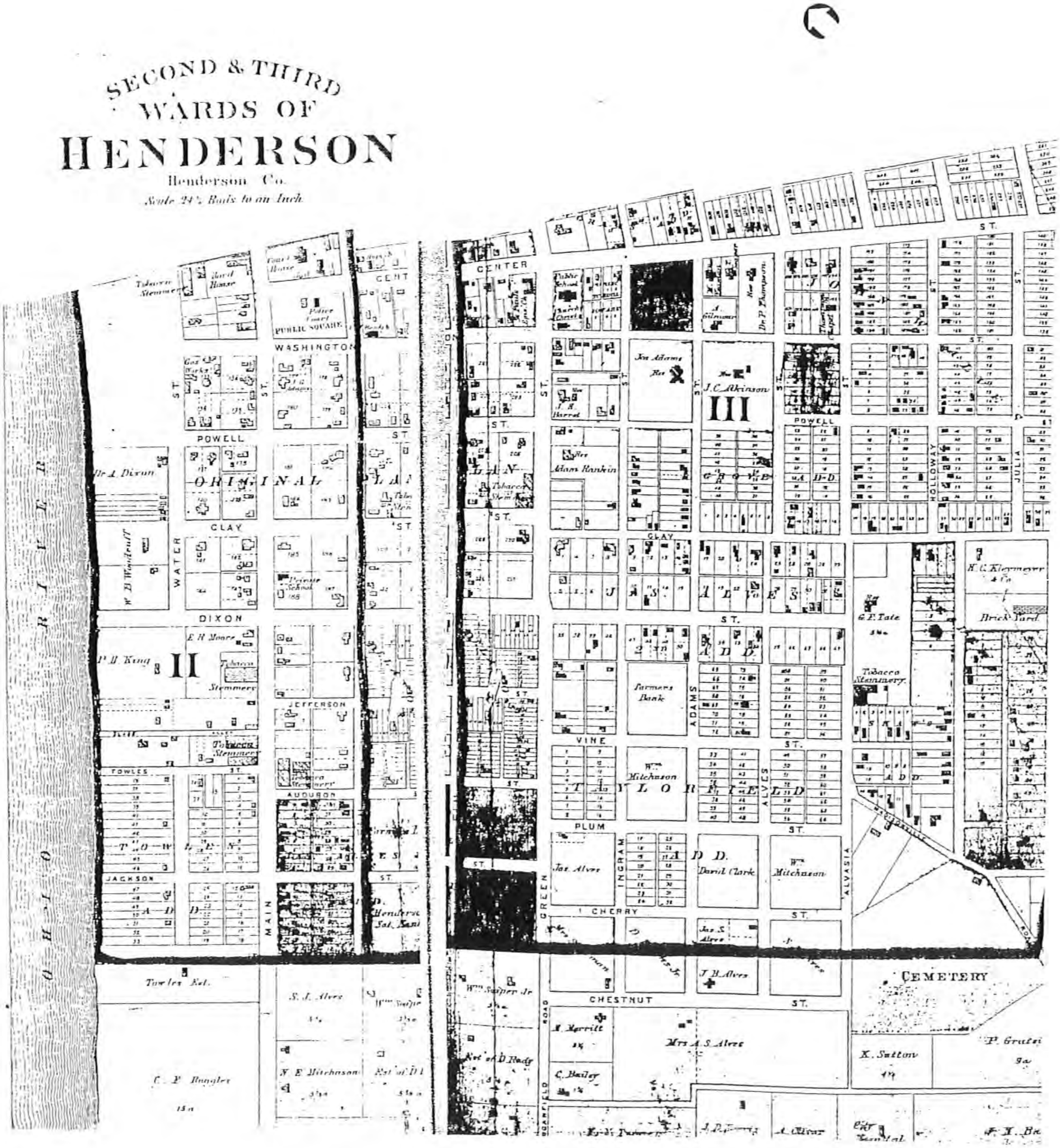
EARLY PURCHASERS OF LOTS

Lot No.	Location	First Owner	Present Owner (Resident)
1	NE Cor. 1st & Water	John Hart	Hecht Lackey
18	NW Cor. 5th & Main	Eneas McCallister	Effie Vaughn
22	NW Cor. 6th & Main	Eneas McCallister	William Elliott
71	SW Cor. 8th & Elm	John Jordan	Armory
82,83, 84,84	11th, Main, & Elm	Jonathan Anthony	Clore Court
88	SE Cor. 12th & Main	George Grant	Pearl Ayres Lowe
95	SW Cor. 3rd & Green	John J. Audubon	First Methodist Church
138	SW Cor. Powell & Main	Evans Bennett	E. Lambert Farmer

From:

A Pictorial History of Henderson County, 1775-1950. Henderson Bicentennial Committee, 1974.

Figure II-2: B.N. Griffing/ D.J. Lake Map of Henderson, 1880



III. WINDSHIELD SURVEY

The windshield survey of the project corridor was conducted in December 2008 and January 2009. Sites were researched using the SHPO records, Google Streetscape, Sanborn Fire Insurance Maps (1885, 1892, 1897, 1901, 1906, 1913, 1923, 1931), *Illustrated Historical Atlas of Henderson and Union Counties, Kentucky* by B.N. Griffing in 1880, and aerial photography provided by QK4. The sites are labeled on the Cultural-Historic Overview Map (Figure III-1).

No sites were examined in detail. A final evaluation relative to National Register eligibility can not be made until more in-depth research is done for the formal cultural-historical baseline study for submission to the Kentucky Heritage Council (SHPO).

Key to Evaluations in Overview for US 60, Henderson, Ky.

NR National Register: Buildings or districts which are either listed on the National Register or have ben determined eligible for the National Register by Agreement with the SHPO or by the Keeper of the National Register in previous compliance projects or nominations.

NRP National Register Potential: Buildings which, compared to other listed on the National Register, appear to meet Criteria A, B, or C as either an individual property or contributing property within a potential district. These structures may also be a property type which the SHPO has determined eligible in other recent compliance projects.

S Survey: Buildings which would be documented in a baseline study, but appear to have no significant architectural characteristics or association with historic events or persons to meet National Register criteria.

X Destroyed: Site which was previously documented, but has either been torn down or removed from that location.

Site/ Evaluation

A/X **Winhaus' South Y Barbeque (HEH-520), junction US 60/ US 41A**
Site A was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. The building has been torn down since the completion of the report.

B/ X **1890 US Highway 41A**
Site B was a two-story, frame dwelling which was documented as Site 5 in a compliance report in 2001 by Kristie Baynard and James T. Kirkwood. Site B has been torn down.

<u>Site/ Evaluation</u>

C/ S **Fairmont Cemetery (HEH-519)**

Fairmont Cemetery was established by the City of Henderson in 1925.The entry road from US 60 is framed by battered brick posts. It was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria.

D/NRP **Mt. Zion Cemetery (HEH-523)**

According to the Henderson County cemetery records, the earliest documented interment date is 1909. Approximately 900 burials are documented in *Gone, But Not Forgotten*, a publication on Henderson County cemeteries published by the Henderson County Historical Society. Among those buried here is Richard Brooks who served with the 6th U.S. Colored Cavalry at Camp Nelson. Site D was documented in the I-69 compliance report in 2002. Although the SHPO concurred at the time that the site did not meet National Register criteria, the present-day SHPO focus on African American resources, would probably yield a different eligibility call today.

<u>Site/ Evaluation</u>

E/ X **1776 S. Green St. (HEH-524)**
Site E was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria.

F/S **1649 South Green St. (HEH-518)**
Site F is a one-story, front-gabled, frame dwelling with a single-bay front-gabled porch. Site F was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria.

G/X **1637 and 1639 S. Green St. (HEH-517)**
Site G was documented in the I-69 compliance report in 2002. The SHPO concurred that the two early twentieth century houses did not meet National Register criteria. Both houses have been torn down.

H/S **1623 S. Green St. (HEH-516)**
Site H was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site H is a one story, two-bay, front-gabled frame house dating from the period from 1925 to 1945.

I/S **Frazier's Garage, 1619 S. Green St. (HEH-515)**
Site I was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. The single-story, shed-roofed gas station was built during the period from 1940 to 1955.

<u>Site/ Evaluation</u>

J/S **1569 S. Green St. (HEH-514)**

Site J was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site J is a one-story, front-gabled brick dwelling dating from 1938.

K/NRP **1563 S. Green St. (HEH-513)**

Site K was documented in the I-69 compliance report in 2002. Although the SHPO concurred that the site did not meet National Register criteria, the present-day SHPO focus on mid-twentieth century Tudor Revival houses would probably yield a different eligibility call today. Site K, built in 1935, is a one-and-one-half-story, frame dwelling with a steeply pitched side-gabled roof, front-facing brick chimney, and arched entry within a steeply pitched wall gable.

L/S **1529 S. Green St. (HEH-512)**

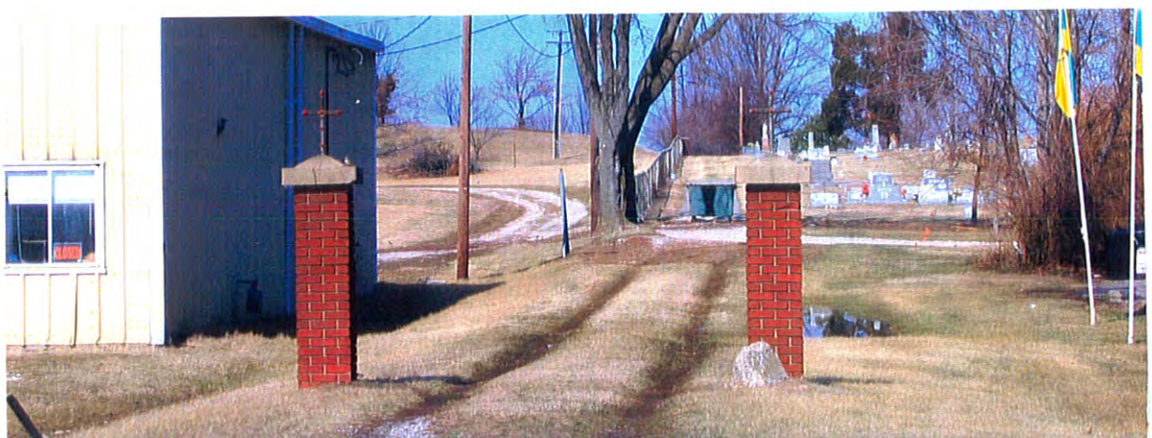
Site L was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site L is a one-story, brick commercial building with a stepped parapet. It was built in 1934.

<u>**Site/ Evaluation**</u>

M/S **Shannon Lumber Company, 1560 S. Green St. (HEH-525)**
Site M was documented in the I-69 compliance report in 2002. The SHPO concurred that Site M did not meet National Register criteria. Site M is a one-and-one half-story, frame commercial building dating from the period between 1935 and 1945.

N/S **1525 S. Green St. (HEH-511)**
Site N is a two-story, three-bay, brick commercial building dating from 1947.

O/NRP **St. Louis Cemetery (HEH-507)**
Site O was documented in the I-69 compliance report in 2002. Although the SHPO concurred in that the site did not meet National Register criteria, the present-day SHPO might have a different evaluation. The St. Louis Cemetery does not have any S. Green Street frontage except for a narrow strip which appears to have been an earlier cemetery entrance. There are brick entry piers where this former entrance intersects S. Green Street. St. Louis Cemetery was established in 1875.



Evaluation

1425 S. Green St. (HEH-510)

Site P was documented in the I-69 compliance report in 2002. Although the SHPO concurred in that the site did not meet National Register criteria, the present-day SHPO focus on mid-twentieth century bungalows would probably yield a different evaluation today. The one-and-one-half-story, five-bay, side gabled brick bungalow has a porch which is supported by brick posts atop a brick porch railing. Site P was built during the period from 1925 to 1945.

1423 S. Green St. (HEH-509)

Site Q was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site Q is a one-and-one-half-story, side-gabled, frame, Colonial Revival dwelling dating from the period between 1930 and 1945.

1405 S. Green St. (HEH-508)

Site R was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site R is a two-story brick commercial building dating from the period between 1935 and 1945.

Site/ Evaluation

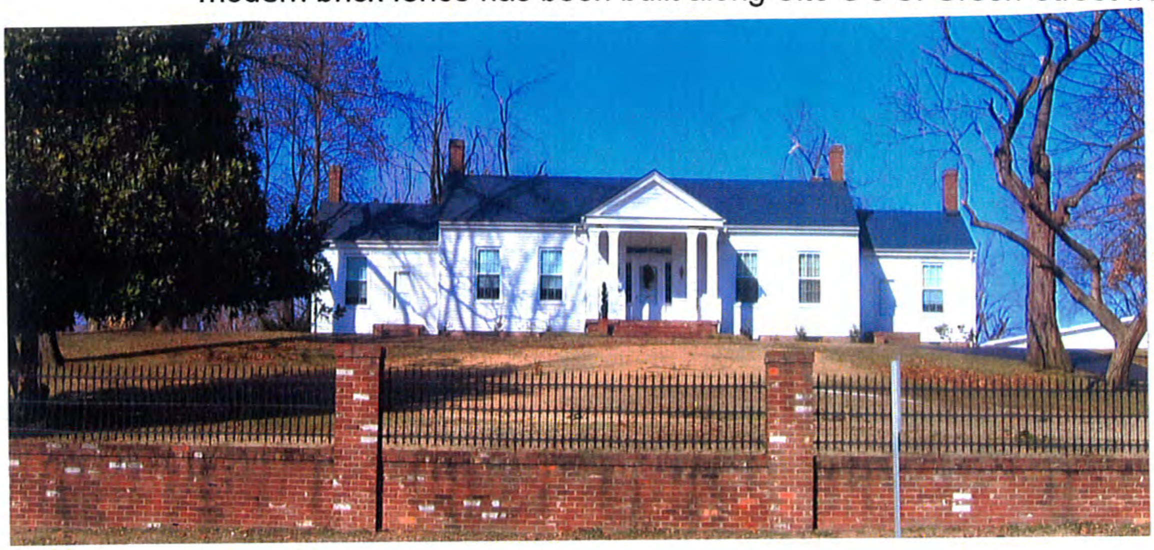
S/S **1326 S. Green St. (HEH-527)**
Site S was documented in the I-69 compliance report in 2002. The SHPO concurred that the site did not meet National Register criteria. Site S is a two-story, concrete block commercial building dating to the period between 1945 and 1955.

T/S **1124 S. Green St.**
Site T is a two-story, hipped roof brick dwelling with a rounded turret on the northwest corner. Site T does not meet National Register criteria due to the numerous changes to the siding, windows, and porch.

Site/ Evaluation

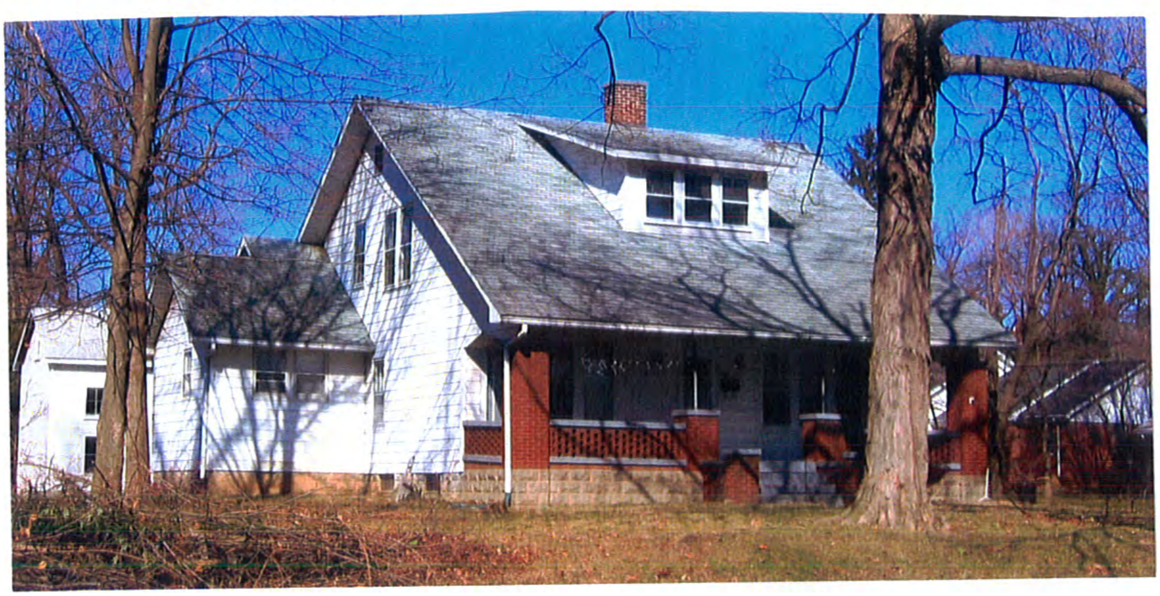
U/NRP **H.F. Turner House, 1005 S. Green St.**

Site U is a one-story, five-bay, frame dwelling with a central entry which is framed by sidelights and a transom. Over the entry is a pedimented porch which is supported by paired columns. H.F. Turner came to Henderson in 1852 and bought a large farm. The house dates to circa 1853. Turner, a lawyer, helped write the city charter for Henderson in 1867; was an organizer and board member for the Henderson High School in 1869; and served on the Fair Board. Turner's holdings included land which extended from Main to Green and from Sand Lane north to Hancock Street. A modern brick fence has been built along Site U's S. Green Street frontage.



V/S **901 S. Green St.**

Site V is a one-and-one-half-story, three-bay, frame bungalow. The full-width porch is supported by brick posts atop a brick porch railing. According to the Sanborn Insurance Maps, Site V was built between 1923 and 1931.



W/NRP **1002 S. Green St.**

Site W is a two-story, four-bay, frame, side-gabled T-plan built after the publication of the W.B. Griffing Map in 1880.

Site/ Evaluation

X/S **930 S. Green St.**

Site X is a two-story, three-bay, hipped roof, side passage, frame dwelling. The entry contains double leaf doors. Site X is shown on the W.B. Griffing Map from 1880 and labeled as belonging to "C. Bailey".

Y/S **916 S. Green St.**

Site Y is a one-story, side-gabled, frame T-plan with double leaf doors. It shown on the 1923 Sanborn Map.

Z/NR **Stewart House, 827 S. Green St. (HEH-224)**

The Stewart House was listed on the National Register in 1998 with a boundary of .64 acre. The one-story, prefabricated house was built in 1951 as the first home in a planned subdivision for Army officers. After the prefabricated house cost between $14,000 and $16,000 to build, construction on the remainder of the subdivision was halted because it was considered cost prohibitive. The Stewart House meets Criterion C for architecture. It embodies the distinctive characteristics of a type of prefabricated construction, marketed by the Lustron Corporation after World War II as a response to the housing shortage. It developed a mass-produced house with pre-fabricated framing, roof and ceiling panels, and interior and exterior walls made of porcelain enamel-finished steel.

Stewart House, 827 S. Green St., Listed on the National Register

Site/ Evaluation

AA/NRP **818 S. Elm St.**

A wood screen fence along Site AA's S. Green St. frontage blocks the view of the dwelling from the street. On the W.B. Griffing Map of Henderson from 1880, the William Soaper House is shown in this location. No house is shown in this location on 1923 Sanborn Insurance Map. The 1931 insurance map shows a one-story frame dwelling.

According to the owner, this frame house dates from the early nineteenth century and was moved here in the 1920s from its original location on the corner of Washington and Water Streets. The oldest section of the present-day house consists of two rooms which have a central chimney and Greek Revival detailing. The Sanborn Insurance maps from 1897 show a frame house with a similar configuration on the original site. The owner requested that no photos be taken of the house.

<u>Site/ Evaluation</u>

BB/NRP **702 S. Green St.**

Site BB is a two-story, three-bay, frame dwelling with a hipped roof and wrap around porch which is shown on the 1923 Sanborn Insurance Map. On the northeast corner is a rounded tower with a conical roof.

CC/S **618 S. Green St.**

Site CC is a two-story, four-bay, side-gabled frame T-plan which is shown on the 1923 Sanborn Map.

:valuation

614 S. Green St.
Site DD is a one-and-one-half-story, gambrel roofed dwelling with a front facing gable. The entry is covered by an arched porch which is clad in fish scale shingles. Over the arched window is an intaglio design.

602 S. Green St.
Site EE is a one-story, side-gabled, frame T-plan with interior brick chimneys on the gable ends. On the northwest corner is a hipped roof section which contains a bay window. The house sits upon a raised elevation, possibly part of a former dune. The dwelling is shown on the W.B. Griffing Map from 1880.

Site/ Evaluation

FF/S **534 and 536 S. Green St.**

Site FF consists of two one-story, side-gabled, frame T-plans. They are shown on the 1906 Sanborn Insurance Map for Henderson. The abandoned railroad right-of-way for the Belt Line Railroad (shown on the 1901 Sanborn Map) is located to north of 534 S. Green Street.

GG/S **Farm Bureau, 529 S. Green St.**

Site GG is a one-story, concrete block commercial building, possibly a former service station. Site GG is not shown on the 1931 Sanborn Map.

HH/S **509 S. Green St.**

Site HH is a one-and-one-half-story, frame, side-gabled bungalow. The house sits upon a raised elevation, possibly part of a former dune. Site HH is not shown on the 1931 Sanborn Insurance Map.

II/S **432 S. Green St.**

According to the Sanborn Maps, Site II was built between 1901 and 1906. It is a one-story, frame T-plan.

432 S. Green St.

Site/ Evaluation

JJ/NRP **Pure Oil Service Station, NE corner Martin Luther King and S. Green**

Site JJ is an example of the Pure Oil patented English Cottage design for the company's service stations. The prototype was designed by C.A. Peterson and first built in 1927. With minor variations, the English Cottage service station served as the corporate symbol for Pure Oil until 1946. Site JJ, a one-and-one-half-story, brick, Tudor Revival structure with a steeply pitched, side gabled roof, was built between 1923 and 1931.

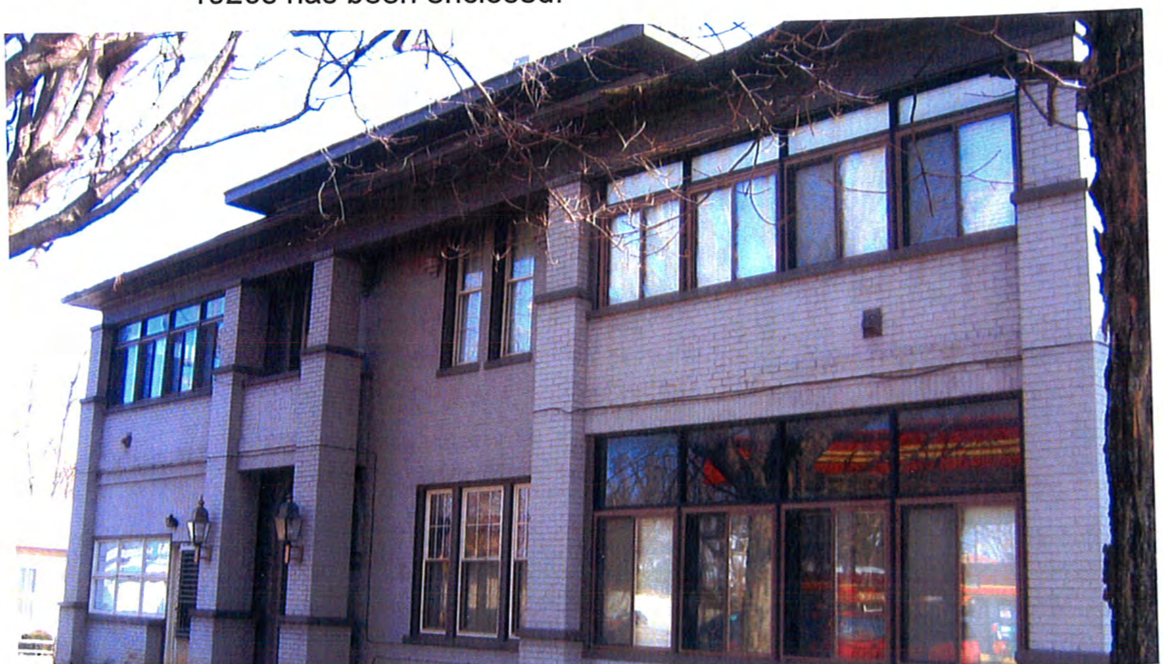
Site/ Evaluation

KK/S **332 S. Green St.**

Site KK is a two-story, hipped roof, frame dwelling which has three bays on the first floor and two bays on the second. It is shown on the 1901 Sanborn Insurance Map.

LL/S **304 S. Green St.**

Site LL is a two story, brick, hipped roof Italianate dwelling which was shown on the W. B. Griffing Map from 1880. According to a plaque on the building, it became the Vogel Apartments in 1923. A porch dating from the 1920s has been enclosed.



Site/ Evaluation

MM/S **Dairy Bar, 241 S. Green St.**

Site MM is an example of post World War II roadside architecture.

Sites NN through PP and SS through WW are potential contributing elements in the potential expansion of the South Main and South Elm Streets Historic District which was listed on the National Register in 1992. Sites QQ and RR are already included within the boundaries of the district.

NN/NRP **222 S. Green St. (HEH-118)**

Site NN is a two-story, hipped roof, frame Queen Anne dwelling with an asymmetrical plan. It retains the original wood frieze on the wrap around porch. The dwelling is shown on the 1897 Sanborn Map.

Site/ Evaluation

OO/X **214 S. Green St. (HEH-117)**
Site OO has been torn down.

PP/NRP **200 S. Green St. (HEH-116)**
Site PP is a two-story, brick, four-bay, side passage dwelling. The entry contains double leaf doors and is framed by pilasters and a bracketed hood molding. The windows have flat hood moldings. Brackets ornament the eaves of the hipped roof. The porches retain original friezes. A cast iron fence defines the property along its S. Green Street frontage. The dwelling is shown on the 1897 Sanborn Map.

QQ/NR **Lucy Furman House, 334 Powell St. (HEH-119)**
Site QQ is a contributing element in the South Main and South Elm Streets Historic District which was listed on the National Register in 1992. Lucy Furman, an author and lecturer, was born here in 1870. Furman depicted the life of the Kentucky mountain people in books and serials. Her first book was published in 1897. She taught in the Hindman Settlement School in Knott County from 1907 until 1927. Her books include *The Quare Women* and *The Glass Window*.

Site QQ is a two-story, brick, hipped roof dwelling which has an asymmetrical plan. On the north end of the main facade is a three-story, pyramidally roofed tower. Stone is used in the hood moldings over the windows and arches. Stone bands delineate the floors. The wrap around porch which connects the east and south facades retains its wood frieze.

RR/NR **Craig House, 329 Powell St. (HEH-432)**
Site RR is a contributing element in the South Main and South Elm Streets Historic District which was listed on the National Register in 1992. Site RR is a one-and-one-half-story, brick bungalow with a shed roofed dormer. The full-width porch is supported by brick posts atop a brick porch railing. Site RR is shown on the 1923 Sanborn Map.

<u>Site/ Evaluation</u>

SS/NRP **138 S. Green St.**

Site SS is a two-story, two-bay, hipped roof, brick dwelling which is shown on the 1923 Sanborn Insurance Map. It has a hipped roof dormer on the tile roof. A single-bay, hipped roof porch supported by brick posts covers the entry. On the west side is a porte cochere.

Site/ Evaluation

TT/NRP **J. Barrett House, 132 S. Green St. (HEH-115)**

Site TT is a two-story, five-bay, brick, hipped roof T-plan dating from the period between 1850 and 1875. Sidelights and transom frame the entry. Over the windows are flat hood moldings. It is shown on the W.B. Griffing Map from 1880.

UU/X **123 S. Green St.**

Site UU, a one-story, stuccoed brick duplex built 1906 and 1913, has been torn down.

VV/NRP **119 S. Green St. (HEH-120)**

Site VV is a two-and-one-half-story, three-bay, hipped roof brick T-plan. It has an asymmetrical plan and round corner turret with a conical roof and terra cotta ornamentation. Aluminum has replaced the wood ornamentation on the entry surround. Windows on the first and second floors have been boarded up. Along the S. Green Street frontage is a period stone retaining wall.

Site VV, 119 S. Green St.

WW/NRP **115 S. Green St.**

Site WW is a two-story, three-bay, side-gabled brick dwelling. The central entry is famed by sidelights and transom and covered by a flat-roofed porch which is supported by doubled columns. According to the Sanborn Maps, Site WW was built between 1913 and 1923.

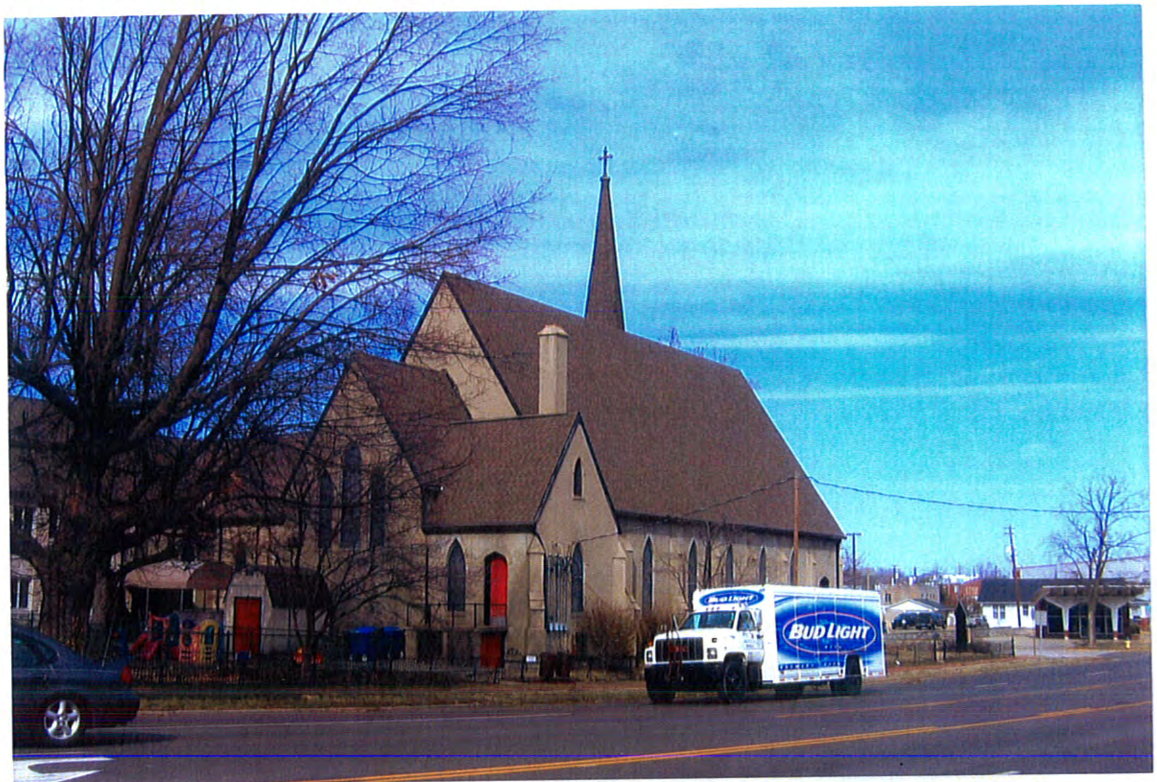
<u>**Site/ Evaluation**</u>

XX/X **112 S. Green St. (HEH-114)**
Site XX has been torn down.

YY/NR **St. Paul's Episcopal Church, 338 Center St. (HEH-418)**
Decorative Wrought Iron Fence, 338 Center St. (HEH-419)
Listed on the National Register in 1978 as an individual property, Site YY is also a contributing element in the South Main and South Elm Streets Historic District which was listed on the National Register in 1992.
Built in 1859-1860, the Gothic Revival church is based on the cruciform plan. The main facade facing Center Street features a steeply pitched wall gable which contains an equilateral arch window with a low-relief stone hood molding. A simple, wooden peak ornament is the only other decorative element on the facade. The main entrance is in a square bell tower which contains a Tudor arch doorway and is surmounted by an eight-sided spire. The church sanctuary is seven bays deep with buttresses as the only major interruptions of its smooth stuccoed brick walls.

St. Paul's Episcopal Church meets Criterion C as an example of the adaptation of the Gothic Revival by Anglican churches throughout the latter half of the nineteenth century. The building is also significant under Criterion B through its association with the Right Reverend Benjamin Bosworth Smith (1794-1884), the first bishop of the Diocese of Kentucky. The plan for St. Paul's resembles several other Episcopal churches built in central Kentucky during this same period. The design for these other churches is credited to Bishop Benjamin Bosworth Smith. Bishop Smith was a leader in the fields of both religious and secular education in the state.

Site YY, St. Paul's Episcopal Church and Decorative Wrought Iron Fence



Site/ Evaluation

ZZ/NRP **Christian Church, 36 S. Green St.**

Site ZZ is a two-story, five-bay brick building which once housed the Christian Church which was organized in Henderson in 1841. The east section of the present-day church was built in 1855. In 1861, during the Civil War, Federal authorities seized the church building and used the structure at various times as a barracks, commissary, hospital, and prison. Even though Henderson was removed from the battlegrounds of the Civil War, its location near the Ohio and Green rivers made it a transit point for Union troops, prisoners, and wounded. The Henderson County Courthouse, private dwellings, and tobacco warehouses were used by Union troops.

In 1926, the main facade of the 1855 church, which was front-gabled with two corner towers, was replaced by the present-day facade in which the central entrance is housed in a Gothic-arched opening. The church congregation outgrew this building and relocated in 1957.

Site/ Evaluation

AAA/S **34 S. Green St.**

Site AAA is a one-story, brick structure built as an annex to the Center Street Public School which was located to the north. On the 1897 Sanborn Map, Site AAA is labeled as "being built".

Note: Center Street divides North Green and South Green Streets.

BBB/NR **Wolf's Tavern, 31 N. Green St. (HEH-219)**

Site BBB is a contributing element in the Henderson Commercial District which was listed on the National Register in 1989. Wolf's Tavern was built on the northwest corner of S. Green and First Streets in 1878. On the 1885 Sanborn Map, Site BBB is labeled as "variety and saloon".

Site BBB is a two-and-one-half-story, three-bay, brick commercial building. It retains some Mesker steel components including the only surviving elaborate metal cornice pediment in the Henderson Commercial Historic District. Other metal elements include the gabled hood moldings above the windows on the second floor and a metal cornice with side piers. On the south side of the tavern is an attached one-story, two-bay, side gabled, brick dwelling.

CCC-1/ S **Masonic Lodge, 338 Second St.**
Site CCC-1 is a two-story, flat-roofed, brick and stone structure which was completed in 1930.

CCC-2/NRP **First United Methodist Church, NW corner of N. Green and Third**
Circa 1826, Methodist congregational worship began in Henderson in the Union Church in Central Park. In 1850, the congregation bought this lot and built a brick Gothic Revival church which was destroyed by a tornado. The present-day church sanctuary which dates to 1914 is a two-and-one-half-story, five-bay brick building with a colossal pedimented portico supported by Ionic columns. In the center of the church sanctuary is a dome. To the south is a church education building completed in 1956. An addition to the west side of the church dates to 1999.

Site/ Evaluation

DDD/S **Oddfellows Building, 329 Third Street**

Site DDD is a two-and-one-half-story, brick building with two storefronts on the first floor and six bays, all windows, on the second. Above the windows are brick hood moldings. Along the cornice is brick corbelling. The east side of Site DDD is present on the Sanborn Map from 1906. In the 1920s, a frame porch covered the main facade.

EEE/S **Dwellings, 323, 325, 327, 329, 331 N. Green St.**

Site EEE consists of five two-story, frame dwellings. The porches on 325, 327, and 329 of the hipped roof T-plans have been either removed or significantly altered. According to the Sanborn Insurance Maps, these dwellings were built between 1901 and 1906. On 323 and 331, the porches retain original posts. Other alterations to this group of dwellings include modern exterior fabric and modifications to windows.

FFF/NRP **L&N Railroad Ohio River Bridge Approach,**

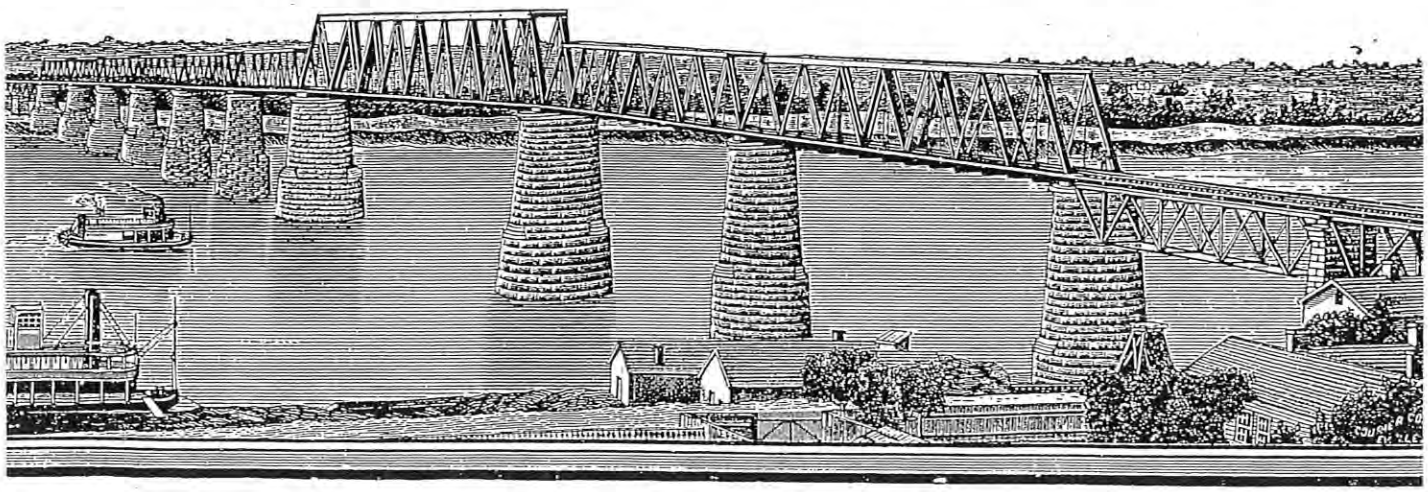
The Henderson and Nashville Railroad was incorporated in 1866. From Henderson the rail line was extended to Madisonville by 1869 and to the Tennessee line at Gutherie by 1871. It connected to the Edgefield and Kentucky Railroad, which completed the line known as the St. Louis and

Southeastern, between Henderson and Nashville.

In Henderson, a round house, machine shop, carpenter shop, blacksmith shop and paint shop were built to service the railroad. Since there was no railroad bridge across the Ohio River at Henderson, passengers and freight were ferried across the river. Ice in the winter cancelled all river crossings.

The Henderson Bridge Company was incorporated by the Kentucky General Assembly in 1872 to construct a bridge between Evansville and Henderson. No action was taken until the St. Louis and Southeastern became the Henderson Division of the Louisville and Nashville (L&N) Railroad in 1879. The L&N gained control of the Henderson Bridge Company and began construction of an Ohio River Bridge in 1881.

Completed in 1885, the railroad bridge and its approaches had a total length of 27,995 feet and a channel span of 525 feet. At the time of its completion, the L&N Railroad Bridge at Henderson was the largest trestle span in the world.



First L&N Bridge opened in 1885

From: *A Pictorial History of Henderson County, 1775-1950.* Henderson Bicentennial Committee, 1974.

The original railroad bridge was used for 47 years until 1932, when it was replaced by the present-day, double-tracked structure.

Present-Day, Ohio River Bridge between Henderson and Evansville

On the 1901 Sanborn Map, the L&N Railroad was shown at grade in the vicinity of N. Green Street. The 1906 Sanborn Map shows a separation in grade between N. Green Street and the bridge approach. The bridge approach rests upon fill. On the north side (Fourth Street) of the bridge approach is a stone retaining wall which extends from Green Street west toward the river to Main Street and toward the east two blocks. The south side of the bridge approach is an earth embankment.

Looking north along N. Green toward L&N bridge approach

Looking northeast at east abutment in bridge approach N. Green St.

Looking northwest at west abutment in bridge approach N. Green St.

Looking west along stone retaining wall on north side of bridge approach

Looking west along stone retaining wall on north side of bridge approach

<u>**Site/ Evaluation**</u>

GGG/S **440 N. Green St.**
Site GGG is a two-story, three-bay, front-gabled brick commercial building. A modern one-story section has been added to the first floor. Site GGG was shown on the 1885 Sanborn Map. It was labeled as "grocery and feed" on the 1897, 1901, 1906, 1913, 1923, and 1931 editions of the maps.

HHH/S **616 N. Green St.**
Site HHH is a two-story, brick commercial building. It is not shown on the 1923 Sanborn Map.

III/NRP **William McClain House, 804 N. Green St. (HEH-174)**
Site III is a two-story, five-bay, central passage brick dwelling dating to the period from 1850 to 1855. Above the central entry is a wall gable. Built by William McClain, a lawyer, the dwelling was sold to the Home Mission sanitarium in 1879. In 1895, the institution was conveyed to the Elks who sold it to the City of Henderson. On the 1906 Sanborn Map, Site III is labeled as "city hospital" with an annex to the east.

The McClain House has an address on N. Green Street, but is approximately 330 feet to the east. Numerous modern commercial buildings have been built along its S. Green Street frontage and block the view of the house from the street. Because of the extensive development in the vicinity, a potential National Boundary for the William McClain House would be confined to the area immediately adjacent to the house.

<u>Site/ Evaluation</u>

JJJ/NR **John McAllister House, 839 N. Green St. (HEH-175)**

The McAllister House was listed on the National Register in 1982. Site JJJ, built in 1867, is a two-story, three-bay, central passage, brick dwelling with brackets along the eaves of its hipped roof. The McAllister House, which displays elements from the Greek Revival and Italiante styles, meets Criterion C for architecture.

IV. CONCLUSION

Within the proposed planning study area for US 60/ US 41 in Henderson, Kentucky are the following two historic districts and three individual properties which are listed on the National Register:

Henderson Commercial Historic District
- Wolf's Tavern, 31 N. Green St. (Site BBB, HEH-219)

South Main and South Elm Streets Historic District
- Lucy Furman House, 334 Powell St. (Site QQ. HEH-116)
- Craig House, 329 Powell St. (Site RR, HEH-432)

John E. McCallister House, 839 N. Green Street (Site JJJ, HEH-175)
St. Paul's Episcopal Church, 338 Center Street (Site YY, HEH-418)
Stewart House, 827 S. Green Street (Site Z, HEH-224)

After a windshield survey, the following 19 properties appear to have potential to meet National Register criteria:

Site D: Mt. Zion Cemetery (HEH-523)
Site K: 1563 S. Green St. (HEH-513)
Site O: St. Louis Cemetery (HEH-507)
Site P: 1425 S. Green St. (HEH-510)
Site U: Turner House, 1005 S. Green St.
Site W: 1002 S. Green St.
Site AA: 818 S. Elm St.
Site BB: 702 S. Green St.
Site JJ: Service Station, NE corner Martin Luther King/ S. Green St.
Site NN: 222 S. Green St. (HEH-118)
Site PP: 200 S. Green St. (HEH-116)
Site SS: 138 S. Green St.
Site TT: 132 S. Green St. (HEH-115)
Site VV: 119 S. Green St. (HEH-120)
Site WW: 115 S. Green St.
Site ZZ: 36 S. Green St.
Site CCC-2: First United Methodist Church, SW corner of N. Green/ N. Third
Site FFF: L&N Railroad Ohio River Bridge Approach
Site III: William McClain House, 804 N. Green St. (HEH-174)

For the location of these sites with National Register potential, see the oversize project maps (Figure III-1). A final determination of National Register eligibility will require additional research, photography, physical examination of the structures, an evaluation of these sites relative to the integrity standards established by similar properties in Henderson, Kentucky which are currently listed on the National Register, and consultation with the State Historic Preservation Officer (SHPO) at the Kentucky Heritage Council in Frankfort.

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APPENDIX G ENVIRONMENTAL JUSTICE REPORT

Environmental Justice and Community Impact Issues

US 41A, Green Street in Henderson

Six Year Plan Item No. 2-140

Prepared By:

Green River Area Development District
3860 US 60 West
Owensboro, KY 42301

Table of Contents

Environmental Justice and Community Impact Issues
US 41A, Six Year Plan Item No. 2-140, Green Street in Henderson

<u>Identification of Community leaders or other contacts who may be able to represent population groups:</u>

- See *Appendix A*.

<u>Comparison of the Census tracts and block groups encompassing the project area to other nearby Census tracts and block groups, county, state, and United States percentages:</u>

- Notable conclusions of Tracts and Blocks located along US 41A, Green Street in Henderson between the milepoints of 13.325 and 17.390:
  - The defined study area encompasses portions of 10 Block Groups within 8 Census Tracts. The Census Tracts and Block Groups are listed below. (*Appendix B* includes maps). Detailed data of Census Tracts and Block Groups are located in *Appendix C* of this document.

    <u>Henderson County</u>

    Census Tract: 201
    Block Group: 1

    Census Tract: 202
    Block Group: 1

    Census Tract: 203
    Block Group: 1

    Census Tract: 204
    Block Group: 1 & 2

    Census Tract: 205
    Block Group: 2

    Census Tract: 206.01
    Block Group: 2 & 3

    Census Tract: 206.02
    Block Group: 1

    Census Tract: 209
    Block Group: 3

- Population by Race
  - Henderson County's overall population by race percentages are lower than both the United States and Kentucky averages. However, there are 6 Census Tracts and 8 Block Groups within the study area that warrant further discussion.
    - Census Tracts 201, 202, 203, 204 and 206.02 indicate higher percentages of minority populations than the United States, Kentucky, Henderson County and nearby areas. Census Tracts 205 and 206.01 indicate a lower percentage of minority population than the United States but higher than Kentucky, Henderson County and

nearby areas. Upon review and discussion with community leaders, the higher concentration occurs in 8 of 10 Block Groups. These Block Groups are located within the older section of the City of Henderson and encompass several subsidized housing areas. Census Tract 204 and Block Groups 1 and 2 contain the highest concentration of minorities with 20.80% black population in Census Tract 204; 18.83% in Block Group 1 and 23.94% in Block Group 2.

- Population 65 and over
  - Henderson County's population 65 and over is higher than the United States and Kentucky. Seven of 8 Census Tracts have higher percentages that warrant further consideration.
    - Census Tracts 201, 202, 204, 205, 206.01 and Block Group 3 of Census Tract 209 indicate higher percentages of persons 65 and over than the United States, Kentucky and Henderson County. Census Tract 203 has a higher percentage than the United States and Kentucky. These areas are located within the older section of the City of Henderson and encompass several subsidized housing developments and areas. The 201 Census Tract and Block Group 1 has a disproportionately high level of population 65 and over at 20.87%. This area is located in the older more historic area of the City of Henderson. A retirement complex and nursing home is located within Census Tract 206.01 Block Group 2.
- Population by Disability
  - Kentucky and Henderson County's population by persons with a disability (5 years and over) are higher than the United States. All 8 Census Tracts within the study area are higher than the United States percentages. Six Census Tracts contain at least 1 Block Group that is higher than the United States, Kentucky, and Henderson County percentages and warrant further consideration.
    - Census Tracts 201, 202, 203, 204, 205 and Block Group 3 of Census Tract 209 indicate higher percentages of persons with disabilities than the United States, Kentucky and Henderson County. Census Tract 204, Block Group 1 has the highest percentage of persons with a disability at 41.62% which is twice the United States average and almost twice the Kentucky and Henderson County percentages.

- Population by Poverty Level
    - Henderson County's poverty level is lower than both the United States and Kentucky percentages. However, there are 6 Census Tracts and 7 Block Groups within the study area that have higher percentages that warrant further consideration.
        - Census Tracts 201, 202, 203, 204, 205 and 206.02 indicate higher percentages of persons below poverty level than the United States, Kentucky, Henderson County and nearby areas. Upon review and discussion with community leaders, the higher concentration occurs in 7 of 10 Block Groups. These Block Groups are located within the older section of the City of Henderson and encompass several subsidized housing areas and developments. Census Tract 204 contains the highest concentration of persons below poverty level with 29.45% and 37.85% within Block Group 1. These percentages are more than double the United States, Kentucky and Henderson County percentages.

Locations of specific identified populations:

- Staff completed a study of the project area in order to identify any segment of the population that may be affected by the proposed project.
- Few changes have occurred in the affected area since the last census.
- The study area is located within one historical district and adjacent to the central business district.

Concentrations or communities that share a common religious, cultural, ethnic, or other background:

- A minority concentration of 20.80% was identified within the study area of Census Tract 204. A subsequent review of population data within this affected Census Tract should be undertaken to determine if particular populations exist in the study area; and if so, proactive measures should be undertaken to insure that these groups are not disproportionately affected by any projects.

Communities or neighborhoods that exhibit a high degree of community cohesion:

- Based on the minority population percentages and the high percentages of persons 65 and over a high degree of community cohesion may be present. A subsequent review of data within the affected Census Tracts should be undertaken to determine if particular populations exist in the study area; and if so, proactive measures should be undertaken to insure that these groups are not disproportionately affected by any projects.

Concentrations of common employment, religious centers, and/or educational institutions:

- There is one elementary school located along US 41A within the study area.
- The project area runs through the central business district of the City of Henderson, a hub of employment.
- A total of 7 religious centers are located along US 41A within the study area.

Potential effects, both positive and negative, of the project on the affected groups:

1. **Access to services, employment, or transportation.**
   - There may be substantial negative impact anticipated regarding access to services, employment, or transportation in this zone during construction of the project.
2. **Displacement of persons, businesses, farms, or non-profit organizations.**
   - Possible displacement of numerous businesses.
   - Possible displacement of numerous homes within the study area. Several apartment complexes are located along US 41A.
   - A total of 4 community service agencies and/or non-profit organizations are also located along US 41A within the study area and could be potentially affected with this project
3. **Disruption of community cohesion or vitality.**
   - The possibility of the project having a negative impact on community cohesion exists.
4. **Effects to human health and/or safety.**
   - Approximately 22 former gasoline service centers and 2 former industries with potential environmental concerns located along US 41A within the study area. The disruption of property near these former sites could possibly have a negative impact on human health and/or safety. Further study may be necessary to avoid potential environmental hazards.
   - The completion of this project will provide for a safer and more efficient driving experience for one the most highly traveled routes through the City of Henderson.

Possible methods to minimize or avoid impacts on the target populations:

- Actively encourage public involvement and participation in the planning and construction phases to residents, businesses, and concerned citizens of the area.

Appendix A

Appendix A

Community Leaders

Henderson County, 20 N. Main Street, Third Floor, Henderson, KY 42420

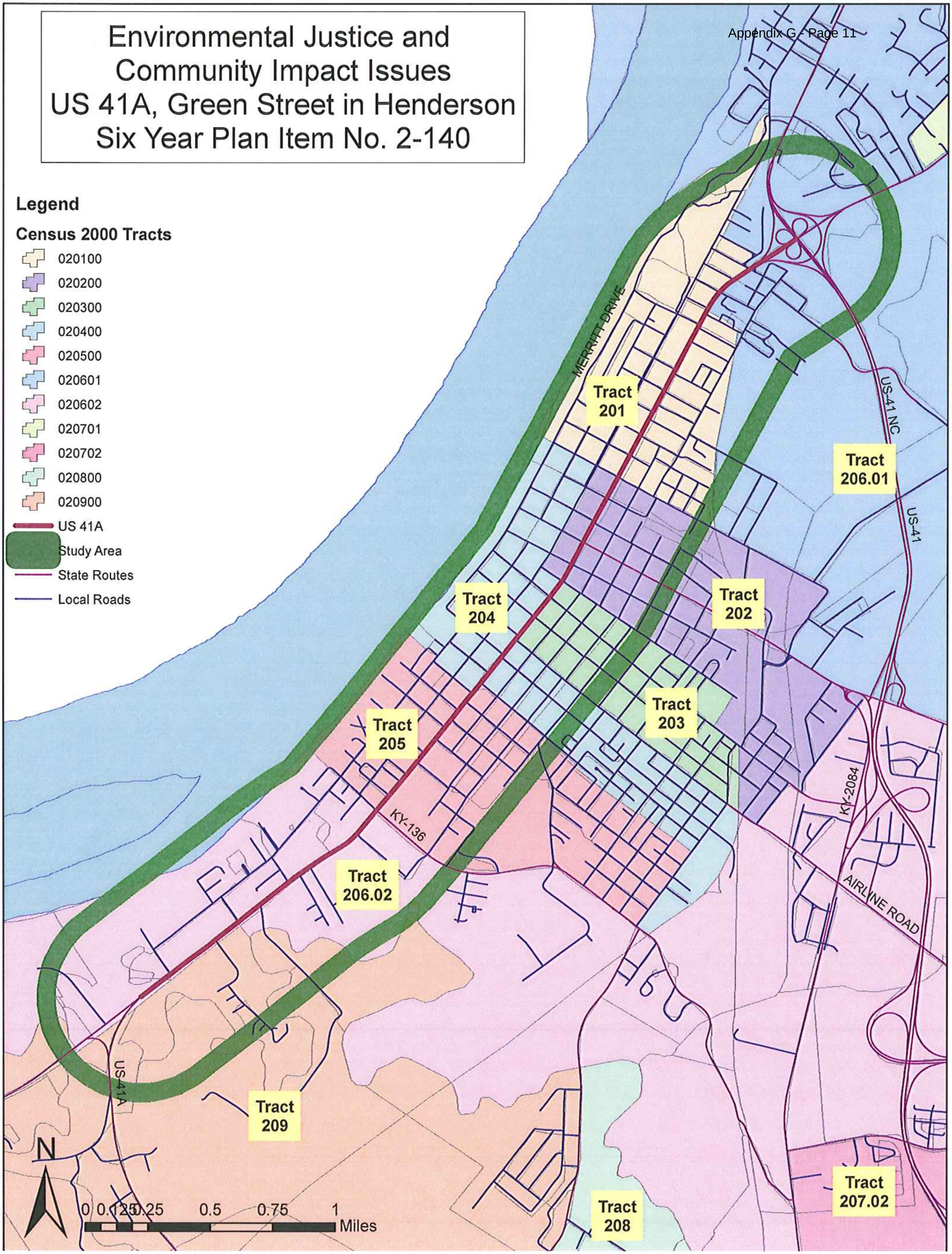
TITLE	NAME	ADDRESS	PHONE # (270)
County Judge/Executive	Sandy Lee Watkins	20 N. Main St, 3rd Floor, Henderson 42420	826-3971
County Magistrates	Ray Lacer Carter Wilkerson Charles Alexander Hugh McCormick Bruce Todd	20 N. Main St, 3rd Floor, Henderson 42420	826-3971
County Attorney	Steven R. Gold	PO Box 1316, Henderson 42419	827-5753
County Clerk	Renny Tapp Matthews	PO Box 374, Henderson 42419	826-3906
Sheriff	Ed Brady	20 N. Main St, 1st Floor, Henderson 42420	826-2713
Jailer	Ron Herrington	380 Borax Dr, Henderson 42420	827-5560
Coroner	Bruce Farmer	PO Box 1011, Henderson 42419	826-0260
Treasurer	Rebecca Carroll	20 N. Main St, 2nd Floor, Henderson 42420	826-3233
Finance Officer	Brenda Rider	20 N. Main St, 2nd Floor, Henderson 42420	826-3233
PVA	Howard Moran	20 N. Main St, Henderson 42420	827-6024
Econ. Dev. Director	Kevin Sheilley	PO Box 674, Henderson 42419	826-7505
Road Eng./Supervisor	Bill Hubiak	5682 Airline Road, Henderson 42420	826-8843
Supt. of Schools	Thomas Richey	1805 2nd St, Henderson 42420	831-5000
Planning/Zoning Dir.	Peggy Wood	1990 Barrett Ct, Suite C, Henderson 42420	831-1200
Emergency Mgmt.	Larry Koerber	PO Box 983, Henderson 42419	831-1235
Health Dept	Ruth Stocking	PO Box 13, Henderson 42420	826-3951
Housing Inspector	Brian Bishop	5682 Airline Rd, Henderson 42420	826-8843
Public Works Director	N/A		
Solid Waste Director	Pauline Allen	5684 Airline Rd, Henderson 42420	830-7544
Parks Director	N/A		
Circuit Judges	Karen Wilson	20 N. Main St, Henderson 42420	827-1295
Circuit Clerk	Ruth London	20 N. Main St, Henderson 42420	826-2405
Commonwealth Atty.	William Markwell	446 N. Main St, Henderson 42420	826-3936
State Senator	Dorsey Ridley (4th)	Independence Bank 235 N Elm St, Henderson 42420	830-0122
State Representatives	Dr. David Watkins (11th) John Arnold, Jr. (7th)	PO Box 19, Henderson, 42419 PO Box 124, Sturgis, 42459	827-9824 333-4641
Chamber of Commerce	Joan Hoffman (Interim)	201 N. Main St, Henderson 42420	826-9531
Sr. Citizens Center	Steve Rust	1817 N. Elm St, Henderson 42420	827-2948
Newspaper	The Gleaner	PO Box 4, Henderson 42419	827-2000
Radio Station	WSON 860 AM	PO Box 418, Henderson 42420	826-3923
Public Library	Don Wathen	101 S. Main St, Henderson 42420	826-3712

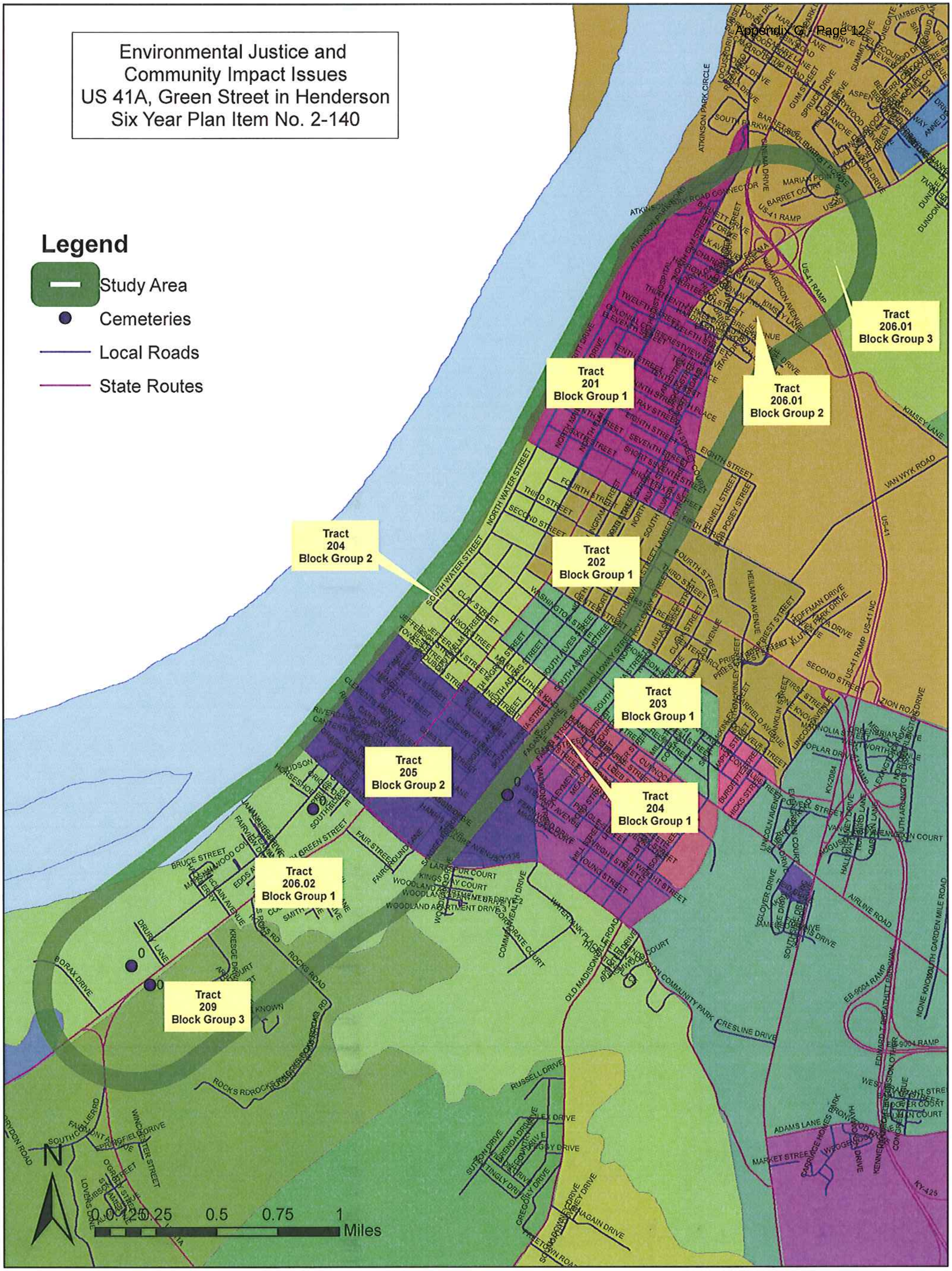
Appendix A

City of Henderson, PO Box 716, Henderson, KY 42419

TITLE	NAME	ADDRESS	PHONE #
Mayor	Tom Davis	PO Box 716, Henderson 42419	831-1200
City Council Members	Mike Farmer Robby Mills Jim White Paul Kuerzi	PO Box 716, Henderson 42419	831-1200
City Clerk/Treasurer	Carolyn Williams	PO Box 716, Henderson 42419	831-1200
City Administrator	Russell Sights	PO Box 716, Henderson 42419	831-1200
City Attorney	Joseph E Ternes, Jr.	PO Box 716, Henderson 42419	831-1200
Police Chief	John Reed	PO Box 716, Henderson 42419	831-1200
Fire Chief	Terry Lewis	PO Box 716, Henderson 42419	831-1200
Chamber of Commerce	Joan Hoffman (Interim)	201 N. Main St, Henderson 42420	826-9531
Planning/Zoning Dir.	Peggy Wood	1990 Barrett Ct, Suite C, Henderson 42420	831-1200
Street Dept. Supervisor	X. R. Royster	PO Box 716, Henderson 42419	831-1200
City Engineer	Doug Boom	PO Box 716, Henderson 42419	831-1200
Downtown Henderson Project	Julie Turnipseed	131 N. Main St, Henderson 42420	827-0016
Parks Director	Emily Gilliam	PO Box 716, Henderson 42419	831-1200
Tourism Director	Marcia Eblen	101 N. Water St, Henderson 42420	826-3128
Newspaper	The Gleaner	PO Box 4, Henderson 42419	827-2000
Radio Station	WSON 860 AM	PO Box 418, Henderson 42420	826-3923

Appendix B


Environmental Justice and
Community Impact Issues
US 41A, Green Street in Henderson
Six Year Plan Item No. 2-140
Legend
Census 2000 Tracts
020100
020200
020300
020400
020500
020601
020602
020701
020702
020800
020900
US 41A
Study Area
State Routes
Local Roads
MERRITT DRIVE
Tract 201
Tract 202
Tract 203
Tract 204
Tract 205
Tract 206.01
Tract 206.02
Tract 207.02
Tract 208
Tract 209
US-41 NC
US-41
KY-136
KY-2084
AIRLINE ROAD
US-41A
N
0 0.125 0.25 0.5 0.75 1
Miles


Environmental Justice and
Community Impact Issues
US 41A, Green Street in Henderson
Six Year Plan Item No. 2-140
Legend
Study Area
Cemeteries
Local Roads
State Routes
Tract 201 Block Group 1
Tract 206.01 Block Group 3
Tract 206.01 Block Group 2
Tract 204 Block Group 2
Tract 202 Block Group 1
Tract 203 Block Group 1
Tract 205 Block Group 2
Tract 204 Block Group 1
Tract 206.02 Block Group 1
Tract 209 Block Group 3
N
0 0.125 0.25 0.5 0.75 1
Miles

U.S. Census Bureau
American FactFinder

TM-P001B. Persons Who are Black or African American Alone: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
United States by State

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Legend

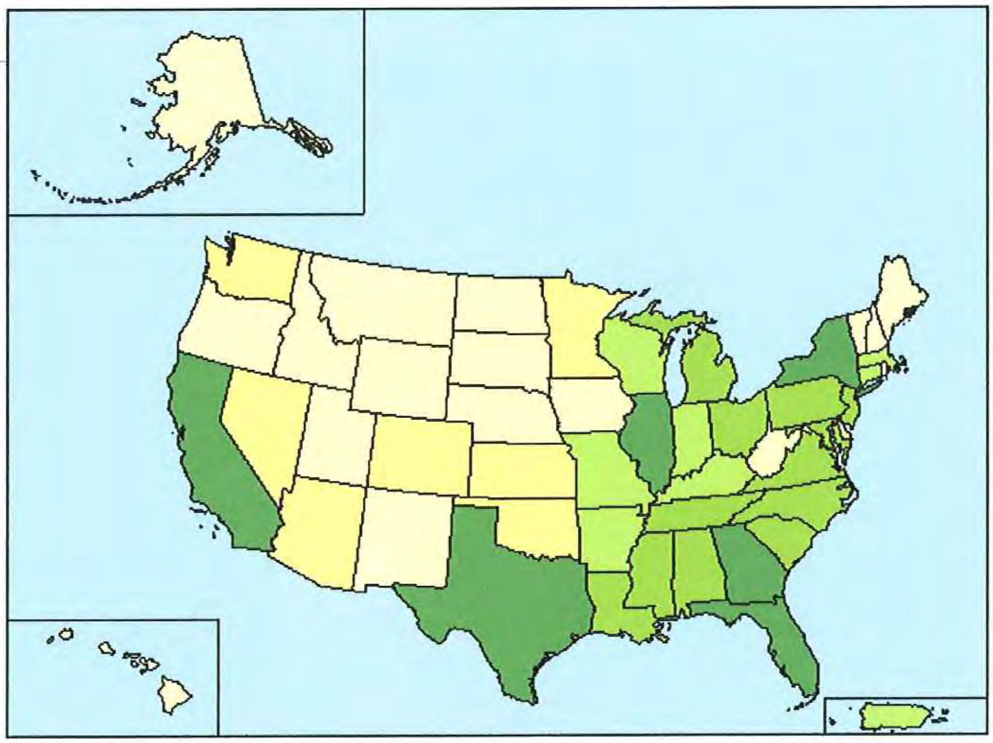
Data Classes

Persons
- 2692 - 68541
- 135477 - 260968
- 295994 - 629391
- 932809 - 1737545
- 1876875 - 3014385

Features

Major Road
Street
Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P7.

