



