TM-P001B. Persons Who are Black or African American Alone: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Kentucky by County

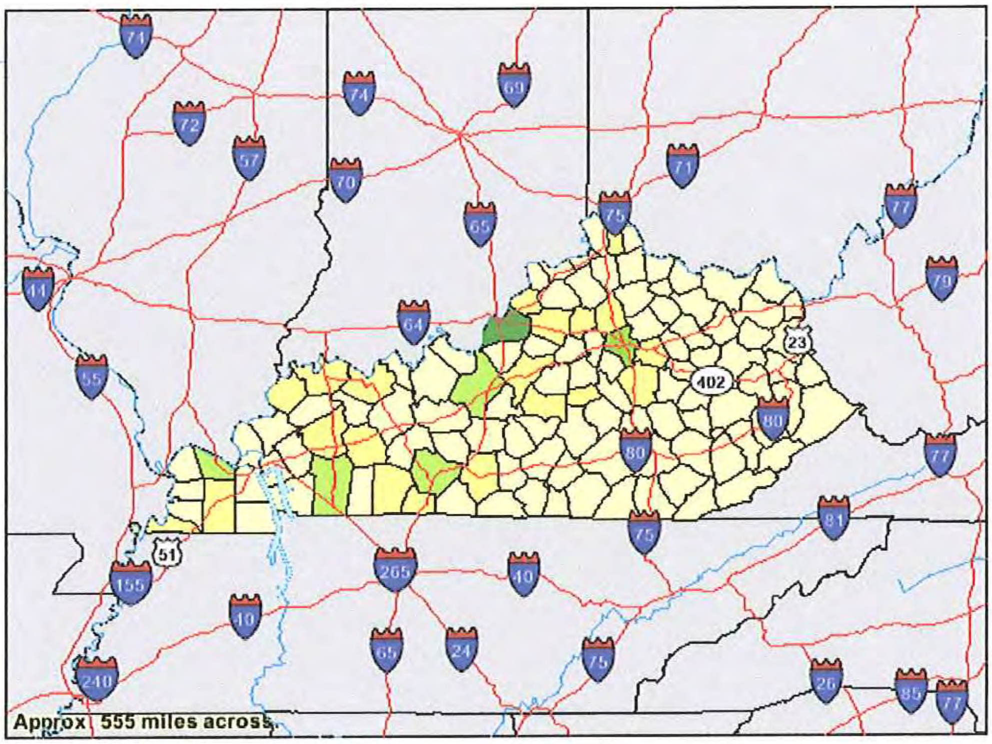
NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Legend

Data Classes
Persons
1 - 1394
1480 - 5810
7128 - 17148
35116 - 35116
130928 - 130928

Features
Major Road
Street
Stream/Waterbody
Stream/Waterbody

Items in gray text
are not visible
at this zoom level

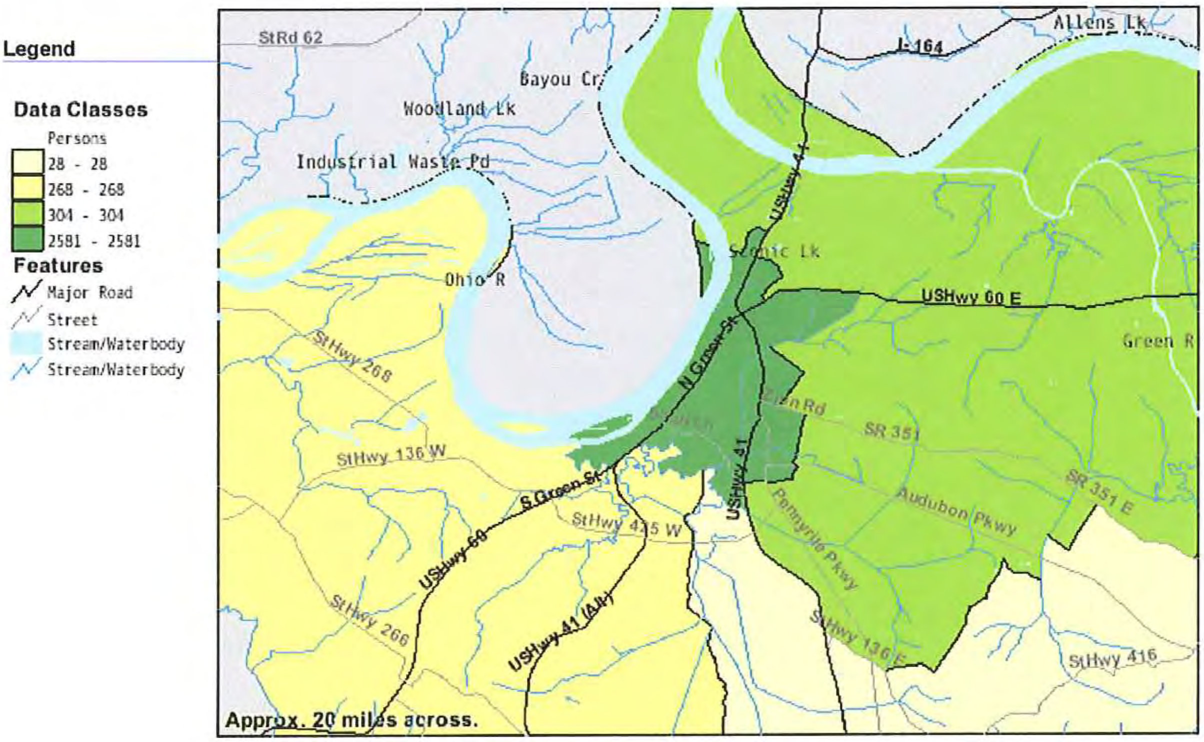


Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P7.

U.S. Census Bureau
American FactFinder

TM-P001B. Persons Who are Black or African American Alone: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by County Subdivision

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P7.

U.S. Census Bureau
American FactFinder

TM-P001B. Persons Who are Black or African American Alone: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by Census Tract

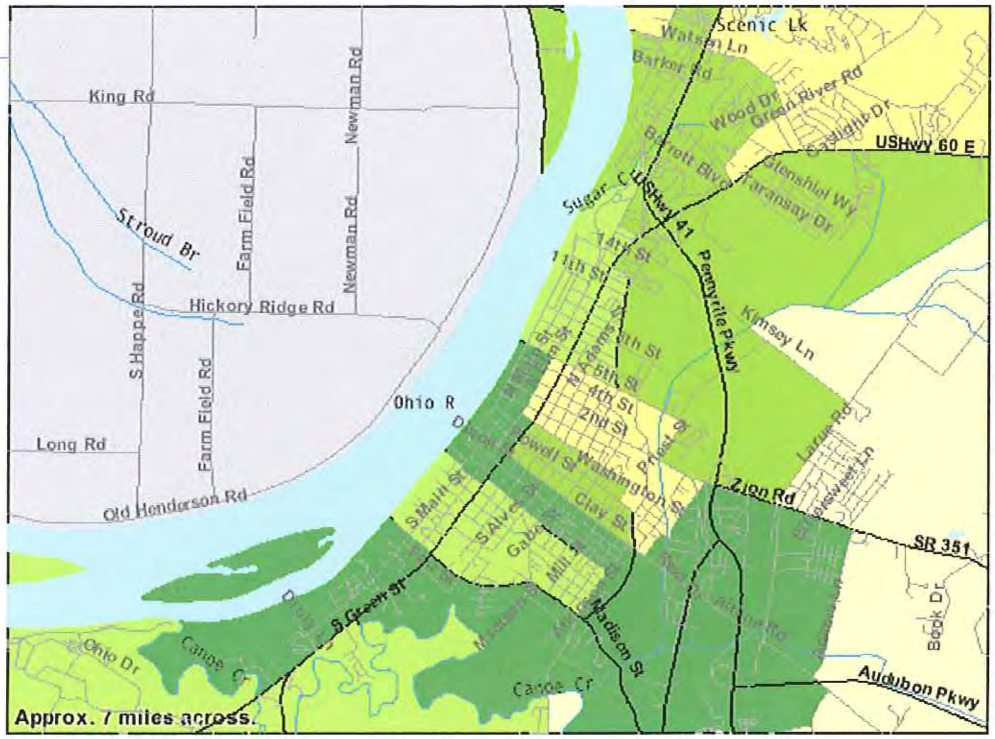
NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Legend

Data Classes

Persons
- 28 - 99
- 186 - 205
- 268 - 308
- 345 - 405
- 520 - 531

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P7.

U.S. Census Bureau
American FactFinder

TM-P001H. Persons Who are Hispanic or Latino (of any race): 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
United States by State

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Legend

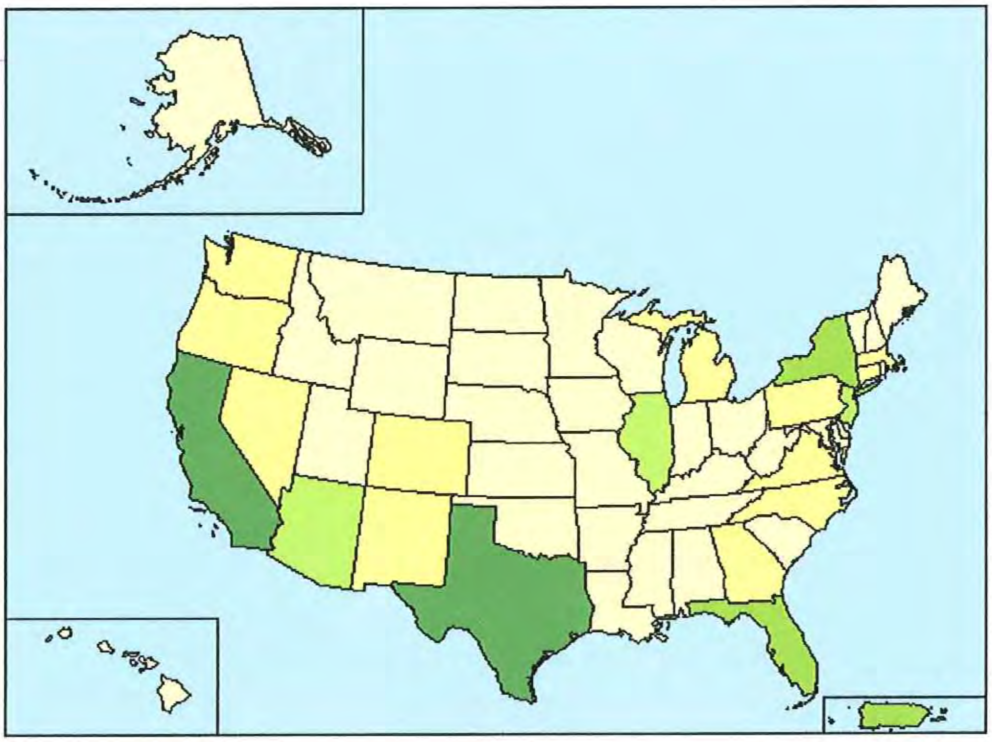
Data Classes

Persons
- 5504 - 227916
- 275314 - 765386
- 1117191 - 1530262
- 2682715 - 3762746
- 6669666 - 10966556

Features

Major Road
Street
Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P8.

U.S. Census Bureau
American FactFinder

TM-P001H. Persons Who are Hispanic or Latino (of any race): 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Kentucky by County

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

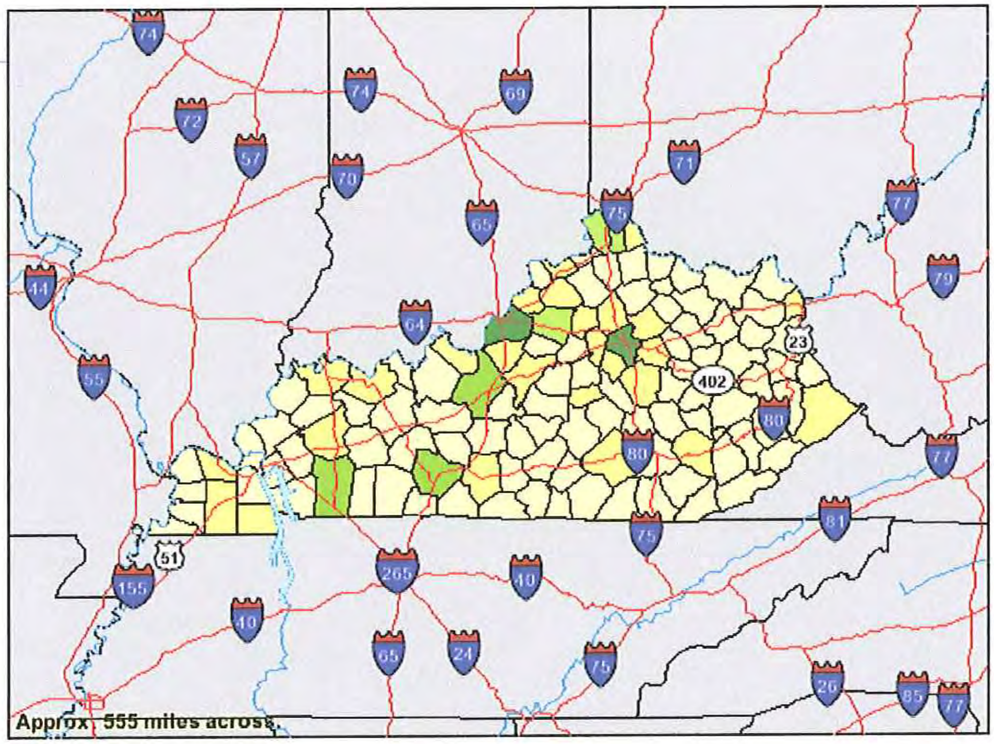
Legend

Data Classes

Persons
- 21 - 291
- 330 - 888
- 1505 - 1702
- 2466 - 3494
- 8561 - 12370

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Items in gray text are not visible at this zoom level



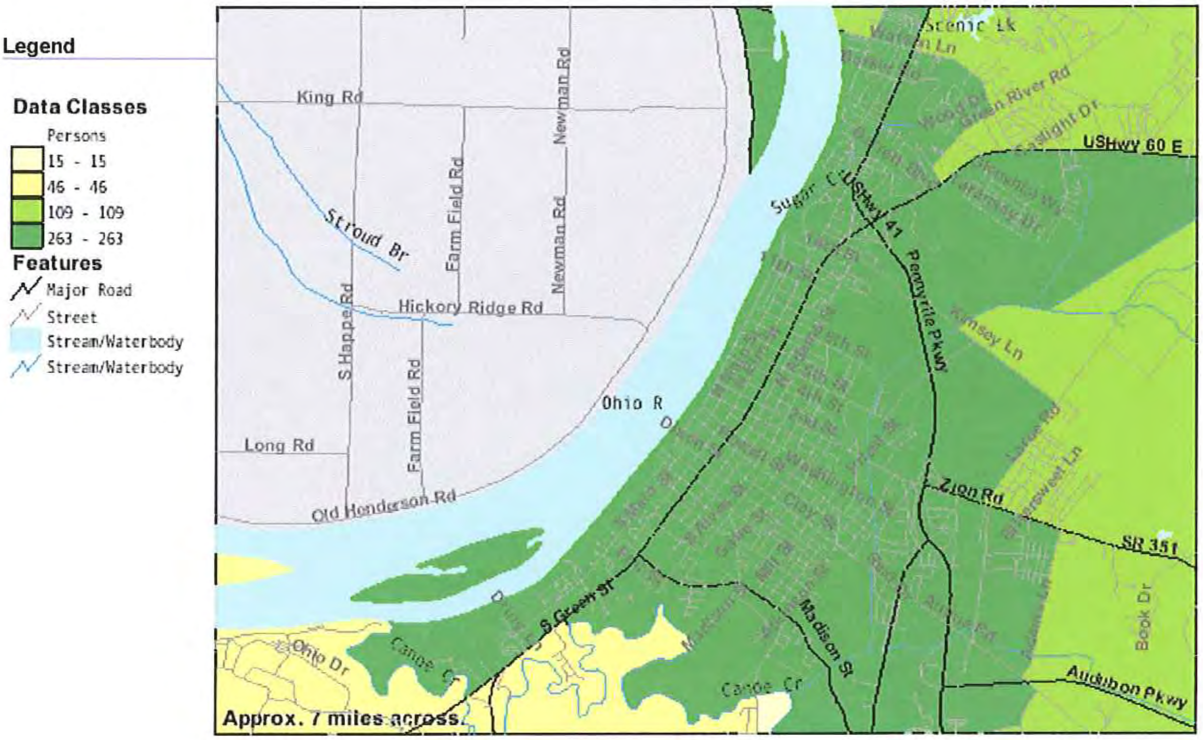
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P8.

U.S. Census Bureau

American FactFinder

TM-P001H. Persons Who are Hispanic or Latino (of any race): 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by County Subdivision

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm



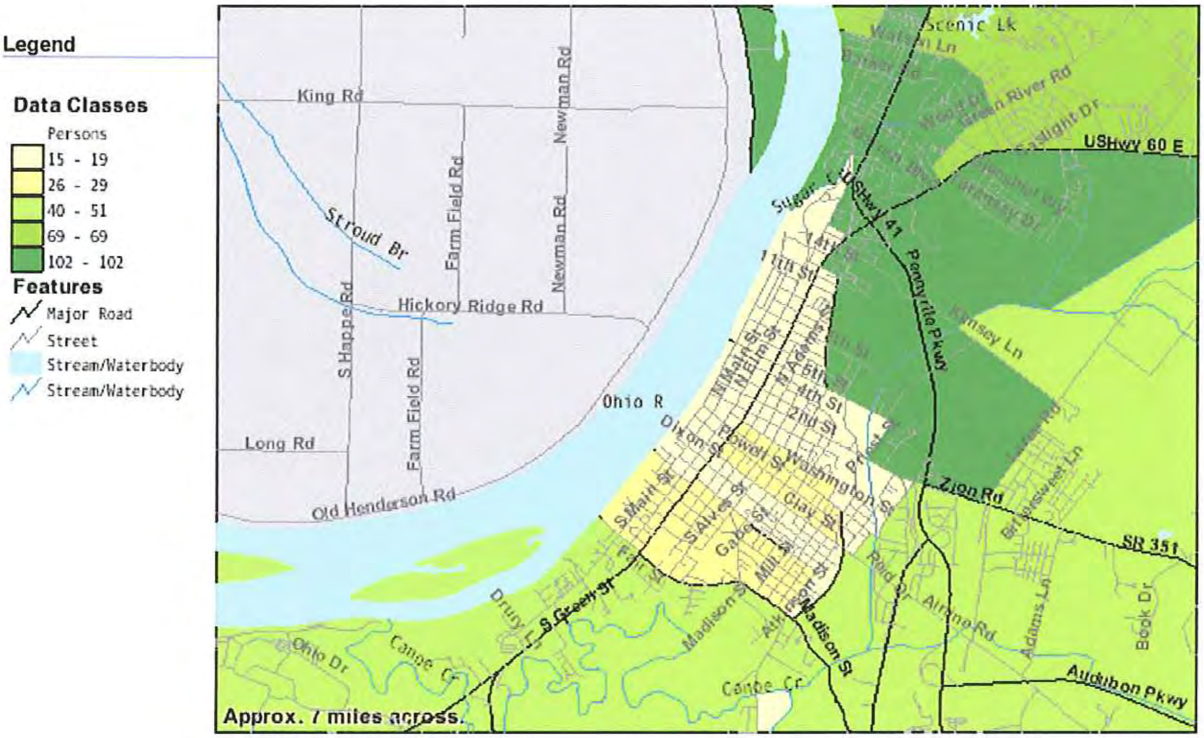
Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P8.

U.S. Census Bureau

American FactFinder

TM-P001H. Persons Who are Hispanic or Latino (of any race): 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by Census Tract

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrix P8.

U.S. Census Bureau
American FactFinder

TM-P020. Percent of Persons 65 Years and Over: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
United States by State

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm

Legend

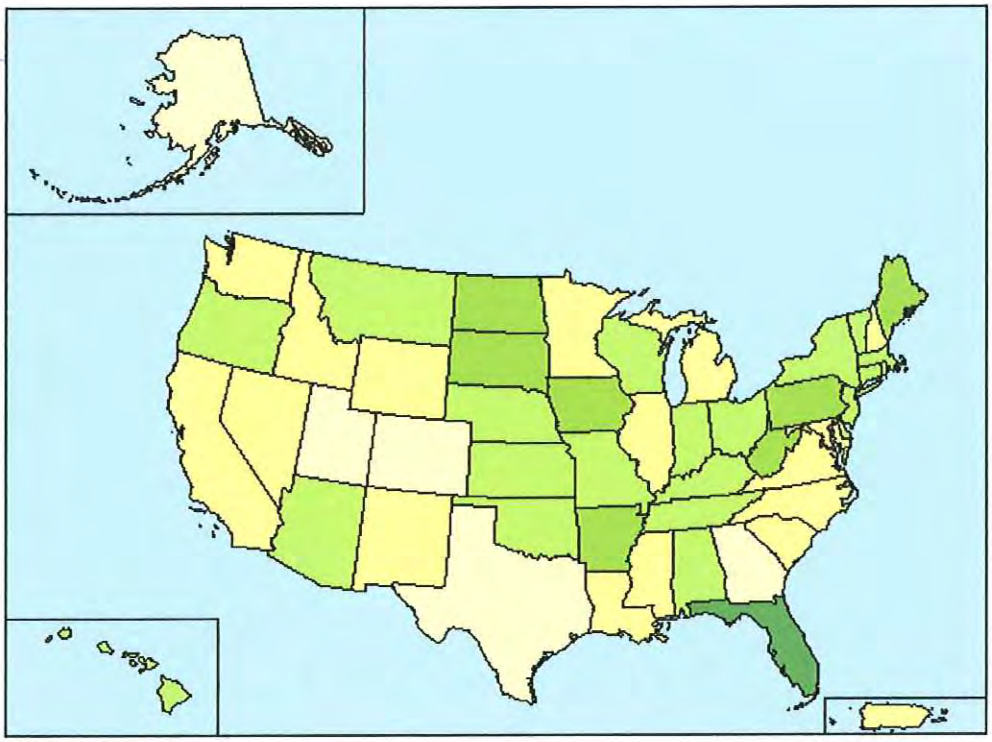
Data Classes

Percent
- 5.7 - 9.9
- 10.6 - 12.3
- 12.4 - 13.8
- 14.0 - 15.6
- 17.6 - 17.6

Features

Major Road
Street
Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, and P30.

U.S. Census Bureau
American FactFinder

TM-P020. Percent of Persons 65 Years and Over: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Kentucky by County

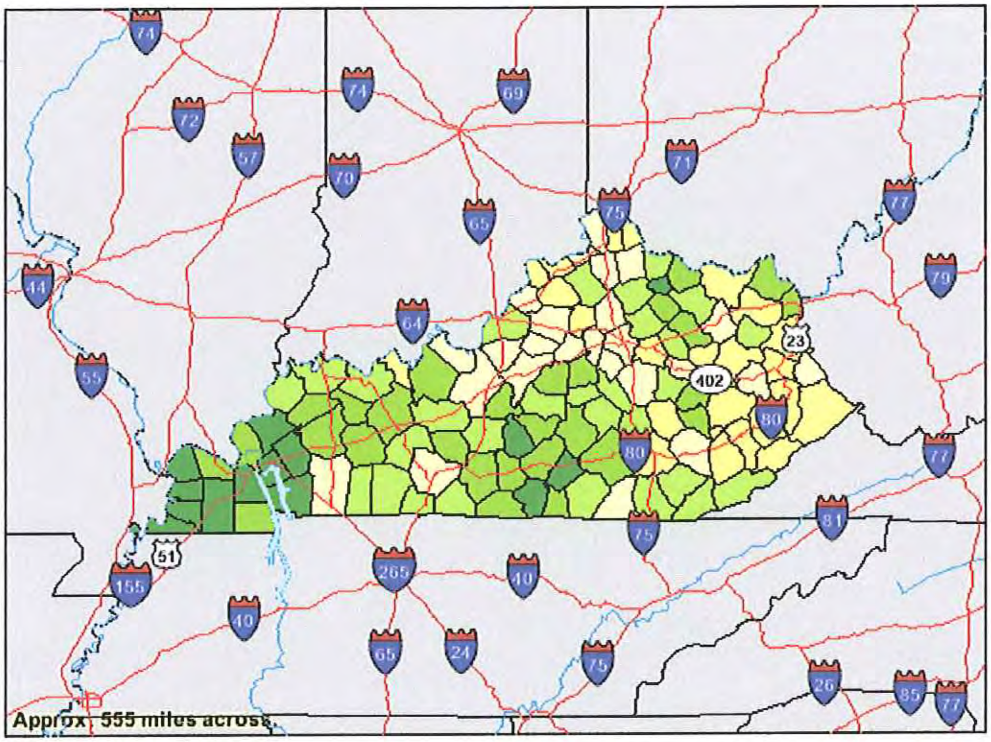
NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

Legend

Data Classes
Percent
7.0 - 10.8
11.0 - 12.6
12.7 - 14.1
14.2 - 15.9
16.1 - 18.5

Features
Major Road
Street
Stream/Waterbody
Stream/Waterbody

Items in gray text are not visible at this zoom level

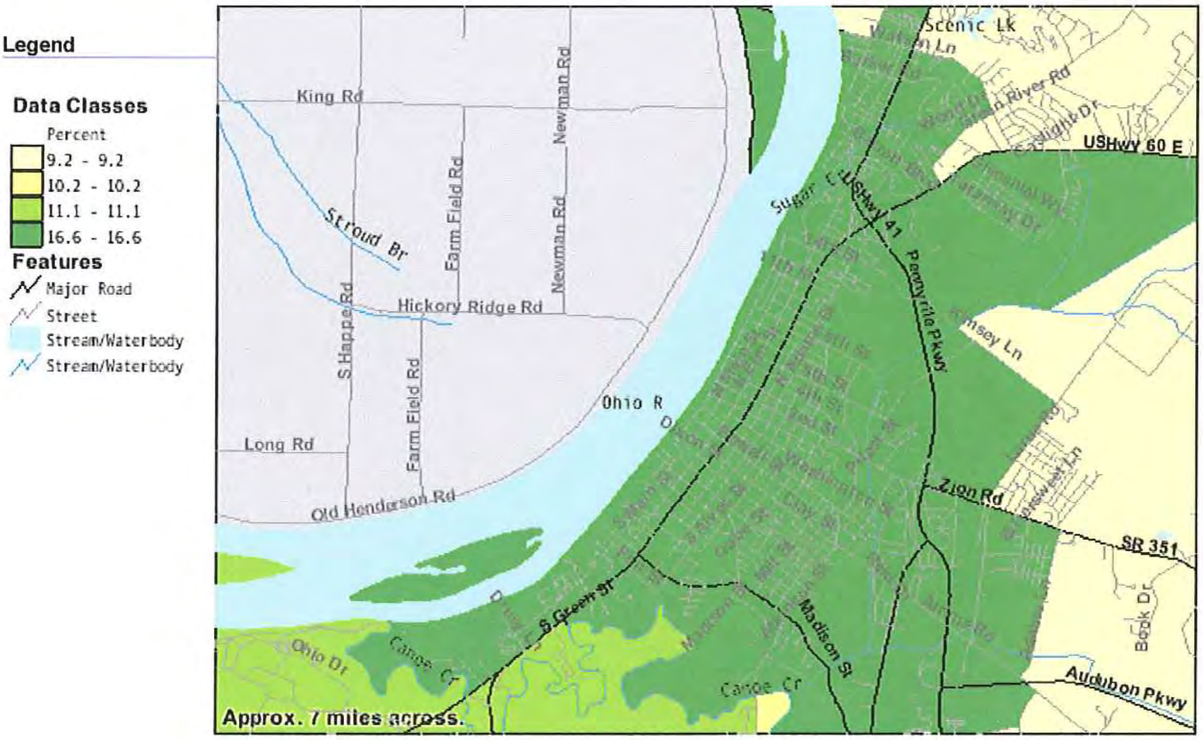


Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, and P30.

U.S. Census Bureau
American FactFinder

TM-P020. Percent of Persons 65 Years and Over: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by County Subdivision

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.

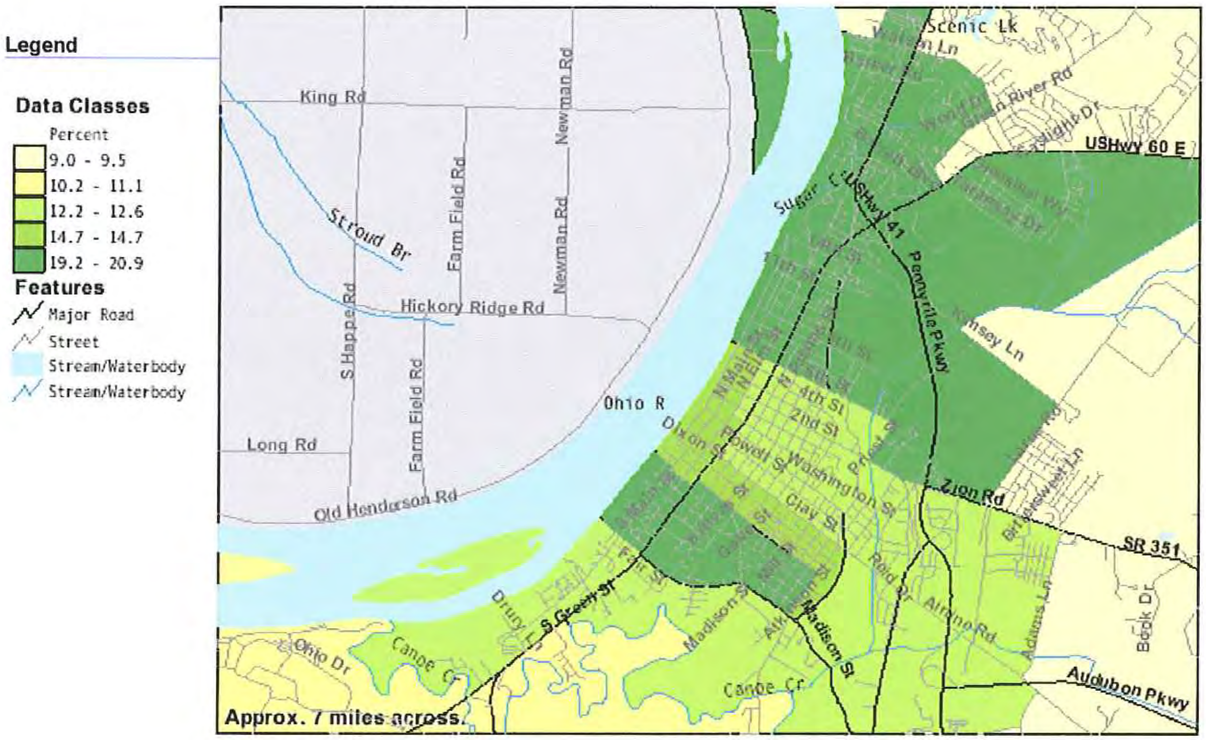


Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, and P30.

U.S. Census Bureau
American FactFinder

TM-P020. Percent of Persons 65 Years and Over: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 1 (SF 1) 100-Percent Data**
Henderson County, Kentucky by Census Tract

NOTE: For information on confidentiality protection, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf1u.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 1, Matrices P1, and P30.

U.S. Census Bureau
American FactFinder

TM-P045. Percent of Persons 5 to 20 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 5 to 20 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
United States by State

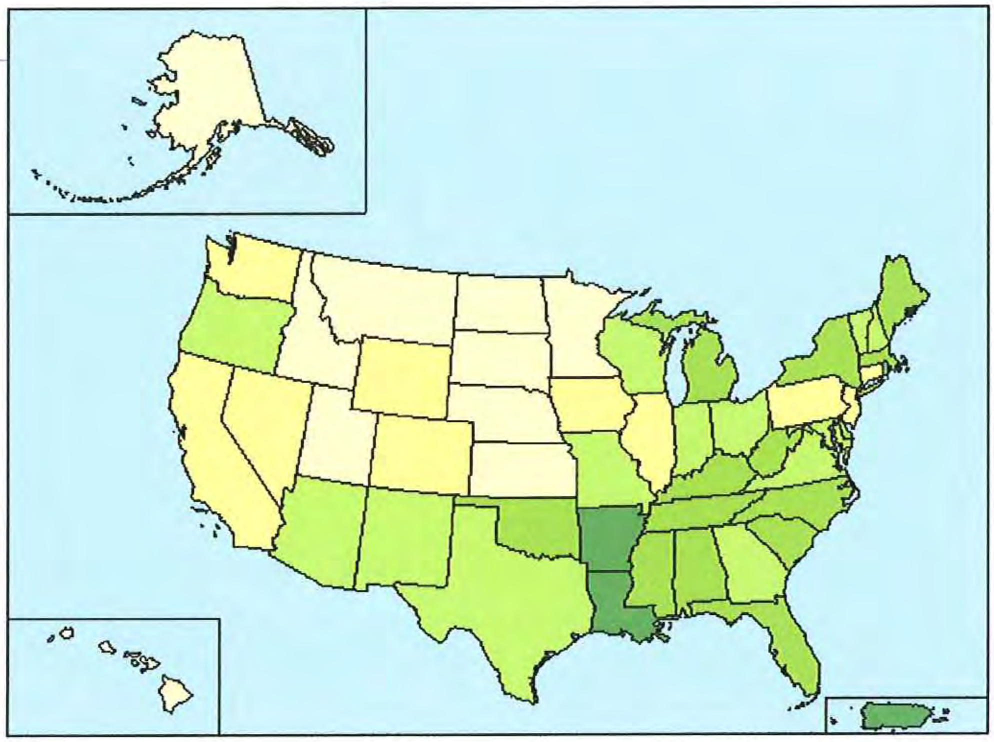
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes
Percent
6.6 - 7.2
7.3 - 7.7
7.9 - 8.4
8.5 - 9.1
9.3 - 10.2

Features
Major Road
Street
Stream/Waterbody

Items in gray text are not visible at this zoom level



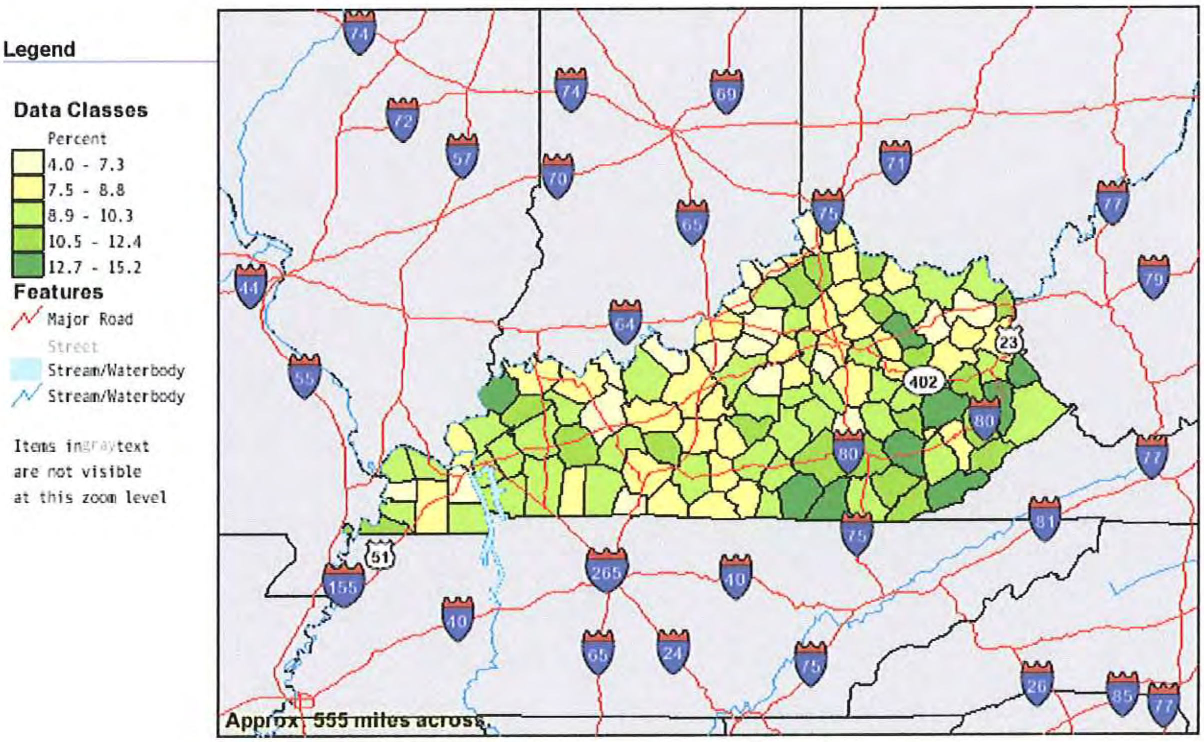
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P045. Percent of Persons 5 to 20 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 5 to 20 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Kentucky by County

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P045. Percent of Persons 5 to 20 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 5 to 20 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson County, Kentucky by County Subdivision

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm

Legend

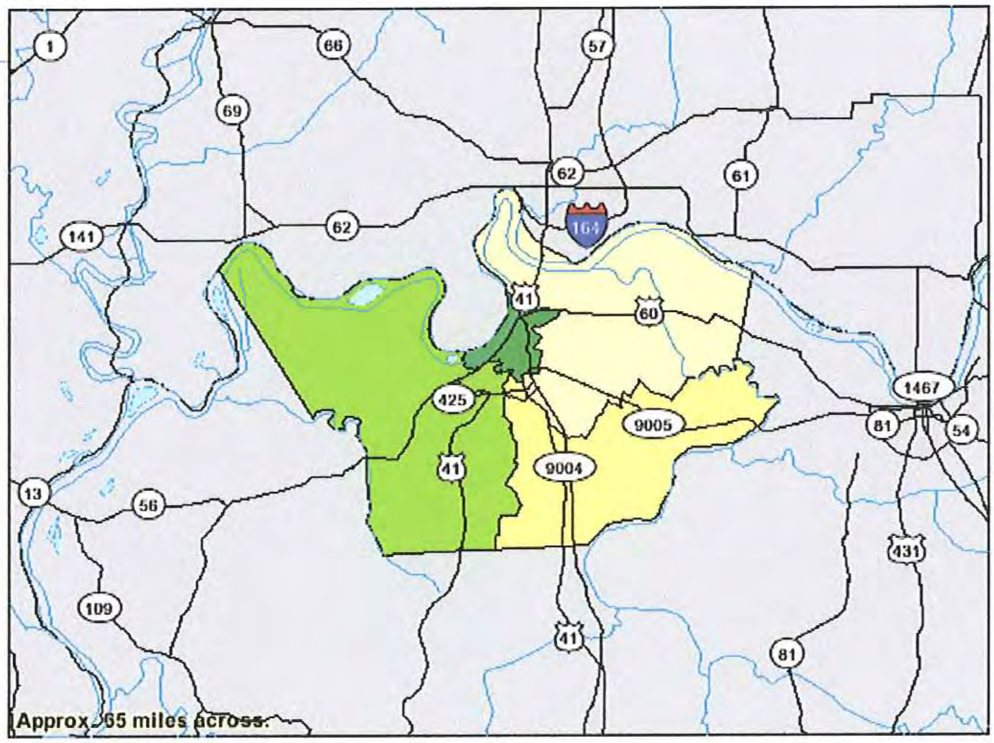
Data Classes

Percent
5.8 - 5.8
6.1 - 6.1
6.8 - 6.8
10.8 - 10.8

Features

Major Road
Street
Stream/Waterbody
Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P045. Percent of Persons 5 to 20 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 5 to 20 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Census Tract

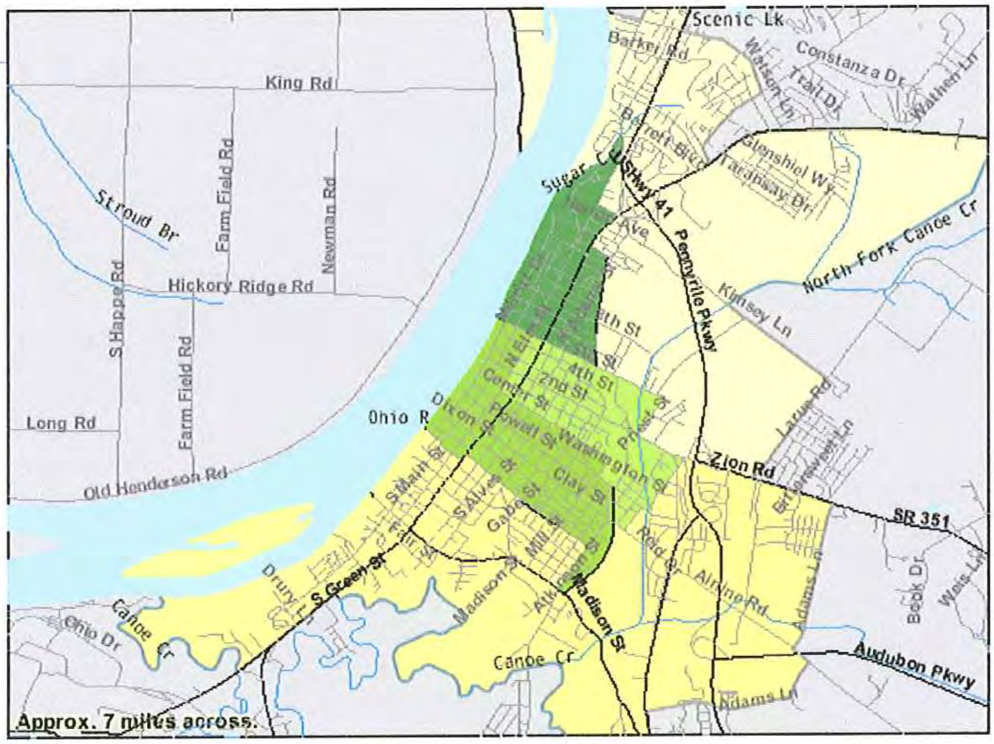
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes

Percent
- 2.8 - 2.8
- 7.0 - 8.6
- 12.7 - 12.7
- 19.4 - 20.1
- 21.4 - 21.4

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P045. Percent of Persons 5 to 20 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 5 to 20 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Block Group

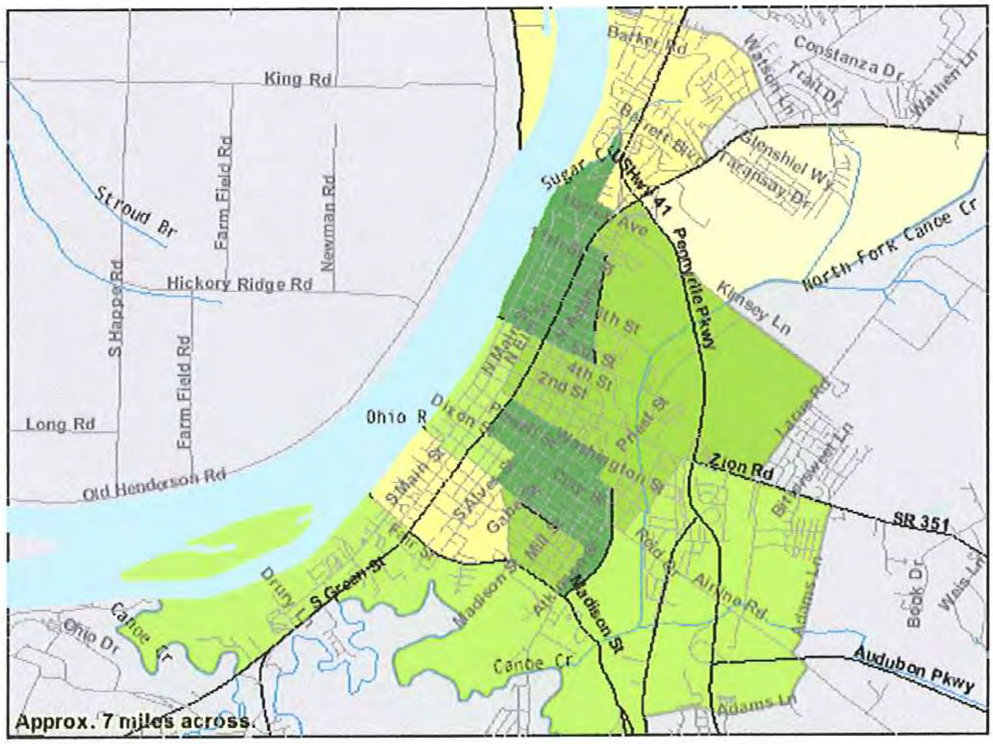
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes

Percent
- 0.0 - 0.0
- 2.4 - 3.6
- 6.9 - 9.5
- 11.3 - 12.9
- 20.1 - 24.6

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

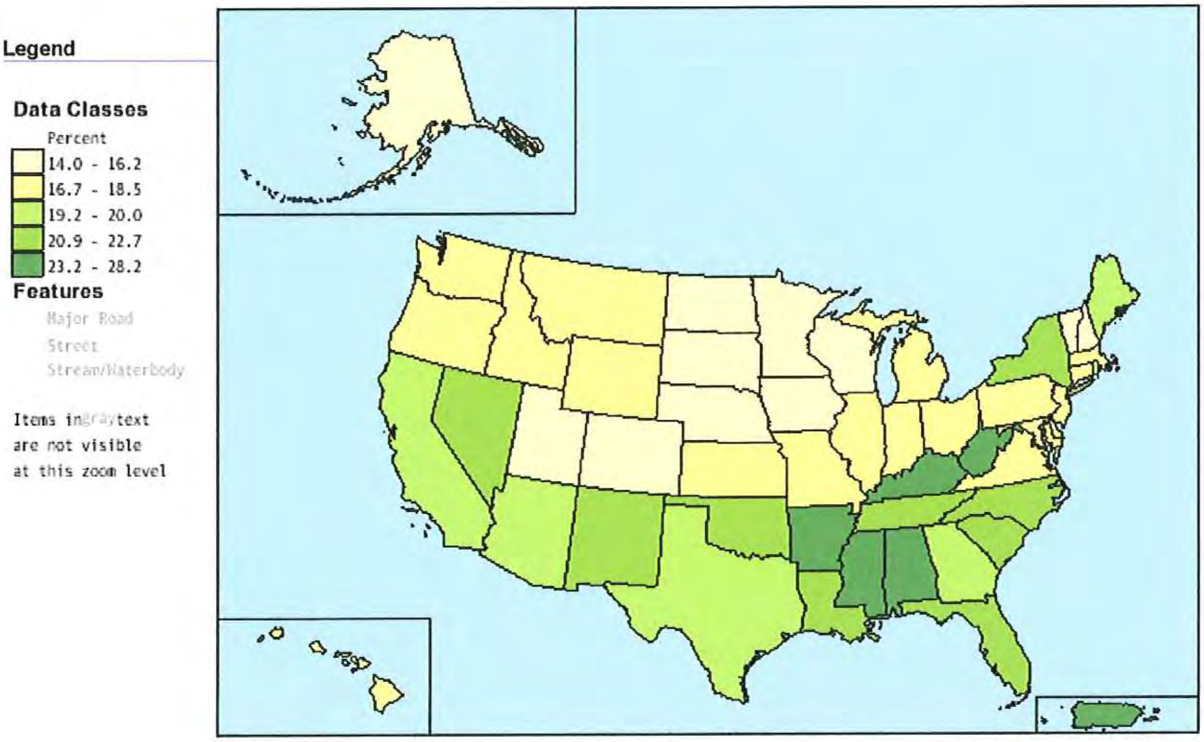


Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P046. Percent of Persons 21 to 64 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 21 to 64 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
United States by State

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P046. Percent of Persons 21 to 64 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 21 to 64 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Kentucky by County

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

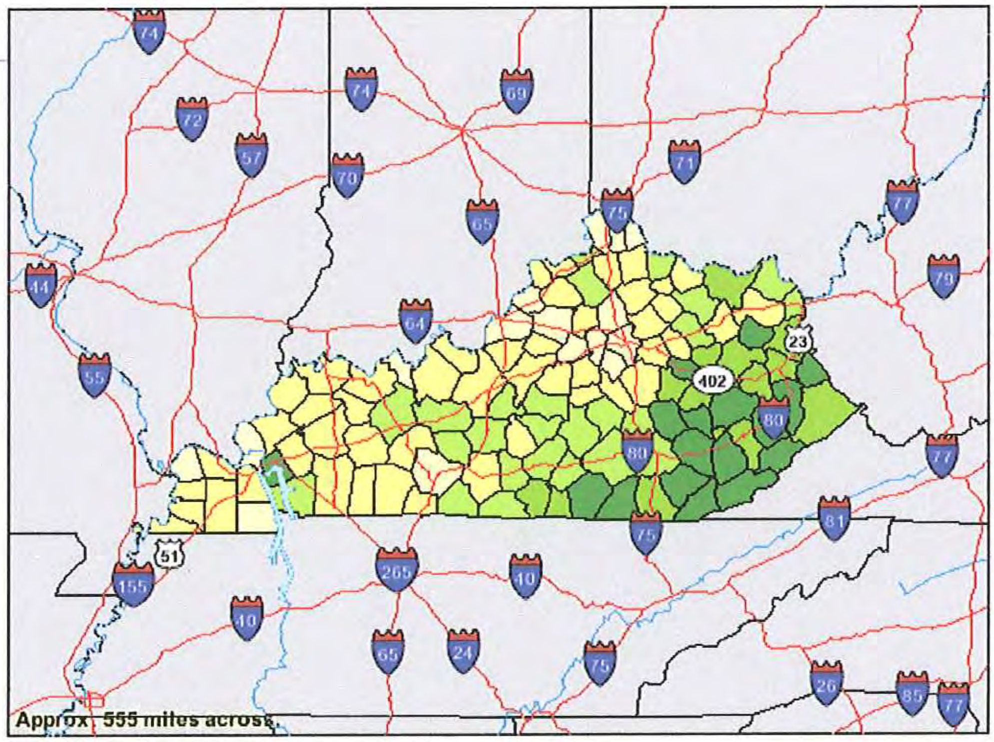
Legend

Data Classes

Percent
- 13.1 - 20.5
- 21.3 - 26.0
- 26.3 - 31.1
- 32.2 - 36.1
- 36.9 - 42.8

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P046. Percent of Persons 21 to 64 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 21 to 64 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson County, Kentucky by County Subdivision

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

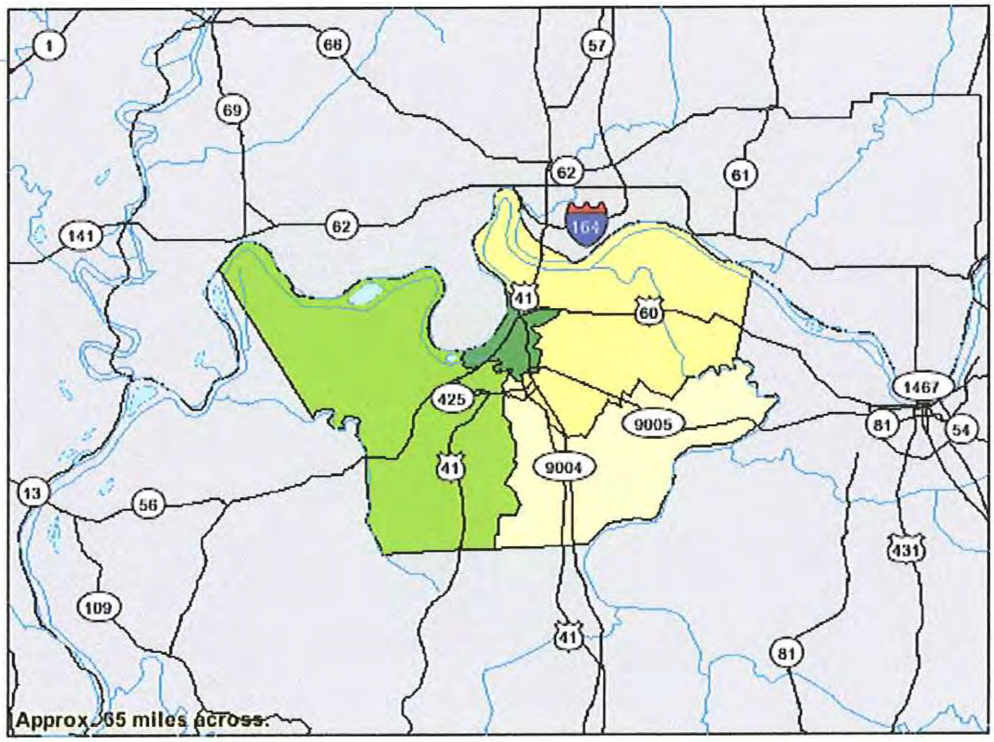
Legend

Data Classes

Percent
12.6 - 12.6
16.8 - 16.8
26.0 - 26.0
26.7 - 26.7

Features
Major Road
Street
Stream/Waterbody
Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P046. Percent of Persons 21 to 64 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 21 to 64 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Census Tract

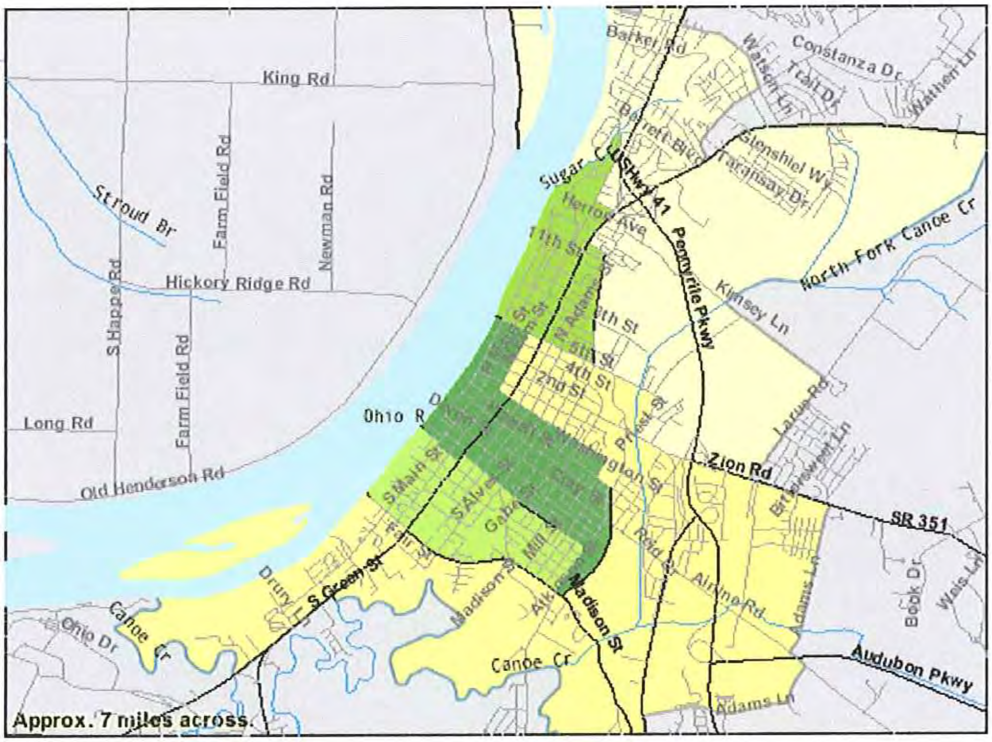
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes

Percent
- 16.5 - 16.5
- 26.2 - 27.5
- 29.3 - 29.3
- 30.6 - 30.6
- 36.9 - 38.9

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

TM-P046. Percent of Persons 21 to 64 Years With a Disability: 2000
Universe: **Civilian noninstitutionalized population 21 to 64 years**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Block Group

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

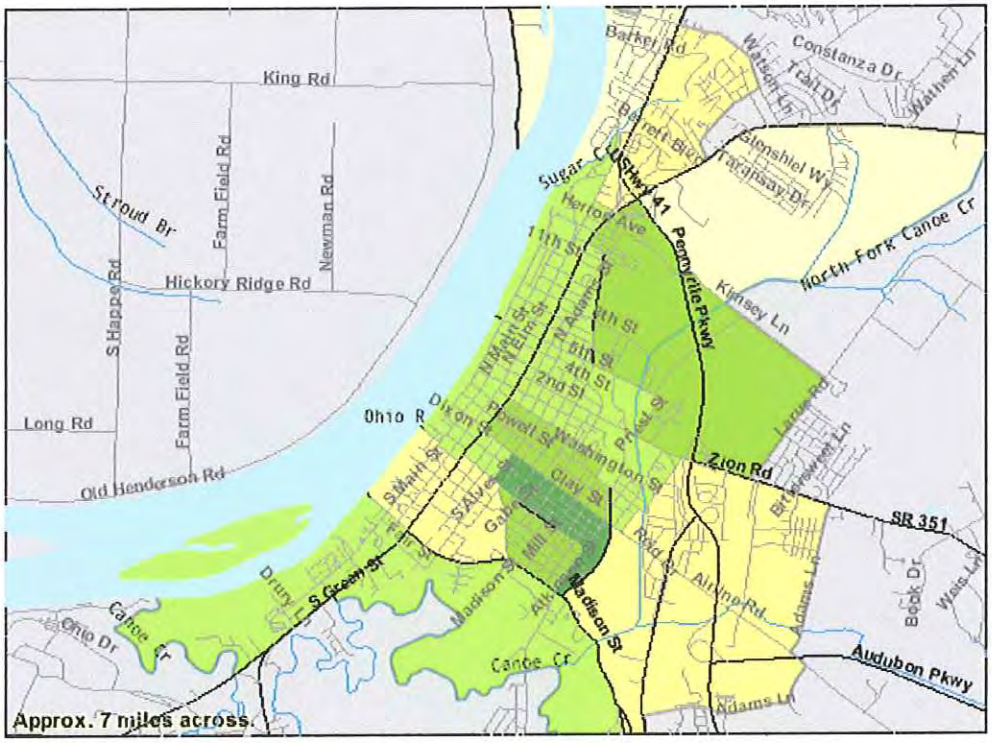
Data Classes

Percent

- 10.4 - 13.0
- 19.0 - 25.2
- 27.5 - 30.6
- 34.8 - 36.9
- 45.9 - 45.9

Features

- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody



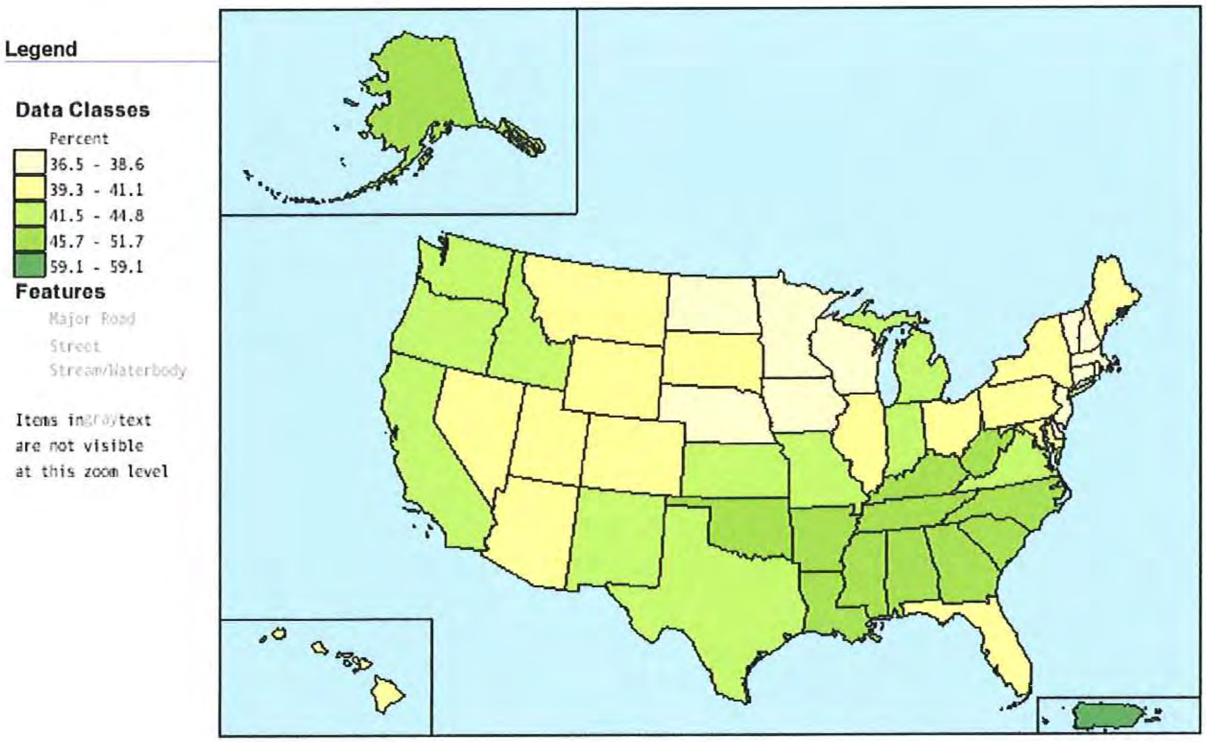
Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P047. Percent of Persons 65 Years and Over With a Disability: 2000
Universe: **Civilian noninstitutionalized population 65 years and over**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
United States by State

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P047. Percent of Persons 65 Years and Over With a Disability: 2000
Universe: **Civilian noninstitutionalized population 65 years and over**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Kentucky by County

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

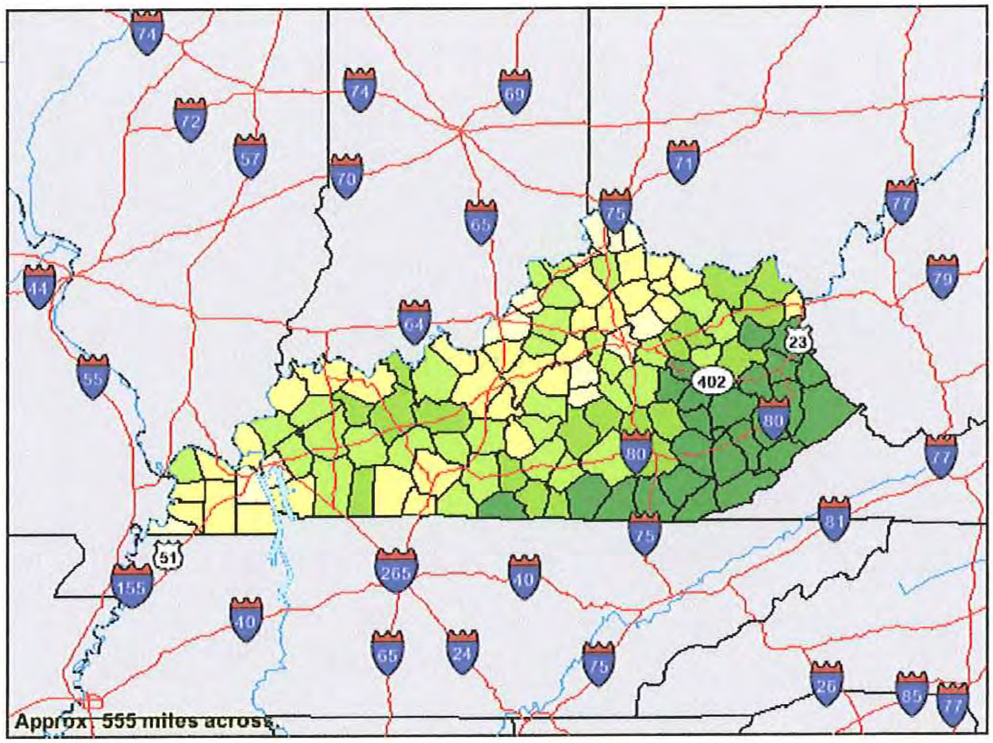
Legend

Data Classes

Percent
- 39.1 - 44.6
- 45.1 - 49.2
- 49.7 - 53.8
- 54.4 - 59.9
- 60.7 - 70.5

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Items in gray text are not visible at this zoom level



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau

American FactFinder

TM-P047. Percent of Persons 65 Years and Over With a Disability: 2000
Universe: **Civilian noninstitutionalized population 65 years and over**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson County, Kentucky by County Subdivision

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

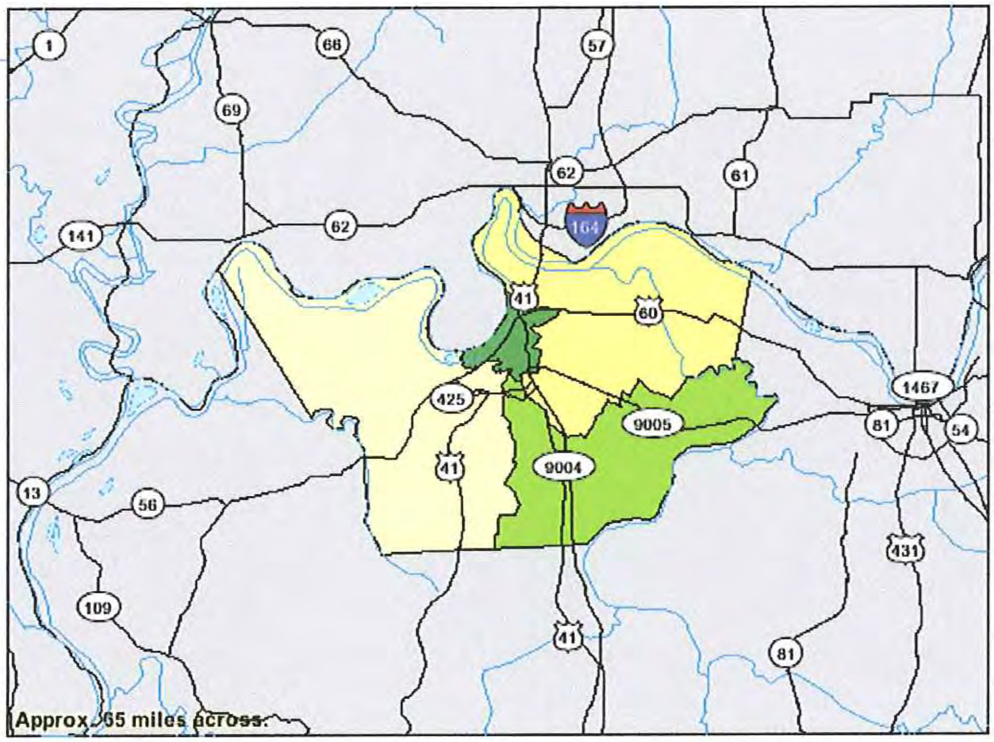
Legend

Data Classes

Percent
- 37.8 - 37.8
- 39.7 - 39.7
- 48.3 - 48.3
- 54.5 - 54.5

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

Items in gray text are not visible at this zoom level

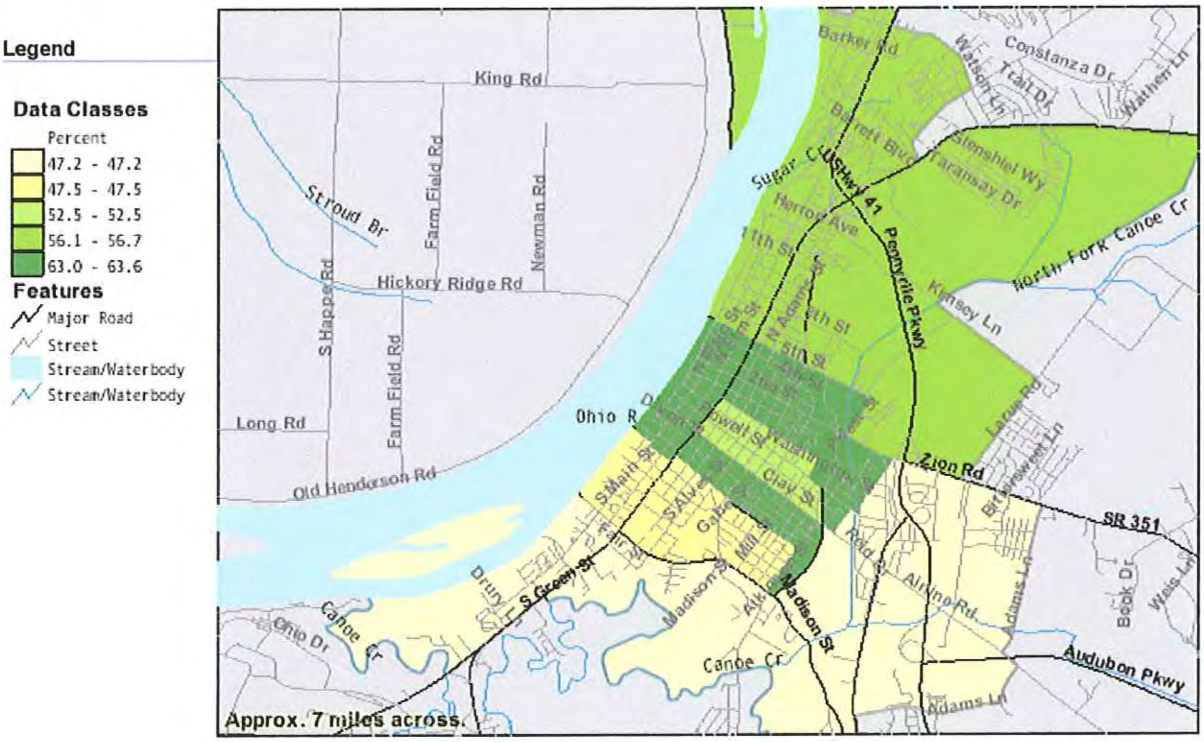


Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P047. Percent of Persons 65 Years and Over With a Disability: 2000
Universe: **Civilian noninstitutionalized population 65 years and over**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Census Tract

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

TM-P047. Percent of Persons 65 Years and Over With a Disability: 2000
Universe: **Civilian noninstitutionalized population 65 years and over**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Block Group

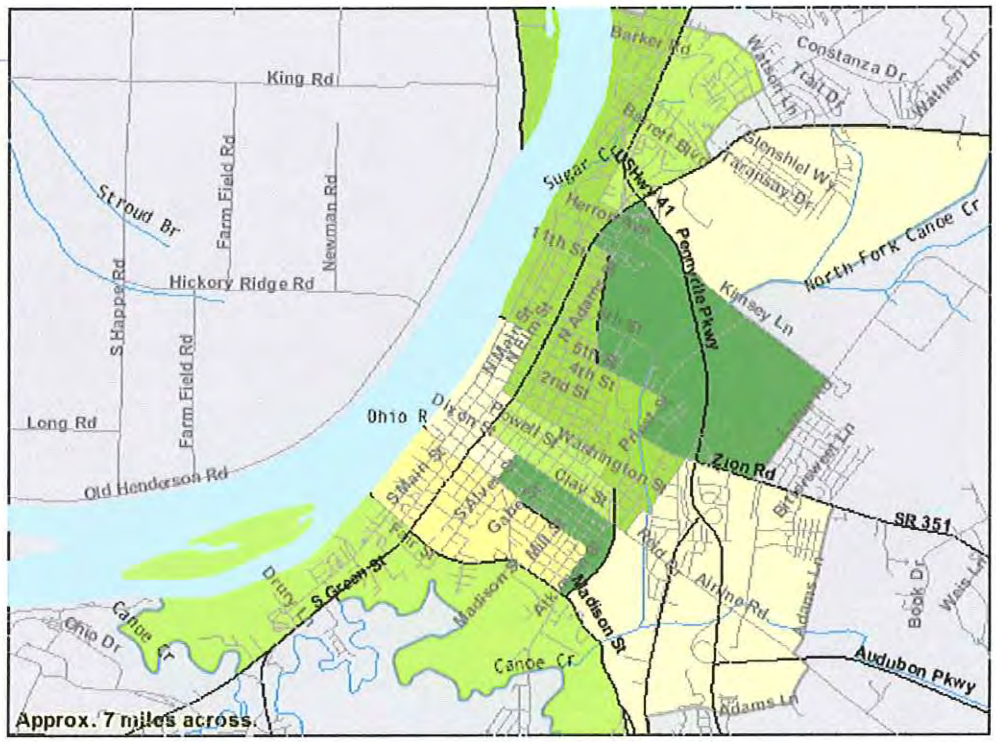
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes

Percent
- 42.2 - 45.0
- 47.4 - 47.6
- 50.7 - 52.5
- 56.7 - 63.6
- 75.9 - 76.5

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

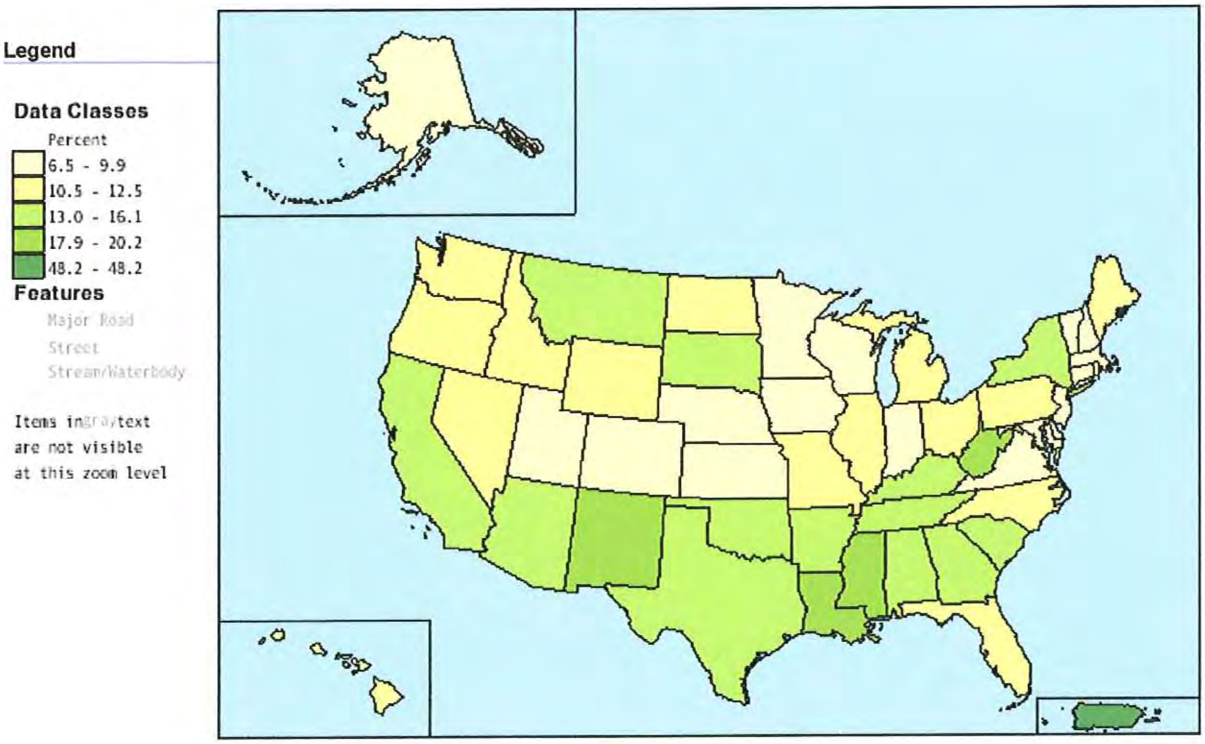


Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P42.

U.S. Census Bureau
American FactFinder

TM-P067. Percent of Persons Below the Poverty Level in 1999: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
United States by State

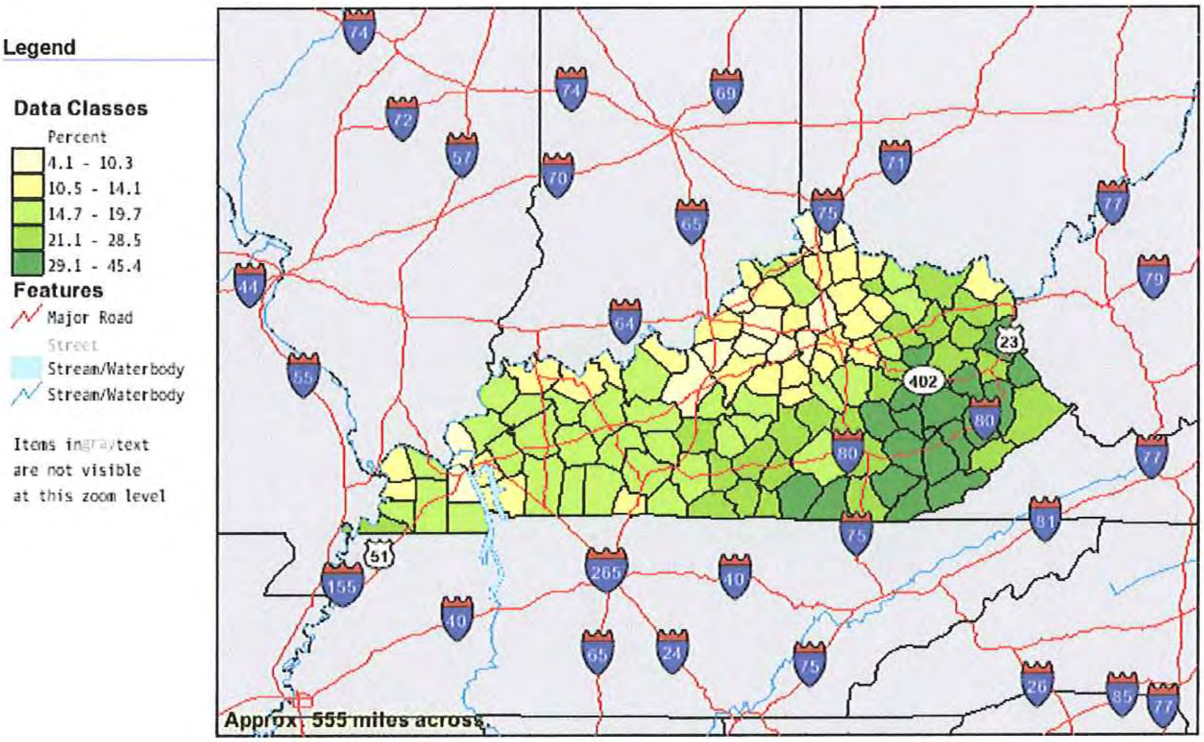
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P87.

TM-P067. Percent of Persons Below the Poverty Level in 1999: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Kentucky by County

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

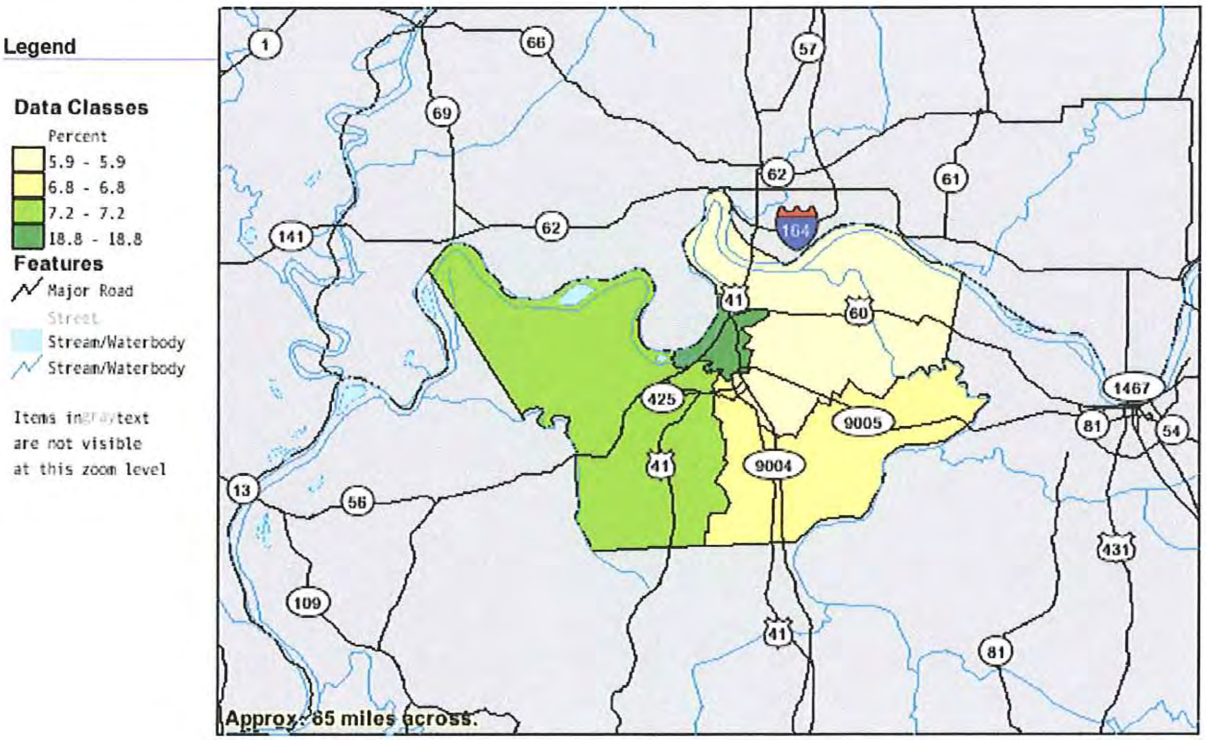


Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P87.

U.S. Census Bureau
American FactFinder

TM-P067. Percent of Persons Below the Poverty Level in 1999: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson County, Kentucky by County Subdivision

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P87.

U.S. Census Bureau

American FactFinder

TM-P067. Percent of Persons Below the Poverty Level in 1999: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Census Tract

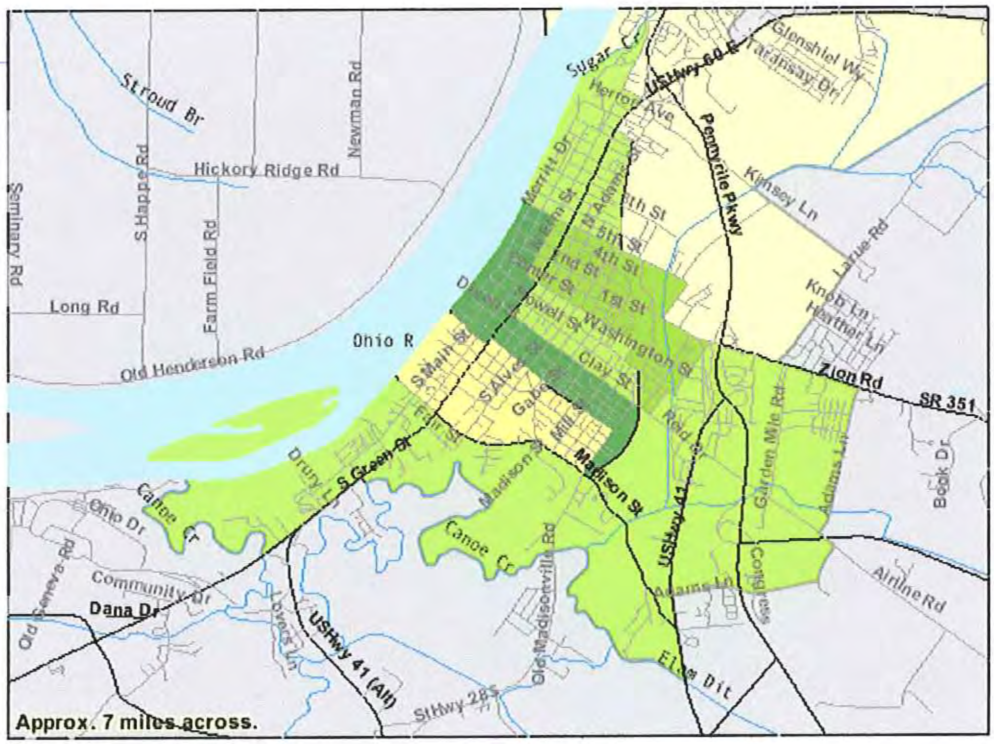
NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.

Legend

Data Classes

Percent
- 9.4 - 9.4
- 18.5 - 18.5
- 20.6 - 22.0
- 25.4 - 25.4
- 29.7 - 29.7

Features
- Major Road
- Street
- Stream/Waterbody
- Stream/Waterbody

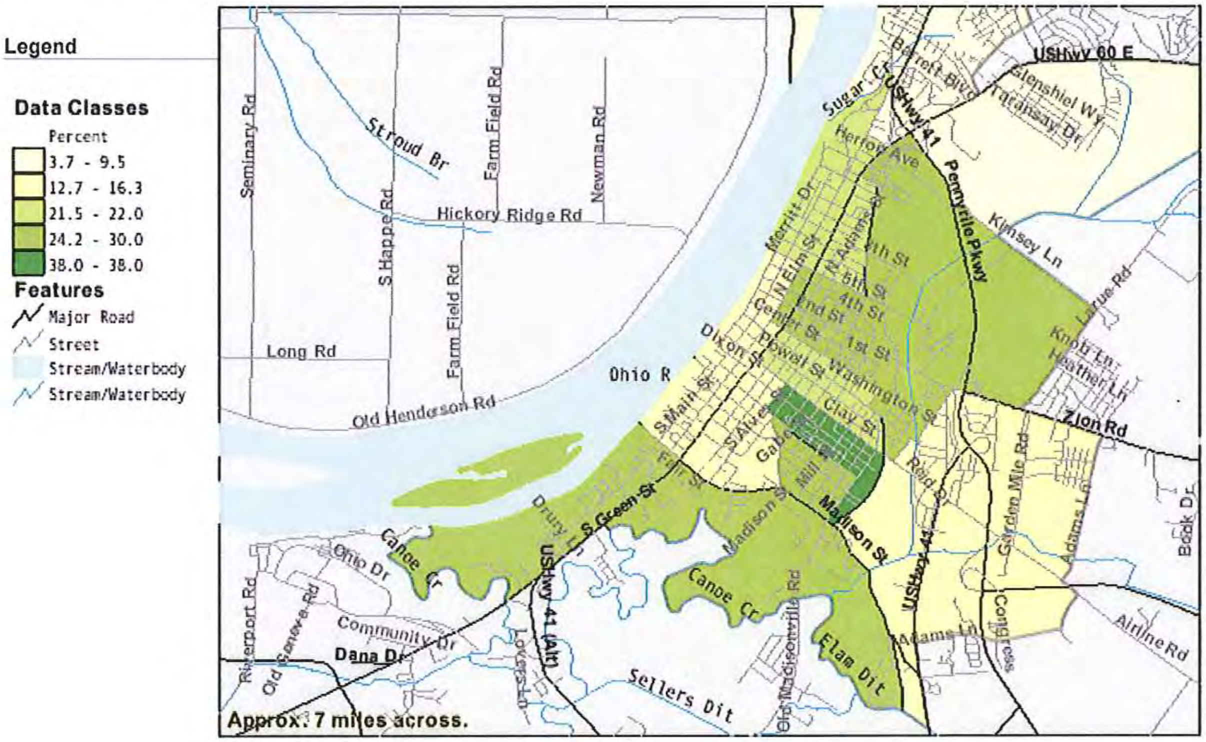


Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P87.

U.S. Census Bureau
American FactFinder

TM-P067. Percent of Persons Below the Poverty Level in 1999: 2000
Universe: **Total population**
Data Set: **Census 2000 Summary File 3 (SF 3) - Sample Data**
Henderson CCD, Henderson County, Kentucky by Block Group

NOTE: Data based on a sample except in P3, P4, H3, and H4. For information on confidentiality protection, sampling error, nonsampling error, definitions, and count corrections see http://factfinder.census.gov/home/en/datanotes/expsf3.htm.



Source: U.S. Census Bureau, Census 2000 Summary File 3, Matrix P87.

Appendix C

HENDERSON COUNTY, KENTUCKY ENVIRONMENTAL JUSTICE DATA

REGION	TOTAL POPULATION	WHITE ALONE	% WHITE ALONE	BLACK OR AFRICAN AMERICAN ALONE	% BLACK OR AFRICAN AMERICAN ALONE	AMERICAN INDIAN & ALASKA NATIVE ALONE	% AMERICAN INDIAN & ALASKA NATIVE ALONE	ASIAN ALONE	% ASIAN ALONE	NATIVE HAWAIIAN & OTHER PACIFIC ISLANDER ALONE	% NATIVE HAWAIIAN & OTHER PACIFIC ISLANDER ALONE
United States	281,421,906	211,353,725	75.10%	34,361,740	12.21%	2,447,989	0.87%	10,171,820	3.61%	378,782	0.13%
Kentucky	4,041,769	3,639,168	90.04%	293,915	7.27%	9,080	0.22%	28,994	0.72%	1,155	0.03%
Henderson County	44,829	40,705	90.80%	3,197	7.13%	38	0.08%	251	0.56%	8	0.02%
Census Tract 201	1,739	1,417	81.48%	300	17.25%	9	0.52%	0	0.00%	0	0.00%
Block Group 1	1,739	1,417	81.48%	300	17.25%	9	0.52%	0	0.00%	0	0.00%
Census Tract 202	1,720	1,454	84.53%	238	13.84%	0	0.00%	0	0.00%	0	0.00%
Block Group 1	1,720	1,454	84.53%	238	13.84%	0	0.00%	0	0.00%	0	0.00%
Census Tract 203	2,022	1,599	79.08%	381	18.84%	0	0.00%	0	0.00%	0	0.00%
Block Group 1	2,022	1,599	79.08%	381	18.84%	0	0.00%	0	0.00%	0	0.00%
Census Tract 204	2,587	1,994	77.08%	538	20.80%	5	0.19%	0	0.00%	0	0.00%
Block Group 1	1,593	1,253	78.66%	300	18.83%	5	0.31%	0	0.00%	0	0.00%
Block Group 2	994	741	74.55%	238	23.94%	0	0.00%	0	0.00%	0	0.00%
Census Tract 205	2,509	2,130	84.89%	285	11.36%	0	0.00%	9	0.36%	0	0.00%
Block Group 2	1,251	1,037	82.89%	194	15.51%	0	0.00%	0	0.00%	0	0.00%
Census Tract 206.01	6,373	5,782	90.73%	359	5.63%	7	0.11%	65	1.02%	0	0.00%
Block Group 2	2,342	2,012	85.91%	211	9.01%	0	0.00%	0	0.00%	0	0.00%
Block Group 3	1,412	1,279	90.58%	89	6.30%	0	0.00%	39	2.76%	0	0.00%
Census Tract 206.02	4,428	3,779	85.34%	558	12.60%	0	0.00%	52	1.17%	0	0.00%
Block Group 1	2,142	1,735	81.00%	350	16.34%	0	0.00%	26	1.21%	0	0.00%
Census Tract 209	7,239	6,870	94.90%	287	3.96%	6	0.08%	4	0.06%	0	0.00%
Block Group 3	958	958	100.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Source: www.census.gov

Data Set: Census 2000 Summary File 3 (SF 3)

Detailed Tables: P1-Total Population; P6-Race; P7-Hispanic or Latino by Race; P8-Sex by Age; P87-Poverty Status in 1999 by Age; P42-Sex by Age by Disability Status

HENDERSON COUNTY, KENTUCKY ENVIRONMENTAL JUSTICE DATA

SOME OTHER RACE ALONE	% SOME OTHER RACE ALONE	TWO OR MORE RACES	% TWO OR MORE RACES	HISPANIC OR LATINO ORIGIN	% HISPANIC OR LATINO ORIGIN	PERSONS 65 AND OVER	% PERSONS 65 AND OVER	PERSONS WITH DISABILITY (5 YRS & OVER)	% PERSONS WITH DISABILITY	PERSONS BELOW POVERTY LEVEL	% PERSONS BELOW POVERTY LEVEL
15,436,924	5.49%	7,270,926	2.58%	35,238,481	12.52%	34,978,972	12.43%	49,746,248	19.30%	38,899,812	13.82%
22,116	0.55%	47,341	1.17%	56,414	1.40%	503,668	12.46%	874,156	23.70%	621,096	15.37%
249	0.56%	381	0.85%	409	0.91%	5,926	13.22%	9,334	22.60%	5,393	12.03%
0	0.00%	13	0.75%	0	0.00%	363	20.87%	570	32.78%	374	21.51%
0	0.00%	13	0.75%	0	0.00%	363	20.87%	570	32.78%	374	21.51%
12	0.70%	16	0.93%	0	0.00%	236	13.72%	475	27.62%	429	24.94%
12	0.70%	16	0.93%	0	0.00%	236	13.72%	475	27.62%	429	24.94%
9	0.45%	33	1.63%	0	0.00%	257	12.71%	647	32.00%	434	21.46%
9	0.45%	33	1.63%	0	0.00%	257	12.71%	647	32.00%	434	21.46%
16	0.62%	34	1.31%	31	1.20%	384	14.84%	917	35.45%	762	29.45%
6	0.38%	29	1.82%	16	1.00%	237	14.88%	663	41.62%	603	37.85%
10	1.01%	5	0.50%	15	1.51%	147	14.79%	254	25.55%	159	16.00%
17	0.68%	68	2.71%	11	0.44%	486	19.37%	665	26.50%	463	18.45%
11	0.88%	9	0.72%	0	0.00%	212	16.95%	278	22.22%	159	12.71%
112	1.76%	48	0.75%	138	2.17%	1,323	20.76%	1,184	18.58%	567	8.90%
79	3.37%	40	1.71%	105	4.48%	343	14.65%	458	19.56%	210	8.97%
5	0.35%	0	0.00%	5	0.35%	94	6.66%	206	14.59%	52	3.68%
22	0.50%	17	0.38%	33	0.75%	530	11.97%	928	20.96%	845	19.08%
14	0.65%	17	0.79%	28	1.31%	227	10.60%	426	19.89%	547	25.54%
12	0.17%	60	0.83%	44	0.61%	799	11.04%	1,533	21.18%	520	7.18%
0	0.00%	0	0.00%	0	0.00%	150	15.66%	270	28.18%	42	4.38%

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APPENDIX H
RESOURCE AGENCY COORDINATION

TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Joe Prather
Secretary

July 31, 2009

«Mailing_Title» «First_Name» «Last_Name»«Suffix»
«Title»
«Organization»
«Address1»
«Address2»
«City» «State» «Zip»

Dear «Letter_Title» «Last_Name»:

Subject: Planning Study
Henderson County
US 41A (Green Street)
Item No. 02-410.00

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 41A (Green Street) in Henderson, Kentucky. The primary goals of this project would be to address highway capacity and growth needs in Henderson County and to improve safety by providing an improved route with a two-way left turn lane that complies with current design standards. 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. In particular, we are asking that you provide the following information:

- Comments on the project goals or purpose and need for the project.
- Significant issues or concerns in the project area that may need to be addressed so that the project can be adequately scoped.
- Any conservation or development plans your agency or organization has ongoing or is aware of in the project area.
- Locations of any known areas, issues, or resources within the project area that should be considered when developing alternatives so that impacts can be minimized, mitigated, or avoided early in the process.
- Any mitigation strategies that should be considered in the development of the project.

We respectfully ask that you provide us with your comments by August 31, 2009, 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.

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:

- Study Purpose, Issues, and Draft Project Goals
- Project Location Map
- Traffic and Crash Data
- Long-Term Vision Typical Section
- Aerial Photography Environmental Footprint
- USGS Environmental Footprint

We appreciate any input you can provide concerning this project. Please direct any comments, questions, or requests for additional information to Nick Hall of Highway District 2 at (270) 840-7080 or at Nick.Hall@ky.gov. Please address all written correspondence to Keith R. Damron, P.E., Director, Division of Planning, Kentucky Transportation Cabinet, 200 Mero Street, 5th Floor West, Frankfort, KY 40622.

Sincerely,

Keith R Damron

Keith R. Damron, P.E.
Director
Division of Planning

KRD/TWW/NH

Enclosures

c: Jose Sepulveda, FHWA (w/e)
Duane Thomas, FHWA (w/e)
Gina Boaz, Green River ADD (w/e)
Doug Heberle, Qk4
Kevin McClearn
Everett Green
Nick Hall
Cary Palmer
David Martin

Mailing Title	Letter Title	First Name	Last Name	Suffix	Title	Organization	Address1	Address2	City	State	Zip
Mr.	Mr.	Phillip	Braden		District Office Manager	Memphis Airports District Office, Federal Aviation Administration	2862 Business Park Drive, Building G		Memphis	TN	38118-1555
	Sir and/or Madam					American Association of Truckers		P.O. Box 487	Benton	KY	42025
	Sir and/or Madam					Delta Regional Authority	236 Sharkey Avenue, Suite 400		Clarksdale	MS	38614
Mr.	Mr.	Edward W.	Tonini		Major General	Department of Military Affairs	Boone Nat'l Guard Ctr., 100 Minuteman Pky.		Frankfort	KY	40601
Mr.	Mr.	Jamie	Link		Acting Commissioner	Department of Parks	10th Floor, Capital Plaza Tower	500 Mero Street	Frankfort	KY	40601
Mr.	Mr.	George	Crothers		Director, Office of State Archaeology	Dept. of Anthropology, University of Kentucky	211 Lafferty Hall		Lexington	KY	40506-0024
Mr.	Mr.	William	Straw	Ph.D.	Regional Environmental Officer	Federal Emergency Management Agency, Region IV	3003 Chamblee-Tucker Road		Atlanta	GA	30341-4130
Mr.	Mr.	Jack	Fish		President	Kentuckians for Better Transportation	10332 Bluegrass Parkway		Louisville	KY	40299
	Sir and/or Madam					Kentuckians for The Commonwealth	105 Reams Street	P.O. Box 1450	London	KY	40743
Ms.	Ms.	Janie	Miller		Secretary	Cabinet for Health and Family Services	275 East Main		Frankfort	KY	40601
Mr.	Mr.	Randall	Royer		Interim Chairman	Kentucky Airport Zoning Commission	Capital City Airport	90 Airport Road, Building 400	Frankfort	KY	40601
Mr.	Mr.	Bob	Arnold		Executive Director	Kentucky Association of Counties	380 King's Daughters Drive		Frankfort	KY	40601
Mr.	Mr.	Dave	Adkisson		President	Kentucky Chamber of Commerce Executives, Inc.	464 Chenault Road		Frankfort	KY	40601
Mr.	Mr.	Richie	Farmer		Commissioner	Kentucky Department of Agriculture	32 Fountain Place		Frankfort	KY	40601
Mr.	Mr.	Bruce	Scott		Commissioner	Kentucky Department for Environmental Protection	300 Fair Oaks Lane		Frankfort	KY	40601
Dr.	Dr.	Jonathan	Gassett		Commissioner	Kentucky Department of Fish and Wildlife Resources	1 Sportsman's Lane		Frankfort	KY	40601
Mr.	Mr.	Carl	Campbell		Commissioner	Kentucky Department for Nat'l. Resources	#2 Hudson Hollow		Frankfort	KY	40601
Mr.	Mr.	Stephen A.	Coleman		Director	Kentucky Department for Nat'l. Resources, Division of Conservation	#2 Hudson Hollow		Frankfort	KY	40601
Mr.	Mr.	Rodney	Brewer		Commissioner	Kentucky State Police	919 Versailles Road		Frankfort	KY	40601
Mr.	Mr.	Paul	Rothman		Director	Division of Mine Reclamation and Enforcement	# 2 Hudson Hollow		Frankfort	KY	40601
Mr.	Mr.	Chase	Foster		President	Kentucky Disabilities Coalition		P.O. Box 1589	Frankfort	KY	40602-1589
Mr.	Mr.	John	Lyons		Director	Kentucky Division of Air Quality	803 Schenkel Lane		Frankfort	KY	40601
Ms.	Ms.	Leah W.	MacSwords		Director	Kentucky Division of Forestry	627 Comanche Trail		Frankfort	KY	40601
Mr.	Mr.	Greg	Howard		Commissioner	Kentucky Department of Vehicle Enforcement	125 Holmes Street, 3rd Floor		Frankfort	KY	40622
Mr.	Mr.	Tony	Hatton		Director	Kentucky Division of Waste Management	14 Reilly Road		Frankfort	KY	40601
Ms.	Ms.	Sandy	Gruzesky		Acting Director	Kentucky Division of Water	14 Reilly Road		Frankfort	KY	40601
Mr.	Mr.	John	Hindman		Secretary	Kentucky Cabinet for Economic Development	Old Capitol Annex	300 West Broadway	Frankfort	KY	40601
Mr.	Mr.	Jim	Cobb		State Geologist & Director	Kentucky Geological Survey, University of Kentucky	228 Mining and Mineral Resources Bldg.		Lexington	KY	40506
Ms.	Ms.	Donna M.	Neary		Executive Director & State Historic Preservation Officer	Kentucky Heritage Council	300 Washington Street		Frankfort	KY	40601
Mr.	Mr.	Kent	Whitworth		Executive Director	Kentucky Historical Society	100 W. Broadway		Frankfort	KY	40601
Mr.	Mr.	Mike	Mangeot		President/CEO	Kentucky Association of Economic Development	2225 Lawrenceburg Road, Bldg. B., Suite 4		Frankfort	KY	40601-8489
Ms.	Ms.	Sylvia L.	Lovely		Executive Director	Kentucky League of Cities, Inc.	101 East Vine Street, Ste. 600		Lexington	KY	40507
Mr.	Mr.	Jamie	Fiepke		President/CEO	Kentucky Motor Transport Association	617 Shelby Street		Frankfort	KY	40601
Mr.	Mr.	Robert D.	Vance		Secretary	Kentucky Environmental and Public Protection Cabinet	Capital Plaza Tower, 5th Floor		Frankfort	KY	40601
Mr.	Mr.	Donald S.	Dott	Jr.	Executive Director	Kentucky Nature Preserves	801 Schenkel Lane		Frankfort	KY	40601
Ms.	Ms.	Vickie	Bourne		Executive Director	Kentucky Office of Transportation Delivery	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622
Mr.	Mr.	Beecher	Hudson		Executive Director	Kentucky Public Transit Association	c/o Louisville Red Cross	P.O. Box 1675	Louisville	KY	40201
Ms.	Ms.	Kay	Berggren		President	Kentucky Tourism Council	612B Shelby Street		Frankfort	KY	40601
Ms.	Ms.	Marcheta	Sparrow		Secretary	Kentucky Commerce Cabinet	Capital Plaza Tower, 24th Floor	500 Mero Street	Frankfort	KY	40601
Mr.	Mr.	Allan	Frank		Director	KYTC, Division of Structural Design	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622
Ms.	Ms.	Greta	Smith		Director	KYTC, Division of Construction	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622
Mr.	Mr.	David	Waldner		Director	KYTC, Division of Environmental Analysis	Transportation Office Building, 5th Floor	200 Mero Street	Frankfort	KY	40622
Mr.	Mr.	Bill	Broyles		Branch Manager	KYTC, Geotechnical Branch	1236 Wilkinson Boulevard		Frankfort	KY	40601-1200
Mr.	Mr.	Duane	Thomas		Director	KYTC, Division of Traffic Operations	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622
Ms.	Ms.	Nancy	Albright		Director	KYTC, Division of Maintenance	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622
Ms.	Ms.	Helen	Mountjoy		Secretary	Education Cabinet	Capital Plaza Tower, 2nd Floor		Frankfort	KY	40601
Mr.	Mr.	James	Aldridge		Director	Nature Conservancy - Kentucky Chapter	642 West Main Street		Lexington	KY	40508
Mr.	Mr.	Paul	Bergmann		Executive Director	Scenic Kentucky		P. O. Box 3646	Louisville	KY	40201
	Sir and/or Madam					Sierra Club	2173 Palomar Trace Drive		Lexington	KY	40513
Mr.	Mr.	Heinz	Mueller		Attorney	U. S. Environmental Protection Agency, Region 4 Office	Sam Nunn Atlanta Federal Center	61 Forsyth St. SW	Atlanta	GA	30303
Mr.	Mr.	Michael D.	Hubbs		State Conservationist	U.S. Dept. of Agriculture, Natural Resources Conservation Service	711 Corporate Drive, Suite 110		Lexington	KY	40503
Mr.	Mr.	Robert	Blake			Environmental Health Services Branch, Mail Stop F-60		4770 Buford Highway	Atlanta	GA	30341
Mr.	Mr.	Lee	Andrews		Field Supervisor	U.S. Dept. of the Interior, Fish and Wildlife Service	330 W. Broadway, Suite 264		Frankfort	KY	40601
Mr.	Mr.	Roger	Wiebusch		Bridge Administrator	United States Coast Guard, Bridge Branch	1222 Spruce Street		St. Louis	MO	63103
The Honorable	Senator	Jim	Bunning		United States Senator	United States Senate	316 Hart Senate Office Building		Washington	DC	20510
The Honorable	Senator	Mitch	McConnell		United States Senator	United States Senate	361-A Russell Senate Office Building		Washington	DC	20510
Colonel	Colonel	William	Howard		Executive Director	Kentucky Association of Riverports, Henderson County Riverport	6200 Riverport Rd.		Henderson	KY	42420
Colonel	Colonel	Raymond E.	Midkiff		District Engineer	U. S. Army Corps of Engineers, Louisville District		P.O. Box 59	Louisville	KY	40201
The Honorable	Congressman	Ed	Whitfield		United States Representative - District 1	U. S. House of Representatives	236 Cannon House Office Building		Washington	DC	20515
Ms.	Ms.	Krista	Mills		Field Office Director	U.S. Department of Housing & Urban Development, Ky. Louisville Field Office	601 West Broadway		Louisville	KY	40202
Mr.	Mr.	Tony	Reck		President & CEO, P& L Railway, Inc.	Kentucky State Rail Association	1500 Kentucky Avenue		Paducah	KY	42003
Ms.	Ms.	Peggy	Wood		Executive Director	Henderson Planning Commission	1900 Barret Court	Suite C	Henderson	KY	42420
Ms.	Ms.	Pam	Whitter		Coordinator	Henderson Area Rapid Transit	401 N. Elm Street		Henderson	KY	42420
Mr.	Mr.	Brad	Schneider		President	Henderson Chamber of Commerce	201 N. Main Street		Henderson	KY	42420
Mr.	Mr.	Bradley	Mills		Executive Director	Evansville MPO	Civic Center Room 316	1 N.W. Martin Luther King Blvd.	Evansville	IN	47708
The Honorable	Congressman	David	Watkins		Representative - District 10	Kentucky House of Representatives	702 Capitol Avenue, Annex Room 429H		Frankfort	KY	40601
The Honorable	Senator	Dorsey	Ridley		Senator - District 4	Kentucky Senate	702 Capitol Avenue, Annex Room 255		Frankfort	KY	40601
Mr.	Mr.	William "Buzzy"	Neaman		Assistant City Manager	City of Henderson	P.O. Box 716		Henderson	KY	424[illegible]0716
The Honorable	Judge	Sandy	Watkins		Judge Executive	Henderson County	20 N. Main Street	Henderson County Courthouse	Henderson	KY	42420
Sheriff	Sheriff	Ed	Brady		Sheriff	Henderson County Sheriff's Office	20 N. Main Street	Henderson County Courthouse	Henderson	KY	42420
Dr.	Dr.	Thomas L.	Richey		Superintendent	Henderson County Schools	1805 Second Street		Henderson	KY	42420
The Honorable	Mayor	Thomas	Davis		Mayor	City of Henderson	Henderson Municipal Center, 1st Floor	222 First Street	Henderson	KY	42420

STUDY PURPOSE, ISSUES, AND PROJECT GOALS

US 41A GREEN STREET
ITEM NO. 02-140.00
HENDERSON COUNTY

STUDY PURPOSE

The purpose of the US 41A Green Street Scoping Study is to identify key issues and cost factors associated with a proposal to widen Green Street in Henderson to provide a continuous, 2-way left turn lane from US 60 to US 41, a distance of about four miles. Items involved with this study include:

- Discuss project needs and issues with the Project Team,
- Define project goals, needs, and issues,
- Identify any known environmental, historical, or archaeological concerns
- Identify and evaluate different widening alternatives.

ISSUES

Major issues and concerns have been identified within the study area that will be addressed in the Scoping Study. These include:

- US 41A is a highly congested highway that operates at a less than desirable level of service. Several intersections with US 41A including US 60, KY 136, KY 351, and others are not adequate due to safety deficiencies and congestion issues.
- 2007 ADT ranged from 19,600 to 30,100, with 9% trucks.
- In the study area, US 41A exhibits the characteristics of a high crash corridor, with two fatalities from 2003 to 2007.
- Many businesses, homes, and historic properties abut the existing rights-of-way
- Many utilities are located adjacent to the existing rights-of-way

DRAFT PROJECT GOALS

For the US 41A Green Street project, several goals and objectives were identified. These include:

- Address highway capacity and growth needs in Henderson County
- Improve safety by providing an improved route with a 2-way left-turn lane that complies with current design standards

CONTACTS

Address written comments to:

Keith Damron, P.E.
Director
Kentucky Transportation Cabinet
Division of Planning
Station W5-05-01
200 Mero Street
Frankfort, KY 40622

Or, you may contact by phone or e-mail:

Nick Hall
Project Engineer
Kentucky Transportation Cabinet
District 2
(270) 824-7080
Nick.Hall@ky.gov

Visit our web page at: http://www.planning.kytc.ky.gov/

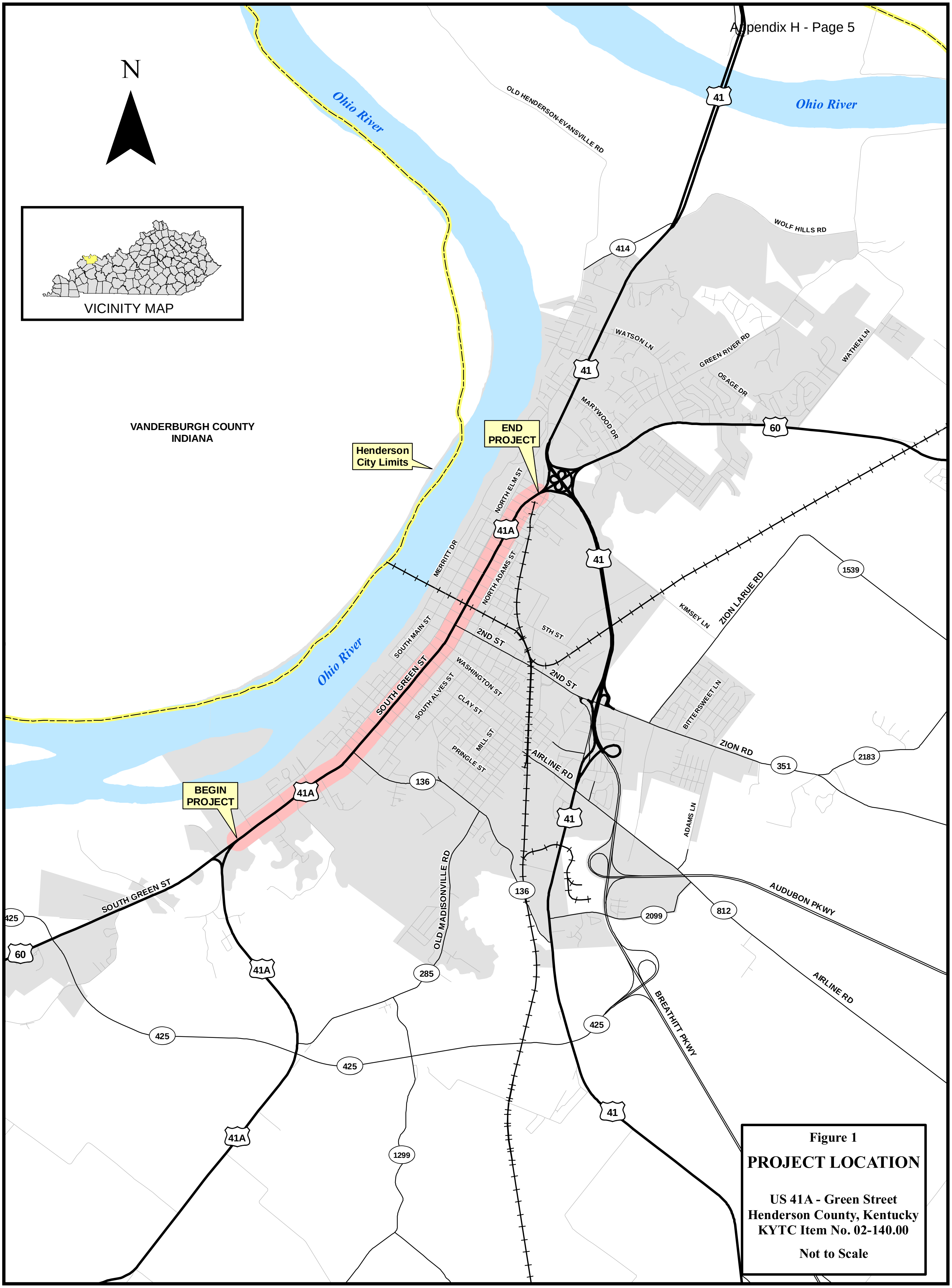
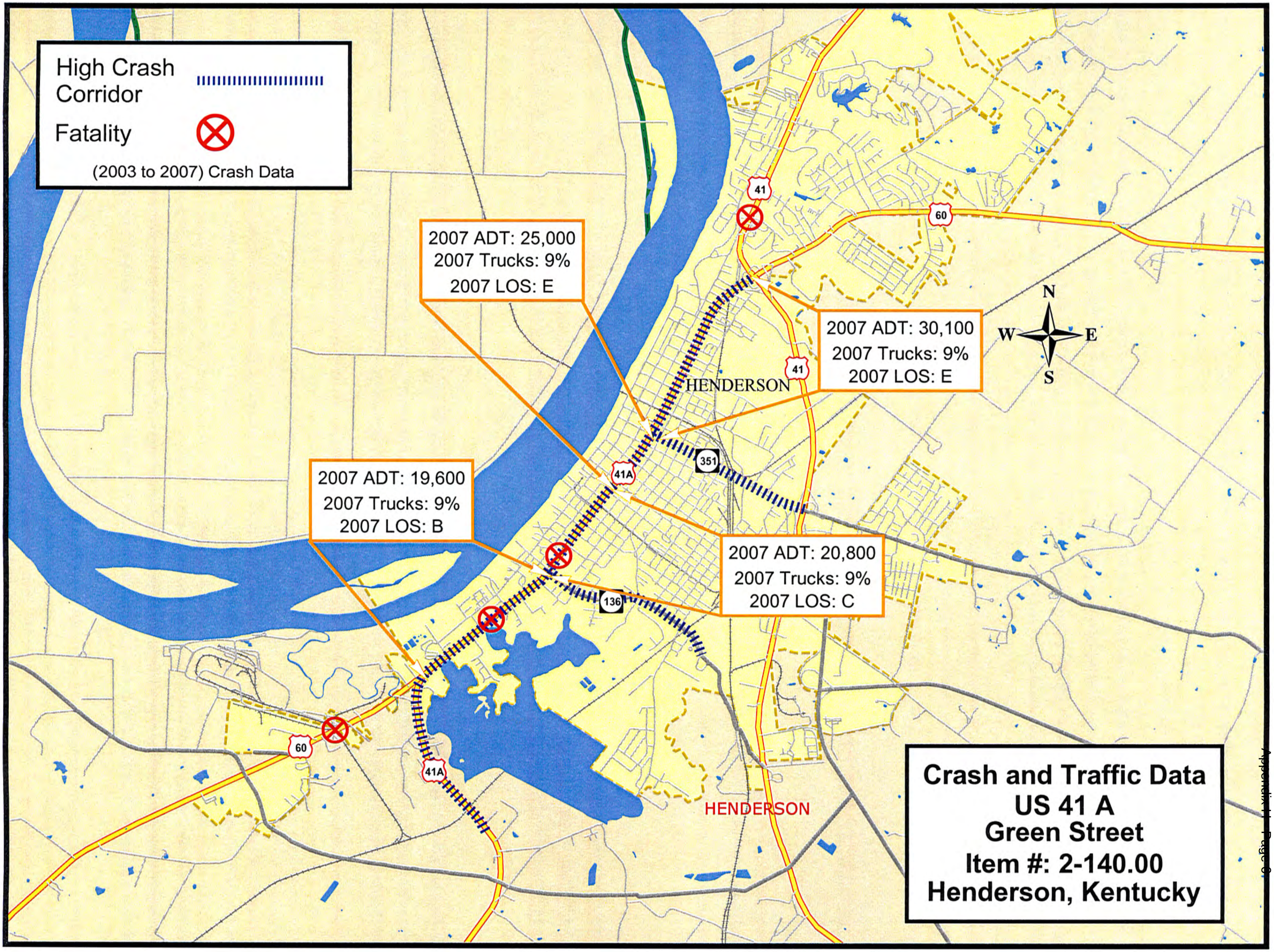


Figure 1

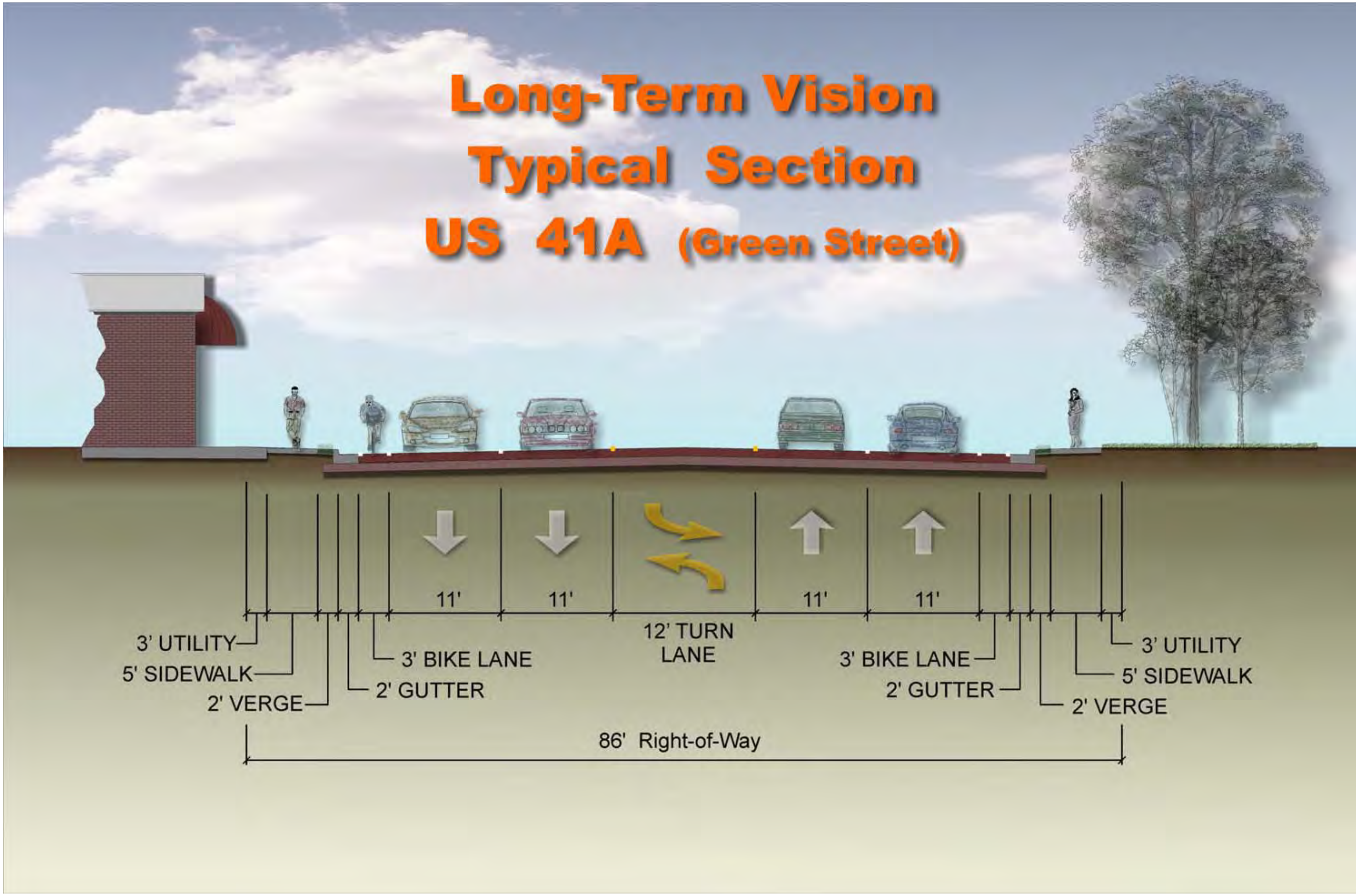
PROJECT LOCATION

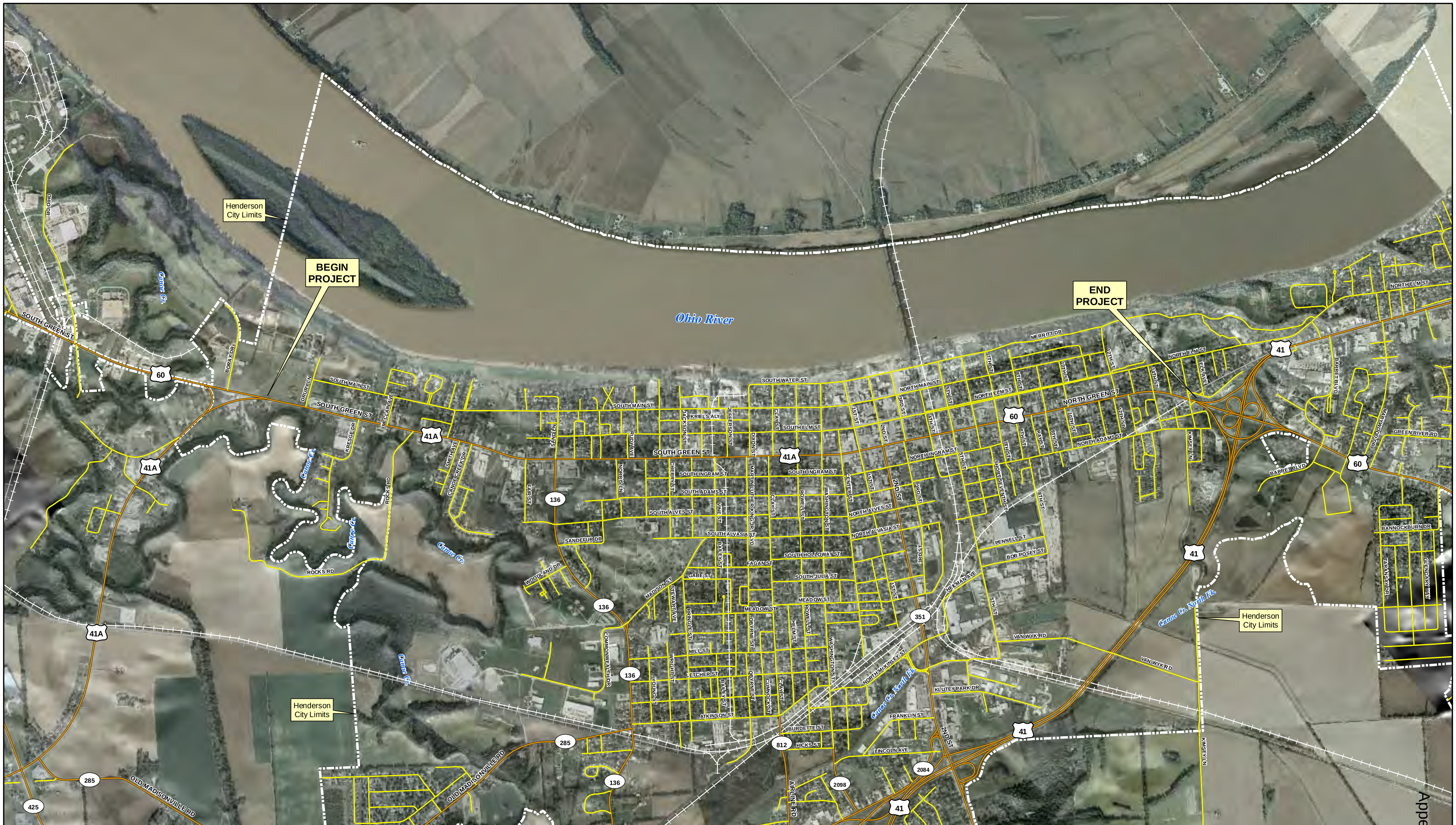
US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00

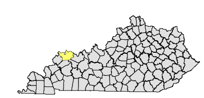
Not to Scale



High Crash Corridor
Fatality
(2003 to 2007) Crash Data
2007 ADT: 25,000
2007 Trucks: 9%
2007 LOS: E
2007 ADT: 30,100
2007 Trucks: 9%
2007 LOS: E
2007 ADT: 19,600
2007 Trucks: 9%
2007 LOS: B
2007 ADT: 20,800
2007 Trucks: 9%
2007 LOS: C
HENDERSON
HENDERSON
N
W
E
S
41
60
41
41A
351
136
60
41A
Crash and Traffic Data
US 41 A
Green Street
Item #: 2-140.00
Henderson, Kentucky


Long-Term Vision
Typical Section
US 41A (Green Street)
11'
11'
12' TURN LANE
11'
11'
3' UTILITY
5' SIDEWALK
2' VERGE
2' GUTTER
3' BIKE LANE
3' BIKE LANE
2' GUTTER
2' VERGE
5' SIDEWALK
3' UTILITY
86' Right-of-Way





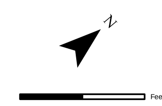


Figure 1

2004 Aerial Photography

US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00

Division of Planning

Source Citation:
Topographic data, including utilities and imagery and less historic, aquatic and terrestrial courtesy of the Kentucky Office of Geographic Information Systems (KYOGIS) QK4 makes no claim to the accuracy of that data shown on this map.

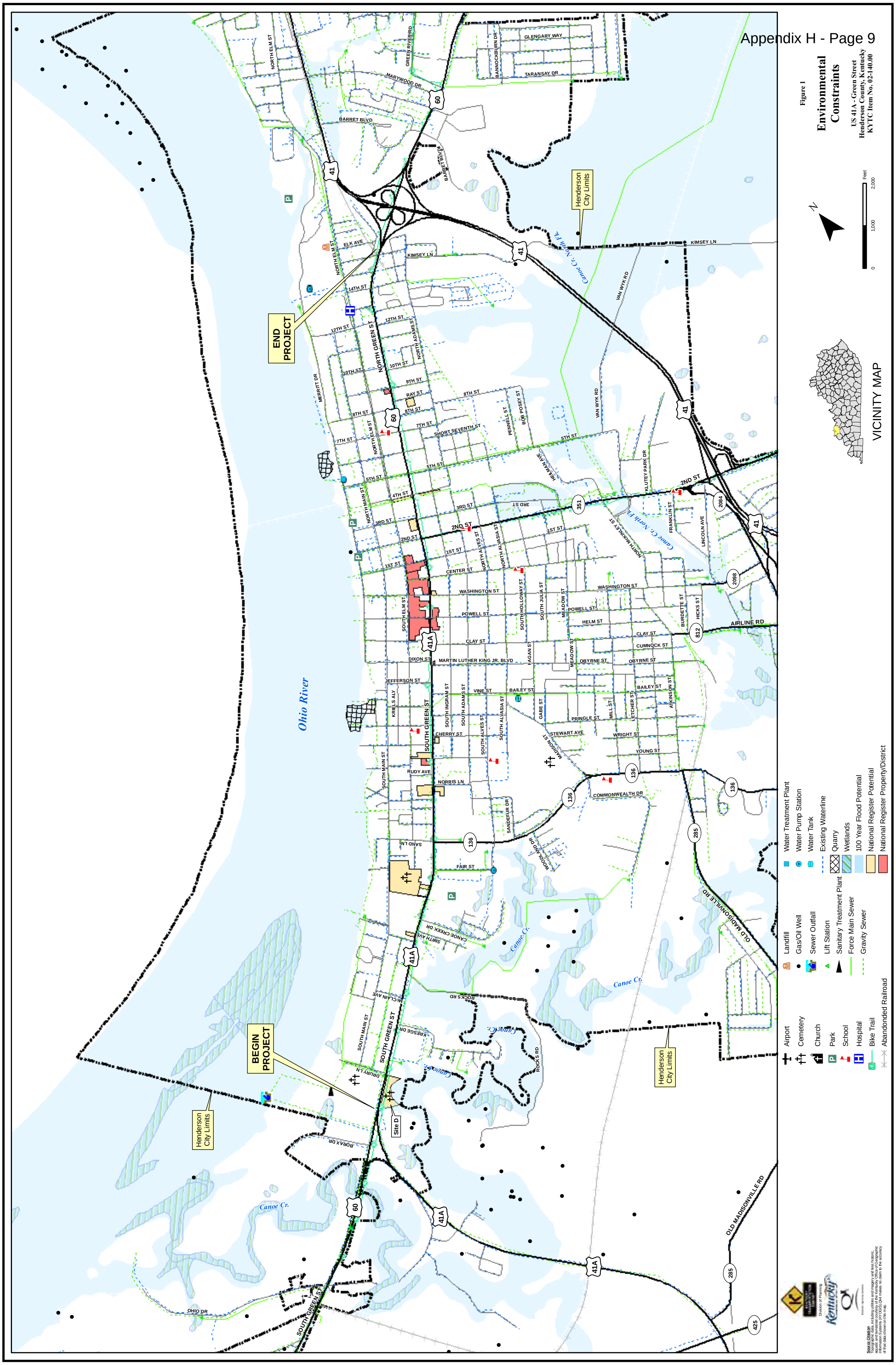


Figure 1
Environmental Constraints
US 41A - Green Street
Henderson County, Kentucky
KYTC Item No. 02-140.00
VICINITY MAP
BEGIN PROJECT
END PROJECT
Henderson City Limits
Ohio River
Canoe Cr.
Site D
Airport
Cemetery
Church
Park
School
Hospital
Bike Trail
Abandonded Railroad
Landfill
Gas/Oil Well
Sewer Outfall
Lift Station
Sanitary Treatment Plant
Force Main Sewer
Gravity Sewer
Water Treatment Plant
Water Pump Station
Water Tank
Existing Waterline
Quarry
Wetlands
100 Year Flood Potential
National Register Potential
National Register Property/District
NORTH GREEN ST
SOUTH GREEN ST
2ND ST
AIRLINE RD
OLD MADISONVILLE RD
MARTIN LUTHER KING JR. BLVD

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From: Wilkins, Joe N MR NGKY [mailto:joe.wilkins@us.army.mil]
Sent: Wednesday, August 05, 2009 4:07 PM
To: Damron, Keith (KYTC)
Cc: Jones, Michael A NGKY COL(R); Pope, Julie A Ms. NGKY
Subject: Planning Study, Henderson County, US 41A (Green Street), Item No. 02-410.00

Mr. Damron,

The Department of Military Affairs can not identify any issues or concerns that affect the development of subject project. These changes could have a positive impact on the movement of military vehicles to and from the National Guard Armory which is located at 735 N. Elm Street in Henderson.

Joe N. Wilkins
Director, Facilities Division
Department of Military Affairs
Boone National Guard Center
Frankfort, KY 40601-6168
502-607-6536
DSN 667-6536
502-382-7270 (Cell)
502-607-1270 (Fax)
Joe.Wilkins@us.army.mil

U.S. Department of Homeland Security
United States Coast Guard

Commander
Eighth Coast Guard District

1222 Spruce Street
St. Louis, MO 63103-2832
Staff Symbol: dwb
Phone: (314) 269-2380
Fax: (314) 269-2737
Email: peter.j.sambor@uscg.mil

16591.1
August 31, 2009

Mr. Keith Damron
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor West
Frankfort, KY 40622

Subj: GREEN STREET (US 41) IMPROVEMENT PROJECT, HENDERSON COUNTY

Dear Mr. Damron:

We have reviewed the information provided in your letter of July 31, 2009, and determined that this project is not a project over which the Coast Guard exercises jurisdiction for bridge administration purposes. A Coast Guard permit is not required.

If there are any questions, please contact Mr. Peter Sambor at the above listed number. We appreciate the opportunity to comment on the project.

Sincerely,

ROGER K. WIEBUSCH
Bridge Administrator
By direction of the District Commander

Heberle, Doug

From: Stephen.Wilson@faa.gov

Sent: Tuesday, August 18, 2009 3:16 PM

To: Hall, Nick (KYTC-D02)

Subject: Henderson County Green Street

Mr. Hall-

I have reviewed the proposed hwy. project for Henderson County (Item 02-410.00).
There appears to be no impacts from the proposed project to Henderson City-County Airport.

If you need a formal response letter, I will be happy to furnish.

Thank you.

Stephen Wilson
Community Planner
Federal Aviation Administration
Memphis Airports District Office
2862 Business Park Drive, Bldg. G
Memphis, TN 38118
Ph. 901-322-8185

Heberle, Doug

From: Ryan, Thomas K [Thomas.K.Ryan@hud.gov]
Sent: Friday, August 07, 2009 8:56 AM
To: Hall, Nick (KYTC-D02)
Cc: Mills, Krista
Subject: Henderson County Planning Study - Item No. 02-410.00

Dear Mr. Hall,

We are in receipt of the Transportation Cabinet's request for information regarding its' Henderson County Planning Study, (US 41A Green Street, Item No. 02-410.00), and are forwarding the request to our Environmental Protection Specialist in Atlanta, Georgia.

In the future, any Transportation Cabinet request of this nature would be expedited by sending the requests directly to:

Linda Poythress, Environmental Protection Specialist
US Department of Housing and Urban Development
40 Marietta Street, Five Points Plaza
Atlanta, GA 30303-2806

We appreciate having the opportunity to provide input on these projects. If we can be of further assistance, please to hesitate to contact us.

Sincerely,

Tom Ryan
Field Policy and Management
hud Louisville Field Office
601 West Broadway, Suite 110
Louisville, KY 40202
502-618-8167 (Office)
502-582-6074 (Fax)

KENTUCKY STATE POLICE

Steven L. Beshear
Governor

919 Versailles Road
Frankfort, Kentucky 40601
www.kentucky.gov

J. Michael Brown
Secretary

Rodney Brewer
Commissioner

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

Dear Mr. Damron:

Subject: Planning Study
Henderson County
US 41A (Green Street)
Item No. 02-410.00

Having reviewed the information provided and being familiar with the section of US41A (Green Street) under consideration, I find that the proposed construction is greatly needed in this area.

This stretch of highway during the 2008 calendar year averaged nearly one accident per day throughout the year. This is an excessive amount of accidents for such a small stretch of road. This problem must be addressed to better provide for the safety of the motoring public.

Just in observation alone it is apparent at the excessive amount of traffic this section of road experiences on a daily basis. Just as apparent is the need to provide for some type of traffic control devices that will help to eliminate stress placed on this section of highway. The proposed plan appears to be a highly aggressive and the most adequate approach in helping to resolve the issues that face this area. Understanding that during the construction phase of this plan, construction will cause some traffic issues in the area. However, these concerns can be addressed by rerouting traffic around the area, use of media notifications and with traffic enforcement to name a few.

The project will cause a period of discomfort during the construction phase, as with any project. However, the benefits that a center lane will provide to US41A are tremendous. This will provide benefits for all who travel and/or have business to conduct on this section of US41A.

If you have any questions regarding this, please call Post 16 at 270-826-3312.

Sincerely,

Capt. John C. Blanton

Captain John C. Blanton
Kentucky State Police
Post 16 Henderson

JB:ms

Heberle, Doug

From: Arends, Anita - Lexington, KY [anita.arends@ky.usda.gov]

Sent: Wednesday, August 05, 2009 11:17 AM

To: Hall, Nick (KYTC-D02)

Subject: re: US 41A (Green Street) planning study in Henderson

Nick,

Hello – I review the external projects for NRCS-USDA in Lexington and received a notice regarding a planning study for a segment of US 41A in Henderson.
I review project that may impact NRCS interests which include PL-566 watershed structure, Wetland Reserve Easements, Prime Farmland and/or Farmland of Statewide Importance, and Grassland Reserve Easements. None of these apply, so NRCS has no comments on this project.

Also, our State Conservationist is now Thomas Perrin. If you could make that change in your database I'd appreciate it.

Please feel free to email me if you have any questions.

Anita Arends
Resource Conservationist
NRCS-USDA
771 Corporate Drive, Suite 210
Lexington, KY 40503
Work phone: 859-224-7354
Fax: 859-224-7410
anita.arends@ky.usda.gov

Heberle, Doug

From: Houlihan, John (KYTC) [John.Houlihan@ky.gov]

Sent: Wednesday, August 05, 2009 3:28 PM

To: Hall, Nick (KYTC-D02)

Subject: Item No. 02-410.00 Planning Study US 41A (Green Street)

Importance: Low

Mr. Hall,

I have reviewed the above subject and found that it will have no negative effect to air navigation. However, if construction equipment (ex. Cranes) exceed 200 feet above ground level, you will need to get a permit from us. If you have any questions, please let me know.

Thank you.

Kentucky Airport Zoning Commission
John Houlihan, Administrator
90 Airport Road, Building 400
Frankfort, KY 40601
Desk 502.564.0310
Cell 502.330.3955

http://transportation.ky.gov/aviation/kyzoning.htm

Heberle, Doug

From: MacSwords, Leah (EEC) [Leah.Macswords@ky.gov]

Sent: Tuesday, August 25, 2009 1:45 PM

To: Hall, Nick (KYTC-D02)

Cc: Mullins, Michael (EEC); Maddox, Owen (EEC)

Subject: US41A Planning Study - Henderson County

Dear Nick,
Division of Forestry personnel inspected the areas indicated by the planning study. Trees observed include typical street trees such as elms, maples, sycamores, sweetgums, and Bradford pears. We also noted cottonwood, yellow-poplar, and some red oak species as well as some non-natives such as Tree-of-Heaven. Some of the larger trees have soundness problems. There is an 18 inch hemlock on the corner of Ruby and Green Streets, which is of interest because Kentucky's hemlocks in southeastern Kentucky are infested with an insect that will like destroy most if not all untreated hemlocks in the state.

However, we do not believe any tree issues would negatively impact the need to correct highway safety concerns. We do recommend that the Transportation Cabinet make an effort to replace street trees where possible after the project is complete. We can assist you in selecting an appropriate mixture species.

Thank you for the opportunity to review the proposal.

Leah W. MacSwords
Director/State Forester
Kentucky Division of Forestry
627 Comanche Trail
Frankfort, KY 40601
ph: 502-564-4496, 800-866-0555
fax: 502-564-6553

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
TOURISM, ARTS, AND HERITAGE CABINET

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Marcheta Sparrow
Secretary

Dr. Jonathan W. Gassett
Commissioner

August 12, 2009

Keith Damron, P.E.
Director
Kentucky Transportation Cabinet
Division of Planning
Station W5-05-01
200 Mero Street
Frankfort, KY 40622

RE: Planning Study
Henderson County
US 41 A (Green Street)
Item No. 02-410.00

Dear Mr. Damron,

The Kentucky Department of Fish and Wildlife Resources (KDFWR) have received your request for the above-referenced information. The Kentucky Fish and Wildlife Information System (KFWIS) indicate that state threatened and endangered species are known to occur within close proximity of the proposed project area. However, the KDFWR does not expect impacts to listed species due to the location and nature of the project. Please be aware that our database system is a dynamic one that only represents our current knowledge of the various species distributions.

KDFWR recommends that erosion control measures be developed and utilized during any construction to minimize siltation into nearby waterways. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

I hope this information proves helpful to you. If you have any questions or require additional information, please call me at (800) 852-0942 Extension 4473.

Sincerely,

Courtney C. Hunt

Courtney C. Hunt
Fisheries Biologist II

Cc: Environmental Section File

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Div. of Planning

Heberle, Doug

From: Hines, Martina (EEC) [Martina.Hines@ky.gov]

Sent: Wednesday, August 05, 2009 11:00 AM

To: Hall, Nick (KYTC-D02); Damron, Keith (KYTC)

Cc: White, Deborah (EEC)

Subject: US 41A (Green Street)

We have reviewed the proposal for project No. 02-410.00 in Henderson, KY, and have no comments regarding potential impacts on rare species and communities.

Thanks for the opportunity to comment,

Sincerely,

Martina Hines, ecologist
Kentucky State Nature Preserves Commission
801 Schenkel Lane, Frankfort, KY 40601
(502) 573-2886
www.naturepreserves.ky.gov

MEMO TO: Nancy Albright, PE
Director
Division of Maintenance

FROM: T.J. Gilpin, P.E.
TE Specialist
Division of Maintenance

DATE: August 24, 2009

SUBJECT: Planning Study
Henderson County
US 41A (Green Street)
Item No. 02-410.00

I reviewed this section of US 41A (Green Street) during mid afternoon and noticed steady traffic flow. The roadway consists of four lanes, two lanes in each direction. A short section along this route also included a continuous left turn lane. There was curb and gutter along this route along with overhead utilities that ran parallel to the corridor. It also appeared that underground utilities could also be present.

In order to widen this roadway to accommodate two lanes in each direction and a continuous left turn lane, right-of-way would need to be acquired and utilities would need to be relocated. Because of the number of historic homes and businesses, the right-of way costs would be enormous. Utility relocation would also be costly. Also, within the limits of this study, there is a railroad bridge that runs over US 41A with piers placed along the edge of US 41A. To widen this route would also involve CSX railroad and building a new structure.

An alternative to widening this corridor would be to conduct a "road diet". This alternative should be studied to determine if this section of US 41A is a good candidate for a road diet. By performing a road diet, you could utilize the existing pavement width to construct a continuous left turn lane, one lane in each direction with wider driving lanes, and could also possibly add bicycle lanes to encourage other modes of transportation and reduce the traffic volume along this route. This could be completed at a significantly reduced cost, as there would be no right-of-way or utility costs.

These are my comments based on the field review conducted on August 19, 2009. If you have any questions or comments, please feel free to contact me.

Heberle, Doug

From: Harman, Charles L (Education Cabinet) [CharlesL.Harman@ky.gov]

Sent: Tuesday, August 04, 2009 4:03 PM

To: Hall, Nick (KYTC-D02)

Subject: Item No. 02-410.00

Nick:

The Education and Workforce Development Cabinet have no comments on this planning study at the current time.

Charlie Harman

Charlie Harman, Executive Director
Office of Budget and Administration
Education and Workforce Development Cabinet
500 Mero Street
Capital Plaza Tower Suite 301
Frankfort Ky 40601
E-MAIL: CharlesL.Harman@ky.gov
Phone: (502)564-9681

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ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-2150
FAX (502) 564-4245
www.dep.ky.gov

Leonard K. Peters
Secretary

R. Bruce Scott
Commissioner

September 20, 2009

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

Re: Planning Study, Henderson County, US41A (Green Street). Item No. 02-410.00. (SERO 2009-21)

Dear Mr. Damron,

The Energy and Environment Cabinet serves as environmental review office for documents prepared under the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies. We received your letter requesting our review of the subject project. Based on the scope of the project, the document was sent to the Kentucky Divisions of Water, Air Quality, Waste Management, and the Kentucky Heritage Council (State Historic Preservation Office).

We have completed our review of the letter and the figures that were included. The attached comments were provided by the Division of Water, Air Quality and Waste Management. No response has been received from the Kentucky Heritage Council.

If you have any questions, please contact me at (502) 564-2150, ext. 112.

Sincerely,

Larry Taylor

Larry C. Taylor
State Environmental Review Officer

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Division of Water Comments

PLANNING STUDY, HENDERSON CO. US41A (GREEN ST.)

Endorsement:

A request for review of the 12 Henderson County; PLANNING STUDY, HENDERSON CO. US41A (GREEN ST.) in Henderson County, Kentucky was received on 8-18-09. The Division of Water (DOW) completed this review and has provided the following comments.

Compliance & Technical Assistance Branch:
No comments from the Madisonville Regional Office.

Water Quality Branch:
Best management practices shall be used to reduce runoff from the project.

Watershed Management:
No Comment

Enforcement Branch:
No DENF objections to this project.

Division of Waste Management Comments

Project Number: SERO 2009-21

All solid waste generated by this project must be disposed at a permitted facility. Due to the number of businesses, homes and historic properties that abut the existing right of way, KTC should be aware of potential encounters with underground storage tank, asbestos, lead paint and other contaminants that need to be addressed and disposed of in accordance with the applicable regulations.

Division for Air Quality Comments

DAQ Comments: US 41A (Green Street) in Henderson County (SERO 2009-21)

As this project is presented, the owner or operator of this company should comply with any applicable Division for Air Quality permitting requirements contained in 401 KAR Chapter 52 Permits, Registrations, and Prohibitory Rules located at http://www.lrc.state.ky.us/kar/TITLE401.HTM and http://www.air.ky.gov/permitting/. For permitting information, please contact the Division for Air Quality Permit Review Branch Manager, at (502) 564-3999.

Kentucky Division for Air Quality Regulation **401 KAR 63:010** Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please see the Fugitive Emissions Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm

Kentucky Division for Air Quality Regulation **401 KAR 63:005** states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm

Finally, the projects listed in this document must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 23 and Title 49 of United States Code.

The Division also suggests an investigation into compliance with applicable local government regulations.

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Steven L. Beshear
Governor

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
www.air.ky.gov

Leonard K. Peters
Secretary

August 28, 2009

Mr. Keith R. Damron, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, Kentucky 40622

Dear Mr. Damron:

The Division has reviewed the planning study for evaluating proposed highway improvements for US 41A (Green Street) in Henderson in Henderson County, Item Number 02-410.00. The following Kentucky Administrative Regulations apply to this proposed project:

Kentucky Division for Air Quality Regulation **401 KAR 63:010** Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm.

Kentucky Division for Air Quality Regulation **401 KAR 63:005** states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. Open burning may be utilized for the expressed purposes listed on the Open Burning Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm. Although, vegetative matter accumulated by land clearing is included as a permissible method of disposal, the Division encourages the use of chipping and grinding in order to avoid excessive particulate emissions in the immediate vicinity of the project.

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Div. of Planning

Finally, the projects listed in this document must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 23 and Title 49 of United States Code.

Every effort should be made to maintain compliance with the preceding regulations and requirements. The Division also suggests an investigation into compliance with applicable regulations in the local governments.

The Division appreciates the opportunity to review this submittal. If you have any questions regarding this matter, please contact Joe Forgacs of my staff at (502) 564-3999.

Sincerely,

John E. Gowins

John E. Gowins
Supervisor, Evaluation Section
Program Planning & Administration Branch

JEG/jmf

Selected Report Condition(s): AI County = 'Henderson'

AI ID	AI Name	SI County	AAZZ#	SI Desg	SI Decription	Regulatory Desc	Site Status	Closure Option	Closure Dt	SI Long.	SI Lat.	AI Addr Line 1	AI Addr Line 2	AI City	AI St	AI Zip	AI Lat	AI Long	AI County	SI Addr Line 1	SI Addr Line 2	SI City	SI St	SI Zip
52066	City Park - Coast Guard Aid	Henderson	1	11358	CITY PARK - COAST GUARD AID (Closed: Option C Restored)	State Superfund	Closed	Option C Restored	08/11/2006	-87.57660	37.87550	Riverview Dr		Henderson	KY	42420	37.875500	-87.576600	Henderson	Riverview Drive		Henderson	KY	42420
52086	Seventh Street Drum	Henderson	1	673	SEVENTH STREET DRUM (Closed: Unfounded)	State Superfund	Closed	Unfounded	02/21/2001	-87.58876	37.84866	729 Merritt Dr		Henderson	KY	42420	37.848660	-87.588760	Henderson	729 MERRITT DRIVE		Henderson	KY	42420
5506	International Paper Company	Henderson	1	7054	WEYERHAEUSER CORP - HENDERSON CO. (Closed: No Action Necessary)	State Superfund	Closed	Option A No Action	01/17/2002	-87.59722	37.81028	1500 Commonwealth		Henderson	KY	42420	37.817778	-87.587222	Henderson	1500 COMMONWEALTH DR		Henderson	KY	42420
1809	Henderson Co Riverport Authority	Henderson	1	20376	HENDERSON COUNTY RIVERPORT AUTHORITY	Federal Superfund	Managed	Option B Contained/Man	11/29/2004	-87.65278	37.81250	6200 Riverport Rd		Henderson	KY	42420	37.812500	-87.650000	Henderson	6200 Riverport Road		Henderson	KY	42420
38468	Brenntag Mid-South Inc	Henderson	1	47913	P B & S CHEMICAL/BRENNTAG MID-SOUTH	State Superfund	Active			-87.65167	37.80389	1405 KY 136 W		Henderson	KY	42420	37.803850	-87.652748	Henderson	1405 HWY 136 W, PO BOX 20		Henderson	KY	42420 0020
53255	Old Henderson Rd Drum	Henderson	1	48587	OLD HENDERSON ROAD DRUM	State Superfund	Active					Old Henderson Rd		Henderson	KY	42420			Henderson	OLD HENDERSON RD		Henderson	KY	42420
38473	Pittsburg Tank & Tower Co Inc	Henderson	1	50693	PITTSBURG TANK & TOWER / PENNEL STREET SITE (Closed: Contained / Managed)	State Superfund	Managed	Option D Combination	08/10/2004	-87.57782	37.84044	515 Pennell St		Henderson	KY	42420	37.840444	-87.577889	Henderson	515 Pennel Street		Henderson	KY	42420
52049	Posey McCormick Property-Pittsburg Tank & Tower	Henderson	1	51199	PITTSBURG TANK & TOWER / POSEY MCCORMICK SITE (Closed : Contained /	State Superfund	Managed	Option B Contained/Man	11/10/2005	-87.45426	37.87643	7612 Baskett Cemetery Rd		Baskett	KY	42402	37.876427	-87.454255	Henderson	7612 Baskett Cemetery Road		Baskett	KY	42420
53250	Dennis Jones Property - Pittsburg Tank & Tower	Henderson	1	51201	DENNIS JONES PROPERTY/PITTSBURG TANK AND TOWER (Closed: Restored)	State Superfund	Closed	Option C Restored	09/20/1999	-87.53350	37.73135	13021 US 41 S		Robards	KY	424529 701	37.731351	-87.533496	Henderson	13021 HIGHWAY 41 SOUTH		Robards	KY	42452 9701
1802	Sunspring America	Henderson	1	20391	GAMCO / GAMCO PRODUCTS (OLD FACILITY)	State Superfund	Active			-87.57722	37.84028	1105 5th St		Henderson	KY	42420	37.840000	-87.577778	Henderson	1105 Fifth St		Henderson	KY	42420
50243	Adams St - Henderson Co	Henderson	1	20495	ADAMS STREET DEVELOPMENT	State Superfund	Active			-87.56769	37.83489	Adams St		Henderson	KY	42420	37.834890	-87.567690	Henderson	1100 N ADAMS ST		Henderson	KY	42420
43356	Henderson Landfill	Henderson	1	40463	Closed: Referred to Solid Waste Branch 29 Aug 2008 - OLD HENDERSON CO. LANDFILL /	State Superfund	Closed	Referred	08/29/2008	-87.53889	37.88722	790 Stratman Rd		Henderson	KY	42420	37.887222	-87.538889	Henderson	STATE RT 414 & GREEN RIVER RD		Henderson	KY	42420
53252	Green River Lock No 1	Henderson	1	47365	GREEN RIVER TANK	State Superfund	Active			-87.41109	37.86101	Dam Rd		Henderson	KY	42420	37.858352	-87.408576	Henderson	GREEN RIVER LOCK 1	Dam Rd	Henderson	KY	42420
52355	Doyle Harris Property	Henderson	1	47783	DAN FRITTS (FORMER DOYLE HARRIS PROPERTY) (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	08/11/2003	-87.60457	37.82237	1410 S Green St		Henderson	KY	424204 343	37.822366	-87.604566	Henderson	1410 S GREEN ST		Henderson	KY	42420 4343
5490	Vincent Industrial Plastics	Henderson	1	52342	AEROQUIP (Closed: Restored)	State Superfund	Closed	Option C Restored	09/01/1999	-87.56772	37.83364	232 Heilman Ave		Henderson	KY	42420	37.834444	-87.575278	Henderson	232 HEILMAN AVE		Henderson	KY	42420
53108	Saddlebrook Apartments	Henderson	1	2821	(Closed: Non-Incident: 2/23/2000) VILLAGE HOUSING CORPORATION - SADDLEBROOK	Petroleum Cleanup	Closed	Non-Incident	02/23/2000	-87.54167	37.86806	1051 Saddlebrook Dr		Henderson	KY	42420	37.868056	-87.541667	Henderson	1051 SADDLEBROOK DRIVE		Henderson	KY	42420
1809	Henderson Co Riverport Authority	Henderson	2	57600	HENDERSON COUNTY RIVERPORT AUTHORITY DRUMS (Closed: Restored)	State Superfund	Closed	Option C Restored	12/12/2001	-87.59000	37.83611	6200 Riverport Rd		Henderson	KY	42420	37.812500	-87.650000	Henderson	6200 RIVERPORT ROAD		Henderson	KY	42420
15765	US 60 - Henderson Co	Henderson	1	7968	CORYDON, CITY OF (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	08/30/2000	-87.70510	37.74236	US 60		Henderson	KY	42420	37.742360	-87.705100	Henderson	THIRD STREET AND US HIGHWAY 60		Corydon	KY	42406
1786	Accuride Corp Henderson	Henderson	1	37208	ACCURIDE CORPORATION (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	08/11/1995	-87.59000	37.83611	2315 Adams Ln		Henderson	KY	42420	37.805700	-87.566800	Henderson	2315 ADAMS LANE	Box 40	Henderson	KY	42420
53034	Baskett Grocery	Henderson	1	49612	BASKETT GROCERY (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	07/22/1998	-87.46294	37.87126	7536 Doctor Hodges Rd		Baskett	KY	42420	37.871262	-87.462936	Henderson	7536 DOCTOR HODGES ROAD		Baskett	KY	42420
53253	H&M LC/Hazex Construction - Merritt Place	Henderson	1	53050	H&M LC / HAZEX CONSTRUCTION - MERRITT PLACE (Closed: Contained/Managed)	State Superfund	Managed	Option B Contained/Man	08/12/1999	-87.59000	37.83611	Merritt Dr		Henderson	KY	42420	37.836110	-87.590000	Henderson	Merritt Drive	Betwee n 6th	Henderson	KY	42420
53254	Henderson Oil Drum	Henderson	1	33629	HENDERSON OIL DRUM (Closed: Restored)	State Superfund	Closed	Option C Restored	07/26/1994	-87.59000	37.83611	None		Henderson	KY	42420			Henderson	NONE		Henderson	KY	42420
53121	Osborne	Henderson	1	32522	OSBORNE (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	12/01/1995	-87.58102	37.82004	1621 Pringle St		Henderson	KY	42420	37.820043	-87.581015	Henderson	1621 PRINGLE STREET		Henderson	KY	42420
38468	Brenntag Mid-South Inc	Henderson	2	40395	P B & S (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	07/16/1996	87.65167	37.80389	1405 KY 136 W		Henderson	KY	42420	37.803850	-87.652748	Henderson	1406 KY 136W		Henderson	KY	42420
53062	Period Furniture	Henderson	1	51701	PERIOD FURNITURE (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	05/06/1999	-87.57927	37.82338	1700 E OByrne St		Henderson	KY	42419	37.823377	-87.579272	Henderson	1700 EAST OBYRNE STREET		Henderson	KY	42419
51718	Sunrise Tool & Die Inc	Henderson	1	47310	SUNRISE TOOL AND DIE (Closed: Unfounded)	State Superfund	Closed	Unfounded	03/13/1998	-87.59000	37.83611	2049 Cresline Dr		Henderson	KY	42420	37.810833	-87.574722	Henderson	4020 CRESTLINE DRIVE		Henderson	KY	42420
53081	Womacks Garage	Henderson	1	53634	WOMACKS GARAGE (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	11/03/1999	-87.57577	37.83436	1209 Lower 2nd St		Henderson	KY	42420	37.834361	-87.575771	Henderson	1209 LOWER SECOND STREET		Henderson	KY	42420
53081	Womacks Garage	Henderson	2	53635	WOMACKS GARAGE (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	11/03/1999	-87.57567	37.83432	1209 Lower 2nd St		Henderson	KY	42420	37.834361	-87.575771	Henderson	1215 LOWER SECOND STREET		Henderson	KY	42420
52822	Gertrude Givens Residence	Henderson	1	37620	GERTRUDE GIVENS RESIDENCE (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	08/18/1995	-87.59000	37.83611	2315 Sunset Ln		Henderson	KY	42420	37.871398	-87.575969	Henderson	2315 SUNSET LANE		Henderson	KY	
40341	Ohio River - Henderson Co	Henderson	1	64002	FUDS site is now an industrial park.	Federal Superfund	Active			-87.65227	37.81047	Ohio River		Henderson	KY	42420	37.937778	-87.582500	Henderson	Rt. 268	Ordnan ce	Henderson	KY	42420
52075	Henderson Drum Site		1	15765	HENDERSON DRUM SITE	State Superfund	Active					NONE		NONE	KY	NONE			Henderson	NONE			KY	
52901	Texas Gas - Henderson Co		1	20250	HENDERSON 1388C (Closed: Unfounded)	Petroleum Cleanup	Closed	Unfounded	11/04/1998	-87.59000	37.83611	Various		Henderson	KY	42420			Henderson	NONE			KY	
1803	Gibbs Die Casting Corp	Henderson	1	29401	GIBBS DIE CASTING ALUMINUM CORP. (Closed: Restored)	State Superfund	Closed	Option C Restored	07/13/1995	-87.64088	37.80507	369 Community Dr		Henderson	KY	42420	37.805230	-87.641820	Henderson	369 Community Drive		Henderson	KY	42420
51831	Willingham Mold Drums		1	61053	WILLINGHAM MOLD DRUMS (FORMER) (Closed: Restored)	State Superfund	Closed	Option C Restored	09/07/2004	-87.63611	37.80689	NONE		NONE	KY	NONE	37.806889	-87.636111	Henderson	NONE			KY	
52064	Webster Coal Co - Ritiki Mine		1	15794	WEBSTER COAL CO. - RITIKI MINE	State Superfund	Active					NONE		NONE	KY	NONE			Henderson	NONE			KY	
38449	Henderson Materials Inc		1	15775	HENDERSON MATERIALS MIDNIGHT DUMPING	State Superfund	Active					2351 Old Geneva Rd		Henderson	KY	42420	37.845000	-87.590833	Henderson	NONE			KY	
52901	Texas Gas - Henderson Co		2	20272	RECIPFUELDIXIE6225 (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	10/14/1998			Various		Henderson	KY	42420			Henderson	NONE			KY	
52901	Texas Gas - Henderson Co		4	20271	DIXIE TO STORAGE 4100 (Closed: Unfounded)	Petroleum Cleanup	Closed	Unfounded	10/13/1998			Various		Henderson	KY	42420			Henderson	NONE			KY	
52507	Stanley Property	Henderson	1	63226	STANLEY PROPERTY (Closed: No Action Necessary)	Petroleum Cleanup	Closed	Option A No Action	10/04/2002	-87.45297	37.84947	6287 E Doubletree Dr		Henderson	KY	42420	37.849471	-87.452965	Henderson	6287 E Doubletree Drive		Henderson	KY	42420
52092	Laketown Rd - Henderson Co	Henderson	1	15781	LAKETOWN ROAD	State Superfund	Active			-87.31300	37.87920	Laketown Rd		Reed	KY	42451	37.879200	-87.313000	Henderson	Lake Town Rd.		Reed	KY	42451
52058	Scott Lester Residence		1	15784	LESTER (SCOTT) RESIDENCE	State Superfund	Active					NONE		NONE	KY	NONE			Henderson	NONE			KY	
52901	Texas Gas - Henderson Co		3	20249	HENDERSON 1388 (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	11/04/1998	-87.59000	37.83611	Various		Henderson	KY	42420			Henderson	NONE			KY	
53575	Race Creek - Henderson Co	Henderson	1	12468 2	RACE CREEK	State Superfund	Active			-87.41361	37.85750	US 60		Spottsville	KY	42458	37.857500	-87.413610	Henderson	(Creek) Off US60	across from	Henderson	KY	42420

52901	Texas Gas - Henderson Co		5	20270	MORGANFIELD 1689 (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	10/13/1998			Various		Henderson	KY	42420			Henderson	NONE			KY	
53251	Effie Walker Transformers	Henderson	1	12075	EFFIE WALKER TRANSFORMERS (Closed: Restored)	State Superfund	Closed	Option C Restored	04/09/2001	-87.49511	37.72542	14830 Hwy 136 E		Niagara	KY	42420	37.725420	-87.495110	Henderson	14830 Hwy 136 E		Niagara	KY	42420
1786	Accuride Corp Henderson	Henderson	2	41414	ACCURIDE CORPORATION (Closed: Restored)	Federal Superfund	Closed	Option C Restored	09/26/1996	-87.56680	37.80570	2315 Adams Ln		Henderson	KY	42420	37.805700	-87.566800	Henderson	2315 Adams Ln		Henderson	KY	42420
52447	Kurtz Property	Henderson	2	43902	KURTZ PROPERTY (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	03/17/1997	-87.53805	37.75855	9603 Hwy 136 E		Henderson	KY	42420	37.758549	-87.537940	Henderson	9603 Highway 136 East		Anthoston	KY	42420
52079	Cleotus Fegget Residence		1	15761	FEGGET (CLEOTUS) RESIDENCE	State Superfund	Active					NONE		NONE	KY	NONE			Henderson	NONE			KY	
52083	Spottsville Drum Site	Henderson	1	15791	(nonincident 1/7/04) SPOTTSVILLE DRUM SITE	State Superfund	Closed	Non-Incident	01/07/2004	-87.43472	37.85944	West of 9565 Ridgwood Road		Spottsville	KY	42458	37.859440	-87.434720	Henderson	West of 9565 Ridgwood Road	west of 9565	Spottsville	KY	42451
52083	Spottsville Drum Site	Henderson	1	15791	(nonincident 1/7/04) SPOTTSVILLE DRUM SITE	State Superfund	Closed	Non-Incident	01/07/2004	-87.43472	37.85944	West of 9565 Ridgwood Road		Spottsville	KY	42458	37.859440	-87.434720	Henderson	West of 9565 Ridgwood Road	west of 9565	Spottsville	KY	42451
1788	Alcan Primary Metals Group - Sebree Works		1	15757	ALCAN INGOT AND RECYCLING	State Superfund	Active					9404 KY 2096		Robards	KY	42452	37.669889	-87.489361	Henderson	NONE			KY	
38468	Brenntag Mid-South Inc		3	15790	PB&S CHEMICAL CO.	State Superfund	Active					1405 KY 136 W		Henderson	KY	42420	37.803850	-87.652748	Henderson	NONE			KY	
52686	Latta Development	Henderson	1	38850	LATTA DEVELOPMENT (Closed: Unfounded)	Petroleum Cleanup	Closed	Unfounded	01/04/1996	-87.61350	37.81240	Arbor Dr	SW side on bank	Henderson	KY	42420	37.812400	-87.613500	Henderson	Arbor Drive	Southwest of	Henderson	KY	42420
52090	Oil Refinery	Henderson	1	15788	OIL REFINERY (OLD)	State Superfund	Active			-87.42316	37.87683	Jct of KY 1078 & Reisnerg Rd		Spottsville	KY	42458	37.876769	-87.423166	Henderson	Jct of KY 1078 & Reisnerg Rd		Spottsville	KY	42458
66541	Henderson Co Toll Plaza	Henderson	2	KTC Proper	Closed Option A (No Action Required) 92 MOA	State Superfund	Closed	Option A No Action	08/27/2007	-87.39581	37.75206	Audubon Pkwy Inter Chg & KY		Hebbardsville	KY	42420	37.752495	-87.396068	Henderson	2630 HWY 416 E		Hebbardsville	KY	42040
1802	Sunspring America	Henderson	4		Chromium 6+ release into groundwater	State Superfund	Active			-87.57722	37.84028	1105 5th St		Henderson	KY	42420	37.840000	-87.577778	Henderson	1105 South Fifth St		Henderson	KY	42420
1821	Henderson Co State Maintenance Garage	Henderson	2	KTC Histori	92 MOA	Petroleum Cleanup	Active			-87.56843	37.80464	2280 Adams Ln		Henderson	KY	42420	37.805157	-87.568349	Henderson	2280 Adams Lane		Henderson	KY	42420
52540	CR Mining	Henderson	1	113310	CENTENNIAL RESOURCES	Federal Superfund	Active			-87.39717	37.82158	Jct ofJones Rd & Chaney Rd		Spottsville	KY	42458	37.821583	-87.397167	Henderson	Jones Road		Spottsville	KY	42458
104390	Housing Authority of Henderson KY Property	Henderson	1	Meth Lab	24-C Lawndale Ct Meth Lab (Closed 5-18-09)	State Superfund	Closed	Option C Restored	05/18/2009	-87.58659	37.82734	24-C Lawndale Ct		Henderson	KY	42420	37.827336	-87.586594	Henderson	24-C Lawndale Ct		Henderson	KY	42420
104391	Brent Wilkerson Property	Henderson	1	Meth Lab	807 Mill Street Meth Lab (Closed 5/18/09)	State Superfund	Closed	Option C Restored	05/18/2009	-87.58418	37.82397	807 Mill St		Henderson	KY	42420	37.823966	-87.584181	Henderson	807 Mill Street		Henderson	KY	42420
83315	Henderson Municipal Power and Light Transformer Spill		1	Transformer	Limited impact	Petroleum Cleanup	Closed	Option A No Action				Behind 1300 S Green St		Henderson	KY	42420	37.822778	-87.603000	Henderson					
99449	US 41 S Weigh Station - Henderson Co	Henderson	1	KTC Proper	92 MOA- Closed 7/22/08 Option A	State Superfund	Closed	Option A No Action	07/22/2008	-87.54938	37.91933	US 41 S		Henderson	KY	42420			Henderson	US HWY 41		Henderson	KY	42420
100006	Henderson Municipal Power & Light Transformer Spill (behind	Henderson	1	Transformer	PCB contaminated soil	Petroleum Cleanup	Closed	Option A No Action	10/24/2008	-87.57233	37.86153	Behind 1900 US 41 N #8		Henderson	KY	42420	37.861528	-87.572333	Henderson	1900 US 41 North #8		Henderson	KY	42420
104897	Jobe Properties	Henderson	1	Meth Lab	305 Main Street Meth Lab (Closed 7/15/09)	State Superfund	Closed	Option C Restored	07/15/2009	-87.70508	37.74239	305 Main St		Corydon	KY	42406	37.742387	-87.705082	Henderson	305 Main Street		Corydon	KY	42406
52068	Watson Landing - Coast Guard Aid	McLean	1	11357	WATSON LANDING - COAST GUARD AID (Closed: Option C Restored)	State Superfund	Closed	Option C Restored	08/11/2006	-87.25200	37.55200	KY 136		Calhoun	KY	42327			Henderson	KY 136		Calhoun	KY	42327
38472	Pittsburg Tank & Tower Co Inc	Henderson	1	51200	(Closed: No Action Necessary 29 July 2009) PITTSBURG TANK & TOWER / CAIRO SITE	State Superfund	Closed	Option A No Action	07/29/2009	-87.65679	37.69851	6541 Cairo-Dixie Rd		Corydon	KY	42406	37.699444	-87.658889	Henderson	6541 Cairo-Dixie Road		Cairo	KY	42406 9733
38472	Pittsburg Tank & Tower Co Inc	Henderson	1	51200	(Closed: No Action Necessary 29 July 2009) PITTSBURG TANK & TOWER / CAIRO SITE	State Superfund	Closed	Option A No Action	07/29/2009	-87.65679	37.69851	6541 Cairo-Dixie Rd		Corydon	KY	42406	37.699444	-87.658889	Henderson	6541 Cairo-Dixie Road		Cairo	KY	42406 9733
3240	Texas Gas Transmission LLC - Dixie Transmission Station		2		TX GAS DIXIE TRANS STA		Active					6321 KY 145		Corydon	KY	42406	37.671472	-87.669944	Henderson					
38434	CSX	Henderson	1	31693	CSX/LES BAR (Closed: Restored)	State Superfund	Closed	Option C Restored	05/05/1994	-87.58401	37.84074	4th & Adams		Henderson	KY	42420	37.840636	-87.584028	Henderson	Corner of 4th St & Adams St		Henderson	KY	42420
52087	Tobacco Patch - Coast Guard Aid	Hopkins	1	11359	TOBACCO PATCH COAST GUARD AID (Closed: Option C Restored)	State Superfund	Closed	Option C Restored	08/11/2006	-87.42700	37.52600	KY 370		Slaughters	KY	42456			Henderson	KY 370		Slaughters	KY	42456
53117	Alves Property	Henderson	1	31973	ALVES PROPERTY (Closed: Restored)	Petroleum Cleanup	Closed	Option C Restored	10/12/1994	-87.59000	37.83611	2322 S Green St		Henderson	KY	42420	37.803437	-87.638560	Henderson	2322 SOUTH GREEN STREET		Henderson	KY	
Total Number of Records	71																							

Heberle, Doug

From: Daniell, Robert (EEC) [robert.daniell@ky.gov]
Sent: Monday, August 24, 2009 8:27 AM
To: Gilbert, George (EEC)
Subject: FW: Planning Study Henderson Co.

Rob Daniell, Manager
Underground Storage Tank Branch
200 Fair Oaks
Frankfort, KY 40601
(502) 564-5981

From: Baase, Dawn (EEC)
Sent: Friday, August 21, 2009 11:36 AM
To: Daniell, Robert (EEC)
Subject: RE: Planning Study Henderson Co.

UST Branch sends the following comments regarding Item No. 02-410.00:

The USTB identified 29 facilities with a total of 99 registered underground storage tanks. Out of the 99 registered underground storage tanks, 77 have been closed, 18 are active, and 2 are listed as abandoned. There are 8 facilities currently undergoing corrective actions within the project area due to soil and/or groundwater contamination.

AI_ID	AI_NAME	X_COORD	Y_COORD	USER_GROUP	ALT_AI_ID	Active	Closed	Contamination	UST_Phase
61163	Hazelwood Service Center	-87.589311	37.837757	UST ID Number	9064051		4	Groundwater Contamination	Corrective Action
75566	Branson Property	-87.58958	37.839917	UST ID Number			5	Groundwater Contamination	Site Investigation
77376	McGaw Property	-87.58601	37.84326	UST ID Number			3	Groundwater Contamination	Site Investigation
61123	Scot Market No 75	-87.586784	37.842207	UST ID Number	1276051		3	Soil & Groundwater Contamination	Corrective Action
61131	Swifty Station No 231	-87.621115	37.8118	UST ID Number	1852051	4		Soil & Groundwater Contamination	Site Investigation
61134	The Pantry No 800	-87.60109	37.82528	UST ID Number	4336051		3	Soil & Groundwater Contamination	Site Investigation
61144	Larrys Sunoco	-87.590179	37.836984	UST ID Number	2520051		7	Soil & Groundwater Contamination	Site Investigation
61175	E Z Service Station No 1	-87.59	37.8375	UST ID Number	9653051		4	Soil & Groundwater Contamination	Site Investigation
61125	Second & Green Self Service	-87.589626	37.839972	UST ID Number	3365051		3		
61140	Thorntons Inc #86	-87.582187	37.848622	UST ID Number	1001051	5			
61145	Lot Of Bargains	-87.580361	37.852058	UST ID Number	314051		3		
61147	Marathon Unit 1767	-87.603611	37.823056	UST ID Number	2516051		5		
61155	Platolene 500 Inc	-87.620854	37.811618	UST ID Number	3977051		5		
61168	Chuckles Food Mart #32	-87.587335	37.840313	UST ID Number	6028051	2	6		
61171	C L Frank Produce	-87.617656	37.814311	UST ID Number	9630051		1		
61174	Dodges Store	-87.595312	37.832154	UST ID Number	6309051	5			
61180	Fast Fuel/Country Cupboard 6	-87.617778	37.814389	UST ID Number	20020681	2			
61202	Chevron 0049045	-87.604712	37.822268	UST ID Number	4956051		4		
64100	K Mart 9635	-87.613101	37.817156	UST ID Number	3570051		1		
64902	Henderson Area Rapid Transit	-87.5884366	37.842715	UST ID Number	3304051		3		
65201	Henderson Save Store-Bigfoot 91	-87.593502	37.833605	UST ID Number	1792051		3		
65286	Southern Indiana Tire	-87.578793	37.854085	UST ID Number	1681051		1		
66524	South Central Hnsnkykma Real Es	-87.584552	37.842698	UST ID Number	757051		1		
67056	Goads Shell	-87.603371	37.823512	UST ID Number	6849051		6		
67114	Mid City Auto	-87.589891	37.837261	UST ID Number	1003051		1		
68044	Shannon Lumber Co	-87.608475	37.820121	UST ID Number	6026051		1		
68098	Firestone	-87.584791	37.845086	UST ID Number	5880051		1		
68587	Schmidt Inc (Goodyear Asc)	-87.581669	37.850058	UST ID Number	9153051		3		
80992	Shell Service Station	-87.610577	37.818842	UST ID Number				4 Abandoned Tanks	
						18	77		

Please notify the UST Branch if additional information is required.

Dawn Langford Baase
Division of Waste Management
Underground Storage Tank Branch
200 Fair Oaks Ln
Frankfort, KY 40601
phone: 502-564-5981 ext. 4014
fax: 502-564-0094

From: Daniell, Robert (EEC)
Sent: Monday, August 10, 2009 1:02 PM
To: Baase, Dawn (EEC)
Subject: FW: Planning Study Henderson Co.

Rob Daniell, Manager
Underground Storage Tank Branch
200 Fair Oaks
Frankfort, KY 40601
(502) 564-5981

From: Gilbert, George (EEC)
Sent: Monday, August 10, 2009 11:50 AM
To: Cooley, Tony (EEC); Gritton, Sharon (EEC); Tan, Wilson (EEC); Daniell, Robert (EEC); Hubbard, Tim (EEC); Maybriar, Jon (EEC); Pratt, Jeff (EEC); Webb, April (EEC)
Cc: Tichenor, Larry (EEC)
Subject: FW: Planning Study Henderson Co.

Please review the following TC study and forward the list of sites and comments by COB Monday, Aug. 24. Thx.

From: Perry, Jennie (EEC)
Sent: Monday, August 10, 2009 9:28 AM
To: Gilbert, George (EEC)
Subject: Planning Study Henderson Co.

I placed the original in your inbox. The file is too large to email so it's on the v drive here: Planning Study Henderson Co.

Jennie Perry
Division of Waste Management
Director's Office
200 Fair Oaks, 2nd Floor
Frankfort, KY 40601
Tel: 502-564-6716, x4604
Fax: 502-564-4049

Heberle, Doug

From:	Cooley, Tony (EEC) [tony.cooley@ky.gov]
Sent:	Monday, August 24, 2009 2:35 PM
To:	Gilbert, George (EEC)
Cc:	Yarnell, Bill (EEC)
Subject:	RE: Planning Study Henderson Co.
Attachments:	9051-001-0004_E02-001.jpg

Attached is a map showing the known waste areas of solid waste landfills related to Henderson City.

The southern waste area is on Henderson Hospital property, was used from the 1940's until 1961, occupies about 5 acres, and is mostly utilized for parking areas. It currently has no AI number or SW permit number. Our index number in our database is 9051.008. There is an HB 174 Stage 1 characterization of this site done by Bell Engineering in 2007.

The northern waste area is within Atkinson Park, was used from 1961 to 1972, occupies about 15 acres, and is mostly covered with baseball diamonds and other park uses. Its AI number is 71420, permit SW051-00001 and index number in our database is 9051.001. There is an HB 174 Stage 1 characterization of this site done by Kenvirons in 2006.

It is unlikely that the proposed road work will interact with this site. This is the only solid waste site in our database near the proposed work.

Tony Cooley ***P.E., P.G.***
Environmental Engineer II
EEC-DEP Division of Waste Management
Solid Waste Branch, Closure Section
502-564-6716
502-564-8158 ext 4654 (direct)

From: Gilbert, George (EEC)
Sent: Monday, August 10, 2009 11:50 AM
To: Cooley, Tony (EEC); Gritton, Sharon (EEC); Tan, Wilson (EEC); Daniell, Robert (EEC); Hubbard, Tim (EEC); Maybriar, Jon (EEC); Pratt, Jeff (EEC); Webb, April (EEC)
Cc: Tichenor, Larry (EEC)
Subject: FW: Planning Study Henderson Co.

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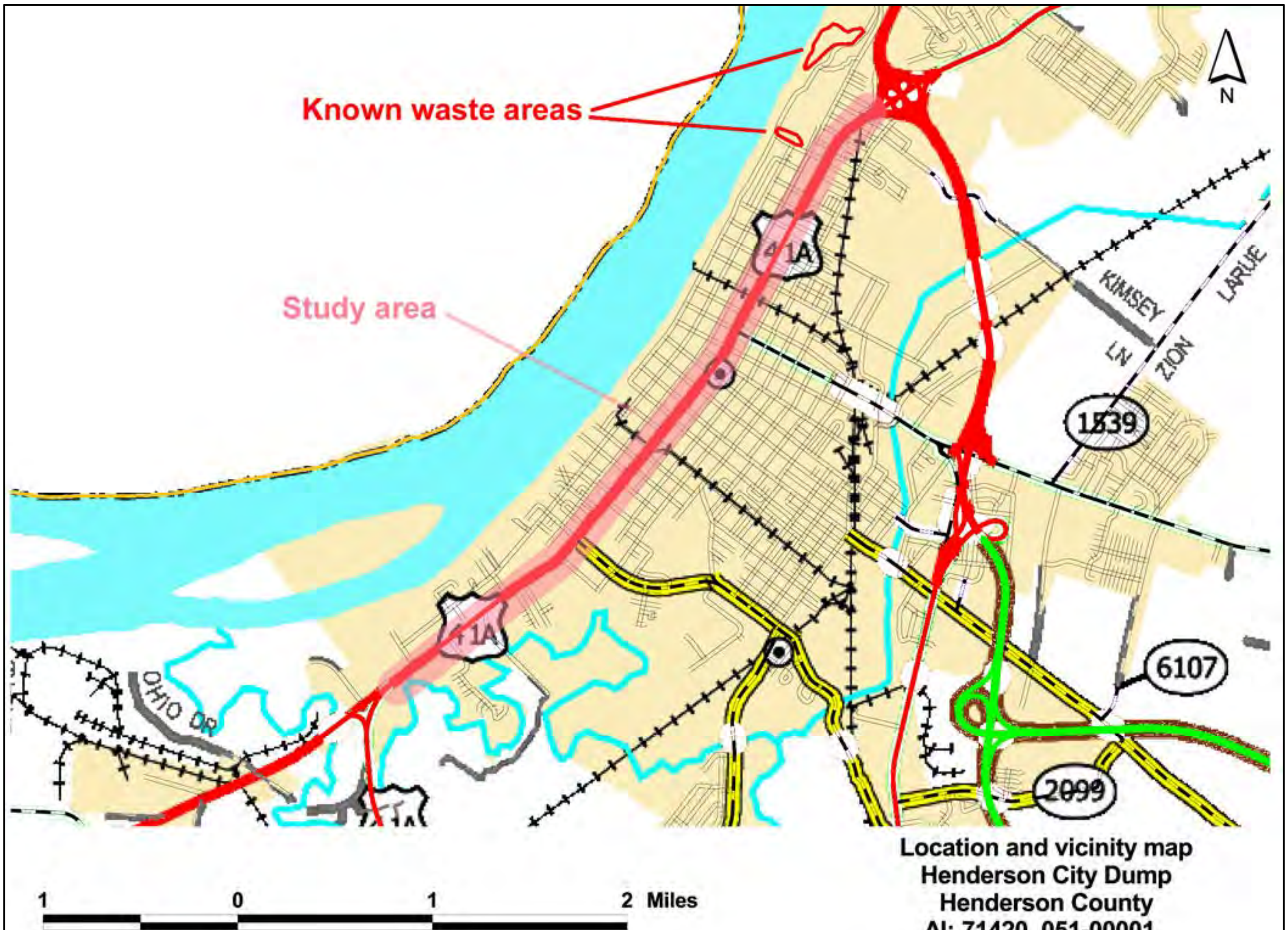
From: Perry, Jennie (EEC)
Sent: Monday, August 10, 2009 9:28 AM
To: Gilbert, George (EEC)
Subject: Planning Study Henderson Co.

I placed the original in your inbox. The file is too large to email so it's on the v drive here: Planning Study Henderson Co.

Jennie Perry
Division of Waste Management
Director's Office
200 Fair Oaks, 2nd Floor
Frankfort, KY 40601
Tel: 502-564-6716, x4604
Fax: 502-564-4049



Location and vicinity map
Henderson City Dump
Henderson County
AI: 71420 051-00001

ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

Department for Natural Resources
2 Hudson Hollow
Frankfort, Kentucky 40601
Phone (502) 564-6940
Fax (502) 564-5698
www.eec.ky.gov
www.dnr.ky.gov

Leonard K. Peters
Secretary

Carl E. Campbell
Commissioner

September 2, 2009

Keith R. Damron, P.E., Director
Division of Planning, Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, KY 40622

Dear Mr. Damron:

We have reviewed our records in conjunction with the proposed Henderson County project and have indicated, on the enclosed map, areas of existing mining within the project area. Please contact John Hiett at (502) 53-0140 for more information regarding the mining in the project area.

Sincerely,

Carl E. Campbell

Carl E. Campbell, Commissioner
Department for Natural Resources

CEC/mm

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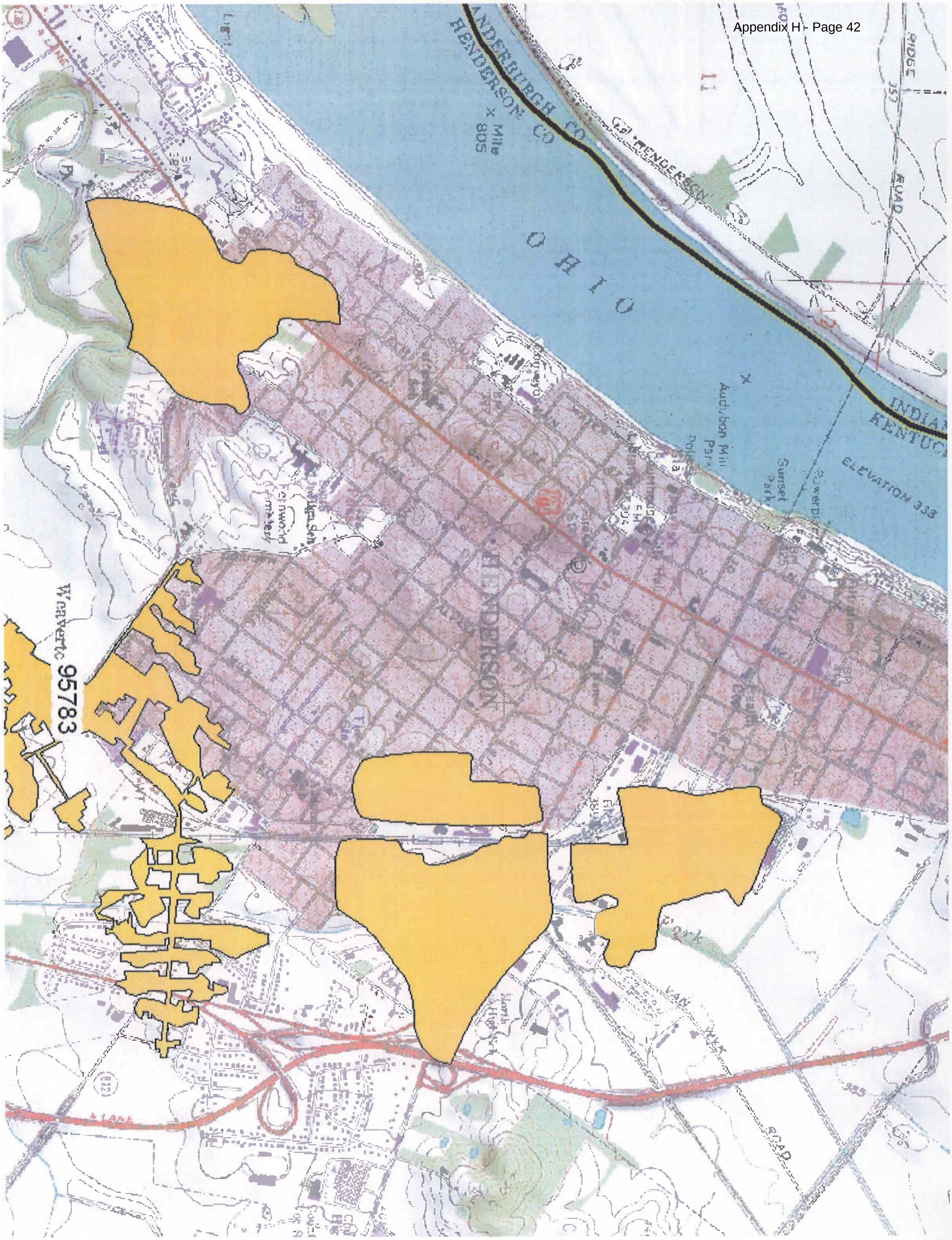
Div. of Planning


VANDERBURGH CO
HENDERSON CO
Mile 805
OHIO
INDIANA
KENTUCKY
ELEVATION 333
Audubon Mill Park
Sunset Park
HENDERSON
95783

J. L. Nicholson Mining & Manufacturing began 1908
No. 9 seam 4'2" thick, 190 feet to top of coal

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UK
UNIVERSITY OF KENTUCKY

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

August 28, 2009

Keith R. Damron, P.E.
Director, Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, KY 40622

RECEIVED
SEP 04 2009
Div. of Planning

Dear Mr. Damron:

Subject: Planning Study response
Henderson County
US 41A (Green Street) in Henderson
Item # 02-410.00

This letter is in response to your request for comments concerning the proposed improvement alternatives for US-41A in Henderson County. The Kentucky Geological Survey has been mapping in the Henderson area since 2004, and has geological data available to share with KTC personnel in this project as desired. The KGS has bedrock and unconsolidated geologic maps, depth to bedrock data, subsurface borings, and seismic shear-wave profiles along or very near the proposed corridor of US 41A improvements. These maps and subsurface data can be provided to the Geotechnical Division in the future upon request.

The bedrock lithologies present along this portion of US-41A include sandstone, shale, coal and minor limestone. None of these materials are directly exposed at the surface in the indicated project corridor. However, drilling associated with our ongoing mapping effort in the area has indicated that highly weathered bedrock may be present below loess in the low upland areas in the central part of your project area. Depth to bedrock varies significantly through the project corridor, ranging from 30 feet to greater than 100 feet in our subsurface borings.

Our mapping has identified the following unconsolidated deposits over bedrock:

Sand dunes: these deposits are dominated by well sorted (poorly graded) fine sand and silt (SP and SM). These materials typically have poor cohesion when dry or exposed, and are commonly interbedded with loess layers.

Loess: these deposits are dominated by silt (ML, CL, CH) and are typical,ly 30 to more than 50 feet thick. These materials can have low strength when saturated.

Lacustrine and paleo-levee deposits: these deposits typically include fine-grained materials such as silt and clay (CL, ML, CH) to a depth of at least 45 feet, with total bedrock depth generally deeper. The unconsolidated material (engineering soils) below that depth is unpredictable and can range from clay to coarse sand.

KGS

Geotechncial reports we have on file indicate very low n-values (<5) for materials locally within the top 35 feet of the corridor as well, especially in the lacustrine and paleolevee map units.

Of particular importance for construction in this area is the potential for thixotropic materials; these are typically fine-grained deposits which can lose all cohesion and load-bearing strength when disturbed with shaking or vibration. They typically are found in the upper 30 feet of the lacustrine, paleolevee and loess map units; our investigations have found they are common within these units.

Issues or concerns that may affect the improvements along US-41A include low/no cohesion in sands when dry, low strength in fines when saturated, variable depth to bedrock, and the potential presence of thixotropic fine-grained materials throughout most of the corridor.

None of the geologic features observed in the field area would preclude improvements on or alternative routes along US-41A. WE will provide any copies of our mapping or supporting data to KTC personnel upon request if it can be of further assistancein the planning process.

Sincerely,

William M. Andrews

William M. Andrews Jr.
Geologist and Head, Geologic Mapping Section
Kentucky Geological Survey
Email: wandrews@uky.edu
Phone: 859-323-0506 (direct line)

EVANSVILLE MPO

Evansville Metropolitan Planning Organization

Civic Center Complex, Room 316, 1 N.W. Martin Luther King Jr. Blvd., Evansville, IN 47708-1833
PH: (812) 436-7833 FAX: (812) 436-7834 www.evansvillempo.com

Bradley G. Mills, P.E., Executive Director

TO: Keith R. Damron, Director, Division of Planning, KYTC

FROM: Bradley G. Mills, Executive Director BGM

SUBJECT: US 41A/Green Street planning study

DATE: August 28, 2009

The MPO supports any necessary improvements that will increase safety and efficiency along this corridor as indicated by the MPO's recommendations published in the Green Street Corridor Study in 1999, or as a result of more recent studies by the KYTC. The MPO requests consideration of the following recommendations:

- Review and relocate traffic signs to provide proper advance warning.
- Prohibit through traffic at particularly hazardous offset intersections.
- Close median openings near the US 41 interchange.
- Review and relocate or close if possible accident-prone private access locations.
- Address capacity/efficiency issues at signalized intersections.
- Maximize intersection site distances by removing or relocating encroachments.
- Increase vertical clearance issues, if possible, for freight vehicles traveling under the CSX overpass.
- Improve or maintain bicycle and pedestrian functionality along the corridor and at the signalized intersections.

Should you have any questions, or if you require additional information, please contact myself or Laura Lamb in our office.

BGM/LL

HCCPC
Henderson City-County Planning Commission

Peggy Wood
Executive Director

August 19, 2009

Keith R. Damron, P.E. Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor West
Frankfort, Kentucky 40622

Dear Keith:

The Henderson City-County Comprehensive Plan adopted August 2006 addresses this section of Highway in the Transportation Chapter. Specifically as follows:

"Improvements to US41A/Green Street: U.S. 60 to U.S. 41

This project will result in safer and more efficient travel through downtown Henderson by providing a continuous two-way left turn lane between US 60 to US 41. This improvement will result in fewer accidents for vehicles using the numerous commercial accesses along this corridor and will allow for better traffic flow in general". Traffic congestion and safety are current concerns along this section of highway.

Further, the Comprehensive Plan plans for all new accesses along this corridor to adhere to the Access Standards Manual.

Respectfully Submitted

Peggy Wood

Peggy Wood
Executive Director

cc: Buzzy Newman, Assistant City Manager

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SEP 01 2009
Div. of Planning

1990 Barret Court • Suite C • Henderson, KY 42420 • Phone (270) 831-1289 • Fax (270) 831-1237
Email:pwood@hendersonplanning.org
www.hendersonplanning.org

Henderson County Schools

1805 Second Street
Henderson, Kentucky 42420
Telephone: (270) 831-5000 Fax: (270) 831-5009

Preparing Students To Succeed Globally
Henderson County Schools
Henderson, Kentucky

August 12, 2009

Dear Mr. Damron:

Thank you for the opportunity to provide input and comments for this potentially very important project. I have listed below the comments and concerns provided by Administrative Staff.

COMMENTS

- Current area along Green Street at Jefferson Elementary includes fencing and playground area
- Construction project at Seventh Street Elementary - converting school to an early childhood center

CONCERNS

- Concern – potential land loss at Jefferson Elementary, 315 Jackson Street and Seventh Street Elementary, 328 7th Street
- Concern - impact of construction project while school is in session in regards to bus transportation and traffic flow

Again, I appreciate your consideration and hope you will contact me if I can be of further assistance in the future.

Sincerely,

Thomas L. Richey

Thomas L. Richey, Ed, D
Superintendent

TLR/sr

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AUG 17 2009
Div. of Planning

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Thomas E. Davis, Mayor

Commissioners:
William M. Farmer
Robert M. Mills
Robert N. Pruitt
James A. White, Jr.

The City of Henderson

P.O. Box 716
Henderson, Kentucky 42419-0716

HENDERSON
John J. Audubon's
KENTUCKY HOME

Russell R. Sights, City Manager
William L. Newman, Jr., Assistant City Manager
Joseph E. Ternes, Jr., City Attorney
Carolyn Williams, City Clerk

August 19, 2009

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

RE: Planning Study
Henderson County
US 41A (Green Stree)
Item No. 02-410.00

Dear Mr. Damron:

Pursuant to your request for comment, attached for your review are the City of Henderson's comments on the US 41A (Green Street) study. The review was conducted by Engineering, Code Enforcement, and the Henderson Water Utility departments. The Henderson City-County Planning Commission will be sending their comments separately.

Hopefully our comments are beneficial and we appreciate the opportunity to review and comment on this project.

Sincerely,

Will L Newman Jr

William L. "Buzzy" Newman, Jr.

/dmc
Enclosures

c: Doug Boom, Engineer
John Stroud, Code Administrator
Ken Ferry, HWU Lead Engineer

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AUG 24 2009
Div. of Planning

Mr. Keith Damron, P.E.
August 19, 2009
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Planning Study
Henderson County
US 41A (Green Stree)
Item No. 02-410.00

1. The City of Henderson agrees with the project goals and needs based upon the increase in traffic usage and the evolving development along this corridor. The comments that follow include information that we received from our Police and Fire Department data regarding traffic accidents that have occurred over the past three years.

2. Specific issues and requests:

    a. Consideration for continuous center turning lanes at the following locations:
        - 5th Street
        - Clay Street
        - Martin Luther King Blvd/Dixon Street
        - Kresge Drive

    b. Install median crossing barrier at Richardson.

3. Possible purchase of properties to better align crossing streets i.e., Martin Luther King Blvd/Dixon Street and Clay Streets.

4. There are proposed development plans between 2nd and Washington Streets that may affect future planning. The Henderson City-County Planning Commission can provide further insight into this development process and the potential for growth.

5. Signage standards located along this corridor have been of significant issue with business owners in the past. The proposed project may have a significant impact with the business owners and the relocation of these signs.

6. All entrances conform to the Henderson City/County Access Standards Manual and Evansville Metropolitan Planning Organization (EMPO) Green Street corridor study.

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7. Although not a significant number of businesses are affected, in an area between 7th and 8th Streets there has been an issue in the past of business parking because of vehicles backing into the lane of traffic. Clear right-of-way of parking on lots and backing out of vehicles onto street areas.

8. The lane width and height restrictions at 4th Street due to the railroad overpass have been a long-standing problem. Railroad overpass requires additional clearance and longer vertical curve for gradual approach to overpass. In regard to the width, the only solution would be to place a longer span with new piers.

9. Additional drainage along northeast side of Green Street from 14th to 12th (super elevated section) as storm water drainage at 14th and Green Streets has presented minor flooding issues at this intersection.

Peggy Wood

From: Ken Ferry [ferryk@hkywater.org]
Sent: Thursday, August 27, 2009 9:38 AM
To: Peggy Wood
Cc: Bruce Shipley; Rodney Michael
Subject: RE: Comments on Green St project

Sorry for not getting this to you sooner. I just got back from a few days vacation wrapped around getting two kids moved to college.

The HWU comments associated with the Green Street Corridor project at this time are:

1. There will need to be coordination with HWU relating to our downtown sewer separation project.
2. There may need to be coordination with HWU relating to our Canoe Creek Interceptor project.
3. Drainage needs to be improved at or near the intersections of Green Street and 12th, 10th, and 8th Streets. HWU anticipates separating the combined sewers in the area between 4th and 12th Streets and between Green Street and the Ohio River. Coordination with this effort is needed in order to reroute the drainage of Green Street in this area from Canoe Creek to the Ohio River.
4. There are current drainage issues in the vicinity of Smith Avenue that will likely need to be addressed as part of this project.
5. HWU has a very old 20-inch CI water transmission main beneath the existing Green Street pavement between Vine and 10th Streets that will require careful treatment in order not to cause a major water service interruption to our customers.

Ken
-----Original Message-----
From: Peggy Wood [mailto:pwood@hendersonplanning.org]
Sent: Wednesday, August 26, 2009 8:42 AM
To: Ken Ferry
Subject: Comments on Green St project

Ken, will you e-mail me your comments from our meeting the other day, I need to get these in the mail to the transportation cabinet today.
Thanks, Peggy

APPENDIX I
PREVIOUS AREA STUDIES

CONGESTION MANAGEMENT SYSTEM (CMS) STUDY

prepared by:

EVANSVILLE URBAN TRANSPORTATION STUDY
1 NW Martin Luther King Boulevard
Room 316 - Civic Center Complex
Evansville, IN 47708

July 2004

This report financed in part through the Federal Highway Administration

and the Federal Transit Administration of U.S. Department of Transportation.

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EVANSVILLE URBAN TRANSPORTATION STUDY POLICY COMMITTEE

Ms. Catherine Fanello	-	Chairperson, Vanderburgh Co. Commissioner
Mr. Stephen Melcher	-	V. Chairperson, City of Evansville
Mr. Jack Corn, Jr.	-	Evansville City Council Appointment
Mr. Jonathan Weinzapfel	-	Mayor, City of Evansville
Mr. Jeffrey Broughton	-	Henderson City Manager
Ms. Mae Mason	-	Newburgh Town Board
Mr. Lloyd Winnecke	-	Vanderburgh Co. Council
Mr. Don Williams	-	Warrick County Commission
Mr. J. Bryan Nicol	-	INDOT
Mr. Robert F.Tally, Jr.	-	Indiana FHWA (NV)
Ms. Joyce Newland	-	Indiana FHWA (NV)
Ms. Janet McCabe	-	Indiana DEM (NV)
Ms. Rhonda Reed	-	FTA (NV)
Mr. Jose Sepulveda	-	Kentucky FHWA (NV)
Mr. Maxwell Clay Bailey	-	KY Transp. Cabinet
Mr. Michael Hill	-	KY Transp. Cabinet (NV)
Mr. Edward H. Merryman	-	KY Transp. Cabinet (NV)
Mr. John Gowins	-	KY Division of Air Quality (NV)
Mr. Sandy Watkins	-	Judge Executive, Henderson County

EVANSVILLE URBAN TRANSPORTATION STUDY

Ms. Rose M. Zigenfus	-	Executive Director
Ms. Pamela Drach	-	Deputy Director/Chief Engineer
Mr. Seyed Shokouhzadeh	-	Chief Transportation Planner
Mr. Brian Howard	-	Senior Transportation Planner
Mr. Doug Lane	-	Transportation Planner
Mr. Craig Luebke	-	Transportation Planner
Ms. Melanie Wellman	-	Transportation Planner
Ms. Kari Akin	-	Accountant
Ms. Lauri Lutz	-	Secretary

(NV) = Non-Voting

TECHNICAL COMMITTEE

Mr. Patrick Keepes	-	Chairperson, Evansville City Engineer
Mr. John Stoll	-	V. Chairperson, Vanderburgh County Engineer
Mr. Brad Mills	-	Evansville-Vanderburgh Co. Area Plan Commission
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Ms. Bernadette Dupont	-	Federal Highway Administration (Kentucky)
Ms. Rhonda Reed	-	Federal Transit Administration (Chicago)
Ms. Gina Boaz	-	Green River Area Development District
Ms. Pam Whitter	-	Henderson Area Rapid Transit
Ms. Peggy Wood	-	Henderson City-County Planning Commission
Mr. John Stroud	-	Henderson City Engineer
Mr. William Hubiak	-	Henderson County Engineer
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Ms. Nancy L. Burns	-	Mt. Vernon Chamber of Commerce
Ms. Shirley James	-	Pigeon Creek Greenway Passage
Ms. Helen Hauke	-	Princeton Chamber of Commerce
Mr. Derek Dillon	-	River City Taxi
Ms. Nancy Cassidy	-	SIRS Inc.
Ms. Judith Weatherholt	-	Southwestern Indiana Regional Develop. Commission
Mr. Phil Wilzbacher	-	Southwind Maritime Centre
Mr. Jerry Hays	-	Traffic Superintendent

TECHNICAL COMMITTEE (cont'd)

Mr. Chris Gwaltney	-	University of Evansville
Ms. Sherri Phillips	-	Warrick Co. Plan Commission
Mr. Guy Gentry	-	Warrick Co. School Corporation
Mr. Fred Padget	-	Westside Improvement Association

I. INTRODUCTION

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the subsequent Transportation Equity Act for the 21st Century (TEA-21) require establishment of a Congestion Management System in each Transportation Management Area (TMA) with a population over 200,000. The Evansville Urban Transportation Study (EUTS) is the designated TMA for the region including all of Vanderburgh County and Warrick County in Indiana and Henderson County, Kentucky. One of the goals of EUTS is to plan for the orderly development and improvement of all transportation facilities within the EUTS Study Area (see Figure 1). The purpose of the Congestion Management System (CMS) is to identify congested areas and devise appropriate strategies to prevent congestion if possible, or to mitigate congestion if a more desirable solution cannot be implemented. Strategies that prevent congestion from the outset are the most desirable.

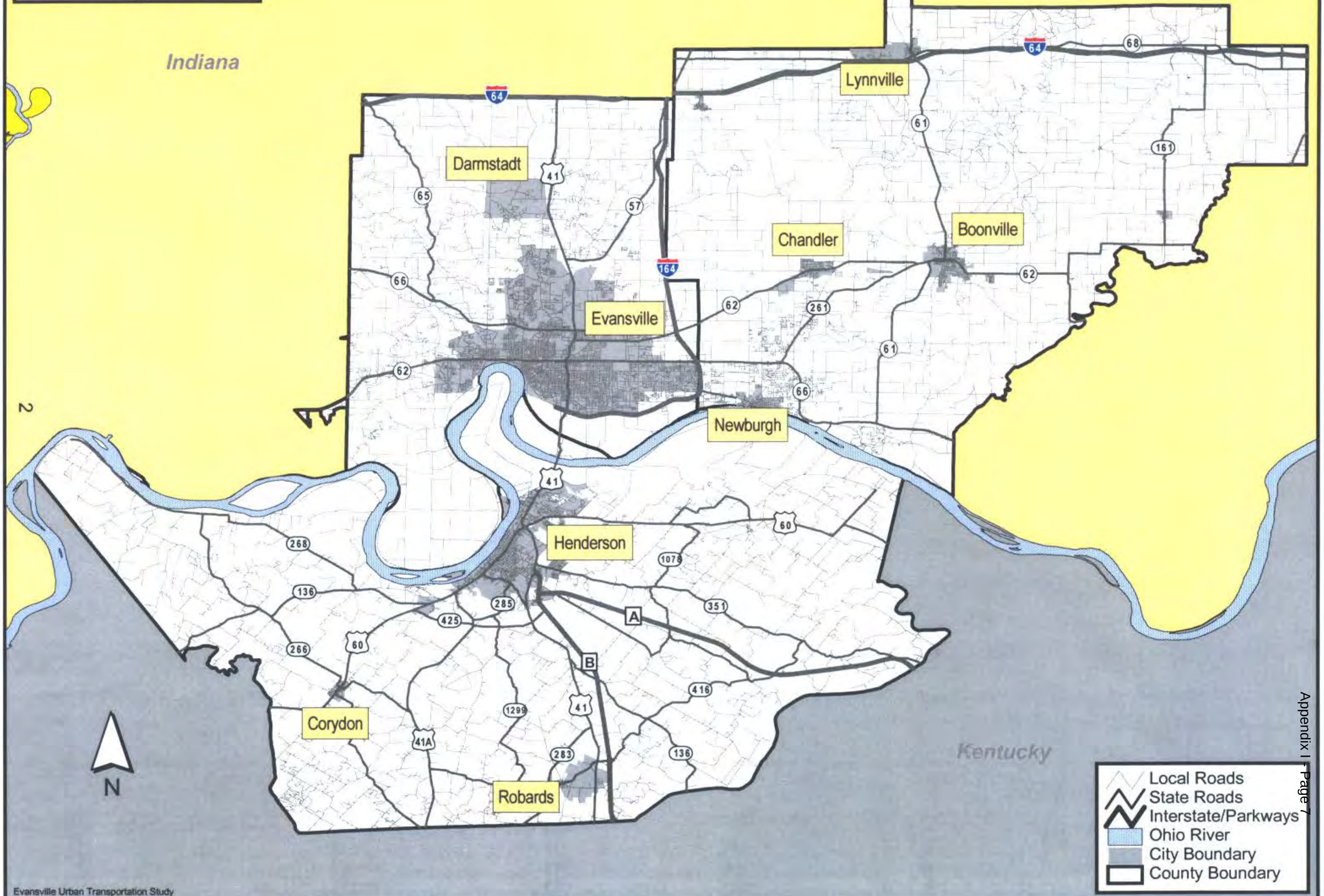
National and local trends indicate the need for capacity expansion projects. According to Census 2000 data, 39 of the nation's 50 largest metropolitan areas experienced a decline in the share of commuters using public transit to get to work (from 5.1 percent in 1990 to 4.6 percent in 2000). This national data can further be supported by local data collected and complied in the EUTS Park and Ride Feasibility Analysis. The trends show that automobile usage is on the rise which can only result in future congestion problems on our roadways. To further compound matters, the majority of automobile trips are made by single occupancy vehicles (SOVs) typically to and from work. All of the data demonstrates the need to carefully manage our existing transportation infrastructure and planned future infrastructure.

Congestion is a natural by-product of our nation's reliance on the automobile as the preferred mode of transportation. The automobile is a convenience of a modern lifestyle and as urban areas tend to promote development and urban sprawl, congestion will only continue to increase. The typical means to address roadway congestion historically has been expansion to the roadway network. However, roadway expansion involves additional right of way and constructions costs which make some projects undesirable or impossible to complete.

As a result, non-capacity expansion methods should also be evaluated as a means to reduce or eliminate congestion. Promoting access management through the reduction of curb cuts along collector and arterial roadways and minimizing the number of median breaks are both effective tools in reducing conflicts along roadways and promoting more efficient traffic flow. Every decision to allow an additional curb cut or break in a median is a another step towards more roadway congestion. Traffic signals are also a source for traffic congestion, especially when not timed correctly or when not synchronized within the entire signal network.

There are many other Travel Demand Management (TDM) and Transportation System Management (TSM) strategies that can be implemented that can improve traffic congestion without the need of additional travel lanes. Appendix 1 explains in detail various TDM, TSM and Growth management strategies while Appendix 2 details typical congestion factors and which of the mitigation actions can be taken to reduce congestion.

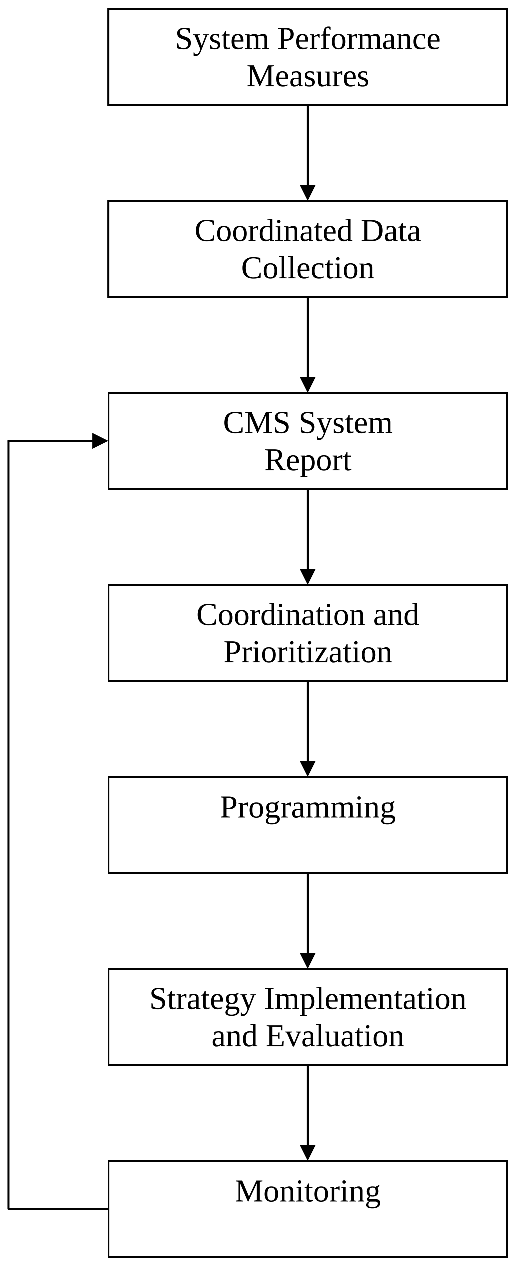
Figure 1 - EUTS Study Area



II. CMS OBJECTIVES

- To satisfy federal requirements that all Transportation Management Agencies (TMAs) develop a CMS to help guide the transportation planning process.
- To consider the CMS at the local, MPO and state level when identifying and recommending capacity expansion of either highway and/or transit systems.
- To develop a flexible CMS that can meet the changing needs of the region.
- To incorporate the CMS as an integral component of the MPO long range transportation planning process.
- To be easy to understand for both planning officials and the public.

To make the CMS process as efficient and user friendly as possible, the following flow chart was developed to show the fundamental process of the CMS analysis.



System Performance Measures identify the location, extent and severity of congestion.

Coordinated Data Collection using GeoStats GPS receivers in commuter vehicles.

CMS System Report will include updated CMS data as available and be updated on a regular basis.

Coordination and Prioritization to identify priority congestion segments and evaluate appropriate strategies.

Programming projects into the Long-Range Plan and TIP documents for construction when necessary.

Strategy Implementation and Evaluation of projects for possible funding sources.

Monitoring of projects to ensure effectiveness and reevaluation when necessary at the CMS Report stage.

III. TYPES OF CONGESTION

The Transportation Research Board (TRB) has identified two types of congestion, as it relates to travel time and speed. "Congestion is travel time or delay in excess of that normally incurred under light or free-flow travel conditions." There are two types of congestion-causing factors that fall under this definition that must be understood in order to properly evaluate overall transportation network congestion. The first and most dominant cause of congestion is inadequate road capacity or recurrent congestion. This simply means that there are more vehicles trying to utilize a roadway that it can physically accommodate at a single time. Historically, solutions for this type of congestion have focused on building new roads or adding travel lanes to existing roadway.

The second type of congestion results from random events such as accidents, spillages, vehicle breakdowns, inclement weather, special events or any other factor that cannot be anticipated on a typical day of travel. This type of congestion is called non-recurrent congestion because it is largely unpredictable as to when or where it will occur. It is estimated that more than 60 percent of traffic delay is caused from incidents in an urban area. A successful congestion management program should address both types of congestion.

Both types of congestion can be difficult to mitigate without reducing overall travel demand. For capacity expansion to occur there must be sufficient right-of-way available for acquisition for expansion or funds available to acquire the addition right-of-way needed to build a new road or add travel lanes. Often right-of-way is difficult to acquire and costs can be prohibitive for smaller roadway projects.

Sometimes minimal or temporary relief can be provided through highway performance improvements such as signalization changes, improved roadway signs and pavement markings and other low cost remedies. However, these improvements are often temporary and only serve to prolong the problem without actually fixing anything. Otherwise, meaningful reductions in congestion can only be accomplished with non-capacity expansion strategies which are described in more detail in both Appendix 1 and 2.

IV. INCIDENT MANAGEMENT

Every day traffic incidents obstruct urban, suburban and rural highways impeding mobility and disrupting the traffic. Incidents are events that reduce the traffic carrying capacity of a highway, such as spilled loads, stalled vehicles and accidents. When they occur during rush hours they cause serious congestion. Delays related to incidents increase at a faster pace with the growth of traffic volumes and it is estimated that by 2005 incidents will cause over 70% of freeway congestion.

Incident Management is defined as a sequence of pre-planned and integrated activities that, applying both human and technological resources, remove incidents as quickly and safely as possible and restore capacity to the highway. It basically applies some of the same resources that are already being used to respond to incidents but it uses these resources more effectively. Time is essential since four minutes is needed to unblock a road for each minute an incident remains obstructing a portion of it.

Incidents may be predictable or unpredictable. See Table 1 below.

TABLE 1 – INCIDENT TYPES

PREDICTABLE	UNPREDICTABLE
Maintenance Activities	Accident
Construction	Stalled Vehicle
Special Events	Weather
	Spilled Loads

Incident programs vary in cost and sophistication, but all consists of detection/verification, response, clearance, traffic management, and information/routing programs. Incident detection and verification is a procedure that informs incidents to agencies responsible for traffic flow and safe operation on roads and highways. The faster an incident is detected, the faster it is cleared. There is a diversity of methods that can improve this process such as video cameras, electronic traffic monitoring devices, CB radios, and visual observation. Dispatchers should be trained to obtain precise information on location and magnitude of the incident verifying if it is a crash or a stalled vehicle, if it is blocking the traffic, if there are injuries, the type and number of vehicles, and other issues that would help the response team.

Once the response agencies are properly notified each agency makes sure to use adequate wrecker equipment to handle the incident and fully trained certified personnel. An effective response process depends on having accurate information about the incident and resources that are necessary to clear the facility and return it to normal conditions. Incidents can be cleared with many techniques and equipment. Therefore, agencies must have adequate training to select the best response. The faster personnel and equipment reach an incident site the faster the incident is cleared, decreasing personnel costs associated with the incident management and costs to motorists associated with delay.

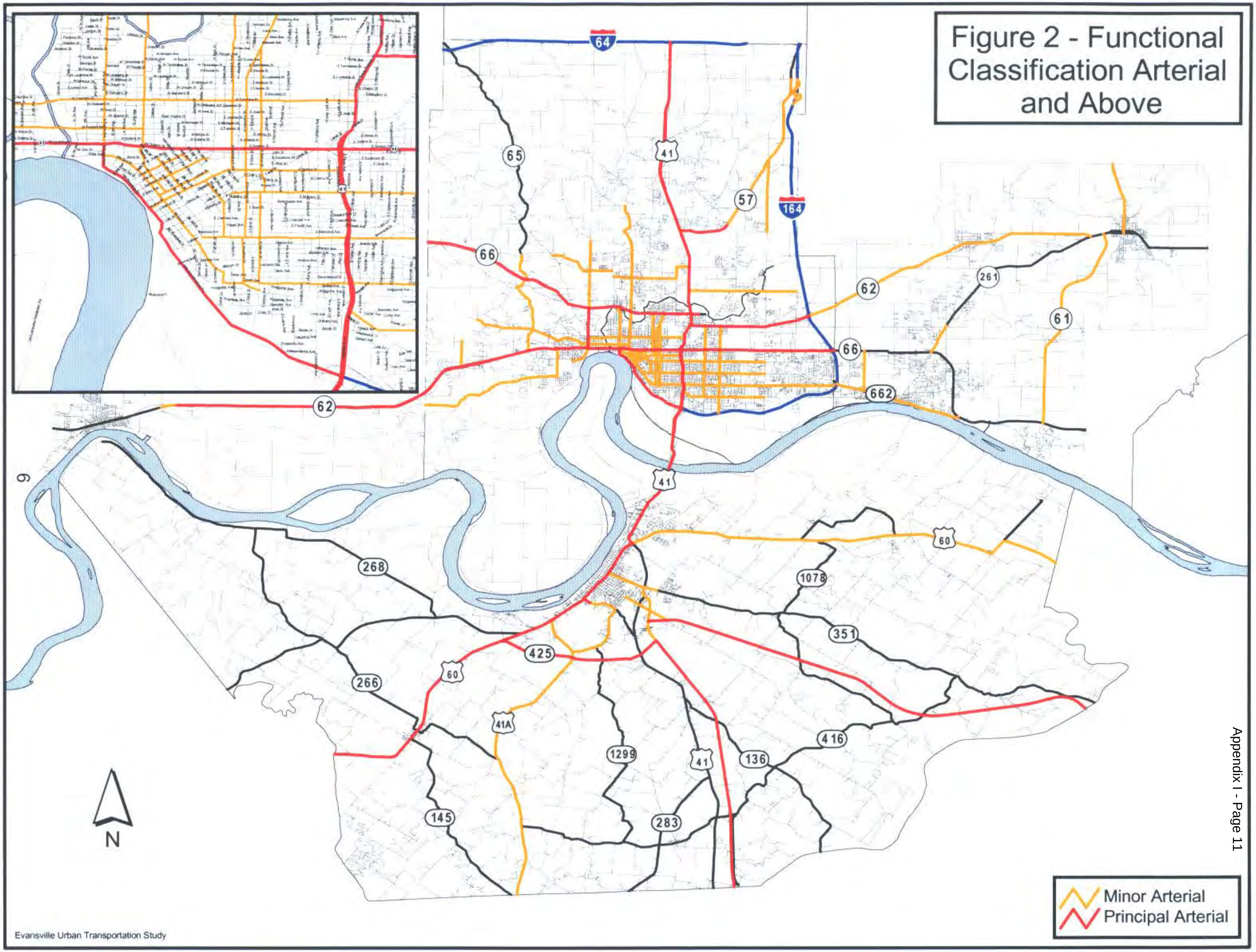
V. MEASURING CONGESTION

Before any data was collected for the CMS, a review of current roadway classifications was completed for the entire study area. Based on the information gathered, roadways classified as arterial, minor or principal, were included in the CMS study (see Figure 2). Any future updates or modifications to the roadway network classification will be updated in subsequent CMS analysis.

Participants for the study were recruited through contacts with local business to drive roadway segments during AM (6:30am to 9:00am) and PM (4:00pm to 6:00pm) peaks. Data for the study was collected for a minimum of 10 typical travel days, excluding days with snow, crashes or any other situation that would create driving conditions inconsistent with a typical daily commute. Drivers were encouraged to travel with the flow of traffic on the roadway, not to travel the posted speed limit. Data was collected on Tuesday, Wednesday, and Thursday only. Previous studies have show that driver patterns are often different on Monday and Friday so they were excluded. An attempt is made to ensure that no significant roadway projects are underway that could alter travel patterns and that local schools are in session during collection periods.

To collect accurate travel time data which can then be utilized to determine roadway congestion, drivers were instructed to install a personal Global Positioning System (GPS) in their vehicle which

Figure 2 - Functional Classification Arterial and Above



would collect data while the vehicle is in motion. Ten Geologger units from GeoStats were purchased for the sole purpose of collection data for the EUTS CMS study. The Geologger units include a GPS receiver and data collection device which are powered by a vehicle's cigarette lighter. The actual GPS receiver is mounted to the front windshield to provide sufficient clearance for data reception and collection. The units are programmed to collect speed, longitude, latitude, and elevation data every five seconds while the vehicle is traveling at a speed greater than two miles per hour.

Once sufficient data has been collected, the data is downloaded from the GPS receiver using a utility provided by GeoStats. The data can then be viewed in tabular form in various data base programs and it can be imported into a GIS system. The data is also divided into AM and PM peak travel times to ensure that the data analysis is completed for the travel period with the heavier peak volume.

Since traffic signals, school zones, lack of proper access management, poor signal timing and many other roadway characteristics create delay for commuters, it was decided to analyze the actual travel speed of the motor vehicle compared to the posted speed limit of the road. Every arterial corridor was split into quarter mile segments for data accuracy purposes. This relatively short segment of roadway allows for more efficient review since it is much easier to view traffic delays that could be attributed to traffic signals, school zones or any number of other roadway characteristics that hamper travel speeds. Several test corridors were evaluated with the study area and reviewed by the driver of the corridor to determine if the data output was in accordance with that actual driving conditions. The data was also compared to capacity analysis studies that have been completed for various segments previously to determine data accuracy. Once it was determined that the method of congestion analysis did accurately represent actual driving conditions, the data collection process began.

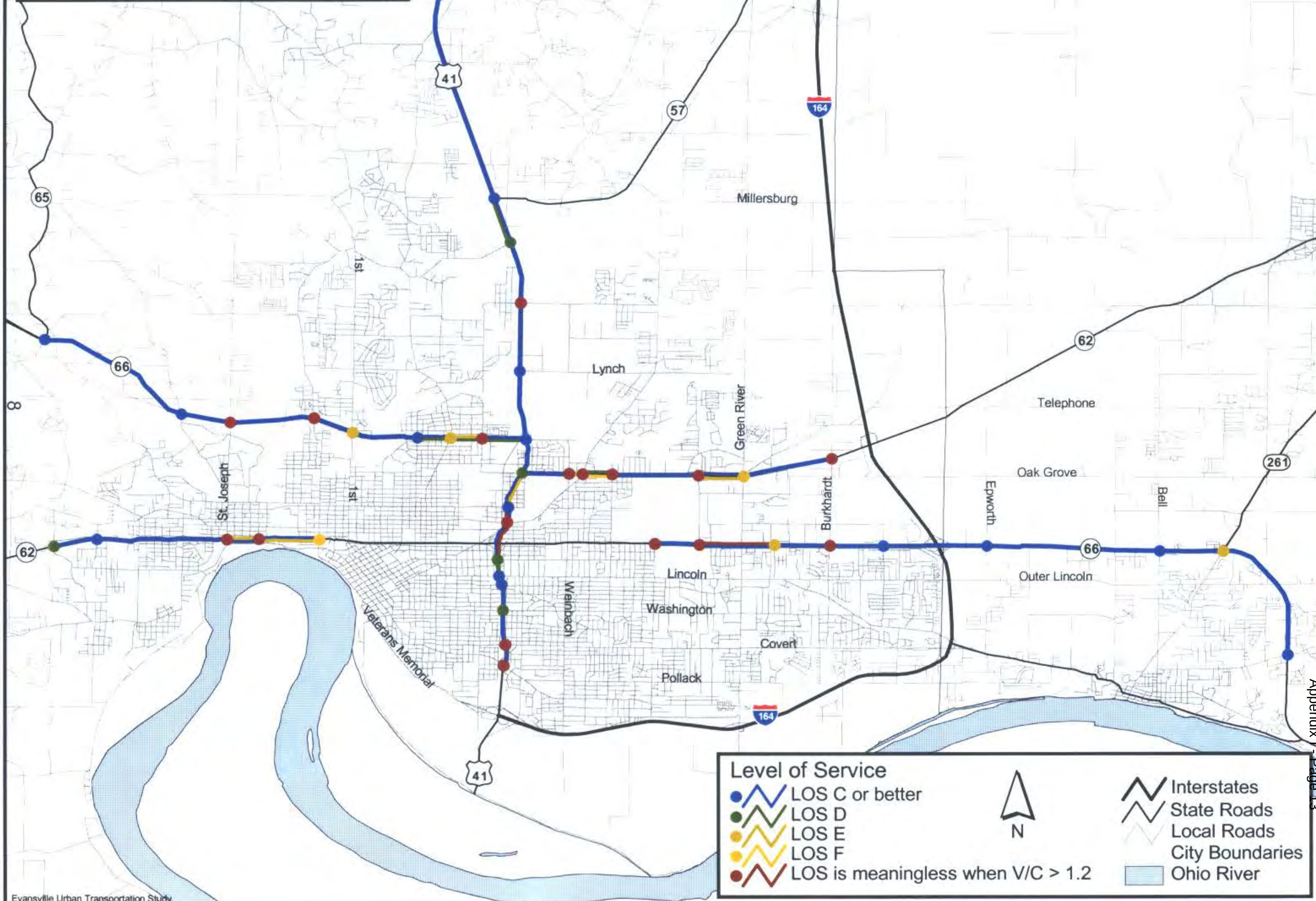
As a supplement to the GPS data collected for this study, some Level of Service (LOS) data was used to determine congestion along various corridors within the CMS study area. However, the LOS data will be replaced with GPS once new data is available.

Turning movements are used to calculate the LOS data in the study. EUTS staff manually cataloged all traffic within the study intersections for an hour and a half during the PM Peak travel period. Highway Capacity Software (HCS) was used to calculate the overall intersection LOS from the data collected. HCS also allows for corridor analysis based on LOS information collected at various intersections.

VI. CMS METHODOLOGY

A CMS study completed by EUTS in the mid 1990s included only the Vanderburgh and Warrick County portions of the EUTS Study Area. Figure 3 shows the existing LOS data for Vanderburgh and Warrick Counties. Since data already exists for the Indiana portion, it was vital that the GPS data collection begin in Henderson County, Kentucky. Some updates to the Indiana portion are included with the first stage of this CMS Study, but as more and more data is collected, the study will be revised to accurately represent current available data. The CMS development will be an ongoing process as well with data updates being made at regular intervals to ensure that the most accurate congestion data is available.

Figure 3 - Existing Level of Service (Indiana Portion)



VII. CMS Data Analysis

As previously stated, the congestion analysis is a comparison of the actual field travel speed versus the posted speed limit. The calculations to analyze the speed data gathered for the CMS study are relatively simple, but time consuming. For this portion of the CMS analysis process, over 350 quarter mile segments were analyzed to obtain the GPS data presented in this study. To analyze the data, all qualifying data, meaning the data was collected on appropriate days at appropriate times, is manually sorted to AM and PM peak travel times. For this analysis, PM Peak was chosen since data shows that overall there is more traffic during the PM Peak. Once the data has been verified and split into appropriate peak travel times, each quarter mile segment can then been analyzed. For each segment, all qualifying speed records are added, then divided by the total number of records to arrive at the average speed for the segment. To calculate the speed ratio, the average speed is then divided by the posted speed limit. The travel speed versus speed limit ratio is then used to map the data along the various arterial corridors. For mapping purposes, the speed ratios were divided into the following four groups: (see Table 2)

Table 2 – Travel Speed vs. Speed Limit Ratio Classifications

SPEED RATIO	LEVEL OF CONGESTION
25% - 49%	Highly Congested
50% - 74%	Moderately Congested
75% - 99%	Slightly Congested
Over 100%	No Congestion

Figures 4 and 5 demonstrate the congestion data collected thus far for the EUTS CMS Analysis. Individual maps were prepared for Henderson County and Vanderburgh County to make the data easier to view and understand.

A. HENDERSON COUNTY CMS

As Figure 4 shows, congestion is most prominent within the City of Henderson and along some of the major corridors into the city. Several of the most congested corridors are discussed in more detail.

1. US 60/Green Street Corridor

US 60/Green Street serves as a major east/west corridor through the city and county and serves as an important link to both Union and Daviess Counties. As seen in Figure 4, some of the most significant congestion in Henderson occurs along this corridor. The portion from the KY 425 By-Pass to Wathen Lane is characterized by almost continuous congestion during the PM Peak travel time. The corridor experiences significant commuter traffic each day and is highly commercialized which results in a significant number of access points and it is burdened with many traffic signals and which serve to slow commute travel times and promote congestion.

2. US 41Corridor

The US 41 corridor serves as the link between Henderson, KY and Evansville, IN. This highly traveled corridor is home to significant commercial and service industry land uses as well as several traffic signals and numerous curb cuts. As a result, the CMS data analysis shows the portion of US 41 from the northern city limits to the US 60 interchange is heavily congested. The portion of US 41 from KY 351/2nd Street to the KY 425 By-Pass is also slightly congested.

Figure 4 - Henderson County CMS Analysis

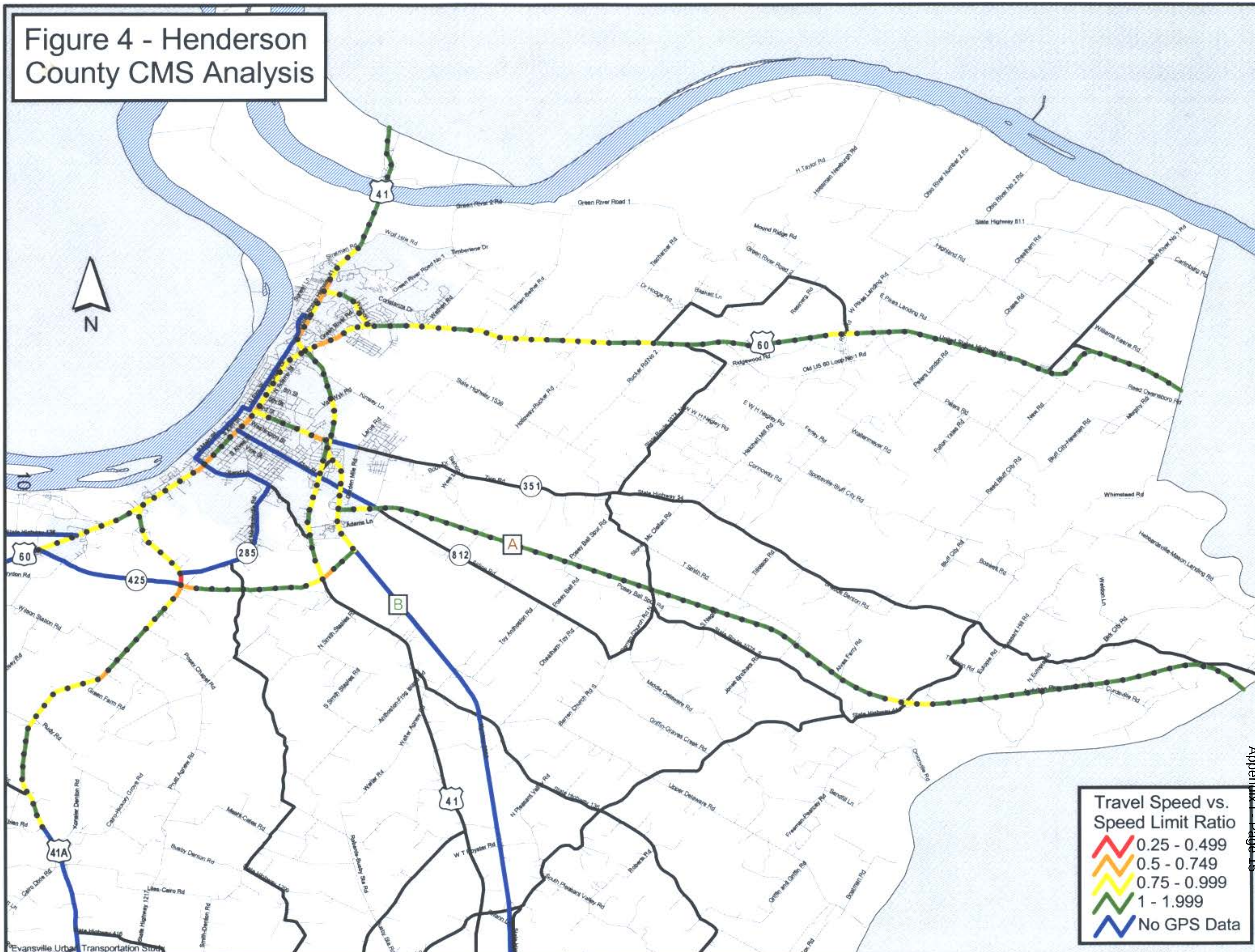
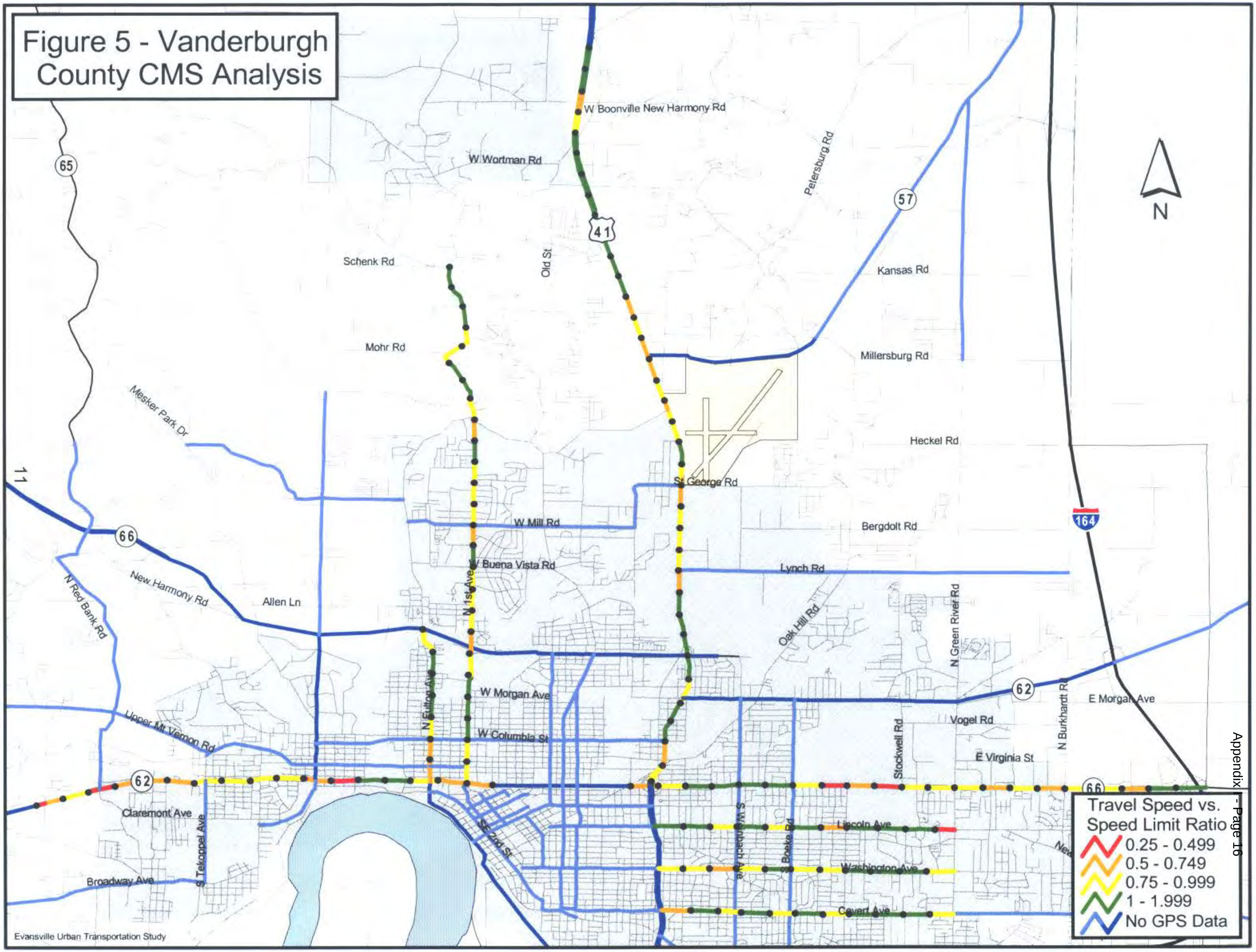


Figure 5 - Vanderburgh County CMS Analysis



3. US 41A Corridor

US 41A serves as an alternate to US 41 as a feeder road from southern and western portions of the county into the city. Congestion is prominent along the majority of the corridor and is most heavily concentrated in the vicinity of KY 425 and US 60/Green Street. Land use along this corridor is mixed with a more rural nature in the county and significantly more commercialized closer to the city.

B. VANDERBURGH COUNTY CMS

As shown in Figure 5, congestion is present on a majority of the roadway segments studied thus far. As anticipated, congestion is present along the Lloyd Expressway corridor which serves as a major east/west route and on US 41 which serves as a major north/south route through the county.

1. Lloyd Expressway Corridor

On both the east and west sides of Evansville, the Lloyd Expressway experiences a significant amount of congestion. On the west side of the city, congestion is most prominent at the major signalized intersections. At the Boehne Camp Road and Red Bank Road intersections the Lloyd Expressway is highly congested meaning that vehicles are traveling under 50 percent of the posted speed limit during peak travel times. The intersection of Rosenberger Avenue, St. Joseph Avenue and Fulton Avenue show moderate congestion as well. On the east side of Evansville, major congestion spots include US 41, Vann Avenue, Stockwell Road, Burkhardt Road and Cross Point Boulevard. Each of these intersections along the Lloyd Expressway corridor are signalized and have significant commercial activities.

Various projects are currently planned along the entire corridor which may help alleviate congestion in the future. An analysis of signal removal and roadway upgrade on the west side and improved interchanges at US 41 and Burkhardt Road should help ease congestion. However, other measures should be evaluated to monitor and improve congestion along the Lloyd Expressway Corridor.

2. US 41 Corridor

The US 41 corridor experiences some congestion just north of the Lloyd Expressway interchange but the majority of congestion takes place from just south of Lynch Road to north of SR 57 and the Evansville Regional Airport. This portion of the corridor is highly industrialized and has a significant amount of truck traffic along with several traffic signals which helps to slow traffic. According to the CMS data, the traffic signal at Boonville-New Harmony Road also serves as a major congestion point along the US 41 corridor.

3. Darmstadt Road/First Avenue Corridor

Darmstadt Road and First Avenue are typically used as alternates for commuters traveling from northern Vanderburgh County into the city without having to use US 41 or St. Joseph Avenue. First Avenue has commercial development south of Kratzville Road with many curb cuts and traffic signals. As the CMS data shows, the majority of the congestion occurs at the major intersections along the route. Mill Road, Diamond Avenue and the stretch leading into downtown Evansville all experience higher than average levels of congestion.

In all, over 350 quarter miles segments were analyzed for this phase of the EUTS Congestion Management Study.

VIII. CONCLUSION

The previous discussion of various roadway segments identified in the CMS Study represents only a portion of the overall congestion in the region. Many other roadway segments and especially signalized intersection, contribute heavily to overall roadway congestion. The intent of this study is to identify those locations through data analysis and use this information as a tool for future planning and project implementation. This study is not intended to fix all areas of congestion but to serve as a guide.

There are many remedies for various forms of congestion that can be implemented to help improve traffic flow. There are numerous Travel Demand Management (TDM) and Transportation System Management (TSM) strategies that are discussed in further detail in both Appendix 1 and 2. However, in most cases, the remedy will not be as simple as working with signal timing or adding a turn lane. As well, there are many forms of congestion relief that would not be appropriate for an area such as ours. The installation of High Occupancy Vehicle (HOV) lanes is not an option on any roadway within the EUTS Study Area. Road pricing is not a viable option either. Both of these concepts are typically used in larger, sprawling metropolitan areas. However, alternative work hours, encouraging the use of bicycle and pedestrian traffic, increased and more efficient public transit coverage, workplace initiated carpool programs and financial incentives for employees that participate in one of these programs are all feasible and could lead to a reduction of traffic during peak travel times.

These travel strategies are not the only possibilities though. It is inevitable that some new roadways will need to be constructed to improve traffic flow. At present, construction has begun on the Eickhoff-Koressel Corridor, which will provide an important roadway link for the western portion of Vanderburgh County. Due to development occurring on the east side of Vanderburgh County, Columbia Street is being extended west of Burkhardt Road. But it shouldn’t stop in Vanderburgh County; an additional link into Warrick County would be extremely beneficial in removing some vehicular traffic from the Lloyd Expressway. The extension of Lynch Road into Warrick County will also serve to reduce traffic volumes on SR 62.

But only so many new roads can be constructed and only so many lanes can be added to an existing facility, before expansion is no longer an option. That’s why this CMS Study is important. At the community and regional levels, transportation planners must look at current problem congestion areas and plan for the future. It will not be a simple or easy process, but it is one that must be done to ensure that traffic flow for the region is not hampered in the future due the to lack of progressive planning today.

APPENDIX 1

CONGESTION MANAGEMENT STRATEGIES

There are several innovative Transportation Demand Management (TDM) and Transportation System Management (TSM) strategies used throughout the US which can be utilized at the local level to improve roadway congestion.

Transportation Demand Management (TDM)
TDM strategies are designed to maximize the people-moving capability of the transportation network by increasing the number of persons in a vehicle, or by influencing the time of, or need to, travel. To accomplish these types of changes, TDM programs must rely on incentives or disincentives to make these shifts in behavior attraction. The primary purpose of TDM is to reduce the number of vehicles using the road system while providing the many mobility options to those who want to travel. The following are some TDM alternatives to a single occupancy vehicle:

Carpools and Vanpools
Typically utilized by commuters who may not be served by existing transit routes or those who commute long distances to a common wok place.

Public Transit
Although studies have shown that transit ridership is on the decline nationwide, transit still provides a very useful commuter alternative. Transit can be utilized when there is a demand and the SOV travel and other TDM strategies are not able to provide service to alleviate congestion.

Non-motorized Travel
Bicycling and walking are very useful in mixed land use development areas and reduce congestion and air pollution.

Parking Management
A parking management program is any plan by which parking space is provided, controlled, regulated or restricted in any manner. Communities across the US have adopted parking policies to improve environmental quality, transportation mode shifts or access preservation.

High Occupancy Vehicle Lanes (HOV)
Dedicating an existing travel lane for vehicles with multiple riders during peak travel times moves more people per vehicle and reduces the overall vehicle miles traveled.

Road Pricing
A price on using a highway or roadway facility forces the users to pay for convenience or divert to less congested roadways which reduces congestion on the principal roadway.

New Highways
When Necessary, new highways are constructed to relieve congestion by routing traffic from an existing system that is congested and contributing to air pollution.

Telecommuting
Allows employees to work from home all or some of the time which helps to reduce the amount of traffic during peak travel times.

Alternative Work Hour Programs
Compressed Work Weeks in which employees work a full 40-hours in fewer than the typical five days and a Flexible Work Schedule that shifts work start and end times to off-peak hours of the day help relieve congestion.

Financial Incentives
Preferential parking for persons sharing carpools and vanpools, subsidies for transit riders, transportation allowances, preferential access and egress to parking lots, periodic prize drawings for carpool and vanpool members, and guaranteed ride home programs help reduce traffic and congestion.

Transportation System Management (TSM)

Intelligent Transportation (ITS)
ITS technology has been a great help in relieving congestion where other solutions have failed. These intelligent transportation systems include computers, communications, and displays.

Goods Movement Management
Is a way to reduce congestion from city streets during peek hours by regulating pick up and deliver times for freight delivery.

Freeway Incident Management System
Prompt removal of disabled vehicles from travel lanes.

Geometric Design
Appropriate geometric design helps in reducing congestion and improves safety and freedom of driving.

Traffic Signal Improvements
Studies have shown that changes in a signal's physical equipment and timing optimization can help significantly in congestion mitigation. Traffic flow could be improved by equipment updates, timing plan improvements, interconnected signals, traffic signal removal, or traffic signal maintenance as needed.

Intersection Improvements
An intersection can be improved by installing traffic control devices for the smooth and safe passage of both pedestrians and vehicles. The devices used could be stop signs, yield signs, traffic signs, turning lanes, traffic islands, channelization, and improved overall design.

Planning Management

These strategies are related to zoning, land-use, and urban design techniques to avoid congestion by integrating land-use planning, site planning, and landscaping within a transportation system.

Growth Management
Is defined as "the use of public policy to regulate the location, geographic patter, quality and rate of growth of development." Travel demand modeling provides valuable information on traffic generation that could be used to implement controls over the land development and its impact on the surrounding transportation network. A tool used for growth management is site plan review and requirements in conjunction with required traffic impact analysis for high-density multi-family, commercial or industrial development.

Access Management
Access management is the art of controlling space and design of driveways, medians, and median openings, intersections, traffic signals, and freeway interchanges. Appropriate access control can decrease the number of accidents and congestion. To have a successful access management plan, both transportation planners and land use planners have to work cooperatively. The benefits of access management are fewer conflict points, fewer crashes, increased capacity, and shorter travel times.

APPENDIX 2

Congestion Factors and Mitigation Actions

SOV Travel
SOV is the predominate mode of travel with the MPO area which is a major cause of congestion and deteriorating air quality.
Action: **TDM:** Ridesharing, carpooling, vanpooling, bicycle, transit service, flexible work hour program, compressed work week, parking management, congestion pricing
TSM: Traffic signal improvement, intersection improvement, growth management, access management, Intelligent Transportation System (ITS).

Traffic Signal Synchronization
Unsynchronized signals contribute to traffic congestion. Driver experience stops, stop-delays, and longer travel time contributing to increased fuel consumption, congestion, and air pollution.
Action: **TDM:** N/A
TSM: Traffic signal improvements.

Bus Bays
Bus bays play an important part in reducing congestion on busy streets.
Action: **TDM:** N/A
TSM: Geometric design. Studies to determine possible addition bus bays where applicable.

Access Management
Closely spaced driveways and drive too near intersection on arterial streets hamper traffic movement causing congestion and air pollution.
Action: **TDM:** N/A
TSM: Geometric design, traffic signal improvements, intersection improvement, parking management, growth management (subdivision regulations).

Intersections without Right Turn Channelization
Intersections that experience heavy right turn traffic movements without dedicated right turn lanes contribute to congestion during peak hours.
Action: **TDM:** N/A
TSM: Geometric design (lane marking), traffic signal improvement, intersection improvement.

School Zones on Major Arterials
The intent of the arterial street system is to emphasize mobility rather than land accessibility within the urban area. Low driving speed limits in school zones on major arterials cause traffic delays and congestion.
Action: **TDM:** N/A
TSM: Geometric design, traffic signal improvements, intersection improvements, parking management, access management (designated crosswalks).

Walkways

Walkways that are not properly maintained, that lack ADA accessibility ramps, and that do not properly connect residential and commercial activity centers discourage potential users.

Action: **TDM:** Walkways

TSM: Traffic signal improvements, intersection improvements, growth management, access management.

Bikeways

On street and off street bicycle facilities are necessary as an alternative mode of transportation to alleviate congestion and enhance air quality.

Action: **TDM:** Bicycle routes.

TSM: Traffic signal improvements, intersection improvements, growth management, access management.

Transit Service

Enhanced travel and headway times in the urban area can mitigate congestion and improve air quality.

Action: **TDM:** Direct transit routes between activity centers and residential areas.

TSM: Growth management.

Speed Limit

Streets with higher functional classifications not posted with appropriate speed limits result in speeding violations and inefficient traffic flow.

Action: **TDM:** N/A

TSM: Speed limit revisions.

Traffic Signs

Improper placement and lack of traffic signs showing directions at intersections hinder traffic flow.

Action: **TDM:** N/A

TSM: Intersection improvement.

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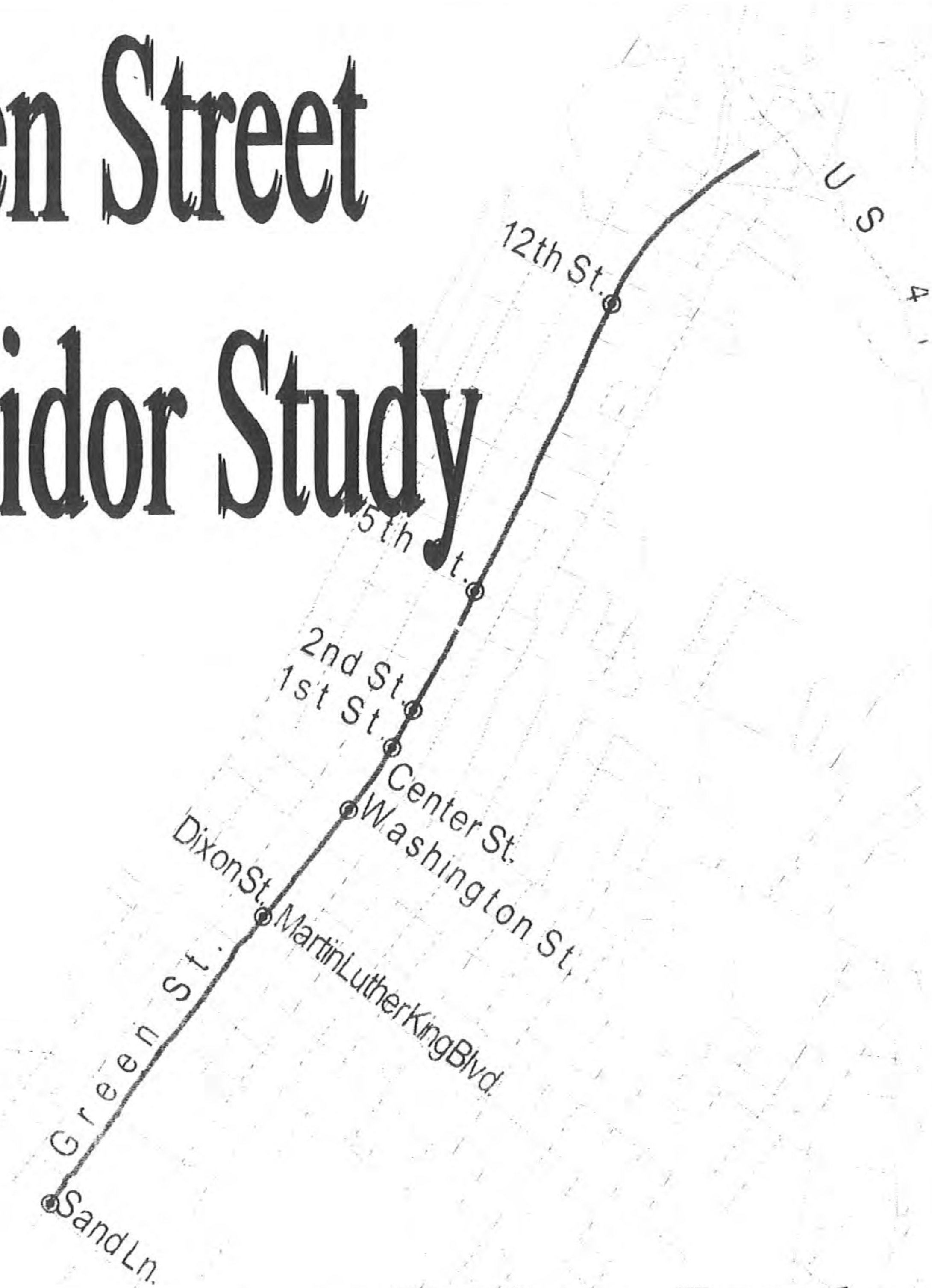
Green Street Corridor Study



Henderson, Kentucky

Prepared by:

Evansville Urban Transportation Study

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POLICY COMMITTEE

Mr. Stephen Melcher	-	Chairman, City of Evansville
Mr. Jack Corn, Jr.	-	Mayoral Appointment
Mr. David Mosby	-	Evansville City Council
Mr. Jeffrey Broughton	-	Henderson City Manager
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EVANSVILLE URBAN TRANSPORTATION STUDY

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Mr. Seyed Shokouhzadeh	-	Computer Analyst
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Ms. Jane Wilber	-	Secretary

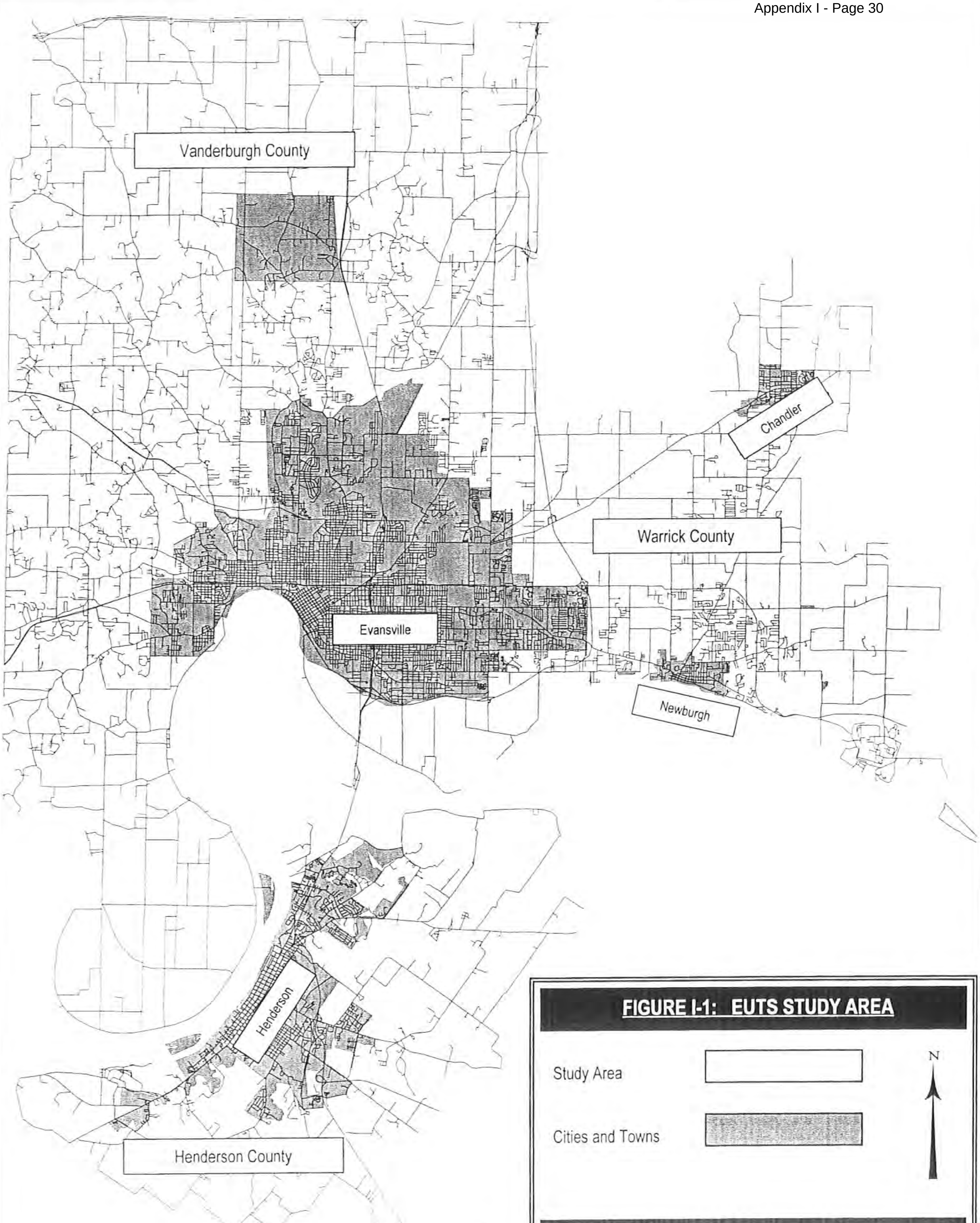
(NV) = Non-Voting

I. INTRODUCTION

The Evansville Urban Transportation Study (EUTS), designated as the Metropolitan Planning Organization (MPO) for the Evansville Urbanized Area in 1986, was created as the planning agency responsible for conducting the 3-C planning process. EUTS was associated with the Southwest Indiana Kentucky Regional Council of Governments (SWIKRCOG) until 1985, when SWIKRCOG was dissolved.

The EUTS Study Area contains approximately 308 square miles in Indiana, including the City of Evansville, all of Vanderburgh County (with the exception of Union Township), and a portion of Warrick County (including all of Ohio Township, Newburgh and Chandler, a segment of Boon Township, including Boonville, and a segment of Anderson Township). In Kentucky, the Study Area encompasses approximately 70 square miles which includes the City of Henderson and a portion of Henderson County. Figure I-1 illustrates the EUTS Study Area.

As part of the 3-C planning process and in coordination with the Henderson City Officials initiated the Green Street Corridor Study. Green Street is a major north-south arterial located in the City of Henderson, Kentucky. It connects the downtown area with various local and regional transportation facilities, including US 41 and US 60, carrying a significant amount of vehicular traffic. Many businesses have located along the Green Street corridor because of its function of mobility and accessibility provided to area residents. Unfortunately, congestion is evident and traffic accidents are prevalent along the corridor. As a result of the technical analysis, a series of recommendations have been identified for current and future mitigation.


Vanderburgh County
Chandler
Warrick County
Evansville
Newburgh
Henderson
Henderson County
FIGURE I-1: EUTS STUDY AREA
Study Area
Cities and Towns
N

II. TRAFFIC CONDITION

The corridor study area (see Figure II-1) was defined as a 2.7 mile segment of Green Street, extending from the interchange with US 41 to the intersection with KY 136 (Sand Lane). Green Street is a four lane principal arterial, which is undivided for the majority of the length of the corridor. Within the study area, there are seven signalized intersections: 12th Street, 5th Street, 2nd Street, 1st Street, Washington Street, Dixon Street/Martin Luther King Boulevard, and KY 136 (Sand Lane). In addition, there are 32 unsignalized intersections with the Green Street corridor. Numerous commercial and residential sites align the majority of the corridor. The middle segment of the corridor is adjacent to the Henderson Central business district. The traffic conditions within the study area were evaluated by intersections and roadway segments with a focus on the traffic volumes and the facility inventory.

1. Intersection Analysis

All unsignalized intersections within the study area are two way stop controlled. Given that traffic flows entering the corridor from the minor approaches to intersections are required to yield complete right-of-way to Green Street, the effect to the primary flow on Green Street is marginal. Capacity issues relating to unsignalized intersections were considered by checking traffic flow on minor approaches for potential signalization. Following a preliminary study and discussion with local officials, no intersections were found to meet warrants for signalization. Therefore, the study of corridor intersections focused on the seven signalized intersections and one interchange. These locations were assumed to have the greatest impact upon the overall corridor capacity.

The traffic signals along Green Street include two types of settings: pre-timed and traffic actuated. The pre-timed controller operates on a predetermined time schedule or series of time schedules. The signal is set to repeat a given sequence of signal indications regularly. The traffic-actuated controller operates on the basis of traffic demand, as registered by the actuation of vehicle or pedestrian detectors on one or more of the intersection approaches. Three of the seven intersections (1st Street, 2nd Street, and Washington Street) are controlled by pre-timed controllers so those signals may be synchronized. Signals at the four remaining intersections (12th Street, 5th Street, Dixon Street/Martin Luther King Boulevard, and Sand Lane) are all semi-actuated, providing green time for the cross streets only when approaching vehicles are detected.

An overview of traffic volumes over these signalized intersections is illustrated in Figure II-2, and the detailed condition at each signalized intersection is described below, beginning at the northern termini.

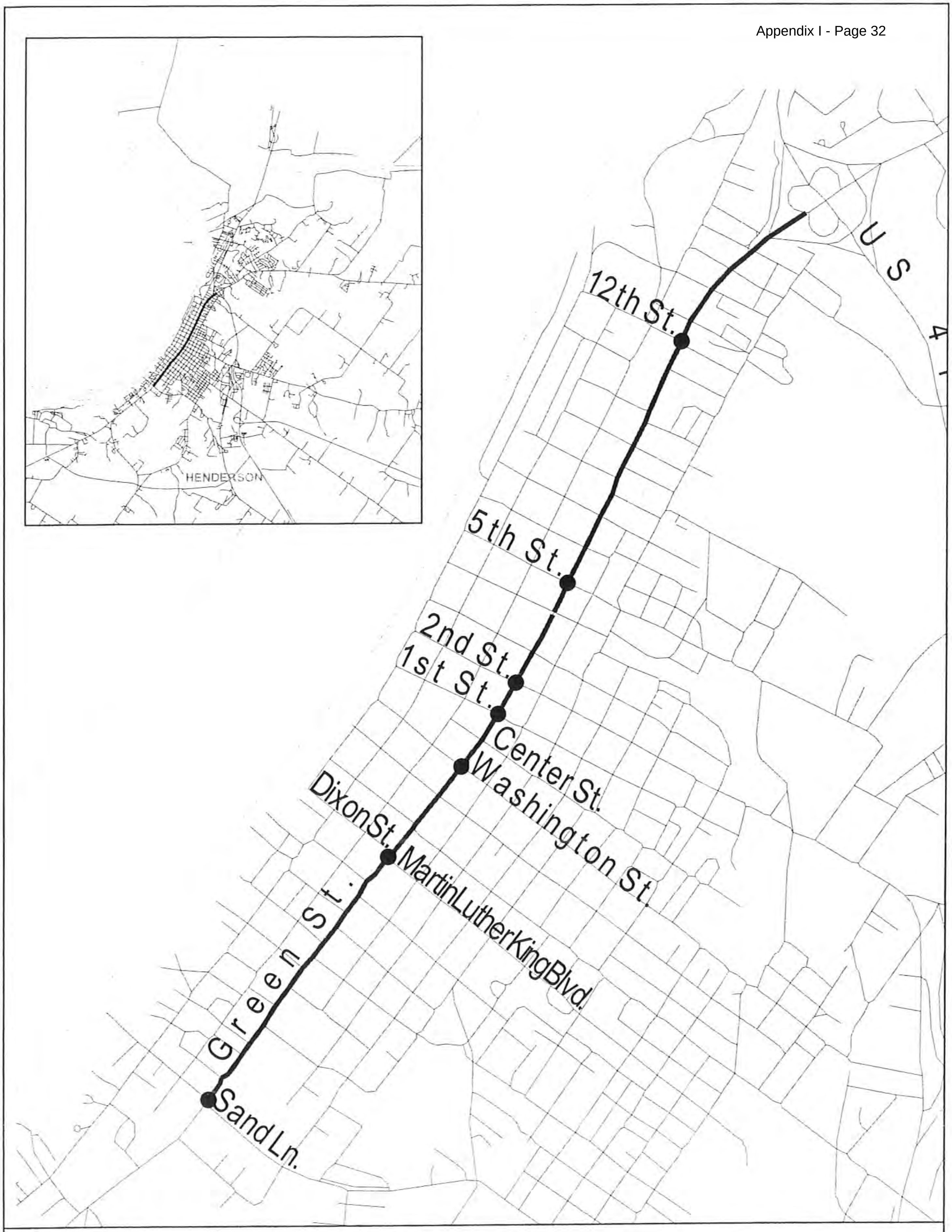


Figure II-1: Green Street Corridor Study Area

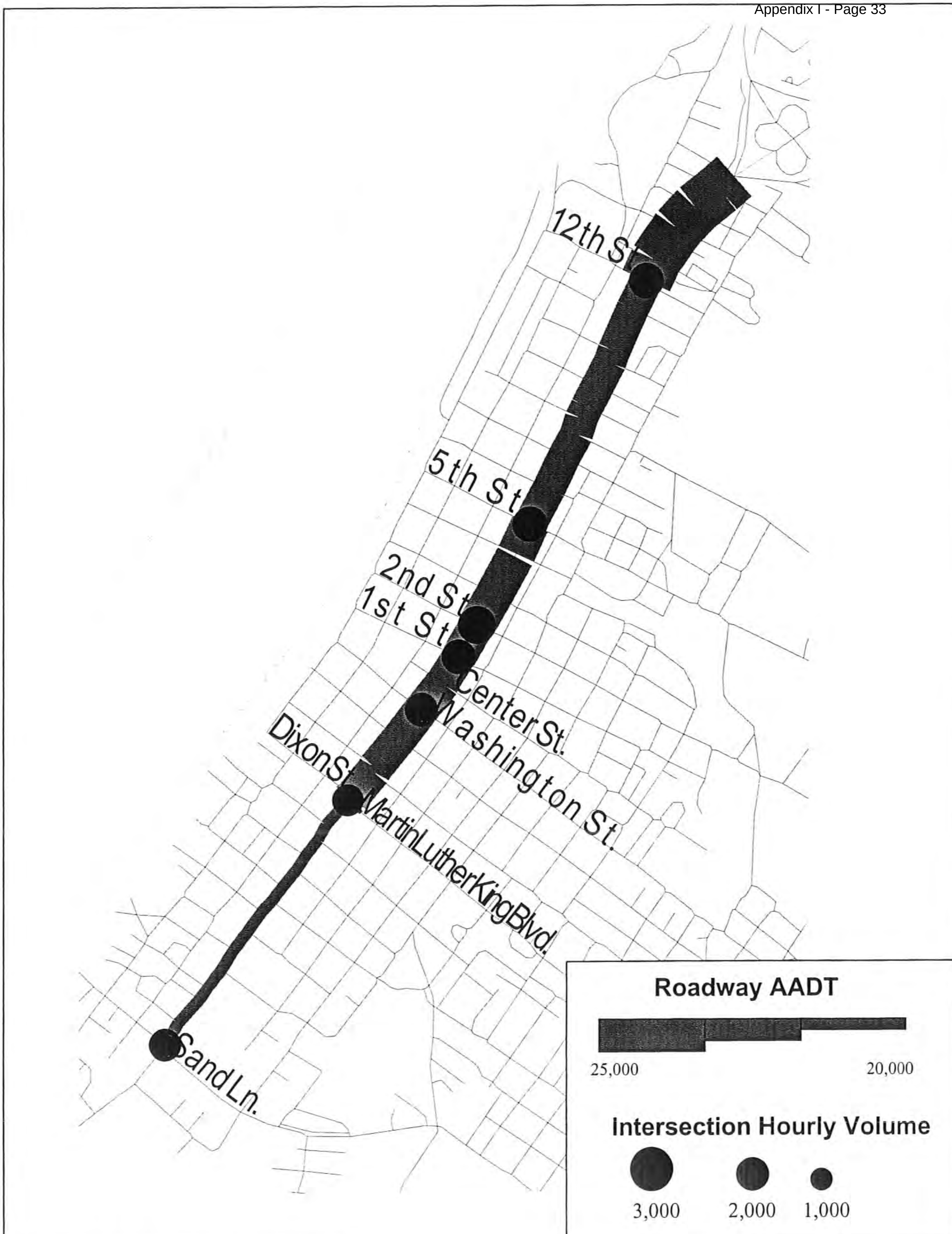


Figure II-2: Traffic Volumes for Intersections and Roadway Segments

12th Street

This at-grade intersection is controlled by a traffic semi-actuated signal. Therefore, green time for 12th Street is only provided when approaching vehicles are detected. No protected left turn movements are provided at this intersection. Green Street is the north and south approach to the intersection. Each approach is 47 feet wide, with two lanes in each direction. There are no dedicated turn lanes, so the two lanes are shared to accommodate the through/left and through/right turning movements, respectively. 12th Street is the east and west approaches. The east approach is 31 feet wide while the west approach is 37 feet wide. Each approach has one lane entering the intersection, which is shared by through, right, and left to accommodate the turn movements. The most noticeable characteristic of this intersection is the offset of 12th Street (east and west approaches of the street have a 70-foot separation between centerlines). The SE, NE, and NW quadrants of the intersection are comprised of two residences and a church. A car dealership currently occupies the SW quadrant. Given the proximity of the car dealership driveways to the intersection and the frequent vehicle turnover at the location, it is assumed to have a greater impact than the other three quadrants.

The corridor peak period was determined to be 3:00-5:00 p.m., based upon a 48 hour continuous traffic count (see Figure II-10). In addition, a turning movement survey was conducted on April 7, 1998, from 4:00-5:15 p.m. Figure II-3 represents the turning movement by magnitude and direction. As shown in the diagram, Green Street through traffic was the predominant scale. In addition, the eastbound left turn from 12th Street to northbound Green Street is also a major movement.

Figure II-3 Turning Movement at 12th Street

Company: Evansville Urban Tranaportation Study
Project: Green Street Corridor Study
Designer: Rob He
Date: 04-7-98

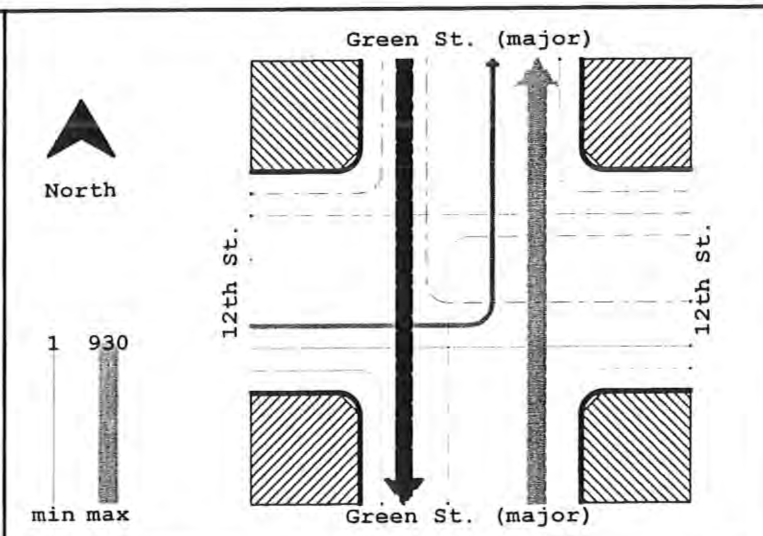
TRAFFIC VOLUME
Unit: vehicles/hour

East bound:12th St.
- Left: 317
- Thru: 16
- Right: 59

West bound:12th St.
- Left: 20
- Thru: 8
- Right: 15

North bound:Green St.
- Left: 25
- Thru: 930
- Right: 7

South bound Green St.
- Left: 1
- Thru: 826
- Right: 76

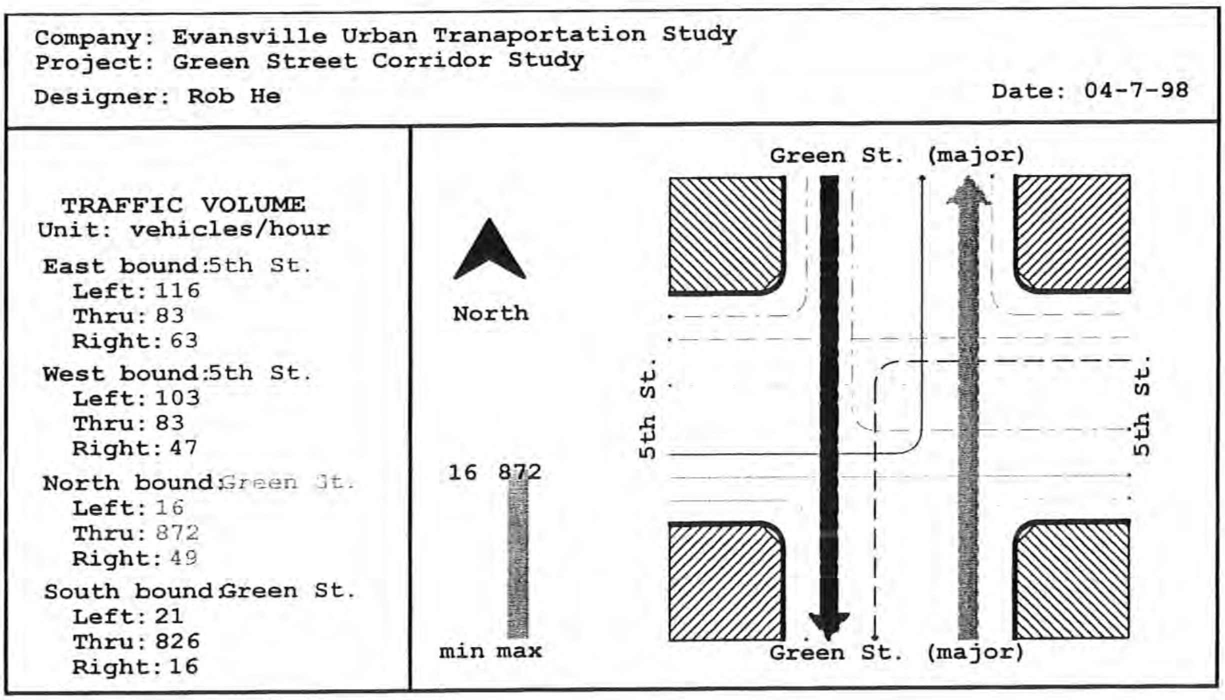


Fifth Street

This at-grade intersection is controlled by a traffic semi-actuated signal. No protected left turn movements are provided for any approach. Green Street is the north and south approaches to the intersection. Each approach is 47 feet wide, with two lanes in each direction. There are no dedicated turn lanes, so the approaching lanes are used for shared through traffic and left/right turn movements. Both east and west approaches on 5th Street are 45 feet wide. Each approach has one designated left turn lane and one lane shared by through/right turn movements. The NE quadrant of the intersection is occupied by a car dealership; the NW quadrant is occupied by a pharmacy, the SW quadrant by a fast food restaurant, and the SE quadrant by a pawnshop. It is assumed that the car dealership has traffic impacts upon the intersection.

A turning movement was conducted at this intersection on April 7, 1998, from 4:00-5:15 p.m. Figure II-4 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street is the dominant flow.

Figure II-4 Turning Movement at 5th Street



Second Street

Second Street is a four lane minor arterial, which connects the downtown central business district to the west and the Pennyrile Parkway to the east. This at-grade intersection is controlled by a pre-timed traffic signal, which is coordinated with First and Washington Streets to the south. The north approach on Green Street is 62 feet wide, with two lanes in each direction. The south approach is 75 feet wide, with three entering lanes (one left turn, one through, and one shared through/right). The west approach on Second Street is 70.5 feet wide, with two lanes (one dedicated through and one through/right). This approach provides a direct connection to the central business district of Henderson. The east approach is similar in lane configuration, but is 61 feet in width. The northwest quadrant of the intersection is currently occupied by a gas station, the northeast quadrant is vacant, the southwest quadrant is occupied by a pharmacy, and the southeast quadrant by a social club. For the purpose of this study, it is assumed that the gas station and pharmacy will attract traffic to and from the intersection.

A turning movement was conducted at this intersection on April 6, 1998, from 4:00-5:15 p.m. Figure II-5 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street is the dominant flow and westbound through traffic on Second Street is also significant.

Figure II-5 Turning Movement at 2nd Street

Company: Evansville Urban Tranaportation Study
Project: Green Street Corridor Study
Designer: Rob He
Date: 04-6-98

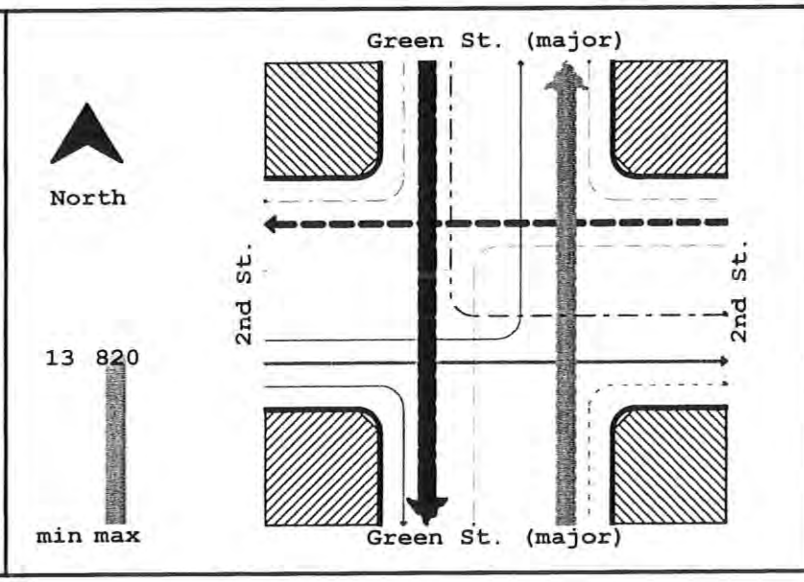
TRAFFIC VOLUME
Unit: vehicles/hour

East bound:2nd St.
Left: 103
Thru: 174
Right: 99

West bound:2nd St.
Left: 61
Thru: 332
Right: 69

North bound:Green St
Left: 13
Thru: 820
Right: 133

South bound:Green St.
Left: 115
Thru: 788
Right: 47

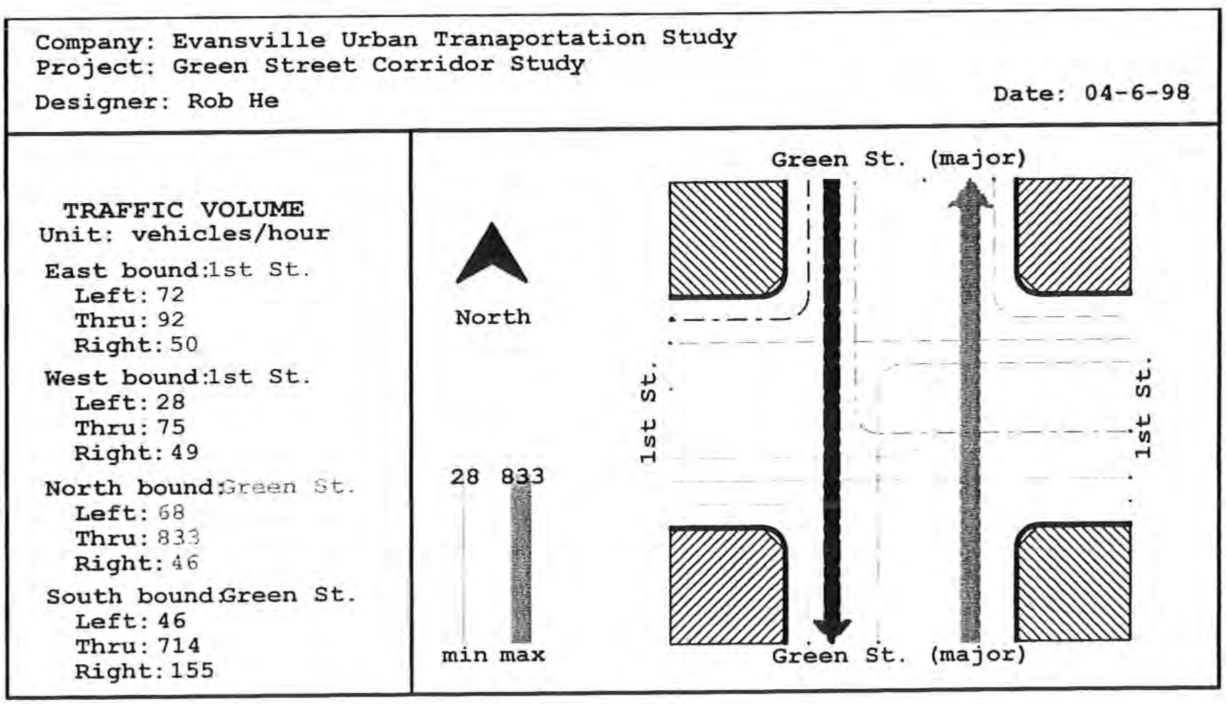


<u>First Street</u>

This at-grade intersection is controlled by a pre-timed signal, which is coordinated with the signalized intersections at Second and Washington Streets. The north-south approaches on Green Street are 63 and 72 feet in width, respectively. Both approaches consist of a left, through and shared through/right turn lanes. The east and west approaches on First Street are 52 and 68 feet wide, respectively. Each approach consists of one dedicated left turn lane and one shared through/right turn lane. On street parking is allowed on the north and south sides of the west approach. The northwest quadrant of the intersection is currently occupied by a vacant building, the northeast quadrant by a fast food restaurant, the southwest quadrant by a small business building, and the southeast by a gas station. The gas station and fast food restaurant are assumed to have the greatest impact upon the intersection.

A turning movement was conducted at this intersection on April 6, 1998, from 4:00-5:15 p.m. Figure II-6 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street was the dominant flow.

Figure II-6 Turning Movement at 1st Street



Washington Street

This at-grade intersection is controlled by a pre-timed signal, which is coordinated with the signalized intersections at First and Second Streets. The north-south approaches on Green Street are both 55 feet in width, with dedicated left, through, and a shared through/right lanes. The east and west approaches on Washington Street are 42 and 52 feet wide, respectively. Each approach has one dedicated left turn lane and one shared through/right lanes. On street parking is provided on north side of the west approach of Washington Street to the intersection. The northwest quadrant of the intersection is occupied by a parking lot, the northeast quadrant by a church, the southeast quadrant by a fast food restaurant, and the southwest quadrant by a fire station.

A turning movement was conducted at this intersection on April 8, 1998, from 4:00-5:15 p.m. Figure II-7 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street is the dominant flow.

Figure II-7 Turning Movement at Washington Street

Company: Evansville Urban Tranaportation Study
Project: Green Street Corridor Study
Designer: Rob He
Date: 04-8-98

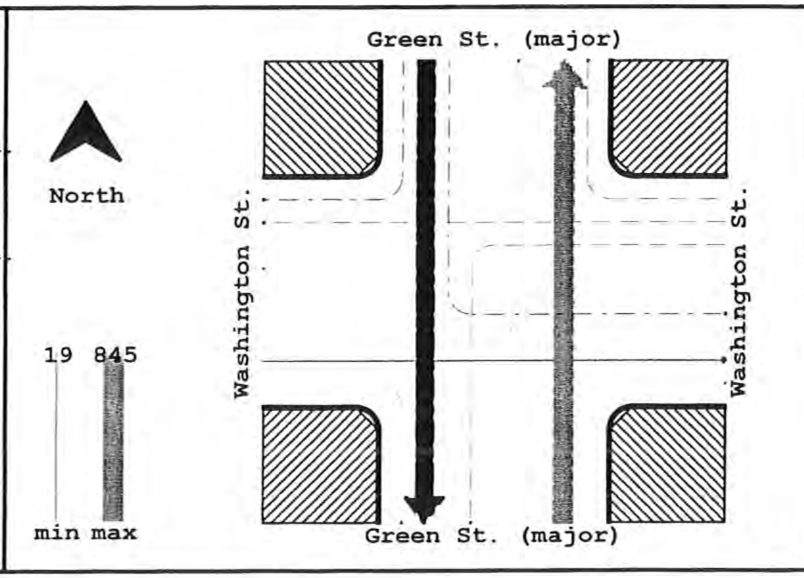
TRAFFIC VOLUME
Unit: vehicles/hour

East bound:Washington St.
Left: 32
Thru: 109
Right: 59

West bound:Washington St.
Left: 56
Thru: 65
Right: 48

North bound:Green St.
Left: 21
Thru: 845
Right: 27

South bound:Green St.
Left: 20
Thru: 771
Right: 19



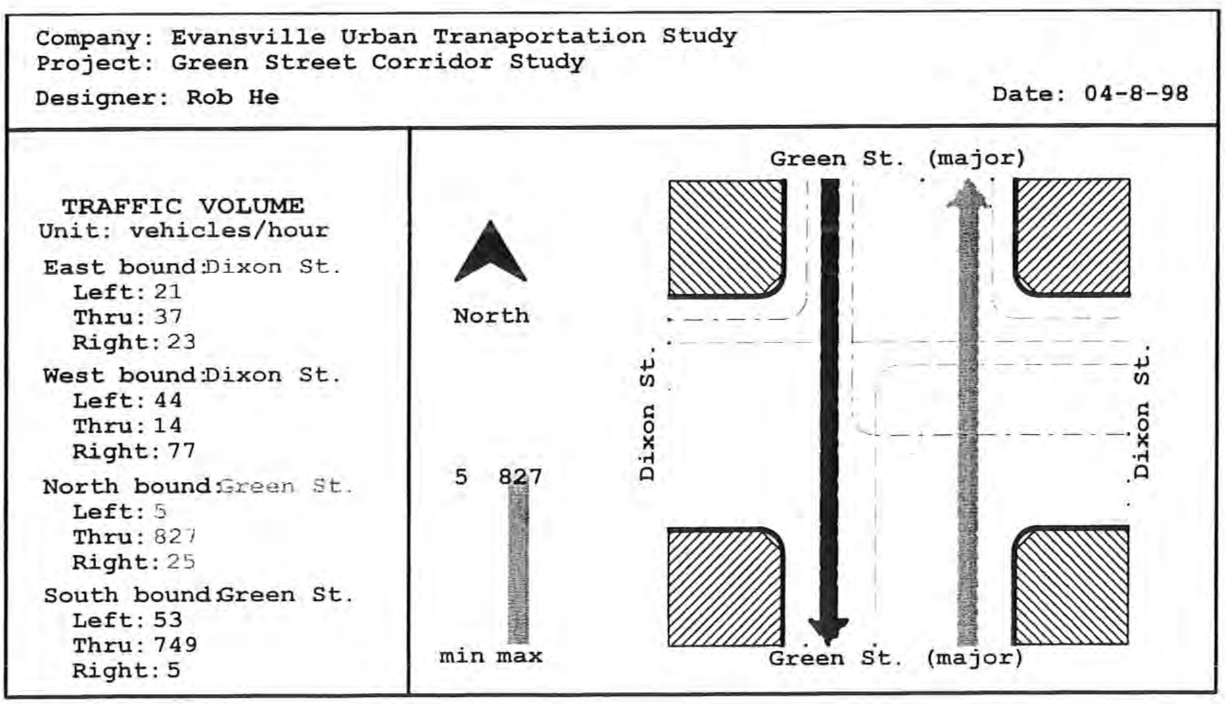
Dixon Street/ Martin Luther King Boulevard

This at-grade intersection is controlled by a traffic semi-actuated signal. The north-south approaches on Green Street are each approximately 47.5 feet wide, with two entering lanes in and two exiting. There are no dedicated turn lanes at this intersection; therefore one shared through/left turn and one shared through right turn lane exist at each north-south approach. The west approach on Dixon Street is 41 feet wide, while the east approach on Martin Luther King Boulevard. is 43 feet wide. Each approach has one lane entering the intersection, sharing through, right, and left turn movements. The most notable characteristic of the intersection is the 70-foot offset between the centerlines of Dixon Street and Martin Luther King Boulevard. This offset may complicate the traffic movements at this intersection, specifically for right or left turns, and could increase the probability of accidents.

The northwest quadrant of the intersection is currently vacant, the northeast quadrant is occupied by a carryout pizza shop, the southeast quadrant is occupied by a government office, and the southwest quadrant by a Dollar General Store. Placement of the driveways to the pizza shop could potentially influence the traffic, because of the parking space in front of the shop only accommodates two vehicles.

A turning movement was conducted at this intersection on April 8, 1998, from 4:00-5:15 p.m. Figure II-8 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street is the dominant flow.

Figure II-8 Turning Movement at Dixon Street/ Martin Luther King Boulevard



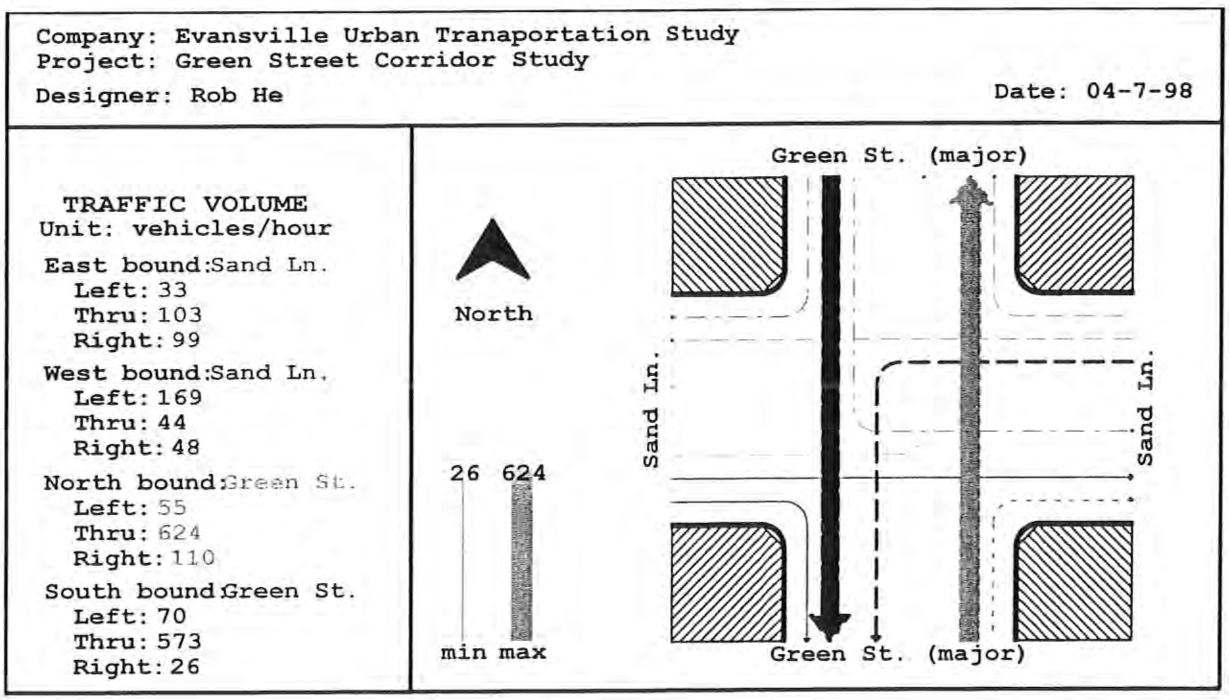
Sand Lane

Sand Lane (KY 136) provides access from Green Street to the west and the Henderson By-pass (KY 425). This at-grade intersection is controlled by a traffic semi-actuated signal. The north-south approaches on Green Street are both 46 feet wide, with two entering lanes and two exiting lanes. Without dedicated turn lanes, left and right turning movements are shared with through traffic. The east and west approaches on Sand Lane are 36 and 47 feet in width, respectively. Each approach has one right turn lane and one shared through/left turn lane.

The northwest quadrant of the intersection is occupied by a video store, the northeast quadrant by a gas station, the southeast quadrant by a Goodwill store, and the southwest quadrant by a bank. The most noticeable feature of this intersection is the video store, which provides off-street parking, but there are no defined access points at the location. This means that vehicles are allowed to enter and exit at any point within the property frontage.

A turning movement was conducted at this intersection on April 7, 1998, from 4:00-5:15 p.m. Figure II-9 represents the traffic movement by magnitude and direction. As shown in the diagram, through traffic on Green Street and west-to-south movements on Sand Lane are the dominant flows.

Figure II-9 Turning Movement at Sand Lane



Interchange with US 41

This grade-separated interchange crosses over US 41 and provides a direct connection between Green Street and US 60. Ramps provide access between Green Street and US 41, allowing a continuous merging of traffic on both roadways. Traffic flows exiting eastbound US 41 to southbound Green Street may maintain continuous movement because Green Street widens to four lanes at the point of intersection with the exit ramp. Therefore, the exit ramp becomes the outer lane on Green Street and eliminates the need for an immediate merge.

2. Roadway Segment Analysis

The study corridor was divided into seven segments, bounded by either signalized intersections or the interchange. Traffic volumes were unevenly distributed among the roadway segments, as illustrated in Figure II-2. Traffic conditions within these segments were analyzed, with the results presented in Table II-1.

Table II-1 Traffic Volumes By Road Section

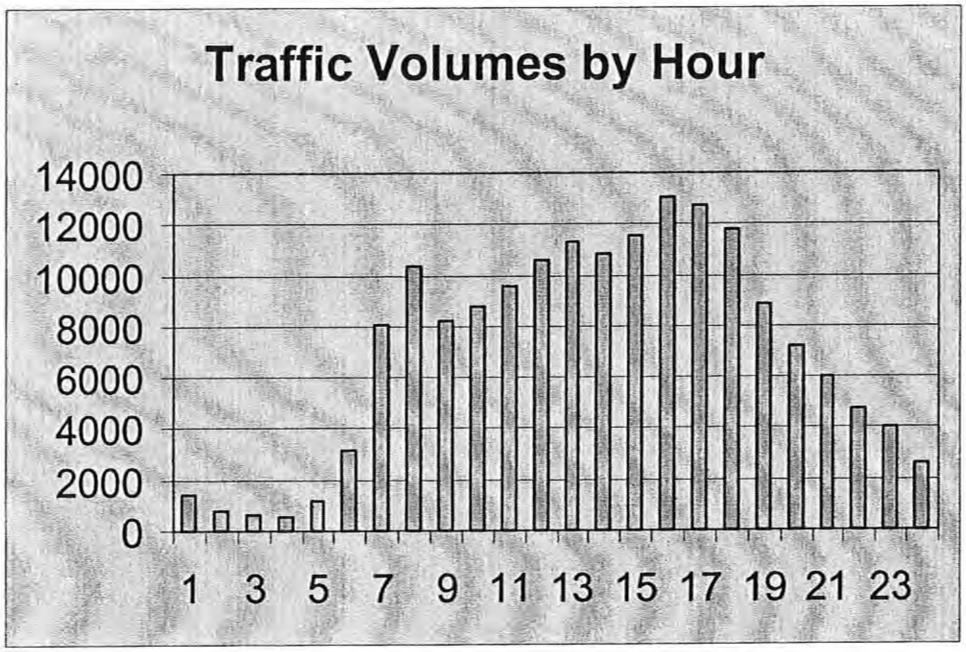
Road Section	Direction	AADT	PM PEAK	PEAK TIME	HEAVY TRUCKS	AVERAGE SPEED	85% SPEED
US 41 – 12th St.	Southbound	12321	848	1600	8.48%	42.2	46.5
	Northbound	13747	1263	1400	10.00%	42.51	47.6
12th St. – 5th St.	Southbound	11985	886	1600	11.03%	42.51	47
	Northbound	12029	961	1600	15.04%	40.36	44.2
5th St. – 2nd St.	Southbound	12748	946	1600	11.02%	34.14	38.2
	Northbound	11805	903	1600	18.39%	32.6	37.4
2nd St. – 1st St.	Southbound	12037	864	1500	10.69%	27.53	30.7
	Northbound	12252	1006	1500	19.96%	25.68	32.2
1st St. – Washington St.	Southbound	12339	910	1600	10.05%	30.6	34.8
	Northbound	11791	1009	1500	16.05%	29.23	34.4
Washington St. – Dixon St.	Southbound	11527	859	1600	11.13%	32.87	36.7
	Northbound	11745	994	1500	20.14%	34.33	39.2
Dixon St. – Sand Ln.	Southbound	11023	873	1500	11.66%	38.52	42.6
	Northbound	10585	956	1500	14.31%	37.73	42
Average	**-**	**11995**	**948**	**-**	**13.36%**	**35.09**	**39.54**

Traffic Volumes

The average annual daily traffic (AADT) represents the traffic volumes of the study corridor during a typical day (1998). The average directional (one way) AADT was 11,995 vehicles per day for the entire study corridor. The section with the highest one way volumes was between 12th Street and the US 41 interchange, with northbound traffic volumes of 13,747. The lowest one way volume was between Dixon Street and Sand Lane, with northbound volumes of 10,585. When considering the entire study corridor, the northern roadway segments showed higher average volumes than the southern segments.

Peak hours may be identified by examining the hourly traffic volume profile over a 24-hour period. Figure II-10 represents the average total traffic volumes for the corridor by hour, indicating that traffic volumes are generally higher in the afternoon hours. Specifically, the highest traffic volumes were experienced between 3:00-5:00 p.m. Only one roadway segment experienced a peak volume outside of 3:00-5:00 p.m. The segment between US 41 and 12th Street had a peak volume between 2:00-4:00 p.m. It was determined that peak hour volumes made up 7.91% of the total daily volume, which nearly doubles the 24 hour average of 4.17%. In general, peak hour volumes typically make up 10% of total daily volume, suggesting that peak hour volumes along the study corridor are lower than average.

Figure II-10 Traffic Volume Distribution in Time



Heavy truck traffic (tractor-trailer, dump truck, etc.) on the average was 13.36% of total traffic volume for the Green Street corridor. The highest proportion of heavy trucks (20.14%) was found on northbound Green Street, between Washington and Dixon Streets. The segments between First Street & Second Streets also exhibited higher than average truck volumes (7,308 trucks per day). For the entire corridor, northbound lanes generally exhibited higher truck volumes (12,574 trucks out of 83,954 AADT) than the southbound lanes (8,866 out of 83,980).

Traffic Speeds

Speed limits for the Green Street Corridor are posted as 35 miles per hour, with the exception of two school zones which are posted at 20 miles per hour. The actual average speed for the corridor (weighted by AADT) was found to be 35.09 miles per hour, however the average varied by roadway segment. The highest average speed was 42.51 miles per hour, in the segment between US 41 & Twelfth Street, while the lowest average was 25.68 miles per hour, between First and Second Streets. Generally, the segments closer to Central business district exhibit lower average speeds than those segments near the edge of the corridor. The segments of Green Street north of the intersection with 12th Street all averaged over 40 miles per hour. The 85th percentile speed was four percent higher than the average.

Access

Many businesses and residences are located along Green Street, accounting for a total of 209 driveways with direct access to the corridor. On average, there are approximately 30 access points on each roadway segment. The roadway segment between 12th and 5th Streets has the highest number with a total of 30 driveways on each side of the corridor. But in terms of the distance between the adjacent driveways, the northbound segment between 1st Street and 2nd

Street has the shortest spacing with 85.4 feet (see Table IV-4). Many of these driveways serve vehicular-related businesses, such as gas stations, drive-through pharmacies, and car dealerships, which generally have high trip generation rates. The more driveways that exist the more conflicts points to slow traffic flow and potentially cause additional traffic accidents.

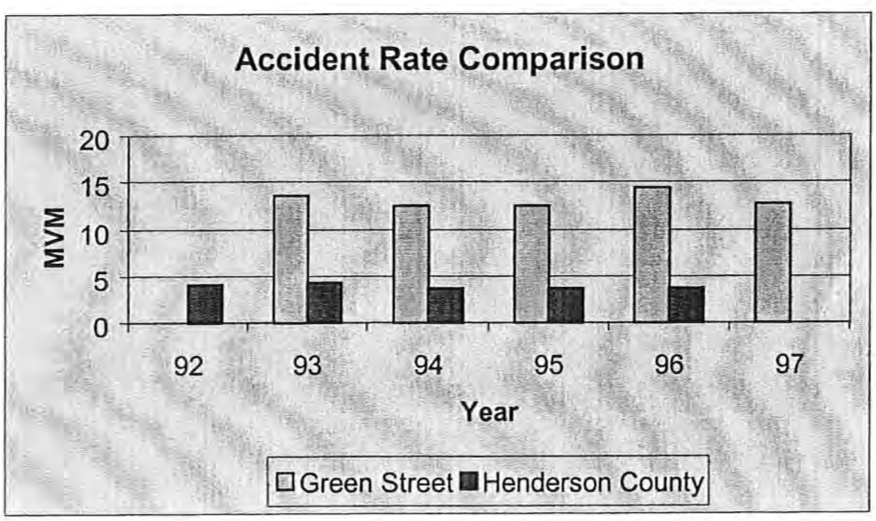
There are a variety of characteristics of these driveways, including type and width of the curb cuts and proximity to intersections and adjacent access points, which can affect traffic flow and travel behavior. The issue will be discussed in detail.

III. Safety Issues

Safety issues along the Green Street Corridor were also considered. Accident data from 1992 through 1997 were collected from the City and County of Henderson and Kentucky State Police agencies. The average yearly number of accidents for the corridor was 303, with an average of 2,024 for the county as a whole. The data sets were then calculated as accident rates (the number of accidents per one million vehicle miles traveled (MVM[1]) for the purpose of comparison, making it possible to track changes in pattern and relative severity. Figure III-1 illustrates the findings for both the Green Street Corridor and the county. Accident data for the study period suggests that no significant changes occurred in accident patterns, however it was determined that the annual accident rate was significantly higher for Green Street (13.11) when compared to the entire county (3.90). It was also higher than the average of the Commonwealth of Kentucky which was 6.44 for the urban 4-lane highway between 1991 and 1995.

A thorough review of the individual accident reports from the Henderson Police Department for the period of 1996-97 revealed that the accident occurrences were higher in October and on Fridays. For a typical weekday, accident frequency was higher between 3:00 and 4:00 p.m., which is consistent with peak traffic volume periods for the corridor. Approximately 58.66% of the accidents occurred at intersections, while 41.34% occurred within the roadway segments. Usually, the ratio of accidents at intersections compared to roadway segments is 2:1, however the Green Street corridor exhibits a 3:2 intersection-to-roadway ratio. This suggests that safety problems between intersections should be specifically examined in this corridor study.

Figure III-1 Accident Rates of Green Street and Henderson County



[1]
$$\text{Rate per MVM} = \frac{\text{number of accidents x 1 million}}{\text{Total VMT}}$$

1. Intersections

Approximately 30% of the accidents recorded at intersections involved personal injury and very few involved non-vehicle victims (pedestrians, bicyclists, etc.). 46.64% of accidents occurred at signalized intersections, while 53.36% occurred at unsignalized intersections.

Among incidents at signalized intersections (see Table III-1), Fifth and Second Streets experienced the highest number of accidents. This may be attributed to the high traffic volumes at these intersections. Taking the traffic volumes into account, Fifth Street was still the most probable accident site with a rate of 1.77 based on accident rates[2], while Dixon Street at 1.11 exceeded the rate of Second Street of 0.99. The intersection with First Street had the lowest accident rate among the signalized intersections.

Table III-1 Signalized Intersection Accidents

Intersection	Frequency (2 Years)	Rank by Frequency	Traffic Volume (PM Peak)	Rate	Rank by Rate
12th Street	18	4	2,300	0.86	5
5th Street	37	1	2,295	1.77	1
2nd Street	25	2	2,754	0.99	3
1st Street	11	7	2,236	0.54	7
Washington Street	16	5	2,072	0.69	4
Dixon/Martin Luther King Boulevard	19	3	1,880	1.11	2
Sand Lane	13	6	1,960	0.89	6
Total	**139**	-	**15,497**	-	-
Average	**20**	-	**2,214**	**0.98**	-

Clay and Richardson Streets experienced more accidents than many other signalized or unsignalized intersections, with 26 and 21 accidents respectively. When considering intersection approaches, the number of accidents on Green Street (68.27%) was higher than those on the intersecting streets.

The data for vehicular activity shows that 29% of incidents were attributed to conflicts between left-turn and through movements, 9% were attributed to collisions between right-turn and through movements, and 16% were attributed to right angle collisions by through movements on approaches,. These accidents were most likely caused by failure to yield the right of way. Conversely, 19% of accidents were attributable to "straight-stopping/stopped" collisions. This type of collision could be reduced with increased driver attention to changes in intersection situations and enhanced defensive driving skills. Although mechanical malfunction was not a major contributor, environmental changes (wet/icy surfaces, obstructed views, etc.) did directly contribute to some incidents. Impaired driving accounted for less than one percent of all accidents.

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[2]

$$\text{Intersection accident rate} = \frac{\text{Annual accident numbers x 1 million}}{\text{Daily traffic volume x 365}}$$

Peak hour factor = 0.08

2. Roadway Segments

Approximately 20% of accidents on the roadway segments involved personal injury. This figure is lower than the percentage at intersections (30%). However, two fatalities were recorded between First and Center Streets, as well as between 14th Street and Herron Street in 1997.

Approximately 90% of all accidents involved multiple vehicles. As shown in Table III-2, the roadway segment between Washington and Dixon Streets experienced the most accidents in 1996 and 1997, followed by the segment between Fifth and Twelfth Streets. The segment between First and Second Streets had the highest accident rate, followed by the segment between Washington and Dixon Streets. The spatial distribution of accident rates is shown in Figure III-2.

Table III-2 Road Section Accidents

Road Section	Frequency (2 Years)	Rank by Frequency	Vehicle Miles Traveled	Rate (MVM)	Rank by Rate
US 41 – 12th Street	26	5	9,392.76	3.80	4
12th Street – 5th Street	42	2	16,795.87	3.44	5
5th Street – 2nd Street	35	4	7,172.98	6.69	3
2nd Street – 1st Street	19	6	2,357.20	11.05	1
1st Street – Washington Street	6	7	4,079.66	2.02	7
Washington St. – Dixon St.	45	1	6,845.50	9.01	2
Dixon St. – Sand Ln.	37	3	17,424.11	2.91	6
Total	**210**	-	**64,068.08**	-	-
Average	**30**	-	-	**4.49**	-

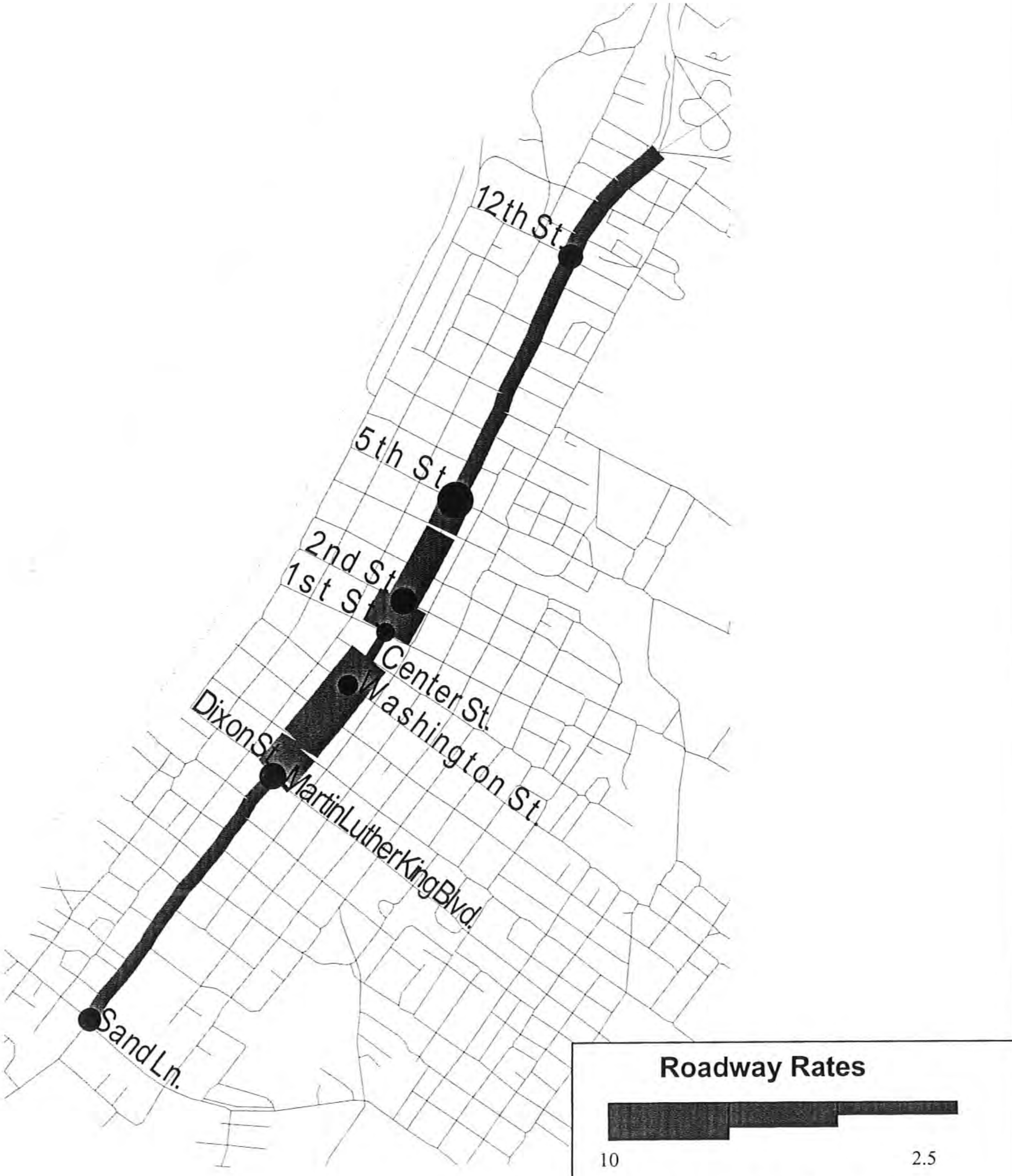

Figure III-2: Spatial Distribution of Accident Rates

IV. Analysis

To evaluate the existing operational conditions for the Green Street Corridor, capacity analyses were performed for the signalized intersections and for the entire corridor. The Level of Service (LOS) for each individual intersection and roadway segment was determined through the capacity analysis based on the Highway Capacity Manual. Additionally, an accident analysis was performed to identify safety problems associated with the corridor.

1. Capacity Analysis

Prior to conducting the capacity analysis, a corridor should be classified according to its function and design characteristics. A set of evaluation criteria from the Highway Capacity Manual of 1994, Table 11-2 and 3 (TRB Special Report 209, 1996) can be cited as a standard with which to compare the actual data obtained from the corridor.

Function

Functional classification was determined by evaluating mobility and access functions, the geographic points that a roadway connects, and the predominant trips it serves. The corridor mobility function is especially important for Green Street because it connects the regional highways of US 41 and US 60. The access function was also considered to be extremely important. Since the opening of the Henderson Bypass (KY 425), a considerable amount of through traffic has been diverted from the study corridor. The majority of the traffic flow served by Green Street is generated by and/or attracted to the local area, producing moderate trip lengths. As a result of these characteristics, the Green Street Corridor should be classified as a minor arterial for study purpose.

Design

The corridor was also classified by its design category, driveway access density, arterial type, parking characteristics, separated turn lane availability, speed limits, pedestrian activity, and residential development.

As stated previously, Green Street:

- is a multiple (4) lane, mostly undivided highway with no shoulders;
- has no specific access control imposed upon the corridor and no on-street parking provided;
- has only two dedicated left-turn lanes among the seven signalized intersections;
- has the average distance between signalized intersections of 0.42 miles and speed limits of 35 miles per hour for the entire corridor;
- has rare pedestrian interference to the corridor, with the only exception being the intersections of First and Second Streets; and
- roadside development is concentrated in the northern portion of the corridor.

Comparing these conditions with the Highway Capacity Manual standards, the corridor should be classified as intermediate (between typical urban-suburban categories) design.

Classified as a minor arterial function and intermediate design, the Green Street Corridor was classified as a Type III arterial. This classification was used to establish the arterial LOS definitions (see Table IV-1). With a Type III arterial classification, the free-flow speed should range between 25 to 35 miles per hour, with a default of 30 miles per hour, and running time between 122 to 165 seconds per mile, with the actual value depending upon segment length.

A capacity analysis was conducted to determine if the road facility is capable of accommodating traffic flows. The LOS is used to indicate how capable a facility is of meeting the needs of traffic. For signalized intersections, the LOS is determined by the average delay a vehicle may experience while waiting at an intersection. But for road sections, the LOS is determined by the average speed. Table IV-1 shows the criteria to determine LOS for both.

Table IV-1 Level of Service

Level of Service (LOS)	Signalized Intersection Average Delay (second)	Road Section Average Speed (Type III, mph)
A	<= 5.0	>= 25
B	> 5.0 and <= 15.0	>= 19
C	> 15.0 and <= 25.0	>= 13
D	> 25.0 and <= 40.0	>= 9
E	> 40.0 and <= 60.0	>= 7
F	> 60.0	< 7

LOS has 6 categories, ranging from A to F, among which A represents the ideal situation while F denotes a fail status to function properly. LOS C is generally accepted as a reasonable LOS, and has been adopted as the standard for the entire metropolitan area. By conducting capacity analyses based on current traffic data, the LOS was determined for signalized intersections and road sections in the Green Street corridor.

Traffic counts, as well as signal timing, physical configurations, etc., have been analyzed according to the Highway Capacity Manual 1994 edition and associated by running a traffic analysis software (TEAPAC/Signal94). The average delay of a vehicle at each intersection was calculated. The LOS for each intersection was determined based upon this average vehicle delay (Table VI-2). Of the seven signalized intersections, only the 2nd Street and Sand Lane intersections appeared to have capacity problems in PM peak hour with a LOS worse than C. Typically, alternatives are developed starting from simple and progressing to sophisticated. Improving signal timing and phasing is the simplest and least costly solution available. Signal optimizations were conducted for both deficient intersections using TEAPAC/Signal94 (see Appendix for the optimized timing/phasing schedules). As a result of the signal optimization, it is projected that the intersection with 2nd Street could be improved to LOS C and Sand Lane improved to LOS B without any additional physical improvements. Therefore, all 7 signalized intersections were capable of accommodating current traffic demands during P.M. peak period.

Table IV-2 Intersection Capacity

Intersection	Traffic Volume	Volumes/Capacity	Delay (second)	Level of Service (optimized)
12th Street	2300	0.673	11.2	B
5th Street	2295	0.516	8.2	B+
2nd Street	2754	0.927	29.8	D (C)
1st Street	2236	0.468	9.9	B+
Washington Street	2072	0.434	8.3	B+
Dixon/MLK Street	1880	0.607	8.7	B+
Sand Lane	1960	0.725	31.3	D (B)

The road segment capacity analysis depends heavily upon the LOS at the signalized intersections of the corridor. The HCS software was used to conduct the analysis. The current LOS for the study corridor is illustrated in Figure IV-1. As shown in Table IV-3, the majority of the road segments were operating at LOS A or B, except for the segment between First Street and Second Street, which had LOS D for southbound and E for northbound. Collectively, the entire arterial LOS was B, with an average speed of 23 mph. Although two segments of the Green Street corridor are currently operating at a deficient LOS, simple signal optimization could improve the corridor to a satisfactory level.

Table IV-3 LOS for Road Section

Road Section	Southbound		Northbound	
	Arterial Speed	LOS	Arterial Speed	LOS
12th Street – 5th Street	26.5	A	25.2	A
5th Street – 2nd Street	19.5	B	23.2	B
2nd Street – 1st Street	12.2	D	8.4	E
1st Street – Washington Street	20.3	B	20.2	B
Washington St. – Dixon St.	21.8	B	24.5	B
Dixon St. – Sand Ln.	25.2	A	26.8	A
The Corridor	**22.9**	**B**	**23.0**	**B**

The EUTS 2020 Transportation Plan projects that traffic volumes on the Green Street corridor will increase by an average of 10% during the next 20 years. Data were modified to reflect this projected increase and a second capacity analysis was performed to estimate future performance. The results showed that LOS for the signalized intersections and the roadway segments would retain a LOS C or better, with the exception being the intersection with 2nd Street. The intersection with Second Street would experience a projected LOS D even with signal optimization. This problem would be attributable to southbound traffic on Green Street, contributing a LOS of E. Therefore, alternatives beyond signal optimization should be considered for this intersection.

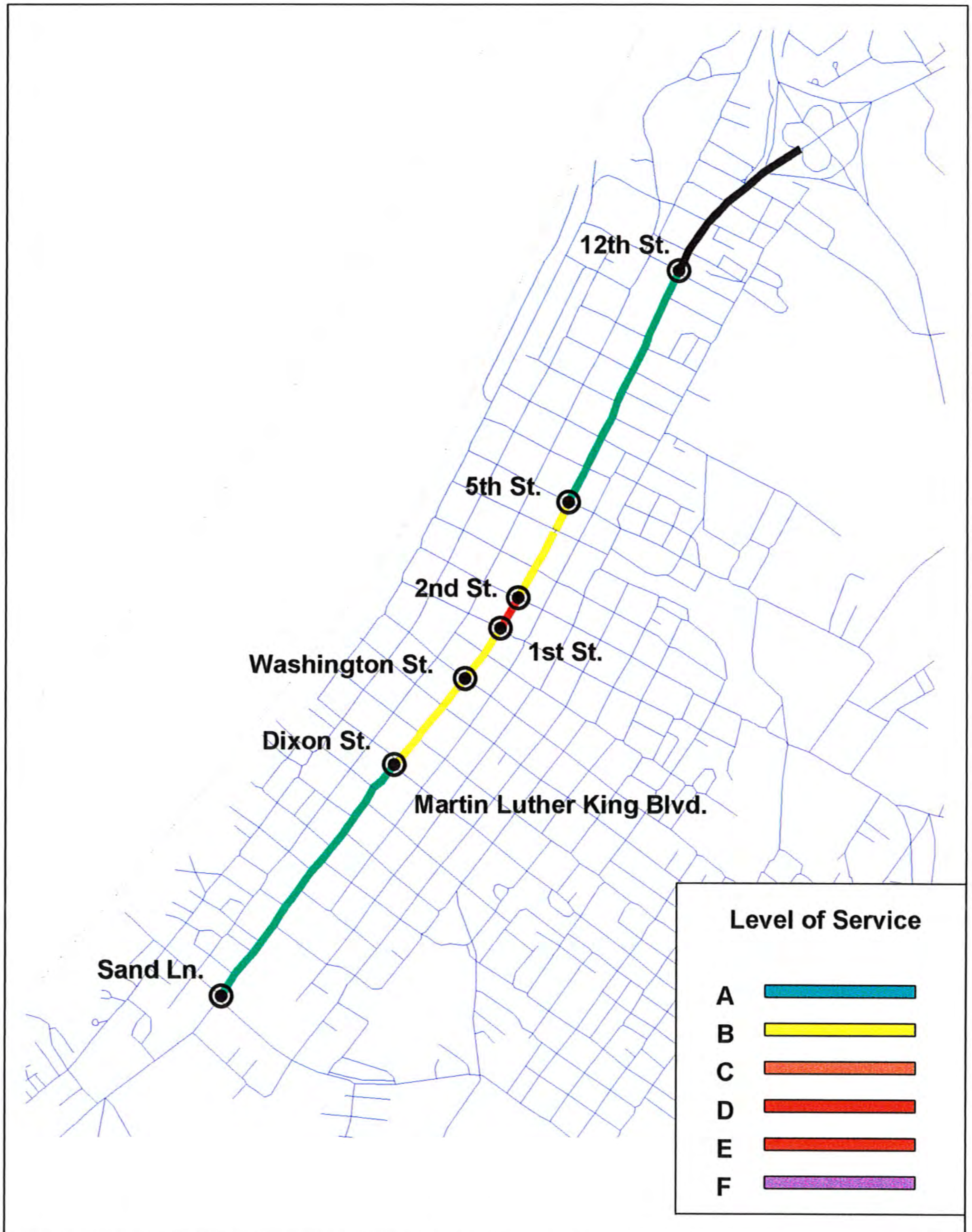

Figure IV-1: Corridor Level of Service

2. Accident Analysis

Accidents can be attributed to driver inattention or failure to follow the traffic rules. Among the accidents occurring at intersections, 39% were caused from driver inattention and 31% from failure-to-yield. In the roadway segments, the proportions were 45% and 15% respectively. Proper improvements to roadway facilities can provide for a safer driving environment and, in turn, reduce the possibility of accidents by:

- minimizing potential conflict points, to simplify traffic flow;
- making efforts to increase drivers' awareness of changes on roadway by improving information/warning signs; and
- improving traffic control techniques.

As mentioned previously, the number of accidents for the Green Street Corridor was unusually high in the past few years, especially in the road sections. Three possible factors were examined to determine their relationship with road section accidents:

- traffic volume;
- speed; and
- number of accesses.

Traffic Volume
Generally, higher traffic volumes will result in increased traffic accidents. Of the three roadway segments with the most accidents, two had higher vehicle miles traveled than all the other segments. However, looking at the accident rates, drivers in these segments actually had less of a chance of being involved in an accident (see Table III-2) as demonstrated by the significantly lower accident rates. Therefore, as long as the road capacity is not exceeded, reducing traffic volumes may not be an appropriate solution to the safety problem.

Speed
The average speed in each roadway segment was selected as a candidate to determine whether it could be statistically related to the occurrence of accidents. Assuming that a driver has less control of a vehicle at higher speeds, speed could be a factor in accident rates. A statistical analysis was performed based on collected data, and the mono-increasing line, logarithm, power, and exponential curves were tested to see how well these curves could represent the relationship between speed and accident rate. The accident/speed diagrams against the curves didn't show good matches since the coefficients of determination[3], or R^2s, were relatively low. That is to say, none of the curves could satisfactorily describe the relationship of accident with speed. As a result, higher speed does not necessarily lead to increased accidents in the study corridor.

[3] The value of R^2 in statistics provides a goodness-of-fit measure to the relationship between studied variables. It ranges in value from 0 (indicating no relation) to 1 (full relation).

Number of Accesses

Vehicles entering or exiting the corridor through driveway accesses cause interruptions to the traffic of the primary roadway. Excessive access points result in increased turning movements/conflict points, thereby increasing the potential for crashes. In addition, the lack of dedicated turn lanes slows traffic and reduces the carrying capacity of the roadway. This prospect has been proven by sound traffic engineering studies. In the case of Green Street, the relationship between the number of access points per mile and the accident rates (MVM) was examined using regression analysis similar to what was used for the speed analysis described above. The result strongly indicates that the more driveways, the greater probability of a traffic accident. Therefore, the number of driveways along the corridor, or their spacing, was a major factor in the high accident rates.

The number of driveways on each side of the road segments is listed in the Table IV-4. By comparing the actual access spacing with the current EUTS Access Standard Manual, 57.14% of the sections had shorter average distance between driveways than 150 feet minimum. When considering the spacing of the unsignalized intersections, the percentages could be even higher. One fatal accident over past two years was caused in part by the access point. A car suddenly stopped to attempt to make a left turn into a driveway which caused the motorbike to crash into the rear of the vehicle. Therefore, it is important that the number and density of driveways along Green Street and the turning movement be reduced when possible.

Table IV-4 Driveway Numbers and Spacing

Road Section	Direction	Length (foot)	Number of Driveway	Driveway Spacing (ft)	Maximum Number of Driveways	Number of Driveways to Be Reduced
US 41 – 12th St.	Southbound	1900.8	11	172.8	12	0
	Northbound	1900.8	19	100.0	12	7
12th St. – 5th St.	Southbound	3674.9	30	122.5	24	6
	Northbound	3674.9	30	122.5	24	6
5th St. – 2nd St.	Southbound	1541.8	15	102.8	10	5
	Northbound	1541.8	12	128.5	10	2
2nd St. – 1st St.	Southbound	512.2	3	170.7	3	0
	Northbound	512.2	6	85.4	3	3
1st St. – Washington St.	Southbound	892.3	3	297.4	5	0
	Northbound	892.3	8	111.5	5	3
Washington St. – Dixon St.	Southbound	1552.3	13	119.4	10	3
	Northbound	1552.3	8	194.0	10	0
Dixon St. – Sand Ln.	Southbound	4255.7	26	163.7	28	0
	Northbound	4255.7	25	170.2	28	0
Total	-	**28659.84**	**209**	-	-	**36**
Average	-	-	-	**137.1**	-	-

V. Summary

Findings:
Through the capacity analyses and accident analyses described in this report, the safety problem in the study area was found to be serious. Specifically, some major findings are summarized as follows:

1. All of the signalized intersections are capable of carrying the existing traffic, except 2nd Street and Sand Lane which exhibit a LOS worse than C. Through signal optimization, each intersection can be improved to C or B. However, the intersection of 2nd Street will deteriorate to a condition of poor if traffic volumes increase by 10% or more as estimated over the next 20 years and no physical improvements are made;

2. The arterial capacity was found to meet the existing traffic demands, except for the section between 1st Street and 2nd Street. Because this is the shortest section of roadway carrying a similar amount of traffic as other sections, the higher density actually reduces the average speed, causing poor LOS;

3. Safety was an overwhelming problem, as the accident rates in the study area were about twice as high as the county average over the past 5 years. Unlike some other corridors in this area, the number of accidents occurring in mid-block were almost the same as those at the intersections;

4. Even though the average speed through a 48-hour observation was slightly more than the posted speed limit of 35 mph, it implies that a sizable amount of vehicles were driving too fast, especially in the northern part of the corridor between 5th Street and the US 41 interchange where the average speeds were more than 40 mph.

Recommendations:
Based on these findings, a series of preliminary recommendations were developed, including engineering, management and policy measures. To improve the deficiencies in road capacity, the following solutions are suggested:

1. Optimize signal timing and phasing for the intersections with 2nd Street and Sand Lane. Computer generated signal timing and phasing patterns for these two intersections are suggested and attached to this report in the Appendix. The patterns were optimized based on the peak hour turning movements and the intersection geometric arrangements. Some of the specific characteristics can not be taken into account by the computer software; therefore, adjustments may be necessary in practical operations;

2. Add a left-turn lane for the southbound approach of the 2nd Street intersection, since the signal optimization alone was not able to improve this particular movement when traffic volumes increase.

To improve safety, the following recommendations are considered to be effective in reducing traffic accidents and should be phased according to available funding:

1. Review and modify traffic signs for proper location of speed limit and other advance warning signs;

2. Prohibit through traffic at the offset intersections, especially those at 12th Street, Dixon/Martin Luther King Boulevard, and Clay Street;

3. Close the median opening at Richardson Street due to proximity to the US 41 interchange. By using the raised median, it will visually remind drivers of the blocked intersection. However, the Fire Department vehicles can roll over the barrier in an emergency;

4. Access control is a major component of a long term solution to improve safety throughout the corridor. In accordance with the EUTS Access Standard Manual, and when possible, effort should be made to reduce at least 36 openings to the corridor while encouraging entry/exit to the side streets.

5. EUTS has thoroughly examined and discussed with local and state officials construction of a median barrier treatment, or continuous left-turn lane. While a median barrier is more effective and less costly, the continuous turn lane is more feasible. According to state and local officials there is adequate right-of-way along the corridor to provide for an continous turn lane, therefore, we recommend construction of a continuous left-turn lane between 1st Street and 12th Street.

APPENDIX: Signal Settings and Level of Service

Second Street
- Current
- Optimized current
- Optimized with 10% of increased traffic volumes
- Optimized with 10% of increased traffic volumes and an additional southbound turn lane

Sand Lane
- Current
- Optimized current
- Optimized with 10% of increased traffic volumes

Green Street Corridor Study, Henderson City
Signalized Intersection Capacity Analysis
Green Street/2nd Street (current)

04/15/98
15:57:07

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 205 - MINUTP number without "5"
Degree of Saturation (v/c) 0.93 Vehicle Delay 29.8@ Level of Service D+
@ expect more delay due to extreme v/c's (see EVALUATE)

```
       ------------------------------------------------------------
Sq 32 |  Phase 1     |   Phase 2     |   Phase 3    |   Phase 4    |
LD/LD ------------------------------------------------------------
      |              | + + +         |          ^   |          ^   |
  .   |              | + + +         |       ++++   |       ++++   |
 /|\  |              |<+ + +>        |      <++++   |      <++++   |
  |   |              |    v          |       ++++   |    ^  ++++   |
  |   |       ^      |          ^    |        v     |++++   v      |
North |    <+ + +>   |       <+ + +> |              |++++>         |
  |   |     + + +    |        + + +  |              |++++          |
      |     + + +    |        + + +  |              |   v          |
       ------------------------------------------------------------
      | G/C=0.076    | G/C=0.341     | G/C=0.076    | G/C=0.306    |
      | G=    6.5"   | G=   29.0"    | G=    6.5"   | G=   26.0"   |
      | Y+R= 3.0"    | Y+R= 5.5"     | Y+R= 3.0"    | Y+R= 5.5"    |
      | OFF=81.2%    | OFF=92.4%     | OFF=32.9%    | OFF=44.1%    |
       ------------------------------------------------------------
       C= 85 sec   G= 68.0 sec = 80.0%  Y=17.0 sec = 20.0%  Ped= 0.0 sec =  0.0%
```

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								58.6@	E	
LT+TH+RT	24/2	0.594	0.371	570	679	1039	1.530	58.6@	E-	391 ft
S Approach								13.3	B	
TH+RT	24/2	0.358	0.482	1500	1583	1031	0.651	13.3	B	319 ft
LT	12/1	0.000	0.076	164	206	13	0.063	10.9	B	25 ft
E Approach								12.7	B	
TH+RT	12/1	0.282	0.447	631	716	329	0.459	12.8	B	216 ft
LT	12/1	0.025	0.076	211	258	124	0.481	12.4	B	81 ft
W Approach								20.6	C	
LT+TH+RT	24/2	0.298	0.335	631	762	533	0.699	20.6	C	210 ft

Green Street Corridor Study, Henderson City
Signalized Intersection Capacity Analysis
Green Street/2nd Street (Optimized)

04/16/98
15:01:29

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 205 - MINUTP number without "5"
Degree of Saturation (v/c) 0.73 Vehicle Delay 18.8 Level of Service C+

```
         -----------------------
Sq 11  | Phase 1  |  Phase 2  |
LD/LD  -----------------------
       | * * *    |       ^   |
   .   | * * *    |      ++++ |
  /|\  |<* * *>   |     <++++ |
   |   |  v       |   ^  **** |
   |   |      ^   |++++  v    |
North  |   <+ + +>|++++>      |
   |   |    + + + |++++       |
       |    + + + |  v        |
       -----------------------
       | G/C=0.586 | G/C=0.320 |
       | G=  49.8" | G=  27.2" |
       | Y+R= 4.0" | Y+R= 4.0" |
       | OFF=81.2% | OFF=44.5% |
       -----------------------
```

C= 85 sec G= 77.0 sec = 90.6% Y= 8.0 sec = 9.4% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								26.3	D+	
LT+TH+RT	24/2	0.602	0.598	1031	1080	1039	0.962	26.3	*D+	250 ft
S Approach								7.8	B+	
TH+RT	24/2	0.358	0.598	1928	1962	1031	0.525	7.8	B+	248 ft
LT	12/1	0.130	0.598	84	106	13	0.116	5.6	B+	25 ft
E Approach								23.6	C	
TH+RT	12/1	0.282	0.332	420	531	329	0.620	19.7	C+	261 ft
LT	12/1	0.369	0.332	105	150	124	0.780	33.8	*D	98 ft
W Approach								21.5	C	
LT+TH+RT	24/2	0.305	0.332	603	734	533	0.726	21.5	C	211 ft

```
Green Street Corridor Study, Henderson City                  07/08/98
Signalized Intersection Capacity Analysis                    09:41:43
Green Street/2nd Street (optimized, +10%)

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 205 - MINUTP number without "5"
     Degree of Saturation (v/c) 0.87  Vehicle Delay  26.6@ Level of Service D+
        @ expect more delay due to extreme v/c's (see EVALUATE)
      -------------------------
Sq 11 |  Phase 1   |  Phase 2   |
LD/LD -------------------------
      | * * *      |          ^ |
  .   | * * *      |       ++++|
 /|\  |<* * *>     |      <++++|
  |   |   v        |    ^  ****|
  |   |       ^    |++++   v   |
North |    <+ + +> |++++>      |
  |   |     + + +  |++++       |
      |     + + +  |   v       |
      -------------------------
      | G/C=0.496  | G/C=0.410  |
      | G=   42.2" | G=   34.8" |
      | Y+R= 4.0"  | Y+R= 4.0"  |
      | OFF=81.2%  | OFF=35.5%  |
      -------------------------
     C= 85 sec   G= 77.0 sec = 90.6%  Y= 8.0 sec =  9.4%  Ped= 0.0 sec =  0.0%
```

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								50.9@	E	
LT+TH+RT	24/2	0.685	0.508	796	868	1143	1.317	50.9@	*E	336 ft
S Approach								12.7	B	
TH+RT	24/2	0.385	0.508	1595	1667	1135	0.681	12.8	B	334 ft
LT	12/1	0.131	0.508	59	77	14	0.165	8.6	B+	25 ft
E Approach								16.2	C+	
TH+RT	12/1	0.300	0.422	584	675	361	0.535	14.6	B	248 ft
LT	12/1	0.391	0.422	152	199	136	0.667	20.5	*C	93 ft
W Approach								15.5	C+	
LT+TH+RT	24/2	0.320	0.422	851	953	587	0.616	15.5	C+	202 ft

Green Street Corridor Study, Henderson City
Signalized Intersection Capacity Analysis
Green Street/2nd Street (optimized, +10%, +SB Left Lane)

07/08/98
09:57:50

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 205 - MINUTP number without "5"
Degree of Saturation (v/c) 0.66 Vehicle Delay 17.1@ Level of Service C+
@ expect more delay due to extreme v/c's (see EVALUATE)

```
        -------------------------
Sq 11  |  Phase 1   |  Phase 2   |
LD/LD  -------------------------
       |  * * +     |        ^   |
   .   |  * * +     |      ++++  |
  /|\  |<* * +>     |     <++++  |
   |   |    v       |    ^  **** |
   |   |        ^   |++++    v   |
North  |     <+ + +>|++++>       |
   |   |      + + + |++++        |
       |      + + + |   v        |
        -------------------------
       | G/C=0.496  | G/C=0.410  |
       | G=  42.2"  | G=  34.8"  |
       | Y+R= 4.0"  | Y+R= 4.0"  |
       | OFF=81.2%  | OFF=35.5%  |
        -------------------------
```

C= 85 sec G= 77.0 sec = 90.6% Y= 8.0 sec = 9.4% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								22.7@	C	
TH+RT	24/2	0.347	0.508	1616	1688	1005	0.595	11.6	*B	295 ft
LT	12/1	0.982	0.508	59	77	132	1.553	107.2@	F	78 ft
S Approach								12.7	B	
TH+RT	24/2	0.385	0.508	1595	1667	1135	0.681	12.8	B	334 ft
LT	12/1	0.131	0.508	66	86	14	0.149	8.5	B+	25 ft
E Approach								16.2	C+	
TH+RT	12/1	0.300	0.422	584	675	361	0.535	14.6	B	248 ft
LT	12/1	0.391	0.422	152	199	136	0.667	20.5	*C	93 ft
W Approach								15.5	C+	
LT+TH+RT	24/2	0.320	0.422	851	953	587	0.616	15.5	C+	202 ft

Green Street Corridor Study, Henderson City
Signalized Intersection Capacity Analysis
Green Street/Sand Lane (current)

04/17/98
08:06:36

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 217 - MINUTP number without "5"
Degree of Saturation (v/c) 0.73 Vehicle Delay 31.3@ Level of Service D+
@ expect more delay due to extreme v/c's (see EVALUATE)

```
       ------------------------------------
Sq 71 |  Phase 1  |  Phase 2  |  Phase 3  |
**/** ------------------------------------
      | + + + ^   |           |        ^  |
  .   | + + + ++++|           |      ++++ |
 /|\  |<+ + +>    |           |     <++++ |
  |   |   v       |           |   ^  ++++ |
  |   |           |        ^  |++++   v   |
North |           |    <+ + +>|++++>      |
  |   |           |++++ + + + |++++       |
      |           |   v + + + |  v        |
       ------------------------------------
      | G/C=0.333 | G/C=0.333 | G/C=0.190 |
      | G=  35.0" | G=  35.0" | G=  20.0" |
      | Y+R= 5.0" | Y+R= 5.0" | Y+R= 5.0" |
       ------------------------------------
      C=105 sec   G= 90.0 sec = 85.7%  Y=15.0 sec = 14.3%  Ped= 0.0 sec =  0.0%
```

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								18.6	C+	
LT+TH+RT	24/2	0.275	0.352	1124	1298	773	0.596	18.6	C+	369 ft
S Approach								21.3	C	
LT+TH+RT	24/2	0.322	0.352	1108	1281	974	0.760	21.3	C	465 ft
E Approach								108.1@	F	
RT	12/1	0.157	0.590	888	944	54	0.057	5.9	B+	32 ft
LT+TH	12/1	0.400	0.210	76	150	239	1.466	131.2@	F	277 ft
W Approach								20.9	C	
RT	12/1	0.184	0.590	888	944	122	0.129	6.2	B+	73 ft
LT+TH	12/1	0.250	0.210	117	225	168	0.715	31.6	D+	195 ft

Green Street Corridor Study, Henderson City
Signalized Intersection Capacity Analysis
Green Street/Sand Lane (optimized)

04/17/98
08:18:19

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 217 - MINUTP number without "5"
Degree of Saturation (v/c) 0.60 Vehicle Delay 13.2 Level of Service B

```
        -------------------------
Sq 11  |  Phase 1   |  Phase 2   |
**/**   -------------------------
       |  * * *     |          ^ |
  .    |  * * *     |       ++++ |
 /|\   |<* * *>     |      <**** |
  |    |    v       |    ^  **** |
  |    |        ^   |++++    v   |
North  |     <+ + +>|++++>       |
  |    |      + + + |++++        |
       |      + + + |   v        |
        -------------------------
       | G/C=0.521  | G/C=0.403  |
       | G=  54.7"  | G=  42.3"  |
       | Y+R= 4.0"  | Y+R= 4.0"  |
        -------------------------
       C=105 sec   G= 97.0 sec = 92.4%  Y= 8.0 sec =  7.6%  Ped= 0.0 sec =  0.0%
```

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								12.9	B	
LT+TH+RT	24/2	0.414	0.530	1060	1133	773	0.682	12.9	*B	268 ft
S Approach								12.7	B	
LT+TH+RT	24/2	0.408	0.530	1355	1428	974	0.682	12.7	B	338 ft
E Approach								15.6	C+	
RT	12/1	0.157	0.413	559	660	54	0.082	12.1	B	47 ft
LT+TH	12/1	0.323	0.413	346	428	239	0.558	16.4	*C+	206 ft
W Approach								13.0	B	
RT	12/1	0.184	0.413	559	660	122	0.185	12.7	B	105 ft
LT+TH	12/1	0.208	0.413	547	647	168	0.260	13.2	B	145 ft

Green Street Corridor Study, Henderson City 07/08/98
Signalized Intersection Capacity Analysis 09:35:41
Green Street/Sand Lane (optimized, +10%)

SIGNAL94/TEAPAC[Ver 1.20] - Capacity Analysis Summary

Intersection Averages for Int # 217 - MINUTP number without "5"
Degree of Saturation (v/c) 0.71 Vehicle Delay 15.9 Level of Service C+

```
        -----------------------
Sq 11  |  Phase 1  |  Phase 2  |
**/**   -----------------------
       | * * *     |        ^  |
   .   | * * *     |      ++++|
  /|\  |<* * *>    |     <****|
   |   |   v       |   ^  ****|
   |   |       ^   |++++   v  |
North  |   <+ + +> |++++>      |
   |   |    + + +  |++++       |
       |    + + +  |   v       |
        -----------------------
       | G/C=0.521 | G/C=0.403 |
       | G=  54.7" | G=  42.3" |
       | Y+R= 4.0" | Y+R= 4.0" |
        -----------------------
```

C=105 sec G= 97.0 sec = 92.4% Y= 8.0 sec = 7.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	90% Max Queue
N Approach								15.4	C+	
LT+TH+RT	24/2	0.461	0.530	1014	1087	849	0.781	15.4	*C+	294 ft
S Approach								16.8	C+	
LT+TH+RT	24/2	0.479	0.530	1216	1289	1072	0.832	16.8	C+	372 ft
E Approach								17.3	C+	
RT	12/1	0.159	0.413	559	660	60	0.091	12.2	B	52 ft
LT+TH	12/1	0.357	0.413	326	406	263	0.648	18.5	*C+	227 ft
W Approach								13.1	B	
RT	12/1	0.190	0.413	559	660	135	0.205	12.8	B	116 ft
LT+TH	12/1	0.219	0.413	534	633	184	0.291	13.4	B	159 ft

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GREATER HENDERSON BICYCLE AND PEDESTRIAN PLAN

JUNE 2003

EVANSVILLE URBAN TRANSPORTATION STUDY
Civic Center Complex, Room 316
1 NW Martin Luther King, Jr. Blvd.
Evansville, Indiana 47708-1833
(812) 436-7833

This report was financed in part through the Federal Highway Administration and the Federal Transit Administration of the U.S. Department of Transportation.

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EVANSVILLE URBAN TRANSPORTATION STUDY
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Mr. Joe Kiefer	-	Mayoral Alternate
Mr. Jeffrey Broughton	-	Henderson City Manager
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Ms. Lauri Lutz	-	Secretary

(NV) = Non-Voting

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Mr. John Stoll	-	Vice-Chairperson, Vanderburgh County Engineer
Mr. Brad Mills	-	Evansville-Vanderburgh Co. Area Plan Commission
Ms. Sherry Snodgrass	-	American Medical Response
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Ms. Theo Boots	-	Evansville ARC
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Mr. David Matthews	-	Evansville Chamber of Commerce
Mr. Matthew Meadors	-	Evansville Chamber of Commerce
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Lt. Andy Chandler	-	Evansville Police Department
Mr. Robert Working	-	Evansville Regional Airport
Mr. Herb Butler	-	Evansville Water & Sewer
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Mr. Anthony DeSimone	-	Federal Highway Administration (Indianapolis)
Mr. Glenn Jilek	-	Federal Highway Administration (Kentucky)
Ms. Bernadette Dupont	-	Federal Highway Administration (Kentucky)
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Ms. Pam Whitter	-	Henderson Area Rapid Transit
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Mr. Derek Dillon	-	River City Taxi
Ms. Nancy Cassidy	-	SIRS Inc.
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Ms. Sue Gibbons	-	Warrick Co. Economic Development
Ms. Sherri Phillips	-	Warrick Co. Plan Commission
Mr. Fred Padget	-	Westside Improvement Association

ACKNOWLEDGMENTS

Evansville Urban Transportation Study wishes to acknowledge and thank the Bicycle/Pedestrian Advisory Committee for its efforts in guiding the development of the Bicycle and Pedestrian Plan. The assistance of the Committee, in combination with input from various other organizations, City and County departments, was beneficial in developing a plan to address the needs of bicyclists and pedestrians in the region. The following representatives participated on the Henderson Bicycle/Pedestrian Advisory Committee:

John Talbert, *Henderson Community Development Department*
Emily Gilliam, *Henderson Parks Department*
Mark Simmons, *Henderson Parks Department*
Buzzy Newman, *Henderson Parks Department/City Commission*
C. A Honaker, *Citizen*
Dr. Mero Nunez, *Citizen*
Bart T. Moore, *Citizen*
Terry N. Todd, *Citizen*
David Latham, *Citizen*
Tony Gager, *Citizen*
Officer Anthony Purcell, *Henderson Police Department*
Officer James Burke, *Henderson Police Departmant*

INTRODUCTION

The *Bicycle and Pedestrian Plan* is a planning effort to make the Henderson area more bicycle- and pedestrian-friendly. The *Plan* is designed to improve the safety and viability of bicycling and walking, first for their value as modes of transportation, and second as forms of recreation. This *Plan* supplements the regional *2025 Transportation Plan*, which identifies current and future transportation needs and recommends projects to address those needs. The EUTS Study Area includes the City of Evansville, Vanderburgh Co., a portion of Warrick Co. including the Towns of Newburgh, Chandler and Boonville, as well as the City of Henderson and Henderson County in Kentucky. Figure 1 illustrates the Kentucky portion of the EUTS Study Area. Separate bicycle and pedestrian plans were developed for the Indiana and Kentucky portions of the Study Area.

While autos will undoubtedly continue to be the main mode of transportation in the region, improving conditions for bicyclists and pedestrians is important for many reasons:

- **To improve the safety of those who currently bicycle and/or walk.** Many residents currently rely on bicycling and/or walking to get to their job, the store, the bus stop, or wherever else they need to go. They need safe facilities.
- **To improve accessibility for all residents.** In particular, older residents, children, citizens with low incomes, and citizens with functional disabilities require safe and affordable alternatives to driving. This need will increase over the next few decades as the Baby Boom generation enters retirement age.
- **To achieve more efficient use of the existing transportation system.** Bicyclists and pedestrians require less space than do autos, meaning that more travelers can be accommodated in less space, with less auto congestion. In addition, bicycling and walking reduce the amount of wear and tear on roads. Greater use of these modes of travel can help delay the need for major roadway widening and construction.
- **To enhance the region's quality of life.** Bicycling and walking encourage interaction between residents, promote a sense of community, and add recreational value. A recent study by the Real Estate Research Corp. calls pedestrian-friendly neighborhood developments the "newest market to watch". The study found that roadway congestion and dependence on the auto decrease the "livability" of an area.[1]
- **To encourage more active and healthier residents.** Walking and bicycling are excellent physical activities, and their use can help improve the public's health.
- **To help address the local air quality problem.** Unlike auto travel, bicycling and walking do not produce harmful emissions. If the Kentucky portion of the EUTS study area is designated as being in nonattainment of federal air quality standards, the region will need to develop strategies to reduce vehicle emissions.

Interest in bicycle and pedestrian planning in the region has fluctuated over the last three decades. However, a particularly strong resurgence in interest has taken place within the last decade, in part because of the Federal Highway Administration's (FHWA) increased emphasis on bicycling and walking as critical elements of a balanced transportation system. The federal government's current transportation bill, the Transportation Equity Act for the 21st Century (TEA-21), specifically requires that bicycling and walking are considered in the planning, design and construction of all federally funded transportation projects.

This Plan was undertaken in part to fulfill TEA-21's requirements. It also serves as an update to the 1979 *Evansville Bikeway Master Plan*, the 1977 *Henderson Bicycle Facility Plan*, and expands bicycle planning activities to include the entire EUTS Study Area.

---

[1] *Emerging Trends in Real Estate 1998*, Real Estate Research Corporation, Chicago, IL

EUTS helped organized a Bicycle/Pedestrian Advisory Committee to assist in developing the *Bicycle and Pedestrian Plan*. Committee members (listed on page v of this document) included bicycle and pedestrian advocates, as well as representatives from the City of Henderson, Henderson Police Department, the Henderson-Henderson County Area Plan Commission, and Methodist Hospital. The Advisory Committee, in combination with input from various other organizations, and City and County departments, assisted in developing a plan that addresses the needs of bicyclists and pedestrians. A committee focused on the specific needs of the Henderson Area met during 2002-2003 to help develop the network presented for Henderson.

The following are the bicycle and pedestrian goals for the region over the next twenty years:

- Recognize bicycling and walking as valid modes in the overall transportation system.
- Recognize that education, enforcement, and encouragement programs are all vital components of a successful bicycle and pedestrian program.
- Consistently consider and accommodate bicyclists and pedestrians, as appropriate, in the design, construction/reconstruction and maintenance of roadways and sidewalks.
- Reduce the number of bicycle- and pedestrian-related crashes.
- Increase bicycling and walking from less than 1% of all trips in 2000[2] to 5% of all trips in the region by the year 2030.

Recommendations to reach these goals include **physical improvements** such as the repair or construction of new sidewalks, creation and maintenance of on-street and separated bikeway facilities, installation of bike storage racks, **policy changes** including new planning activities, revised roadway design standards, support for modifications to local subdivision and zoning ordinances, and **education, enforcement and encouragement** activities to promote and encourage safe bicycling and walking. The support, involvement and action of public agencies and groups including City and County officials, the Area Plan Commission, City and County Engineers, local police department and the general public will be crucial in implementing the recommendations contained in this *Plan*.

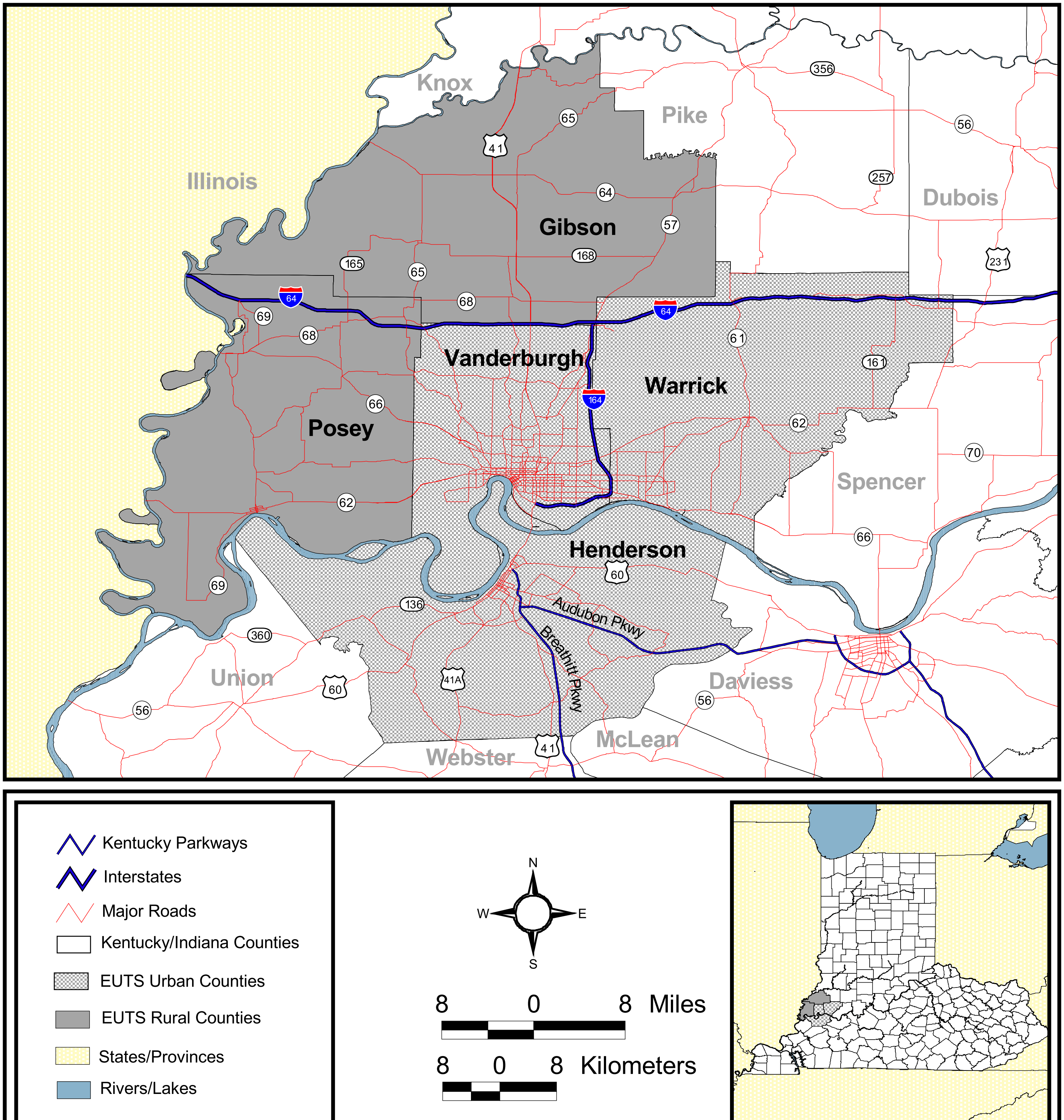
This *Plan* is divided into two sections: Part 1 deals with bicycle issues and Part 2 with pedestrian issues. Each part contains an inventory of existing conditions, and a detailed listing of recommendations for new facilities, and education, encouragement and enforcement activities. As with any plan, the Bicycle and Pedestrian Plan should be revisited periodically. It is recommended that an update be undertaken whenever the regional *Transportation Plan* is updated.

[2] U.S. Census Bureau

Figure 1

Evansville Urban Transportation Study
Study Area

Gibson, Henderson, Posey, Vanderburgh and Warrick Counties



PART 1
BICYCLE PLAN

CHAPTER 1. HISTORY OF LOCAL BICYCLE PLANNING

Bicycle planning in the Evansville-Henderson urbanized area is not a new concept. There have been several attempts in the City of Evansville over the past 30 years to improve the safety of, and encourage, bicycle travel. Those efforts, described in the *EUTS Regional Bicycle and Pedestrian Plan*, focused on creating bicycle routes along selected City streets, and separated trails on levee property and other public rights of way. Few of the improvements that were implemented survive today.

The City of Henderson has also made efforts to establish bicycle planning in the past. A lack of physical improvements from previous plans creates minimal awareness of the efforts, of which there were two. The first was a preliminary bikeway plan produced in 1975 for the Henderson Parks and Recreation Department. The plan consisted primarily of on street bike facility linkages to park and recreation areas within the city. The plan classified routes as proposed and alternate routes (which presumably could be implemented without road improvements), and proposed and alternate routes with improvements. No design standards or cost estimates were developed for the plan. It appears that the '75 plan proceeded no further than the preparation of the preliminary plan.

A second bicycle facility plan was produced by the Green River Area Development District in 1977. This plan was more fully developed than the '75 plan; including an inventory of trip generators and existing roadway conditions and traffic volumes. A substantial amount of design criteria; including location guidance, facility warrants, designs standards and cost estimates, was present in the plan. The importance of an appropriate safety initiative was also discussed.

The physical network in the '77 plan consisted of a short and long range plan. The '75 network was also evaluated for feasibility and found to be less than desirable without major improvements to the existing streets. The '77 short range plan focused on the cities core, and was termed as "very implementable". The short range plan was broken down into eleven segments and described individually. Comments on each segment and facility type recommendations were included, along with illustrative maps. The long range plan, while more comprehensive, was viewed as speculative due to significant improvements required for its implementation. Of note in the long term plan is the idea of recreational development along Canoe Creek, as this is an idea generating interest today. Substantial public involvement and support was deemed necessary for the long range plan to move forward. Although the short term plan was deemed ready for implementation, no improvements were realized at that time.

A strong resurgence in bicycle and pedestrian planning came about in the early 1990's, with the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and continues under the subsequent renewal in 1998 (TEA-21). Recent efforts by the city have capitalized on programs available under TEA-21, resulting in enhancements to the City of Henderson riverfront, including a pedestrian trail corridor.

The field of bicycle planning has seen significant change and growth over the past decade. Experience with projects implemented in the 1970s and '80s have added to the knowledge base of engineers and planners. New research continues to shed light on which approaches to bicycle planning have and have not worked, and facility design standards continue to be modified to reflect what has been learned. This *Plan* draws on both new information and past planning efforts to create a current plan to address the needs of bicyclists.

CHAPTER 2. CURRENT CONDITIONS

Currently only a small number of local trips are made on a bicycle, less than 1% in 2000.[3] However, the Evansville-Henderson urbanized area has the potential to convert many local trips to bicycle. The area has relatively flat terrain, a well-developed grid street network, and a mild climate that allows for bicycling 9 or more months out of the year. To make cycling a more viable means of transportation, though, it is necessary to understand and address the impediments that prevent more people from choosing a bicycle instead of an auto for shorter, local trips. This chapter looks at the current environment and assesses how it either discourages or accommodates bicycling.

A. Bicycle Crashes

Many people seriously overestimate the level of danger involved in cycling, and have misconceptions about what hazards they may encounter while riding a bicycle. Unfortunately, these misconceptions influence the decision of many people about whether or not to bicycle, and on how to operate a bike in traffic. *But the public's perceptions of dangers do not match the facts.* Having a clear understanding of the real safety problems related to cycling is the first step towards developing a legitimate plan for improving the safety of bicycle travel in the region.

One of the first steps in developing the Bicycle Plan was to obtain and analyze information on reported bicycle crashes in the City of Evansville, Vanderburgh County, Town of Newburgh and the City of Henderson for the period 1996-97. More recent information for the Henderson area was unable to be utilized for this plan due to changes in the statewide accident database structure. For this reason, the 1996-97 data is used as a sample of local cycling accidents. Virtually all of the reported incidents occurred in urban areas of the study area: City of Evansville (72), remainder of Vanderburgh Co. (1), Town of Newburgh (0), and the City of Henderson (13). The information is used in the following discussion to discount some of the most common misconceptions relating to bicycling.

MISCONCEPTION #1 ***The greatest danger when cycling is getting hit by an auto.***

There are two main types of cycling accidents – falls and crashes. A "fall" is a single-bicycle accident. A "crash" involves an additional object; for example another cyclist, a pedestrian, a vehicle, parked car, or loose dog.

Many potential bicyclists cite the fear of traffic as their main objection to riding a bicycle. However, national studies estimate that 80% of accidents involving cyclists involve a fall or a collision with another cyclist or some object. While crashes between cyclists and moving autos can result in more severe injuries than falls or collisions with other objects, they occur much less frequently than many people believe. Cyclists who focus all of their attention on dangers that are least likely to produce an accident expose themselves to more real hazards.

MISCONCEPTION #2 ***A crash involving a cyclist and an auto will result in a fatality.***

A total of 86 bicycle-auto crashes were reported in the study area during the time period 1996-97, resulting in 1 fatality and 63 injuries to cyclists. Many times cyclist injuries are not severe. According to national studies, the most common reason for the death of a cyclist in a bike-auto

[3] U.S. Census Bureau

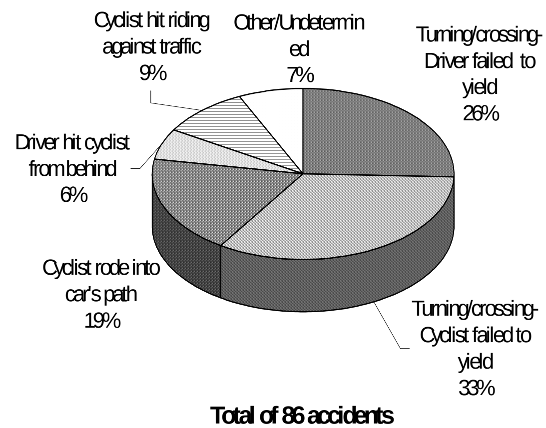
crash is brain injury. This can be addressed by promoting the use of bicycle helmets, which can reduce the risk of brain injury by 88%.[4]

MISCONCEPTION #3 ***A cyclist riding in traffic is most likely to be hit from behind by an auto.***

Cyclists are rarely hit from behind by an auto. On the contrary, if they are involved in a bicycle-auto crash, it will more than likely be caused by what is in front of them—intersections, driveways and alleys where bicycles and autos turn or cross each others' paths. As shown in Figure 2, over half of all local bicycle-auto crashes involved a turning or crossing movement, where either the driver or cyclist failed to properly yield the right of way. This is in contrast to 6% of crashes in which a cyclist was hit from behind.

The fear of being hit from behind causes some cyclists to illegally ride against the flow of traffic in the belief that they will avoid an accident if they can see oncoming traffic. In fact, more cyclists are hit while riding *against* traffic (9%) than are hit while riding *with* traffic (6%).[5]

Figure 2
Reason For Bicycle/Auto Crashes
EUTS Study Area, 1996-97



MISCONCEPTION #4 ***Bicyclists are always at fault in crashes. Or, motorists are always at fault in crashes. (depending on whether you are a cyclist or a motorist!)***

In reality, the blame goes to both motorists and cyclists. As shown in Table 1 below, motorists were responsible for 49% of all crashes involving adult cyclists from 1996-97, with cyclists responsible for another 40%. As evidenced in Table 2, however, in crashes involving child cyclists (under 16 years of age), the cyclist was at fault in 70% of the crashes.

Regardless of age of the motorist or cyclist, most crashes result from easily identifiable and avoidable habits. The vast majority of accidents would have been avoided had both users adhered to the established rules of the road.

[4] Thompson, Robert S., M.D., F.P. Rivara, M.D., D. C. Thompson, M.S., "A Case-Control Study of the Effectiveness of Bicycle Safety Helmets," *New England Journal of Medicine* v 320 n 21 (1989)

[5] "Wrong way cycling" exposes cyclists to the danger of being struck by an auto making a right turn from a side street. Right-turning drivers will check for vehicles approaching from their left, but will not expect a cyclist approaching on their right.

Table 1. Cause of Bike-Auto Crashes Involving Cyclists Age 16+* EUTS Study Area, 1996-97

# of crashes	Reason for crash
12	Driver failed to yield right of way
7	Cyclist failed to yield right of way
5	Cyclist riding against traffic
3	Driver passed too closely, struck cyclist
2	Cyclist failed to obey traffic control
1	Driver backing up – didn't see cyclist
1	Driver failed to obey traffic control
0	Cyclist rode into path of auto
4	Other/Undetermined
35	**TOTAL CRASHES**

* Only includes crashes where age could be determined

Table 2. Cause of Bike-Auto Crashes Involving Cyclists Age 15 and Under* EUTS Study Area, 1996-97

# of crashes	Reason for crash
11	Cyclist rode into path of auto
7	Cyclist failed to obey traffic control
6	Cyclist failed to yield right of way
5	Driver failed to yield right of way
2	Cyclist riding against traffic
2	Driver backing up – didn't see cyclist
1	Driver hit cyclist from rear
1	Driver failed to obey traffic control
2	Other/Undetermined
37	**TOTAL CRASHES**

* Only includes crashes where age could be determined

MISCONCEPTION #5 **Child cyclists are safe as long as they only ride in their neighborhood.**

Accidents involving child cyclists are most likely to occur on neighborhood streets, because that's where children do most of their bicycling. And child cyclists are their own worst enemy. Younger children, in particular, often don't have the cognitive ability, judgment, or bike handling skills to safely and properly ride their bikes on the street. As mentioned above, about 70% of all bike-auto crashes involving a child cyclist were the fault of the cyclist. The most common reasons for crashes are the child riding into the street without looking for cars, failing to stop at Stop signs and red lights, and failing to properly yield to autos at intersections.

Child cyclists need to understand bicycle rules of the road and learn proper bike handling skills before being allowed to ride unsupervised.

MISCONCEPTION #6 ***Cyclists are best accommodated on separated paths.***

Separated trails can supplement, but not substitute for, a good network of on-street bikeways. Cyclists have always, and will continue to, use the street system to get where they need to go. The road network offers the greatest choice of routes and shortest, quickest path to almost any destination. While many people believe that separated bike paths are the safest facility for bicyclists, they have been found to have a higher accident rate than on-street facilities--292 accidents per million bike-miles, or 260% of the basic average.[6]

MISCONCEPTION #7 ***There will be an increase in the number of bike-auto crashes as more residents bicycle.***

As the number of bicyclists increases and roadway design incorporates more bikeway facilities, there will likely be a greater awareness among motorists of bicyclists' rights. In Portland, Oregon bike-auto crashes appear to be leveling off even though the number of cyclists has more than tripled.[7]

[6] *Bicycle Transportation: A Handbook for Cycling Transportation Engineers*, John Forester, M.S., P.E. (1994)
[7] *Bicycle Master Plan*, City of Portland, Ore. (July 1998)

National data also suggests that accident rates drop as cyclists improve cycling skills and gain more experience riding in traffic. As shown in Table 3 below, “club-level” cyclists (members of a recreational and/or racing cycling club), despite averaging more than 4 times the miles of “college-associated” adult cyclists, have only ¼th the number of accidents.

Table 3. General Bicyclist Accident Rates

Type of Cyclist	Miles ridden per year	Accidents per million miles
Elementary school	580	720
College-associated adult	600	500
Club cyclists (League of American Wheelmen)	2,400	113

Source: *Bicycle Transportation*, John Forester, M.S., P.E. (1994)

Clearly, no education or training program will eliminate all cycling crashes. However, national studies have shown that developing proper cycling skills in a population can reduce bike-auto crashes by about 80%.[8] Perhaps the most effective way to reduce crashes is to teach cyclists proper cycling habits so they will be less likely to make errors that now cause many bike-auto crashes, and to recognize and avoid motorist errors that lead to crashes.

B. Existing Roadway Network and Bikeway Facilities

Cyclists rely heavily on the existing roadway network to get where they need to go. And overall, the study area has a well-developed network of city, county and state roadways that can be used by bicyclists. Many roadways--those that carry a low volume of traffic, have paved shoulders or wider travel lanes—already safely accommodate cyclists. However, many other roadways--those with narrow travel lanes or no paved shoulders—put bicyclists and motorists in conflict by forcing them to compete for roadway space.

Sidewalks should not be considered an acceptable bicycle facility, except possibly for children. The use of sidewalks by cyclists introduces many safety problems, such as the speed differences between cyclists and pedestrians, conflict at driveways where drivers don’t expect fast-moving cyclists on the sidewalk, and the presence of obstructions such as light poles, signposts, fire hydrants, etc.

In addition to the roadway network, there are two existing separated shared use paths in Henderson. Both of these trails are located in Newman Park:

- An approximately ½ mile trail is shared use along the entire length
- A short (.11 mile) section of the park’s nature trail is shared use

For a good cycling network, *selected* collector, arterial and rural streets must be designed to accommodate cyclists.[9] While young and/or less experienced cyclists may choose to ride only on local streets, many other cyclists want to travel on collector and arterial roadways for the same reasons as do motorists—they provide the quickest, most direct route to their destinations.

[8] “Defects of the Design-Cyclist Approach as Adopted by the 1991 *AASHTO Guide for the Development of Bicycle Facilities*”, John Forester, M.S., P.E.

[9] Roadways are categorized by use and function into several different classifications: local, collector and arterial roadways. Local streets generally serve residential areas or other low-volume uses. Local streets feed into collectors, which have better connectivity and carry more traffic. Collectors in turn feed into arterials, which are intended to carry traffic longer distances at higher speeds and with fewer interruptions.

Cyclists are accommodated on a roadway by providing room for a cyclist and motorist to operate side by side, and for the motorist to safely pass the cyclist without having to cross lane lines.

In addition to providing adequate roadway space for cyclists, attention needs to be given to the condition of that portion of the roadway used by cyclists--typically the outer 4 feet of a travel lane, or paved shoulder where present. The pavement should be kept smooth and clear of wide cracks, joints, drop-offs, as well as gravel, glass, leaves, trash, and other debris that can cause a bicyclist to lose control. Poor patching jobs and potholes will force a cyclist to ride further into the travel lane.

The type and location of drainage inlet grates and utility covers also needs to be considered. In particular, parallel bar drainage grates can catch a bicycle tire, creating the likelihood of a crash. Drainage grates should be a bicycle-friendly design that is flush with the pavement. Retrofitting parallel bar grates with welded cross bars is less desirable, but acceptable. Utility covers are best located outside of the area that cyclists will use. They are particularly dangerous when the roadway is wet.

Lastly, diagonal railroad crossings present a serious safety problem for cyclists. These crossings, if not approached by the cyclist at a right angle, can divert the front wheel of the bicycle and cause a crash. The problem is greatest on roadways where there is no room for the cyclist to maneuver in order to approach the crossing at a right angle. The installation of smooth rubberized crossings is the preferred solution, but is often cost-prohibitive. Paving a tapered approach on either side of the crossing is an acceptable substitute.

C. Bicycle Parking and Other Supporting Amenities

Every bicycle trip has two basic components: the route chosen by the cyclist, and available facilities at the end of the trip. The importance of the most basic of amenities--convenient, secure bicycle parking--can't be overemphasized. If there is no bike parking available at a particular destination, few people will decide to make the trip by bicycle. Additional amenities such as showers and lockers at the workplace (or at a nearby health club) are ideal, but not critical, for cyclists who commute by bike.

Finding secure bike storage is often the most difficult part of making a bicycle trip. Few public libraries, government offices, schools, park & recreation facilities, large shopping areas and post offices offer bike parking. When bike racks are available, they are generally the older "schoolyard" type, which can damage bike frames and don't accommodate the high-security "U-locks" which many bicyclists today use.

Many communities throughout the country require bicycle parking facilities in commercial or large-scale apartment developments as part of their development permitting process. Requirements generally include a minimum number of bike parking spaces based on a percentage of auto parking spaces, and specifications on rack design. While local ordinances do regulate parking for autos, they don't currently require bicycle parking.

Guidelines for the design of the bike racks are included in Appendix A. In general, however, bike racks should be designed so that they:

- Don't bend wheels or damage the bicycle
- Accommodate high security U-shaped bike locks
- Allow the bicyclist to secure both the frame and both wheels
- Do not interfere with pedestrian traffic
- Are easily accessible and protected from autos

A more recent national development in bicycle planning has been the creation of better linkages between public transit and bicycling. A growing number of public transit providers are realizing the benefits of installing bike racks on buses, and providing secure bike parking at major transit stops and transfer centers. This makes transit an option for those who either live beyond walking distance of a bus route, or whose final destination is beyond walking distance of the closest bus stop. In addition, cyclists caught by inclement weather or equipment problems have the option of using public transit and being able to bring their bike with them.

D. Community Attitudes

New bikeways and ample bike parking will vastly improve local conditions for bicycling, and by themselves will be enough to spur some residents to use a bicycle for recreation and travel purposes. Obviously, not all residents can be expected to bicycle because of physical and health reasons, distance barriers, schedule constraints, or a lack of interest. For many others, however, the choice not to bicycle is determined by two attitudes: fear of traffic, and the stigma associated with not driving a car.

Probably the most deeply ingrained public belief is that roadways are not safe for cyclists. As discussed earlier in this chapter, many people overestimate or have mistaken beliefs about the risks involved in cycling. This affects their decision on whether to bicycle, as well as how they operate their bicycle in traffic. Seasoned cyclists will attest that learning to ride in traffic is similar to learning how to drive a car. New drivers and bicyclists both start out by learning the rules of the road and riding on low-volume streets. With practice and experience, new cyclists and drivers overcome their fears by acquiring the skills and confidence to operate in heavier traffic.

Another detrimental attitude is the stigma associated with not driving a car. Bicycling for transportation is often considered a last resort, and outside of bicycle enthusiast circles cycling generally has a low social status. Many people assume that someone who uses a bicycle for transportation can't afford a car, isn't able to drive for some reason or another, or is simply “odd”.

Bicycling has become a popular form of recreation, and is increasingly being recognized as a legitimate form of travel. Good public education and promotion campaigns should be used to build upon the growing interest in cycling, and will be needed for bicycling to gain a significant foothold in the local transportation mix.

CHAPTER 3. BICYCLE PLAN RECOMMENDATIONS

Chapter 2 of the Bicycle Element highlighted numerous problems and deficiencies that impact the safety, attractiveness, viability and levels of use of bicycling in the Henderson area. The following recommendations address those problems. These recommendations were developed with extensive assistance from the EUTS Bicycle/Pedestrian Advisory Committee, and with input from the general public.

Bicycle recommendations are separated into 6 categories: Planning Activities; Bikeway Network; Bike Parking and Supporting Amenities; Transit Interface; Education and Encouragement; and Enforcement. Recommendations in each category are further grouped into Phases I, II or III for priority of implementation. The exception to the three phase implementation schedule is the Bikeway Network, which is divided into short and long-term phases. Both the <u>need</u> and the <u>feasibility</u> of each recommendation were taken into consideration in assigning it to an implementation phase. As such, a Phase III recommendation might be a high priority, but the feasibility of implementing it at this point in time is low.

A. Planning Activities

The first step towards making the EUTS Study Area bicycle-friendly is to incorporate bicycling issues as a standard consideration in all transportation planning activities and roadway projects (both local and state). Bicycle and pedestrian advocates should have consistent opportunity to provide input into public decisions that affect these modes of travel.

<u>Phase I:</u>

- Organize and conduct Bicycle/Pedestrian Advisory Committee meetings on a semi-annual basis to assist in implementing recommendations in the Bike/Pedestrian Plan, review road/bridge project plans, and provide input into other transportation planning activities.
- Consider bicycle issues in the early planning and design of all locally funded transportation construction, reconstruction, maintenance (i.e. resurfacing) or intersection improvement projects to ensure accommodation of bicyclists, as appropriate.
- Encourage local jurisdictions to develop roadway inventories including number of travel lanes, lane width, shoulder width, shoulder type (paved or unpaved), surface condition, posted speed limit, availability of on-street parking, traffic volumes, and presence/condition of sidewalks.

<u>Phase II-III:</u>

- Monitor status of bike projects, level of use and community response.
- Update the Bicycle/Pedestrian Plan as appropriate.

<u>Continue current practices:</u>

- Participate in early planning and design phases of all federal- and state-funded transportation construction, reconstruction, maintenance and intersection improvement projects to ensure accommodation of bicyclists is appropriately considered.

B. Bikeway Network

Throughout the process of developing this *Plan*, the comment heard most by EUTS is the need for dedicated space on roadways for bicyclists. This is supported by national polls, which frequently cite the lack of bikeways as the primary reason more people don't bicycle for travel purposes. Safe, convenient and well-designed bikeway facilities are essential to encourage bicycle use. In addition to benefiting bicyclists, bikeway facilities such as wide curb lanes and paved shoulders benefit the non-cycling public. National research has found that widening a travel lane by one foot can reduce accidents by 12%, a figure that jumps to 23% when widened by two feet. Widening a shoulder has been found to reduce fatal crashes by 20%.[10]

While all streets except limited access highways should be accessible by bicycle, this Plan includes a network of selected roadways that are recommended for improvements to better accommodate bicyclists. (see Figure 3, insert in rear pocket) Streets on the bikeway network were selected because they provide the best connections between residential areas, schools, parks, commercial areas and other popular destinations, and because adequate, parallel facilities are not available.

On-street bikeways can be developed either by reallocating space on existing roadways, or by incorporating bikeways into new construction or reconstruction projects. There are a variety of treatments that are recommended by the American Association of State Highway and Transportation Officials (AASHTO) to accommodate bicyclists: designated bike routes, wide curb lanes, paved shoulders, bike lanes, and separated paths. (see Figure 4)

Another possible bikeway treatment would be the installation of “Share the Road” (W16-1) signs along corridors where bike use is expected, auto traffic volumes are high, but where physical constraints rule out other treatments. The W16-1 sign is intended for use in situations where there is a need to warn motorists to watch for bicyclists traveling along the roadway. As with all traffic control devices, the W16-1 sign should only be used as directed by MUTCD guidance. It is not intended to serve as a replacement for other, more appropriate bikeway treatments.

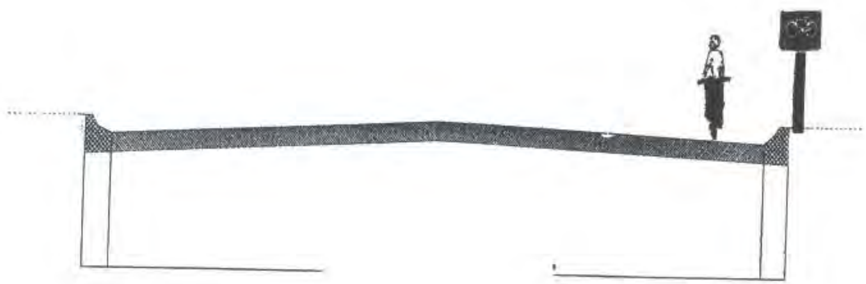
This *Plan* does not suggest the type of treatment for each roadway on the bikeway network. It describes a network of streets/roads which, upon improvements, will serve to provide accommodations for cyclist mobility throughout the community. The appropriate treatment will be determined upon more detailed study as individual projects are moved towards implementation. This approach allows greater flexibility and the opportunity to gauge the effectiveness of the first bikeway “demonstration” projects that are implemented. The Plan identifies roadway segments where additional studies would need to be conducted to determine which, if any, bikeway treatments would be appropriate and acceptable. While bike lanes and/or wide curb lanes might be warranted based on auto traffic volumes, parking restrictions or the removal of a travel lane may not be possible. Other facilities may require widening of the roadway to meet minimum recommended bikeway standards. In these cases, consideration should be given to either installing “Share the Road” signs (would not require parking removal or travel lane reduction) or selecting an alternative route.

The recommended bikeway network is broken into two phases: Short-Term 5 year horizon (by 2008); and Long-Term 5+ year horizon. This list should be used as a general guide to prioritize each project; however, no matter where a project is on the list, implementation should be pursued at each opportunity. On-street bikeways can be implemented in many ways: as a stand-alone project, as part of a repaving project, or by incorporating bikeways into new construction or reconstruction projects. As roadways designated as being on the Bikeway Network are resurfaced, reconstructed, widened or otherwise improved, an appropriate bikeway treatment should be included. Bikeway projects can be as simple as striping a bike lane during a routine resurfacing project and adding appropriate street signs, or more costly, such as adding paved shoulders into the design of a roadway reconstruction project.

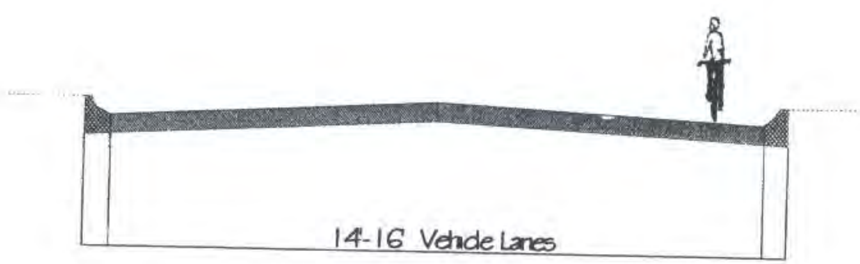
[10] National Transportation Website

Figure 4:

Types of Bikeway Facilities



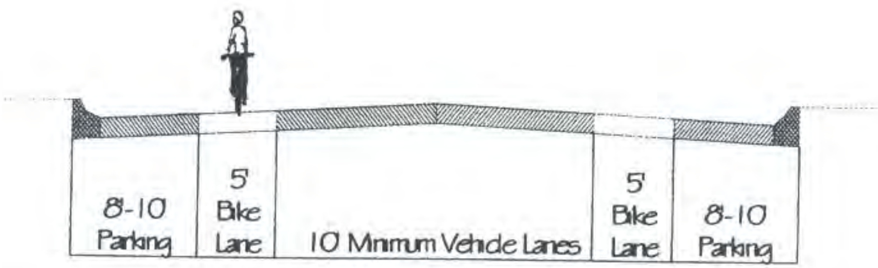
BIKE ROUTE: Signs direct cyclists along a particular route to schools, shopping areas or other major destinations, utilizing low-volume local streets instead of parallel and adjacent roadways.
PROS: Provides direction to new or inexperienced cyclists who are learning to operate in traffic; low implementation cost (requires no improvements other than signs); low maintenance costs if signs are not overused; signs (theoretically!) increase motorist awareness of the presence of bicyclists.
CONS: Typically less direct and less convenient travel route, as they rely on rerouting to avoid higher volume roadways; may limit access to major destinations without traveling on higher volume roadways.



WIDE CURB LANE: Outside travel lane of 14-16' which allows autos room to pass cyclists without changing lanes or crossing over center line; does not utilize any additional pavement markings or signs; typically used in urban areas on roadways with curbs and gutters.
PROS: Low maintenance costs (no signs or pavement markings to upkeep); bicycle travel area kept cleaner because of sweeping action of cars; provides cyclists with high level of access; beneficial to autos as is provides more maneuvering room when drivers are exiting from driveways or in areas with limited sight distance.
CONS: New cyclists may not recognize as a bike facility.

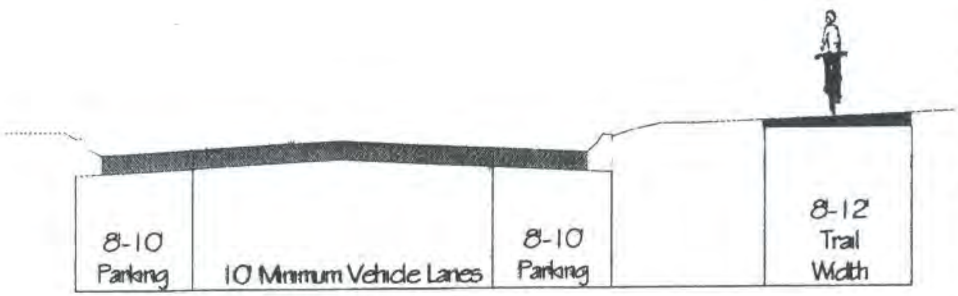
Figure 4: Continued

PAVED SHOULDER: Paved shoulder of 4'+ which accommodates cyclists; does not utilize any additional pavement markings or signs; typically used in rural areas.
PROS: Low maintenance costs (no signs or pavement markings to upkeep); beneficial to both motorized and non-motorized traffic (emergency pull-off area for autos, shoulders improve safety for all users, improve traffic flow); provides cyclists with high level of access.
CONS: Glass/gravel/debris tends to accumulate on outside of shoulder because of lack of sweeping action by motorized traffic.



BIKE LANE: A 4'+ strip on the edge of the roadway, delineated by a solid line, dedicated for bicycles only; utilizes special pavement markings and signs. Typically used in urban areas on streets with curbs and gutters.
PROS: Visible, dedicated roadway space will likely attract new cyclists who are uncomfortable riding in traffic; increases motorist awareness of the presence of cyclists.
CONS: Debate continues over whether bike lanes improve safety; additional striping can create confusion among both motorists and cyclists and complicate turning movements at intersections (where nearly all bike/auto crashes occur); additional pavement markings mean new "rules of operation" for both cyclists and motorists to learn; can give cyclists a false sense of security, as few bike/auto crashes involve being hit from behind or from the side; higher maintenance costs (signs and pavement markings to upkeep).

Figure 4: Continued



SHARED-USE TRAIL: An 8-10' trail constructed for non-motorized users, separated from a roadway, often along an abandoned railroad corridor, levee, or other linear easement.

PROS: Good facility for new, inexperienced and child cyclists to learn basic cycling skills away from traffic; provides for recreational use and open space; can provide access in corridors where bicycle access is limited for some reason;

CONS: Highest construction and maintenance costs; provides lower levels of access than on-street facilities as users are limited by trail access points; often less direct, less convenient and slower for cyclists than riding on roadways; accident rates often higher on trails than on street because of conflict caused by different users (pedestrians, rollerbladers, joggers, cyclists, strollers), different speeds, varying skill levels, and lack of established rules of operation (i.e. rules of the road).

Just as important as creating bikeways is keeping them in good condition. Poor maintenance will deter cyclists and can contribute to accidents. Bikeways will see greater use if they are kept smooth and free of glass, gravel, leaves and other debris.

Development of Facilities

Phase I:

- Adopt the American Association of State Highway and Transportation Officials (AASHTO), the Manual on Uniform Traffic Control Devices (MUTCD) standards and any Kentucky State Transportation Cabinet addendums for the design and development of all bicycle-related transportation improvements.
- Pursue the accommodation of bicyclists as part of all federal, state and locally funded transportation construction, reconstruction or intersection projects on roads and bridges where cyclists are currently, or will be, allowed.
- Implement bikeway facilities that are appropriate to street classification, traffic volume and speed for the Short Term portion of the proposed Bikeway Network.
- Give streets on the Bikeway Network high priority in annual asphalt resurfacing programs.

Phase II-III:

- Continue to implement bikeway facilities that are appropriate to street classification, traffic volume and speed.

Continue current practices:

- Coordinate with rail companies to remove railroad crossings that are no longer in use, and install/repair crossings to current standards.

Maintenance of Facilities

Phase I:

- Review/improve process for street sweeping, giving priority to those roadways on the Bikeway Network.
- Review/improve process for clean-up of glass/debris from auto crashes.
- Review/improve the process for public review and acceptance of roadway patching jobs after road or utility work has been done.
- Update / distribute a “Who To Call” directory for cyclists to report spot problems.

Phase II-III:

- Incorporate bikeway pavement marking maintenance and sign replacement costs into appropriate local budgets.
- Identify lighting problems along bikeways and improve as necessary.

Continue current practices:

- Continue use of the local pothole reporting programs to identify pavement surface problems.

C. Bicycle Parking and Other Supporting Amenities

Chapter 2 of this *Plan* outlined the need for convenient and secure bike parking and, ideally, the provision of showers and locker facilities at employment sites. The importance of the most basic of amenities--convenient, secure bicycle parking--can't be overemphasized. If there is no bike parking available at a particular destination, few people will decide to make the trip by bicycle. Additional amenities such as showers and lockers at the workplace (or at a nearby health club) are ideal, but not critical, for cyclists who commute by bike.

Phase I:
- Seek funding for the purchase and installation of bike racks at major public activity centers.
- Recommend bicycle racks in development projects, as part of the local development review process.
- Support changes in local Zoning Ordinances, in the form of either an incentive or a requirement, to provide for bicycle racks in major commercial and employment centers, and at government buildings.

Phase II-III:
- Encourage employers to provide bike racks, showers and locker facilities for commuting cyclists.
- Begin to monitor bike rack usage and community response, and pursue funding for additional racks as appropriate for rest of study area.

D. Bikes and Transit

As was discussed in Chapter 2, many public transit providers in the country are installing bike racks on buses, and providing secure bike parking at major transit stops and transfer centers. This makes transit an option for those who either live beyond walking distance of a bus route, or whose final destination is beyond walking distance of the closest bus stop. In addition, cyclists caught by inclement weather or equipment problems have the option of using public transit and being able to bring their bike with them. EUTS recommends that Henderson Area Rapid Transit (HART) consider the provision of bicycle racks on their transit vehicles and at transfer centers.

E. Education and Encouragement

Creating bikeways is a major step in encouraging bicycle use and improving safety. Equally important, however, are efforts to educate bicyclists and motorists on how to safely and properly coexist, as well as promotional efforts to encourage the use of bicycles.

Education programs can help to dispel misconceptions about cycling, improve the skill level of cyclists, and encourage more courteous and lawful interaction between cyclists and motorists. There are currently many education efforts in the region, such as through local police departments, bike retailers, schools, hospitals, bike clubs and other groups. Coordination of the various efforts could help to increase coverage, ensure a consistent message, and allow for sharing of resources.

Education efforts should center on three main elements: developing safe cycling skills in children; educating adult cyclists about their rights and responsibilities; and, educating motorists about cyclists' rights, and how to share the road with cyclists.

Encouragement efforts could include: provision of bike racks (Section C above) and bike racks on buses (Section D above); events to promote the use of bicycles; and, printed maps with street recommendations and connections with any local trails.

Recommendations regarding education and encouragement activities are as follows:

Phase I:
- Create a regional inventory of programs aimed at bicycle and traffic safety education.
- Organize public/private support for, and develop, a public campaign and/or printed materials to educate children and adult citizens about bicycle and pedestrian safety issues.
- Coordinate with local school officials, KYTC and the UK Cooperative Extension Service Bicycle/Pedestrian Education Service to develop a bike safety education curriculum targeting elementary school students, for use in both public and private school systems.

Phase II:
- Develop a public education campaign to educate motorists of bicyclists' legal right to use roadways, and on how to safely operate a vehicle around bicyclists.
- Ensure that all bicyclists under the age of 16 have access to a low-cost or free bicycle helmet.
- Develop and distribute a pocket-size bike map which shows existing bikeway facilities, any trail connections, a "bike suitability" rating for local roadways, and information on bike-related traffic laws, bike safety tips, and a "Who to Call" list for reporting spot roadway problems, harassment by motorists, etc.

Phase III:
- Encourage the Kentucky Department of Motor Vehicles to update the driver's manual to incorporate bicycle-related information, and to include related questions on the written drivers' license exam.
- Develop and promote a program that publicly recognizes businesses that encourage their employees and/or customers to bicycle and walk. The participation of local government offices should be encouraged.
- Organize and promote an annual local "Bike to Work Week" event to coincide with other state and national promotional events.

Ongoing:
- Continue to support and promote bike safety education efforts by local Police Departments, bike retailers and others. Bike safety should be aimed at increasing the knowledge and skills of children cyclists through bike rodeos, classroom education, and other opportunities.
- Encourage the Kentucky Transportation Cabinet Bicycle and Pedestrian Coordinator to organize and coordinate statewide educational and promotional programs, and act as clearinghouse for information.

F. Laws and Law Enforcement

The adequacy of laws relating to cycling, and the support of law enforcement personnel in enforcing those laws, has a great effect on the safety and attractiveness of bicycle travel. State and local laws clearly state that the same traffic rules that apply to motorists apply to bicyclists. The support of law enforcement personnel will be critical in developing and maintaining a safe and attractive bicycling environment. The potential role of local law enforcement personnel is:

- **Enforce traffic laws** – Irresponsible cycling and driving is the source of much of the conflict between bicyclists and motorists. It is important that traffic laws are enforced equally against all violators--motorists *and* cyclists—in order to prevent injuries and deaths. This means citing motorists who disobey traffic laws in such a way as to adversely affect a bicyclist, and citing cyclists who disobey a rule for drivers of vehicles. The traffic system will only work properly if both motorists and bicyclists adhere to the rules of the road.

- **Public education and information dispersal** – Most police departments offer some level of bicycle education, typically targeting children. Local data on bicycle accidents should be used to help refine education programs and target the greatest safety problems.
- **Bicycle patrols** – Police bicycle patrols, used by the City of Henderson Police Department, improve police work, improve public relations, and provide personal contact with the public. Benefits to cyclists include greater police officer understanding of how cyclists should operate in traffic, and helping improve the legitimacy of cycling.

Recommendations regarding local laws and law enforcement departments are as follows:

<u>Phase I:</u>

- Review appropriateness of City of Henderson ordinance [Sec. 22-155]: The portion stating: *Whenever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use the path and shall not use the roadway.* (Few states still have these “mandatory sidepath” laws. Mandatory sidepath laws are increasingly being abolished to give cyclists the choice of riding on the path or the road. This is particularly applicable when the path is poorly designed or maintained.)

<u>Phase II:</u>

- Review/revise bicycle-related information in local police department officer training programs, such as issues concerning bicyclist safety, the importance of traffic law enforcement, and the role officers play in promoting bicyclist safety.
- Implement an annual police department enforcement blitz targeting those violations that have the greatest implications for bicyclist injuries and fatalities.
- Local police departments should develop and distribute an annual bike-auto crash data summary to identify spot problems, develop targeted enforcement programs and improve public education efforts.

<u>Phase III:</u>

- Encourage consistent and regular enforcement of motorist/ bicyclist traffic laws by citing both motorist and cyclist violations, targeting those violations that have the greatest implications for bicyclist injuries and fatalities.

<u>Continue current practices:</u>

- Continue the City of Henderson Police Department Bike Patrol program to improve community policing, promote safe bicycle habits and help promote the legitimacy of bicycling.

CHAPTER 4. IMPLEMENTING THE BICYCLE PLAN

The Bicycle Plan outlines a comprehensive approach for addressing bicycle issues. Because the Plan's recommendations are too numerous to implement all at once, recommendations presented in Chapter 3 were divided into three suggested phases of implementation. This chapter summarizes the 5-Year Bikeway Network and other high-priority recommendations, and identifies implementing bodies and possible funding sources.

A. Priorities

Priority projects include the first 5 years of the recommended Bikeway Network (Table 4), necessary roadway maintenance, planning activities, bicycle parking, bike/transit improvements, education and encouragement activities, and laws and law enforcement. All are summarized below.

The recommended 5-Year Bikeway Network is shown in Figure 5. It is a proposed system of on-street bikeways that would provide for basic travel routes in the city, with an emphasis on north/south travel from Atkinson Park to Drury Lane. Bikeway improvements would improve bike access between residential areas and downtown Henderson, numerous schools, recreation facilities including Atkinson, Sunset and Audubon Mill Parks and the Henderson Riverwalk pedestrian path.

Appropriate bikeways treatments would be a combination of bike lanes or wide curb lanes, and signed bike routes. Bikeways could be implemented either as stand-alone projects or as part of repaving/resurfacing projects. The ease of developing bike lanes and wide curb lanes varies from street to street, depending on existing pavement width, number of travel lanes, and presence of on-street parking. As shown in Figure 6, a number of roadways on the 5-Year Bikeway Network could be easily retrofitted with bikeways. However, other roadway segments would require additional parking and engineering studies to determine the feasibility of parking restrictions, lane widening and/or the removal of travel lanes.

TABLE 4. Bicycle Plan Priorities

Recommendation	Implementing Body	Funding Source
Implement bikeway facilities on the 5-Year recommended Bikeway Network.	EUTS, local jurisdictions	Existing agency bud-gets, special grants
Adopt AASHTO and IMUTCD standards for the design of bikeway projects.	Local jurisdictions	Existing budget
Review/improve street-sweeping process, give priority to roads on Bikeway Network.	Local jurisdictions	Existing budget
Review/improve process for clean-up of glass/debris from auto crashes.	Local jurisdictions	Existing budget
Review/improve process for public acceptance of roadway patching jobs.	Local jurisdictions	Existing budget
Update / distribute "Who to Call" directory for cyclists to report spot problems.	EUTS, local jurisdictions	Existing budget, special grants
Give streets on the Bikeway Network high priority in annual asphalt resurfacing programs.	Local jurisdictions	Existing budget
Pursue the accommodation of bicyclists as part of all transportation construction, reconstruction or intersection projects on facilities where cyclists are, or will be, allowed	EUTS, local jurisdictions	Existing budget

Figure 5: Short and Long Term Bikeway Network

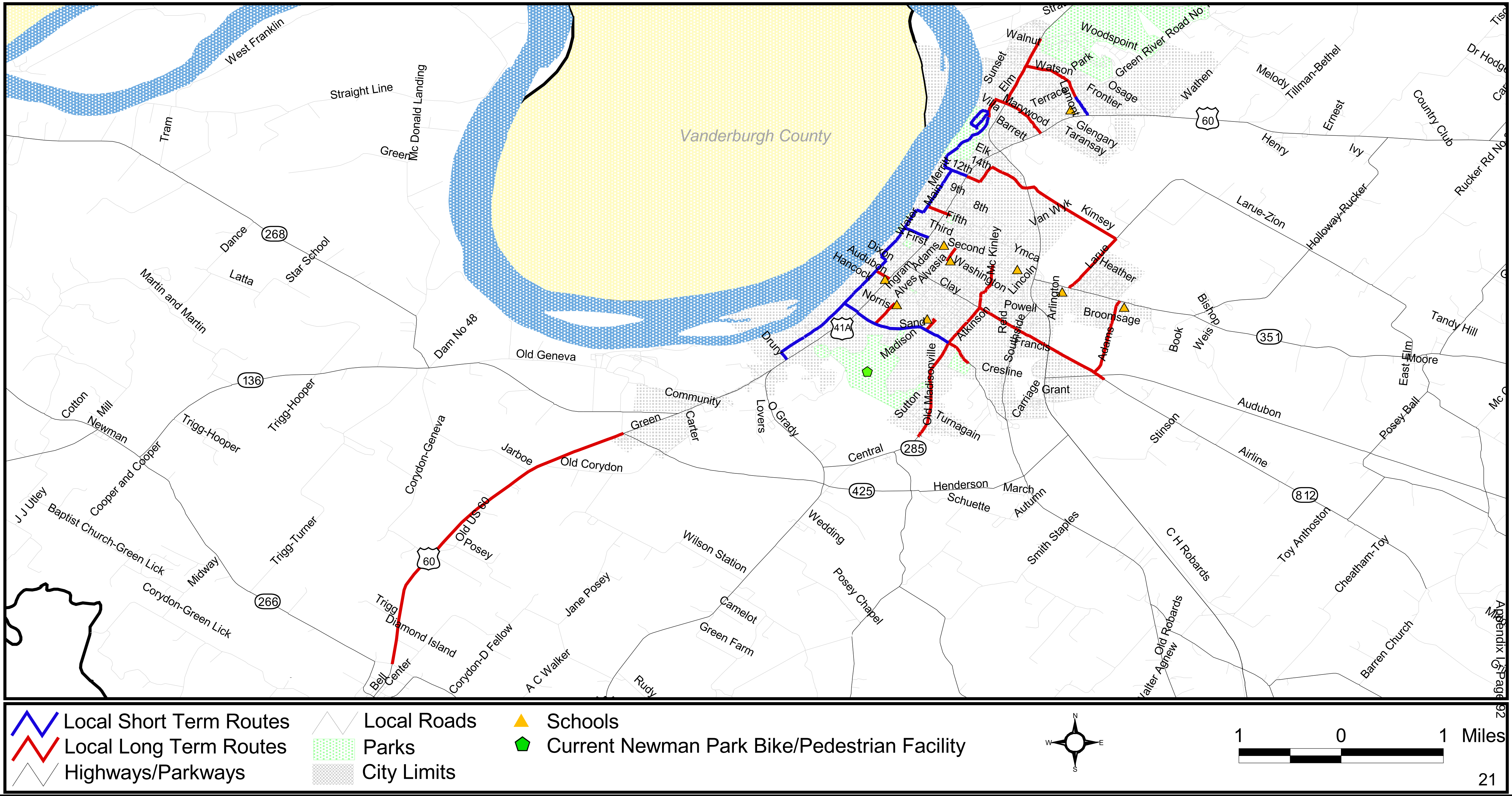
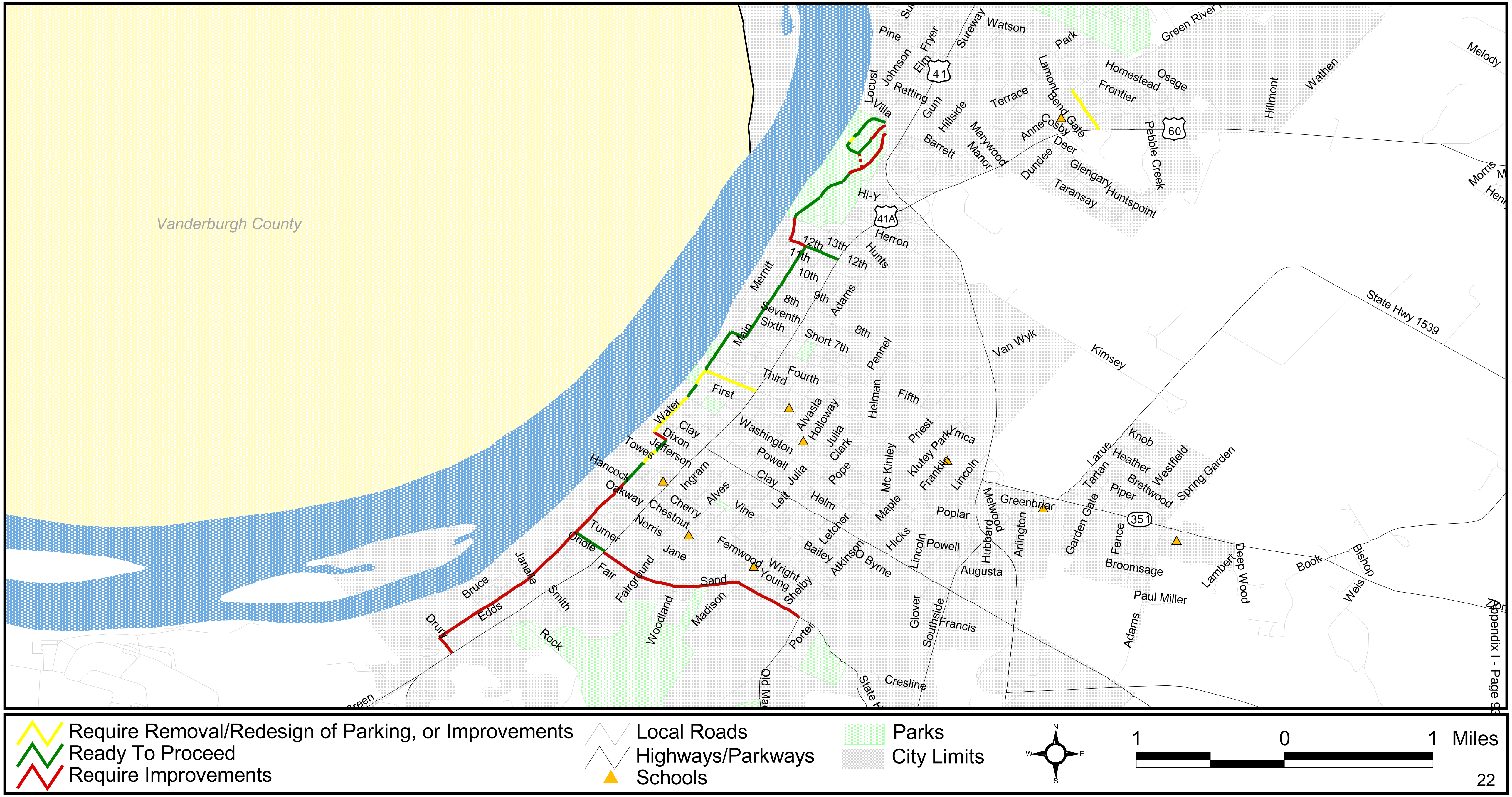


Figure 6: Status of Short Term Bikeway Network



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A. Priorities, cont.

Planning Activities

Recommendation	Implementing Body	Funding Source
Organize and conduct Bicycle/Pedestrian Advisory Committee meetings on as needed basis.	EUTS	Existing agency budget
Consider bicycle issues in the early planning and design of all locally funded transportation construction, reconstruction, maintenance, or intersection improvement projects.	Local jurisdictions	Project budget
Develop roadway inventories to support transportation planning efforts, including bicycle planning.	Local jurisdictions	Existing budget

Bicycle Parking

Recommendation	Implementing Body	Funding Source
Purchase and install bike racks in the City of Henderson – funding to be determined.	EUTS, City of Henderson	City of Henderson, Grants
Recommend bike racks in development projects as part of review process	EUTS, Area Plan Comm.	Existing agency / department budgets
Explore feasibility of modifying local zoning ordinances to encourage or require bike parking at major centers.	EUTS, Area Plan Comm.	Existing agency / department budgets

Bikes and Transit

Recommendation	Implementing Body	Funding Source
Consider the installation of bike racks for HART buses and at transfer centers.	HART, City of Henderson	HART, City of Henderson

Education and Encouragement

Recommendation	Implementing Body	Funding Source
Develop regional inventory of bicycle and traffic safety education programs	EUTS, school districts, local jurisdictions	Existing agency bud-gets
Organize public campaign and/or printed materials on bicycle and pedestrian safety	EUTS, local jurisdictions	Existing agency / department budgets, special grants, business sponsors
Coordinate with local school districts, KYTC and the UK Cooperative Extension Service to develop a bike safety education curriculum	School districts, KYTC, UK Coop. Extension Service, EUTS	Existing budgets, special grants

A. Priorities, cont.

Laws and Law Enforcement

Recommendation	Implementing Body	Funding Source
Review appropriateness of City of Henderson ordinance [Sec. 22-155]: The portion stating: *Whenever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use the path and shall not use the roadway. **	City of Henderson	Existing budget

*Few states still have these "mandatory sidepath" laws. They are increasingly being abolished to give bicyclists the choice of where to ride. This is particularly applicable in the case of a poorly designed or maintained path.

B. Funding

Although funds for infrastructure improvements are limited at this time, it is still possible to make real progress in improving conditions for bicycling. Local jurisdictions should focus on including bikeway projects in the course of routine maintenance projects (i.e. striping bike lanes or wide curb lanes when roads are resurfaced) and road improvement projects (i.e. adding wide curb lanes or paved shoulders in new roadway or reconstruction projects). In this way, bicycle improvements can be made in the course of regular development and maintenance, and funds can be used more effectively.

A range of local funding sources can be utilized for bicycle-related improvements. They include:

- **General revenues**
- **General transportation funds**
- **Annual street and highway improvements**
- **Capital improvement projects budget requests**
- **Developer contributions**
- **Designated bond funds**

The Transportation Efficiency Act for the 21st Century (TEA-21) provides a major opportunity for the region to fund strategic parts of its proposed bicycle plan. All of these funds require some contribution of local funds, typically 20% of the total project cost.

- **National Highway System (NHS).** NHS funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways. NHS roadways in Henderson County are: US Hwy 41 (from the state line to the Breathitt Parkway), US Hwy 41A/60 (from US 41 to KY-425), KY-425 (from US Hwy 41A/60 to the Breathitt Parkway), the Breathitt Parkway and the Audubon Parkway.
- **Surface Transportation Program (STP).** STP funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects (such as brochures, public service announcements, and route maps) related to safe bicycling and walking.
- **Transportation Enhancements.** Ten percent of the STP allocations are used for Transportation Enhancements, which include the provision of facilities, and safety and educational activities for bicyclists and pedestrians. Most of Evansville's Pigeon Creek Greenway project is being funded with Enhancements funding.
- **Congestion Mitigation and Air Quality (CMAQ).** CMAQ funds are only available in those areas designated as being in non-attainment of federal air quality standards. Henderson County is currently in attainment and is therefore not eligible for CMAQ funds. CMAQ funds

may be used for the construction of bicycle transportation facilities and pedestrian walkways, bicycle racks, and non-construction projects (such as brochures, public service announcements, and route maps) related to safe bicycling and walking.

- **Hazard Elimination and Railway-Highway Crossing programs.** Another ten percent of the STP allocations are set aside for the Hazard Elimination program. These funds can be used for activities including surveying hazardous locations, projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic calming measure.
- **Federal Transit Funding.** Transit funds can be used for bicycle and pedestrian access to transit facilities, to provide shelters and parking facilities for bicycles in or around transit facilities, or to install racks or other equipment for transporting bicycles on transit vehicles.

Other non-transportation funding sources are also available, particularly for safety and education programs. For example, hospitals and bicycle retailers sometimes fund education efforts targeting child cyclists' use of bicycle helmets, and provide free or discounted helmets.

While special grants are available to help fund the development of bicycle improvements, they cannot be used for routine maintenance of existing facilities. Ideal maintenance of a bikeway averages about $2,000/mile per year.[11] This includes street sweeping, street repair and restriping. Much of this cost is already covered by routine street maintenance work. However, communities interested in developing bikeway projects must address long-term funding for bikeway maintenance, and dedicate bicycle funding as a regular component of its general and capital funds.

[11] *Bicycle Master Plan*, City of Portland, Ore. (July 1998)

PART 2
PEDESTRIAN PLAN

CHAPTER 1. BACKGROUND

Walking is the oldest and most basic form of transportation. And everyone is a pedestrian at some point in every trip, whether it's walking to the convenience store to buy a newspaper, or just from one's car across a parking lot. Nationally, about 5% of all trips are made on foot.[12] As was stated in the Introduction to this *Bicycle and Pedestrian Plan*, improving conditions for pedestrians (and bicyclists) is important for many reasons:

- To improve the safety of those who currently bicycle and/or walk.
- To improve accessibility for all residents.
- To achieve more efficient use of the existing transportation system.
- To enhance the region's quality of life.
- To encourage more active and healthier residents.
- To help address the local air quality problem.

A look at our older neighborhoods and downtown areas shows how pedestrians were taken into consideration as our communities originally developed: sidewalks are found on both sides of streets, and commercial buildings are oriented towards the street, making walking both easy and pleasant. As our communities continue to grow and develop today, though, walking often receives little or no attention.

Over the past 50 years the Evansville-Henderson region, like much of the nation, has become heavily dependent upon the private auto. New residential and commercial developments and roadway improvements are often designed around the automobile, creating obstacles and deterrents to walking, such as:

- Lack of sidewalks along roadways and bridges
- Narrow sidewalks (particularly a problem for people in wheelchairs)
- Poorly constructed and/or maintained sidewalks
- Difficult street crossings (too wide)
- High-speed and high-volume traffic near schools, parks, shopping and residential areas
- Sprawl-type development in which distances are too great for walking and/or developments lack safe pedestrian access

This Pedestrian Plan identifies opportunities to improve conditions for walking. Included are recommendations for incorporating pedestrian considerations into land use planning and development decisions, improving sidewalk construction and maintenance, better integrating pedestrian improvements into roadway design, and developing education, encouragement and enforcement programs to improve pedestrian and motorist safety.

[12] *1995 National Personal Transportation Survey*, Federal Highway Administration

CHAPTER 2. CURRENT CONDITIONS

To plan for pedestrians, it is necessary to understand and address the problems and barriers that prevent more residents from walking. This chapter looks at the existing environment and identifies pedestrian safety problems and other factors that make walking unsafe or unattractive.

A. Pedestrian-Auto Crashes

EUTS staff could not obtain complete data on local pedestrian-auto crashes due to inconsistencies in accident report coding. In lieu of local data, national data on pedestrian-auto crashes is used here to discuss pedestrian-related safety issues.

Most pedestrian-auto crashes happen in urban areas (80%), and at non-intersection locations (68%). Even though the greatest single "type" of pedestrian-auto crashes involves a pedestrian crossing at an intersection (32.1%), more pedestrians are actually hit at non-intersection locations.

Table 5. Pedestrian-Auto Crash Types
Stratified Sample of National Crash Data, 1990s

Type of Crash	% of all crashes
Pedestrian crossing at intersection	32.1
Pedestrian crossing at midblock location (not at an intersection)	26.4
Pedestrian hit by driverless or backing vehicle, or police car in pursuit	9.1
Pedestrian not in road (waiting to cross street, crossing a driveway)	8.6
Pedestrian walking along road	7.4
Pedestrian working or playing in road	3.0
Pedestrian going to/from school or commercial bus or ice-cream vendor, or entering/exiting a parked vehicle	2.6
Other/Undetermined	10.8
TOTAL	**100%**

Source: *Pedestrian Crash Types: A 1990s Informational Guide*, Federal Hwy. Admin. (April 1997)

Common causes of pedestrian-auto crashes include:

- Driver inattention
- Pedestrians darting out into the street at midblock locations (most common type of crash involving child pedestrians)
- Motorists speeding
- Motorists backing up (difficult to see children and others walking behind)
- Pedestrians at midblock locations misjudging gaps in traffic

Children and older adults are the highest risk groups of pedestrians. While accident rates are higher for children, older adult pedestrians are more vulnerable to serious injury or death when hit by a motor vehicle.[13]

[13] *Pedestrian and Bicycle Crash Types of the Early 1990s*, National Highway Traffic Safety Administration (1995)

B. Existing Facilities

There is currently no complete inventory of sidewalks and other pedestrian facilities in the region, which makes it difficult to assess the extent and condition of the existing pedestrian network. Ideally, an inventory would be developed by each community to identify existing sidewalks, sidewalk width, pavement condition, the presence or absence of curb ramps, and "pinchpoints" created by difficult crossings and/or significant physical obstructions (utility poles, newspaper sales boxes, fire hydrants). Because this information can be time consuming and expensive for a community to collect and maintain, it is generally a low priority.

However, members of the Bicycle/Pedestrian Advisory Committee and individual citizens identified numerous concerns with the existing pedestrian network:

- Commercial developments typically lack pedestrian-friendly features (buildings are set back far from the street in the middle of a parking lot, with no safe pedestrian passage from the street to building entrances).
- New neighborhoods, commercial areas and roadways often lack sidewalks.
- Areas with missing sidewalk segments.
- Sidewalks are poorly maintained.
- Too few curb ramps (ramps that transition from sidewalk to street, needed by pedestrians using wheelchairs or walkers, or pushing strollers).
- Too many obstacles on sidewalks (newspaper vending machines, utility poles, fire hydrants).
- Need to improve pedestrian crossings.

Most of these problems center on a lack of sidewalks, and poor sidewalk conditions. The solution – more sidewalk construction, maintenance and repair - is relatively straightforward. However, a lack of funding has been and will continue to be the biggest hurdle to making these improvements.

Obstacles on sidewalks present a significant problem in areas with narrow sidewalks and for pedestrians in wheelchairs. While obstructions such as vending machines and private mailboxes can be controlled through encroachment permit processes and enforcement, utility poles and fire hydrants are not easily relocated.

Other problems will require more than just a one-shot solution. For example, safe roadway crossings for pedestrians are clearly a critical part of any pedestrian network. While there are a variety of pedestrian crossing treatments, the design can't compensate for driver or pedestrian inattention or poor judgment.[14] Continuous public education and enforcement are part of the solution.

The general rule regarding pedestrian crossings is that unmarked crosswalks exist at all roadway intersections. Pedestrian crossings can also be physically designated, such as with marked crosswalks (i.e. painted, raised), pedestrian crossing signals (Walk/Don't' Walk signals), and grade-separated crossings (overpasses and underpasses). Each of these treatments has its advantages and disadvantages, and is intended for use under certain conditions.

Grade-separated crossings, such as pedestrian overpasses or underpasses, allow pedestrians and vehicles to cross at different levels. These types of crossings have limited application. When used in the proper situation and designed correctly, grade-separated crossings can reduce

[14] Some agencies in the United States believe that crosswalks can actually result in greater danger to pedestrians by giving them a false sense of security, as pedestrians begin to expect motorists to stop for them. They advocate that removing pedestrian crossings will improve safety by forcing pedestrians to use more caution when crossing streets.

pedestrian-auto conflicts, lessen vehicle delay, and help maintain the continuity of neighborhoods divided by high-traffic roads. However, they are extremely costly to construct, and are often considered pedestrian *un*friendly because pedestrians are forced to travel out of their way to use them. Studies have shown that the effectiveness of a grade-separated crossing depends on whether pedestrians perceive that it is *easier to use* than a street crossing.[15]

One area that is often overlooked in pedestrian planning is access to transit. A transit system can't be effective unless people can get to bus stops easily and safely. Pleasant walking conditions, wide sidewalks, safe street crossings, good lighting, informative signs, bus shelters, benches and landscaping are all important features.

As in many other parts of the country, the EUTS Study Area is facing rapid growth, and has the opportunity to ensure that new developments are easily accessible by pedestrians, transit riders, people being dropped off or picked up, people in wheelchairs or baby strollers. The following chapter presents strategies for addressing the problems identified in this chapter.

[15] *Planning Design and Maintenance of Pedestrian Facilities*, Federal Highway Administration (1989)

CHAPTER 3. PEDESTRIAN PLAN RECOMMENDATIONS

Chapter 2 of the Pedestrian Element highlights reasons for developing a more pedestrian-friendly community, and identifies problems and deficiencies that impact the safety, attractiveness, viability and levels of use of walking in the EUTS Study Area. The following recommendations are aimed at addressing those problems. These recommendations were developed with assistance from the EUTS Bicycle/Pedestrian Advisory Committee, and with input from the general public.

Pedestrian recommendations are divided into 5 categories: Planning and Development Review; Sidewalk Construction and Maintenance; Pedestrian Crossings; Education and Encouragement; and Law Enforcement. Recommendations in each category are further grouped into Phases I, II or III for priority of implementation. Both the <u>need</u> and the <u>feasibility</u> of each recommendation were taken into consideration in assigning it to an implementation Phase. As such, a Phase III recommendation might be a high priority, but the feasibility of implementing it at this point in time is low.

A. Planning and Development Review

One of the keys to creating pedestrian-friendly communities is to ensure that pedestrian issues are addressed in the development and planning process. Pedestrian issues should be a standard consideration in all planning and development activities, to ensure that pedestrians are accommodated as the community continues to grow and develop.

<u>Phase I:</u>

- Organize and conduct Bicycle/Pedestrian Advisory Committee meetings on an as needed basis to assist in implementing recommendations in the Bike/Pedestrian Plan, review road/bridge project plans, and provide input into other transportation planning activities.
- Consider pedestrian issues in the early planning and design of all locally funded transportation construction, reconstruction, maintenance (i.e. resurfacing), or intersection improvement projects to ensure accommodation of pedestrians, as appropriate.
- Support changes in local Subdivision Ordinances to strengthen requirements for pedestrian facilities in new or redeveloped areas. This would include sidewalks on both sides of streets and features which support walking (i.e. interconnecting streets between neighboring developments, connector pathways between cul-de-sacs and to connect to abutting schools, parks, shopping centers, etc.).
- Support changes in local Zoning Ordinances that will encourage pedestrian-oriented features in new or redeveloped commercial areas. This could include sidewalk connections to the street, sidewalks throughout the site, and buildings located adjacent to the street and sidewalks.

<u>Phase II:</u>

- Establish a legal process for maintaining pedestrian connections that are not on streets, such as connector pathways.
- Educate the general public and developers about the benefits of pedestrian-friendly residential and commercial design features.
- Encourage a mix of housing types, including smaller residential lot sizes in conjunction with amenities such as dedicated areas of common open space, bikeway/pedestrian connectors.
- Support the development of a landscape ordinance targeting commercial development, and a tree ordinance. Tree-lined streets create a friendly, walkable environment, make outdoor spaces cooler and more inviting, and have been shown to help reduce vehicle speeds.

Phase III:

- Encourage the development of a model pedestrian-friendly development.

Continue current practices:

- Continue to require/recommend sidewalks and other pedestrian accommodations as part of the Subdivision, Rezoning and Site Plan review process.
- Participate in the early planning and design phases of all federal- and state-funded transportation construction, reconstruction, maintenance, or intersection improvement projects to ensure that pedestrians are accommodated, as appropriate.
- Encourage the development of land uses and design features which foster pedestrian activity, such as appropriate mixed-use developments, and residential developments offering a mix of housing types and pedestrian amenities (i.e., dedicated areas of common open space, bikeways and pedestrian connectors).

B. Sidewalk Construction and Maintenance

The most basic facility for pedestrians is a well-connected sidewalk network in good repair. A lack of sidewalks, missing sidewalk segments, deteriorating pavement, a lack of smooth curb ramps, and obstacles (newspaper vending machines, utility poles, fire hydrants) make walking unsafe and uninviting. This section provides recommendations for maintaining and improving the sidewalk network.

Phase I:

- Review/modify local encroachment permitting processes to minimize the number of obstructions on public sidewalks, and to strengthen the enforcement process for removing illegal obstructions.
- Support the construction of sidewalks as part of all locally funded roadway construction, reconstruction or intersection improvement projects, as appropriate.
- Create and distribute a “Who To Call” list for citizens to identify sidewalk problems.
- Incorporate ADA requirements into all sidewalk projects.
- Develop an inventory of the existing sidewalk network and identify missing sections and areas of disrepair.

Phase II:

- Develop annual municipal/county programs to identify and construct missing sidewalk segments, retrofit intersections with curb ramps where they currently do not exist, replace inadequate curb ramps, and maintain sidewalks as appropriate. This should include a process for evaluating and prioritizing projects.
- Research and identify additional funding options for implementing municipal/county sidewalk construction programs.
- Establish a process for maintaining pedestrian connections that are not on streets, such as connector pathways.

Phase III:

- Implement annual municipal/county sidewalk construction/maintenance programs, and update as needed.
- Identify lighting problems and repair or improve as necessary, with priority going to areas with high pedestrian activity.
- Review/improve process for cleaning glass/debris from auto crashes.

Continue current practices:
- Require/recommend sidewalks as part of new or redevelopment projects.
- Support the construction of sidewalks as part of all state and federally funded roadway construction, reconstruction or intersection improvement projects, as appropriate.
- Follow appropriate local sidewalk design and construction guidelines, including the incorporation of ADA requirements, in all sidewalk projects.
- Use Community Development Block Grant funds for sidewalk repair projects in designated focus areas of the City of Henderson.

C. Pedestrian Crossings

Safe roadway crossings for pedestrians are a critical part of any pedestrian network. As discussed in Chapter 2 of this Pedestrian Plan, 32% of all pedestrian-auto crashes involved a pedestrian crossing the street at an intersection, and 26% involved a pedestrian crossing the street at a "midblock" location (between intersections). Clearly, education is needed to make pedestrians aware of the risk of crossing the street at a midblock location, teach them how to properly cross at designated pedestrian crossings, and to increase motorists' awareness of pedestrians. However, creating and maintaining safe pedestrian crossings should continue to be a priority for the region.

Phase I:
- Update and distribute a "Who to Call" list for citizens to identify problematic pedestrian crossings.
- Explore the feasibility of posting signs near pedestrian crossing buttons with the "Who to Call" telephone number.

Phase II:
- Educate the public on how to properly use pedestrian crossing signals and crosswalks.

Phase III:
- Research the applicability of new pedestrian signal technology, surface treatments or paint design for crosswalks as part of new roadway, reconstruction or intersection improvement projects.

Continue current practices:
- Improve the visibility of pedestrians at intersections by trimming vegetation and restricting obstructions such as fences and parked cars.
- Repair broken pedestrian crossing signals.
- Modify traffic signal timing phases, as possible, to increase crossing time for pedestrians at large intersections.
- Identify and improve pedestrian crossings in areas with high pedestrian activity, as part of all new roadway, reconstruction or intersection improvement projects.
- Coordinate with local agencies and the Kentucky Transportation Cabinet (KYTC) to evaluate requests for new pedestrian overpasses/underpasses and/or crosswalks, using KYTC and American Association of State and Highway Officials (AASHTO) standards to determine the appropriate treatment.

D. Education and Encouragement

Education and encouragement efforts will be critical in improving the safety of walking in the region, and in promoting walking as a means of transportation, exercise and recreation.

Phase I:
- Organize public/private support for, and develop a public campaign and/or printed materials to educate all citizens about pedestrian safety issues.
- Produce brochures and other materials to be distributed in order to promote walking for both health benefits and as alternative transportation.
- Develop and seek funding for a highly visible pedestrian pilot project linking neighborhoods and shopping areas, as a demonstration of a safe and attractive pedestrian facility. Such an effort could be a publicly funded stand-alone project, or coordinated as part of a privately funded demonstration model of a pedestrian-friendly development.

Phase II:
- Organize and promote an annual local “Walk Your Children to School” event to coincide with other state and national promotions.
- Sponsor special events to publicize the health benefits of walking, and promote walking as an alternative to driving for short trips.
- School districts and other educational institutions should use local auto-pedestrian crash data to develop educational programs to improve child pedestrian safety.

Phase III:
- Encourage the Kentucky Department of Motor Vehicles to update the driver’s manual to incorporate pedestrian-related information, and to include related questions on the written drivers’ license exam.
- Develop and promote a program that publicly recognizes companies that encourage their employees and/or customers to walk. Local government offices should be encouraged to participate.
- Sponsor walking events to publicize walking for both health benefits and as alternative transportation.

Continue current practices:
- Educate children about pedestrian safety through school, Police Dept. and other programs.

E. Law Enforcement

The support of law enforcement agencies is necessary in creating a safe pedestrian environment.

Phase I:
- Local police departments should structure accident report databases to allow for complete sorting and retrieval of auto-pedestrian accident reports.

Phase II:
- Local police departments should develop and distribute an annual auto-pedestrian crash data summary to identify spot problems, develop targeted enforcement programs, and improve community education efforts.
- Incorporate pedestrian-related information in local police department officer training programs, such as issues concerning pedestrian safety, the importance of pedestrian and traffic law enforcement, and the role that officers play in promoting pedestrian safety.

Phase III:
- Encourage consistent and regular enforcement of traffic laws by citing both motorist and pedestrian violations, targeting those violations that have the greatest implications for pedestrian injuries and fatalities.

CHAPTER 4. IMPLEMENTING THE PEDESTRIAN PLAN

The Pedestrian Plan outlines a comprehensive approach for addressing pedestrian issues in the region. Because the Plan's recommendations are too numerous to implement all at once, recommendations presented in Chapter 3 were divided into three suggested phases of implementation. This chapter summarizes the suggested priorities, and identifies implementing bodies and possible funding sources. (Table 6)

A. Priorities

TABLE 6. Pedestrian Plan Priorities

Recommendation	Implementing Body	Funding Source
Organize and conduct Bicycle/Pedestrian Advisory Committee meetings on as needed basis.	EUTS	Existing agency budget
Consider pedestrian issues in the early planning and design of all locally funded transportation construction, reconstruction, maintenance, or intersection improvement projects.	Local jurisdictions	Project budget
Support changes in local Subdivision Ordinances to strengthen requirements for pedestrian facilities in new /redeveloped areas.	Area Plan Comm. / local planning staff	Existing department budgets
Support changes in local Zoning Ordinances that will encourage pedestrian-oriented features in new or redeveloped commercial areas.	Area Plan Comm. / local planning staff	Existing department budgets

Sidewalk Construction and Maintenance

Recommendation	Implementing Body	Funding Source
Modify / create local encroachment permitting processes to minimize the number of obstructions on public sidewalks, and to strengthen the enforcement process for removing illegal obstructions.	Local jurisdictions	Existing department budgets
Support the construction of sidewalks as part of all locally funded roadway construction, reconstruction or intersection improvement projects, as appropriate.	Local jurisdictions	Construction project budget
Create and distribute a "Who To Call" list for citizens to identify sidewalk problems.	EUTS, local jurisdictions	Existing budgets
Incorporate ADA requirements into all sidewalk projects.	Local jurisdictions	Project budget
Develop an inventory of the existing sidewalk network identifying missing segments and areas of disrepair	EUTS, local jurisdictions	Existing budgets

Pedestrian Crossings

Recommendation	Implementing Body	Funding Source
Update and distribute a "Who to Call" list for citizens to identify problematic pedestrian crossings.	EUTS, local jurisdictions	Existing budgets
Explore the feasibility of posting signs near pedestrian crossing buttons with the "Who to Call" telephone number.	Local jurisdictions	Existing budgets

Education and Encouragement

Recommendation	Implementing Body	Funding Source
Organize and develop a public campaign and/or printed materials to educate citizens about pedestrian safety issues.	EUTS, local jurisdictions, police department, school systems	Existing department budgets, special grants, business sponsors
Produce and distribute printed materials that promote walking for both health benefits and as an alternative to driving for short trips.	Public health department, local hospitals, public health organizations	Existing department budgets, special grants, business sponsors
Develop a highly visible pedestrian pilot project linking neighborhoods and shopping areas, as a demonstration of a safe and attractive pedestrian facility.	EUTS, Area Plan Commission, local planning staff	Existing department budgets, special grants, business sponsors

Law Enforcement

Recommendation	Implementing Body	Funding Source
Local police departments should structure accident report databases to allow for complete sorting and retrieval of auto-pedestrian accident reports.	Local police departments	Existing budgets

B. Funding

Many of the priority recommendations involve policy changes or planning activities that could be pursued using existing staff and agency/department budgets. Sidewalk construction can continue to be accomplished through local funds, as well as through the development process, and by consistently incorporating sidewalks into roadway construction projects. Recommendations for education and encouragement strategies will generally require funding beyond what is currently available. In those cases, special grants and/or participation from the private sector should be sought.

A range of local funding sources can be utilized for pedestrian improvements. They include:

- **General revenues**
- **General transportation funds**
- **Annual street and highway improvements**
- **Capital improvement projects budget requests**
- **Developer contributions**
- **Designated bond funds**

In the City of Henderson, the Community Development Department of also funds sidewalk improvements in qualifying “focus areas” using Community Development Block Grants (CDBG). The focus areas are low-moderate income areas that have been identified as eligible for federal CDBG funds. Blocks of sidewalks are replaced, as opposed to spot improvements based on requests from individual property owners. Priority has been given to areas that currently lack sidewalks, with additional focus on providing access to public facilities.

The Transportation Efficiency Act for the 21st Century (TEA-21) provides funding opportunities for pedestrian improvements and safety education efforts. All of these funds require some contribution of local funds, typically 20% of the total project cost.

- **National Highway System (NHS).** NHS funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System, including Interstate highways. NHS roadways in Henderson County are: US Hwy 41 (from the state line to the Breathitt Parkway), US Hwy 41A/60 (from US 41 to KY-425), KY-425 (from US Hwy 41A/60 to the Breathitt Parkway), the Breathitt Parkway and the Audubon Parkway.
- **Surface Transportation Program (STP).** STP funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or nonconstruction projects (such as brochures, public service announcements, and route maps) related to safe bicycling and walking.
- **Transportation Enhancements.** Ten percent of the STP allocations are used for Transportation Enhancements, which include the provision of facilities, and safety and educational activities for bicyclists and pedestrians. Most of the Pigeon Creek Greenway project is being funded with Enhancements funding.
- **Congestion Mitigation and Air Quality (CMAQ).** CMAQ funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, bicycle racks, and non-construction projects (such as brochures, public service announcements, and route maps) related to safe bicycling and walking. This funding source is only available in those areas designated as being in non-attainment of federal air quality standards. Henderson County is in attainment of the standards and is not currently eligible.
- **Hazard Elimination and Railway-Highway Crossing programs.** Another ten percent of the STP allocations are set aside for the Hazard Elimination program. These funds can be used for activities including surveying hazardous locations, projects on any publicly owned bicycle or pedestrian pathway or trail, or any safety-related traffic calming measure.
- **Federal Transit Funding.** Transit funds can be used for bicycle and pedestrian access to transit facilities, to provide shelters and parking facilities for bicycles in or around transit facilities, or to install racks or other equipment for transporting bicycles on transit vehicles.

Other non-transportation funding sources are also available, particularly for safety and education programs. For example, in Indiana the Governor's Council on Impaired and Dangerous Driving offers funds for certain efforts to improve cyclist and pedestrian safety.

APPENDIX A
BIKE PARKING GUIDELINES

Bike Parking Guidelines

Good bike parking facilities are an essential part of any effort to promote bicycling. Most people won't use a bicycle for travel if there isn't safe bike storage at their destination. Bike parking should be designed and located to protect bicycles from a cyclist's two major concerns - theft and damage.

There are two classes of bike parking: short-term and long-term. *Short-term* parking racks allow the cyclist to lock the bike frame and both wheels, but generally don't provide weather protection (unless the area is covered by a building canopy). These facilities should be used where bicycles will be left for a few hours or less.

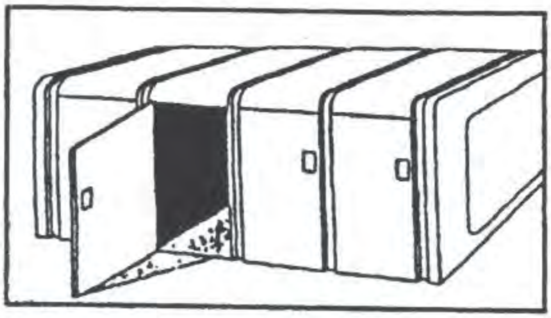
The design of bike racks is very important. Traditional bike racks that support only the wheel of a bike are no longer considered acceptable. Newer racks, such as ribbon racks, bike rails and posts, are better because they support the entire bike frame, will not bend wheels (today's bikes often have light alloy rims), and accommodate the popular, high-security U-shaped bike locks.

Just as important as design is the location of bike racks. Parking that is not in a good location will not be used. It's important that racks are located in a highly visible area, near a building's entrance. Areas with heavier foot traffic are generally better, as pass-by traffic helps "police" the area. However, bike racks should not be placed so that they obstruct sidewalks or pedestrian traffic.

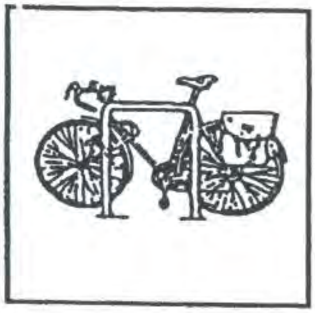
Long-term parking provides a greater degree of security and protection from the weather. Long-term facilities should be used where bicycles will be left unattended for longer periods of time (all day or overnight). Examples are bike lockers, enclosed "cages", or a room inside a building.

Bike parking should be easy to use. If possible, simple instructions on how to use the rack or locker should be posted.

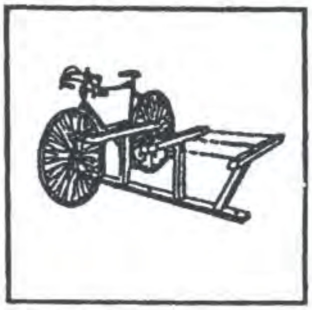
Bicycle Parking Facilities



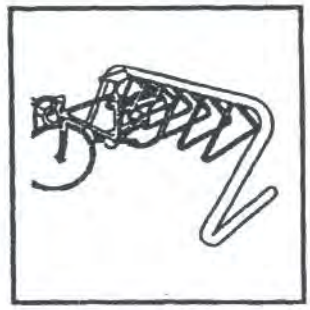
Bicycle Locker



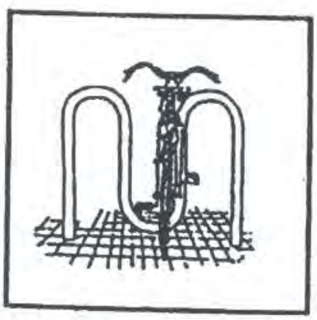
Bike Rail



3-pt. Locking



Freestanding



Ribbon Rack

Traditional
(SUBSTANDARD)

Wheelholder
(SUBSTANDARD)

Taken from Portland, Oregon "Bicycle Master Plan" (1998)

APPENDIX B
BIKEWAY NETWORK STREET LISTING

Planned Roadway Improvements On Bikeway Network

HENDERSON
SHORT TERM BIKEWAY NETWORK

Road	From	To	Any planned roadway improvements	Year
Atkinson Park Roads	Park Road Network		None currently	---
Merritt Drive	12th Street	Atkinson Park South Exit	None currently	---
12th Street	Merritt Drive	Green Street	None currently	---
Main Street	12th Street	5TH Street	None currently	---
5th Street	Main Street	Water Street	None currently	---
Water Street	5th Street	Dixon Street	None currently	---
Dixon Street	Water Street	Main Street	None currently	---
Main Street	Dixon Street	Drury Lane	None currently	---
Drury Lane	Main Street	US 41A/Green Street	None currently	---
Sand Lane/Madison Street	Main Street	Atkinson Street	Widen to 4 lanes from Green Street to Atkinson Street	2015
Watson Lane	Green River Road	US 60	None currently	---
2nd Street	Water Street	US 41A/Green Street	None currently	---

HENDERSON
LONG TERM BIKEWAY NETWORK

Road	From	To	Any planned roadway improvements	Year
US 41	Audubon Park Entrance	Rettig Road	None currently	---
Rettig Road	US 41	Elm Street	None currently	---
Elm Street	Rettig Road	Atkinson Park Entrance (North and South)	Upgrade from Watson Lane to 12th Street	2015
Marywood Drive	US 41	US 60	None currently	---
12th Street	US 41A/Green Street	Adams Street	None currently	---
Adams Street	12th Street	Kimsey Lane	None currently	---
Kimsey Lane	Adams Street	KY 1539/Larue Road	None currently	---
KY 1539/Larue Road	KY 351/ Second Street	Kimsey Lane	Upgrade	2025
Adams Lane	KY 351	KY 812/Airline Road	None currently	---
KY 812/Airline Road	City Limits/	Atkinson Street	None currently	---
Mckinley Avenue	KY 351/ Second Street	Washington Street	None currently	---
Atkinson Street	Washington Street	Madison Street	Widen to 4 lanes from Washington Street to Madison Street	2015
KY 136/ Madison Street	Atkinson Street	Community Park	None currently	---

Planned Roadway Improvements On Bikeway Network

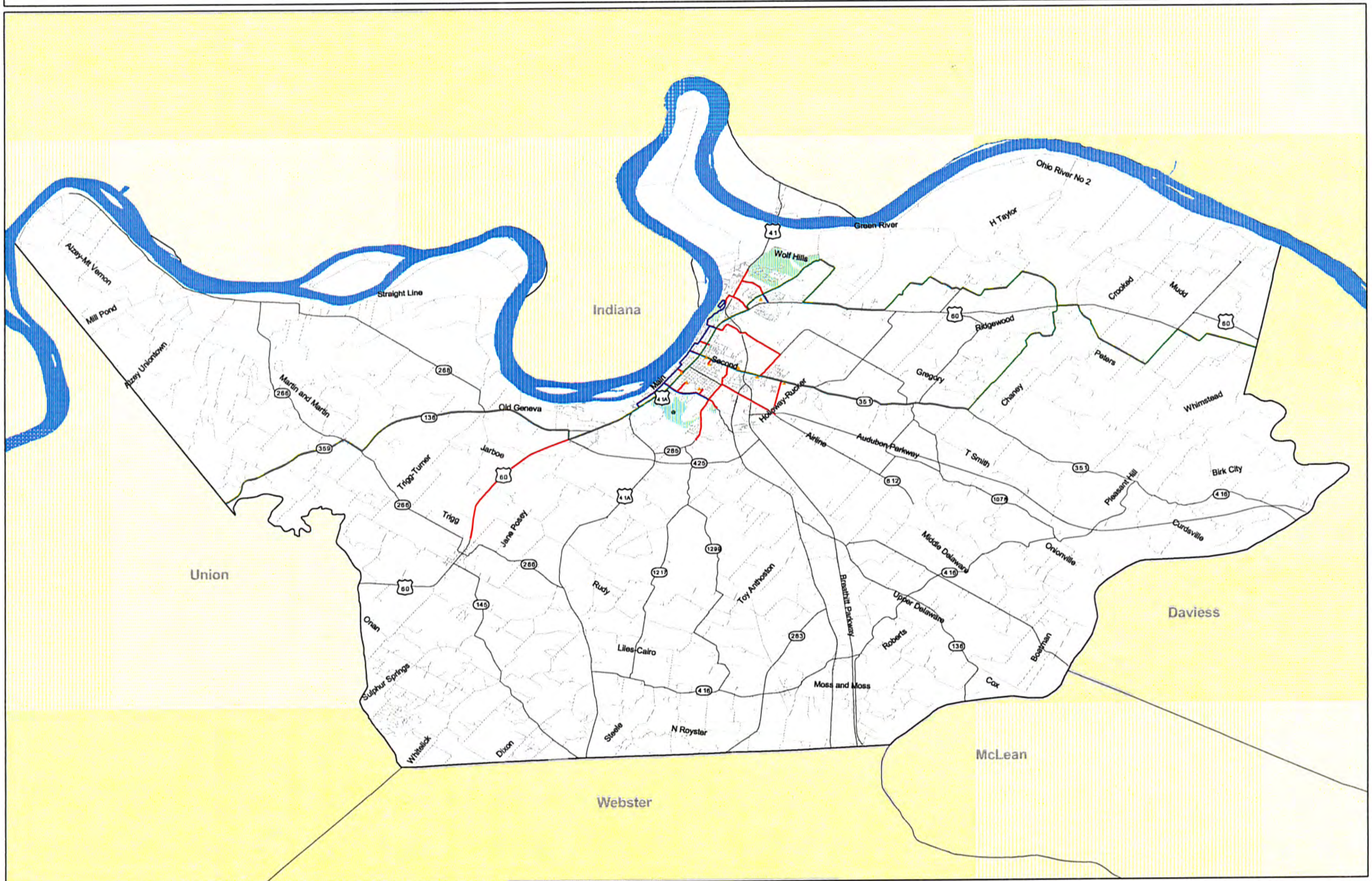
HENDERSON
LONG TERM BIKEWAY NETWORK Cont.

Road	From	To	Any planned roadway improvements	Year
KY 285/ Old Madisonville Road	Madison Steet	City Limits/ Moss Lane	None currently	---
Mill Street	Madison Street	South Heights Elementary	None currently	---
Alves Street	Sand Lane	South Jr. High	None currently	---
Audubon Street	Main Street	Jefferson School	None currently	---
Alves Street	2nd Street	Central Elementary	None currently	---
Sixth Street	Main Street	Ingram Street	None currently	---
US 60	KY 425/ Henderson By-Pass	Corydon	None currently	---

ADOPTED STATE BIKEWAY NETWORK

Road	From	To	Any planned roadway improvements	Year
Reed-Owensboro Road	Daviess County Line	Reed-Bluff City Road	None currently	---
Reed-Bluff City Road	Reed-Owensboro Road	Peters Road	None currently	---
Peters Road	Reed-Bluff City Road	US 60	None currently	---
US 60	Peters Road	KY 1078	None currently	---
KY 1078	US 60	KY 2243	None currently	---
Hatchett Mill Road	KY 2243	KY 351	None currently	---
KY 351/Second Street	Hatchett Mill Road	US 41A/Green Street	None currently	---
KY 1078	US 60	Dr. Hodge Street	None currently	---
Dr. Hodge Street	KY 1078	Tscharner Road	None currently	---
Tscharner Road	Dr. Hodge Street	US 60	None currently	---
US 60	Tscharner Road	Wathen Lane	Widen to 4 lanes from Wathen Lane to KY 2183/ Holloway-Rucker Road	2015
Wathen Lane	US 60	Green River Road	None currently	---
Green River Road	Wathen Lane	US 60	Upgrade from Osage Drive to Wathen Lane	2015
US 60	Green River Road	US 41	None currently	---
US 41A/Green Street	US 41	US 60	Add Left Turn Lane from US 60 to US 41	2025
US 60	US 41A	KY 425/Henderson By-Pass	Reconstruct from KY 425 to US 41A	FY 2004
KY 136	US 60	KY 359	None currently	---
KY 359	KY 136	Union County Line	None currently	---

Greater Henderson Bicycle and Pedestrian Plan
Local and State Designated Bicycle Routes



Local Long Term Routes	Highways/Parkways	Parks	
Local Short Term Routes	Local Roads	City Limits	
State Bicycle Routes	Current Newman Park Bike/Pedestrian Facility	Schools	

2 0 2 4 Miles

Evansville Urban Transportation Study - April 2003

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APPENDIX J
PROJECT
INFORMATION
FORM
AND FY 2006-2012
KYTC SIX YEAR
PLAN

PIF Revised: Aug. 2004

KYTC Project Identification Form

Cycle Year: **2005**
Priority: L : **Hi** R: **Hi** D: **Hi**
Tier: **3**
Tier Rank: R: **2** D: **4**
Overall Top Ten: R: **2** D: **5**

Section I – General Information

Requested by:
Title/Organization: **EUTS**
Date: **11/10/04**

Form Completed by:
Title/Organization: **EUTS**
Date: **11/10/04**

Revision 1 by:
Title/Organization:
Date:

Revision 2 by:
Title/Organization:
Date:

UPL Control #: 02 051 B0041A 52.00 Co. #: **051**
Parent Control #: ____________
RSE Unique Number: **_051 US -41A**

District: **2** County: _Henderson Route: **US 41A**
ADD: ________ MPO: **EUTS** SUA: _____

Mode: **Highway** State System: **State Primary**
Type: **Major Widening** Funct'l Class: **Urban Prin Art**

Project Length: 4.162 **Total Cost Estimate: $ 33,800**
(P:0 D:2200 R:3,500 U:3,000 C:25100)

Possible Funding Sources (Check all that apply):
☐IM ☒NH ☐HES ☐BR ☒STP ☒SP ☐TE ☐CMAQ
☐PLH ☐Other: _____

Highway Networks (Check all that apply): ☐Non NHS ☒NHS
☐NN ☒Scenic Byway ☐Coal Haul ☐Bike ☐Forest
☒Defense ☐Strahnet ☐Ext. Wt. ☐ADHS ( )

Existing Project Studies (Year):

Section II – Problem Statement

Route Number: **US 41A**
Beginning MP: **13.235**
Ending MP: **17.397**
Total Length: **4.162**

Primary Purpose: **Upgrade Existing System(Major)**

(Use Report Year)	Original	Rev. 1	Rev. 2
AdequacyRating:	**52.27**: (**04**)	**43**: (**05**)	: ( )
• CRF: (Year)	**1.40**: (**04**)	**2.14**: (**05**)	: ( )
• IRI: (Year)	**101**: (**04**)	**145.8**: (**05**)	: ( )
• V/SF: (Year)	**0.79**: (**04**)	**0.798**: (**05**)	: ( )
Current ADT: (Year):	**23,037**: (**02**)	: ( )	: ( )
Percent Trucks: (Year):	**na**: ( )	: ( )	: ( )
Projected ADT (HDO): Year:	**2022**	%Growth: **1.80**	ADT: **32,943**

Please provide a clear problem statement for this project:

The Green St. Corridor Study was completed in 1998. Through the capacity analysis and accident analyses described in this report, the safety problem in the study area was found to be serious. As a result of technical analysis, a series of recommendation have been indentified for current and future mitigation. One of these recommendations is a continuous 2 way left turn lane, which is considered to be effective in reducing traffic accidents and improving the LOS. The results of the study found that safety was an overwelming problem, as the accident rates in the study area were about twice as high as the county average over the past 5 years. EUTS has examined and discussed with local and state officials the construction of continuous left turn lanes. According to state and local officials, there should be adequate right of way along the corridor to provide for a continuous turn lane. the average directional AADT was 11, 995 vehicles per day for the entire study corridor (1998)

Section III – Project Description

Project Description Narrative:

Green St.- Major widening to provide a continuous 2-way left turn lane from US 60 to US 41 in Henderson.

Regional Goals/Objectives Addressed:

UPL #: 02 051 B0041A 52.00
County: Henderson Co. #: 051 Route: US 41A

Section IV – Project Area Information:

1. Miscellaneous Roadway Conditions

Access Control:	Existing: **Permit** Proposed: **Permit**	Median Type:	Existing: **N/A** Proposed: ____	Width: ____ Width: ____
Lane No./Width:	Existing: **12/4** Proposed: ____/____	Shoulders:	Existing: **C/G** Proposed: ____	Width: **0** Width: ____
No. of Bridges:	Existing: **3** Proposed: ____	Other Improvement Projects in Area:	☐None ☐SYP ☐Resurface ☐Other ____	

Comments:

2. Right of Way

Avg. Width:	Existing: **98**	Source: ☒ HIS ☐Plans ☐Microfilm ☐Other ____

Current Primary Use: ☐Industrial ☒Commercial ☐Residential ☐Farmland ☐Other: ____

☐ No ☒ Yes Project may require additional R/W. | Possible Relocations : Homes: **1-5** Businesses: ____

Comments:

3. Utilities

Existing Utilities: ☒Power ☐Gas ☒Telephone ☒Cable ☒Sewer ☒ Water ☐ ITS ☐None ☐ Other: ____

☐ No ☒ Yes Project may require Utility Relocations. | Comments:

4. Environmental Impacts

(Check all that apply):

☐Blueline Streams	☐Wetlands	☐Floodplain	☐Wildlife Managed Areas	☐Historic Properties
☐Cemeteries	☐Schools	☐Churches	☐Endangered Species	☐Public Land/Park
☐Noise Impact	☐Arch. Sites	☐NR Properties	☐Potential NR Properties	☐Other:

☐ Potential Contaminated sites: | ☐ Gas Stations ☐ Landfills ☐ Auto Repair ☐ Junkyards ☐Other

Comments:

5. Air Quality

☒No ☐Yes	Project is located in a Maintenance or Nonattainment Area	☐ Ozone	☐ PM 2.5
☒No ☐Yes	Project adds through lane capacity		
☐No ☒Yes	Project results from a Congestion Management Plan		
☒No ☐Yes	Project is included in TIP/STIP	TIP Page #	STIP Page #

Comments: **Green St Corridor Study- 1998, EUTS Congestion Management System Report-July 2004**

6. Economic Impacts

☐No ☒Yes Planning/Zoning Regulations exist in Community | ☒No ☐Yes Project may affect established Business, Commercial or Industrial Districts.

☒ No ☐ Yes This project has economic impacts on regional/local economy:
☐ Development ☐Tax Revenues ☐Employment Opportunity ☐Retail Sales ☐ Other

Please Describe:

☐ No ☒ Yes This project provides direct access to major points of interest:
☐ Nat'l/State Parks ☐Monuments ☐Historic Sites ☐Amusement Parks ☐US Public Land ☐ Other

Please Describe:

☐ No ☒ Yes This project provides direct access to major traffic generators:
☐ Shopping Centers ☐Schools ☐Industries ☐Military Installations ☐ Other

Please Describe:

UPL #: 02 051 B0041A 52.00
County: Henderson Co. #: 051 Route: US 41A

7. Multimodal Opportunities	This project is a candidate for: (check all that apply)	☐ Bicycle Paths ☒ Sidewalks ☐ Shared-Use Paths ☐ Park/Ride Lots ☐ N/A
	This project improves direct access to: (check all that apply)	☐ Airports ☐ Railways ☐ Riverports ☒ Trucking Routes ☐ N/A
	Type of Public Transportation available:	☒ Fixed Route ☐ Demand Response
	Comments:	
8. Social Impacts	This project may affect: (Check all that apply)	☐ Neighborhood or Community Cohesion ☒ Travel Patterns (Vehicular, commuter, bicycle, pedestrian) ☐ Household Relocations ☐ Elderly, disabled, nondrivers, minorities, low-income persons ☐ No adverse effects to neighborhoods apparent.
	Comments/Impact Descriptions:	

Section V – Cost Estimate Information (to be completed by Hwy District Office):

Cost Estimate by Phase:

Phase	Original Estimate	By:	Revision 1	Date	By:	Revision 2	Date	By:
Planning	$0							
Design	$2,000,000	D2	$2,200,000	9/6/06	JKM			
ROW	$3,500,000	D2	$3,500000					
Utilities	$3,000,000	D2	$3,000,000					
Construction	$23,000,000	D2	$25,100,000	9/6/06	JKM			
Total Cost	**$31,500,000**	**D2**	**$33,800,000**	9/6/06	**JKM**			

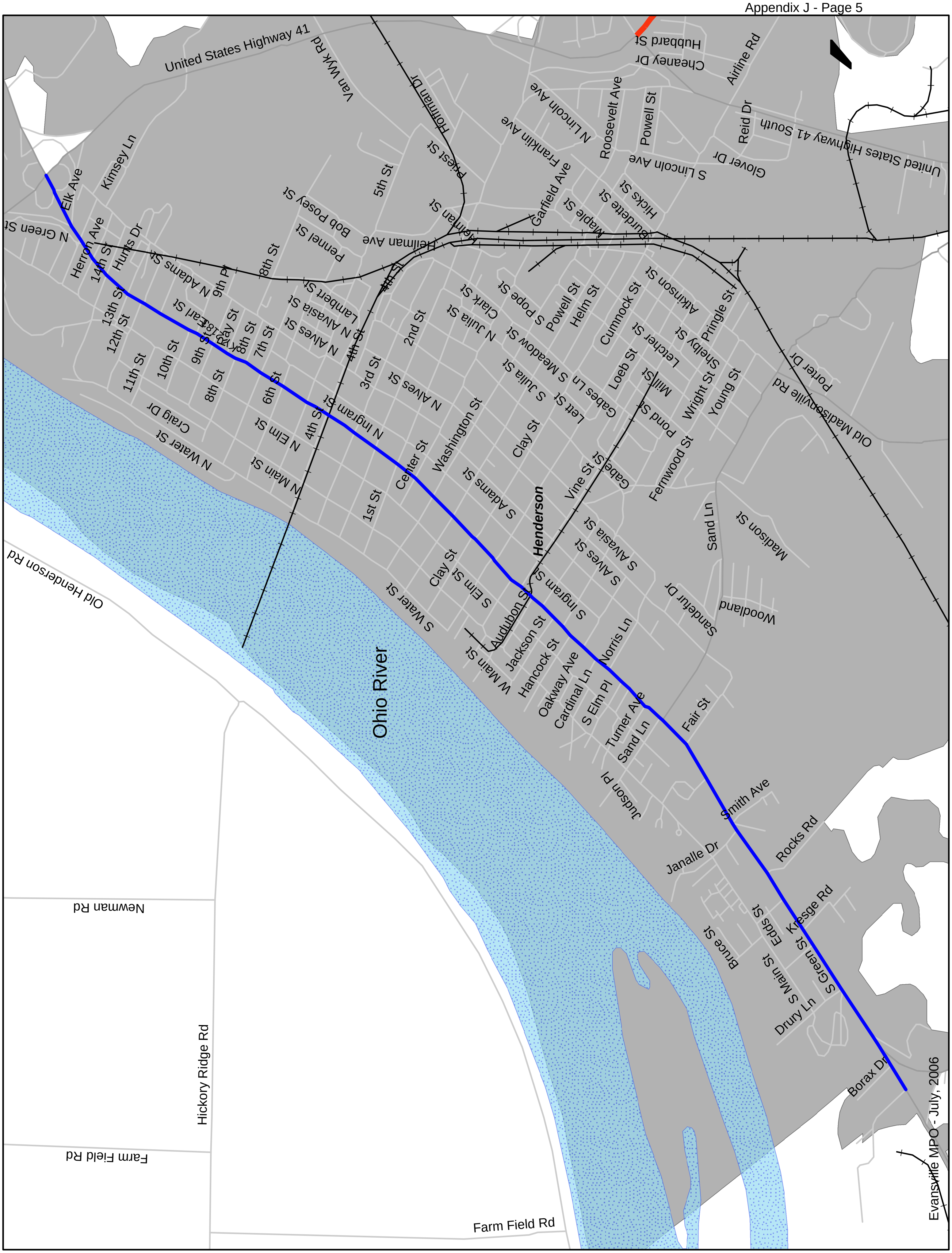
Estimate Procedure Used:

Original Estimate:	Revision 1:	Revision 2:
☐ Per Mile@ $ _____ Terrain: _________	☒ Per Mile@ $ **5.5M for C only** Terrain: _________	☐ Per Mile@ $ _____ Terrain: _________
☒ Detailed Estimate with Calculations Attached	☒ Detailed Estimate with Calculations Attached	☐ Detailed Estimate with Calculations Attached
Estimate Assumptions: **see attached** **02 051 B0041A 52^00 EST.doc**	Estimate Assumptions: **(4.2mi)(5.5M/mi)=23.1 M+ 2M for RR Bridge=25,100**	Estimate Assumptions:
Estimate Class: **E-Requires further study**	Estimate Class: **E-Requires further study**	Estimate Class: _______________

Section VI – Attachments:

The following items are attached to this document: ☒ Location Map ☒ Photograph(s) ☐ Other:

Comments:


United States Highway 41
United States Highway 41 South
Van Wyk Rd
Hubbard St
Cheaney Dr
Airline Rd
Hoffman Dr
Priest St
N Lincoln Ave
Franklin Ave
Roosevelt Ave
Powell St
Reid Dr
S Lincoln Ave
Glover Dr
Kimsey Ln
Elk Ave
5th St
Bob Posey St
Garfield Ave
Maple St
Burdette St
Hicks St
N Green St
Pennel St
Hellman Ave
Heilman St
Herron Ave
14th St
Hunts Dr
N Adams St
8th St
9th Pl
Lambert St
Clark St
S Pope St
Powell St
Helm St
Cumnock St
Atkinson St
Pringle St
13th St
12th St
Earl St
Kimsey Ln
N Alvasia St
N Alves St
4th St
2nd St
N Julia St
S Meadow St
Letcher St
Shelby St
Loeb St
Mill St
Porter Dr
11th St
10th St
9th St
8th St
7th St
3rd St
N Alves St
S Julia St
Lett St
Gabes Ln
Pond St
Wright St
Young St
Old Madisonville Rd
Craig Dr
N Water St
N Elm St
6th St
4th St
N Ingram St
Washington St
Clay St
Vine St
Gabe St
Fernwood St
N Main St
Center St
1st St
S Adams St
Henderson
Sand Ln
Madison St
S Alvasia St
S Alves St
Old Henderson Rd
Clay St
S Elm St
S Ingram St
Sandefur Dr
Woodland
S Water St
Audubon St
Norris Ln
Jackson St
Hancock St
W Main St
Oakway Ave
Cardinal Ln
S Elm Pl
Turner Ave
Sand Ln
Fair St
Ohio River
Judson Pl
Smith Ave
Rocks Rd
Janalle Dr
Newman Rd
Kresge Rd
Eddls St
Bruce St
S Main St
S Green St
Drury Ln
Borax Dr
Hickory Ridge Rd
Farm Field Rd
Farm Field Rd

Green St. @ 12th (WB)

Green St. [10th-9th] (WB)

Green St. @ RR Bridge Near 4th (WB)

Green St. @ Washington (WB)

Green St. [Jackson-Hancock] (WB)

Green St. @ Sand Ln (WB)

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KENTUCKY TRANSPORTATION CABINET
SIX YEAR HIGHWAY PLAN

FY - 2006 THRU FY - 2012

COUNTY	ITEM NO. & PARENT NO.	ROUTE	LENGTH	DESCRIPTION	FUNDING	PHASE	YEAR	AMOUNT
HENDERSON	2006 02 - 68.00 Parent No.: 2006 02 - 68.00	I-69		I-69; PERFORM A FINANCIAL PLANNING STUDY FOR NEW I-69 OHIO RIVER CROSSING AT HENDERSON/EVANSVILLE. Milepoints: From: To: Purpose and Need: RELIABILITY / FEASIBILITY STUDY(O)	STP	P	2007	$500,000
						Total		$500,000
HENDERSON	1998 02 - 79.02 Parent No.: 1996 02 - 79.00	US-60	3.200	PADUCAH-HENDERSON; RECONSTRUCT US60 FROM THE CORYDON BYPASS (CORYDON-GENEVA ROAD) TO THE HENDERSON BYPASS (KY425).(04CCR) Milepoints: From:5.531 To: 8.71 Purpose and Need: RELIABILITY / RECONSTRUCTION(O)	SP	D	2007	$900,000
					SP	R	2009	$4,000,000
					SP	U	2009	$3,800,000
					SP	C	2011	$6,000,000
						Total		$14,700,000
HENDERSON	1998 02 - 79.10 Parent No.: 1996 02 - 79.00	US-60	3.800	PADUCAH-HENDERSON; CONSTRUCT US60 BYPASS OF CORYDON.(04CCR) Milepoints: From: To: Purpose and Need: RELIABILITY / NEW ROUTE(O)	SP	D	2007	$1,400,000
					SP	R	2009	$2,500,000
					SP	U	2009	$1,500,000
					SP	C	2011	$5,000,000
						Total		$10,400,000
HENDERSON	2000 02 - 108.00 Parent No.: 2000 02 - 108.00	US-41	1.000	US-41 BRIDGES OVER THE OHIO RIVER @ HENDERSON (B7); JOINT PROJECT WITH INDIANA TO WASH AND PAINT NORTHBOUND STRUCTURE. Milepoints: From:19.243 To: 20.271 Purpose and Need: RELIABILITY / BRIDGE PAINTING(P)	SP	C	2007	$2,500,000
						Total		$2,500,000
HENDERSON	2000 02 - 109.00 Parent No.: 2000 02 - 109.00	US-41	1.000	US-41 BRIDGES OVER THE OHIO RIVER @ HENDERSON (B7); JOINT PROJECT WITH INDIANA TO WASH AND PAINT SOUTHBOUND STRUCTURE. Milepoints: From:19.243 To: 20.271 Purpose and Need: RELIABILITY / BRIDGE PAINTING(P)	SP	C	2007	$2,500,000
						Total		$2,500,000
HENDERSON	1998 02 - 126.00 Parent No.: 1998 02 - 126.00	US-60	1.700	RECONSTRUCT US-60 FROM KY-425 TO US-41A IN WEST HENDERSON TO ALLEVIATE TRAFFIC FLOW PROBLEMS NEAR INDUSTRIAL AREA. Milepoints: From:8.71 To: 10.435 Purpose and Need: RELIABILITY / RECONSTRUCTION(O)	SP	C	2007	$12,000,000
						Total		$12,000,000
HENDERSON	2000 02 - 140.00 Parent No.: 2000 02 - 140.00	US-41A	4.200	WIDEN GREEN STREET TO PROVIDE CONTINUOUS 2 WAY LEFT TURN LANE FROM US 60 TO US 41 IN HENDERSON.(04CCN) Milepoints: From:13.235 To: 17.39 Purpose and Need: SAFETY / SCOPING STUDY(O)	SP	P	2007	$300,000
						Total		$300,000
HENDERSON	2004 02 - 152.01 Parent No.: 2004 02 - 152.01	-		HENDERSON RIVERFRONT DEVELOPMENT PROJECT IN HENDERSON. (2005HPP-KY152) Milepoints: From: To: Purpose and Need: RELIABILITY / TRANSP ENHANCEMENT(P)	HPP	C	2006	$4,000,000
						Total		$4,000,000
HENDERSON	2004 02 - 152.02 Parent No.: 2004 02 - 152.02	-		HENDERSON RIVERFRONT DEVELOPMENT PROJECT IN HENDERSON. (2005HPP-KY152) Milepoints: From: To: Purpose and Need: RELIABILITY / TRANSP ENHANCEMENT(P)	HPP	C	2007	$2,000,000
						Total		$2,000,000

KENTUCKY TRANSPORTATION CABINET
SIX YEAR HIGHWAY PLAN

FY - 2006 THRU FY - 2012

COUNTY	ITEM NO. & PARENT NO.	ROUTE	LENGTH	DESCRIPTION	FUND-SCHEDULING INFORMATION
HENDERSON	2004 02 - 152.03 Parent No.: 2004 02 - 152.03	-		HENDERSON RIVERFRONT DEVELOPMENT PROJECT IN HENDERSON. (2005HPP-KY152) Milepoints: From: To: Purpose and Need: RELIABILITY / TRANSP ENHANCEMENT(P)	FUNDING / PHASE / YEAR / AMOUNT HPP / C / 2008 / $2,000,000 Total $2,000,000
HENDERSON	2004 02 - 152.04 Parent No.: 2004 02 - 152.04	-		HENDERSON RIVERFRONT DEVELOPMENT PROJECT IN HENDERSON. (2005HPP-KY152) Milepoints: From: To: Purpose and Need: RELIABILITY / TRANSP ENHANCEMENT(P)	FUNDING / PHASE / YEAR / AMOUNT HPP / C / 2009 / $2,000,000 Total $2,000,000
HENDERSON	2006 02 - 175.00 Parent No.: 2006 02 - 175.00	EB-9004		CONSTRUCT ADDITIONAL RAMPS ON E.T. BREATHITT PARKWAY AT KY-416 (EXIT 68) TO FACILITATE ACCESS TO AND FROM THE SOUTH. Milepoints: From:68 To: 68.01 Purpose and Need: RELIABILITY / I-CHANGE RECONST(O)	FUNDING / PHASE / YEAR / AMOUNT SP / D / 2008 / $325,000 Total $325,000
HENDERSON	2004 02 - 700.03 Parent No.: 2004 02 - 700.03	-		FEDERAL 'STP' FUNDS DEDICATED TO HENDERSON. Milepoints: From: To: Purpose and Need: RELIABILITY / MATCHED FED FUNDS(O)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2008 / $400,000 Total $400,000
HENDERSON	2004 02 - 700.04 Parent No.: 2004 02 - 700.04	-		FEDERAL 'STP' FUNDS DEDICATED TO HENDERSON. Milepoints: From: To: Purpose and Need: RELIABILITY / MATCHED FED FUNDS(O)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2009 / $400,000 Total $400,000
HENDERSON	2004 02 - 700.05 Parent No.: 2004 02 - 700.05	-		FEDERAL 'STP' FUNDS DEDICATED TO HENDERSON. Milepoints: From: To: Purpose and Need: RELIABILITY / MATCHED FED FUNDS(O)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2010 / $400,000 Total $400,000
HENDERSON	2006 02 - 700.06 Parent No.: 2006 02 - 700.06	-		FEDERAL 'STP' FUNDS DEDICATED TO HENDERSON. Milepoints: From: To: Purpose and Need: RELIABILITY / MATCHED FED FUNDS(O)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2011 / $400,000 Total $400,000
HENDERSON	2006 02 - 700.07 Parent No.: 2006 02 - 700.07	-		FEDERAL 'STP' FUNDS DEDICATED TO HENDERSON. Milepoints: From: To: Purpose and Need: RELIABILITY / MATCHED FED FUNDS(O)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2012 / $400,000 Total $400,000
HENDERSON	2000 02 - 966.00 Parent No.: 1996 99 - 206.20	US-41A	.100	WIDENING OF US-41A AT KY-136 IN HENDERSON TO CONSTRUCT LEFT TURN LANE (2000BOP) Milepoints: From:14.483 To: 14.548 Purpose and Need: SAFETY / SAFETY-HAZARD ELIM(P)	FUNDING / PHASE / YEAR / AMOUNT SHN / C / 2007 / $1,020,000 Total $1,020,000
HENDERSON	2002 02 - 968.00 Parent No.: 1998 99 - 353.00	KY-351	.600	KY351 NEAR ZION, HORIZONTAL & VERTICAL REALIGNMENT, SHOULDER WIDENING, AND INSTALL GUARDRAIL (B/C=2.5) (D-DISTRICT, C-CONTRACTOR) (2002BOP) Milepoints: From:4.7 To: 5.3 Purpose and Need: SAFETY / SAFETY-HAZARD ELIM(P)	FUNDING / PHASE / YEAR / AMOUNT HES / R / 2008 / $75,000 HES / U / 2008 / $150,000 HES / C / 2010 / $1,000,000 Total $1,225,000

KENTUCKY TRANSPORTATION CABINET
SIX YEAR HIGHWAY PLAN
FY - 2006 THRU FY - 2012

COUNTY	ITEM NO. & PARENT NO.	ROUTE	LENGTH	DESCRIPTION	FUNDING	PHASE	YEAR	AMOUNT
HENDERSON	2004 02 - 2038.00 Parent No.: 2004 02 - 2038.00	EB-9004	7.800	REPAIR THICK OVERLAY ON E.T. BREATHITT PARKWAY FROM MP 70.45 TO MP 78.248. Milepoints: From:70.45 To: 78.248 Purpose and Need: RELIABILITY / PAVEMENT REHAB-PRK(P)	NH	C	2006	$17,100,000
						Total		$17,100,000
HENDERSON	2004 02 - 2040.00 Parent No.: 2004 02 - 2040.00	AU-9005	7.100	REPAIR AND GRIND PAVEMENT ON THE AUDUBON PARKWAY FROM MP 8.75 TO 15.883. Milepoints: From:8.75 To: 15.883 Purpose and Need: RELIABILITY / PAVEMENT REHAB-PRK(P)	SP	C	2008	$3,567,000
						Total		$3,567,000
HENDERSON	2006 02 - 8304.00 Parent No.: 2006 02 - 8304.00	EB-9004		RECONSTRUCT/COMPLETE THE HALF INTERCHANGE AT EXIT 68 ON THE BREATHITT PARKWAY. (06CCN) Milepoints: From:68.25 To: 68.75 Purpose and Need: RELIABILITY / I-CHANGE RECONST(O)	SP	D	2007	$325,000
					SP	R	2008	$300,000
					SP	U	2008	$350,000
					SP	C	2009	$4,000,000
						Total		$4,975,000

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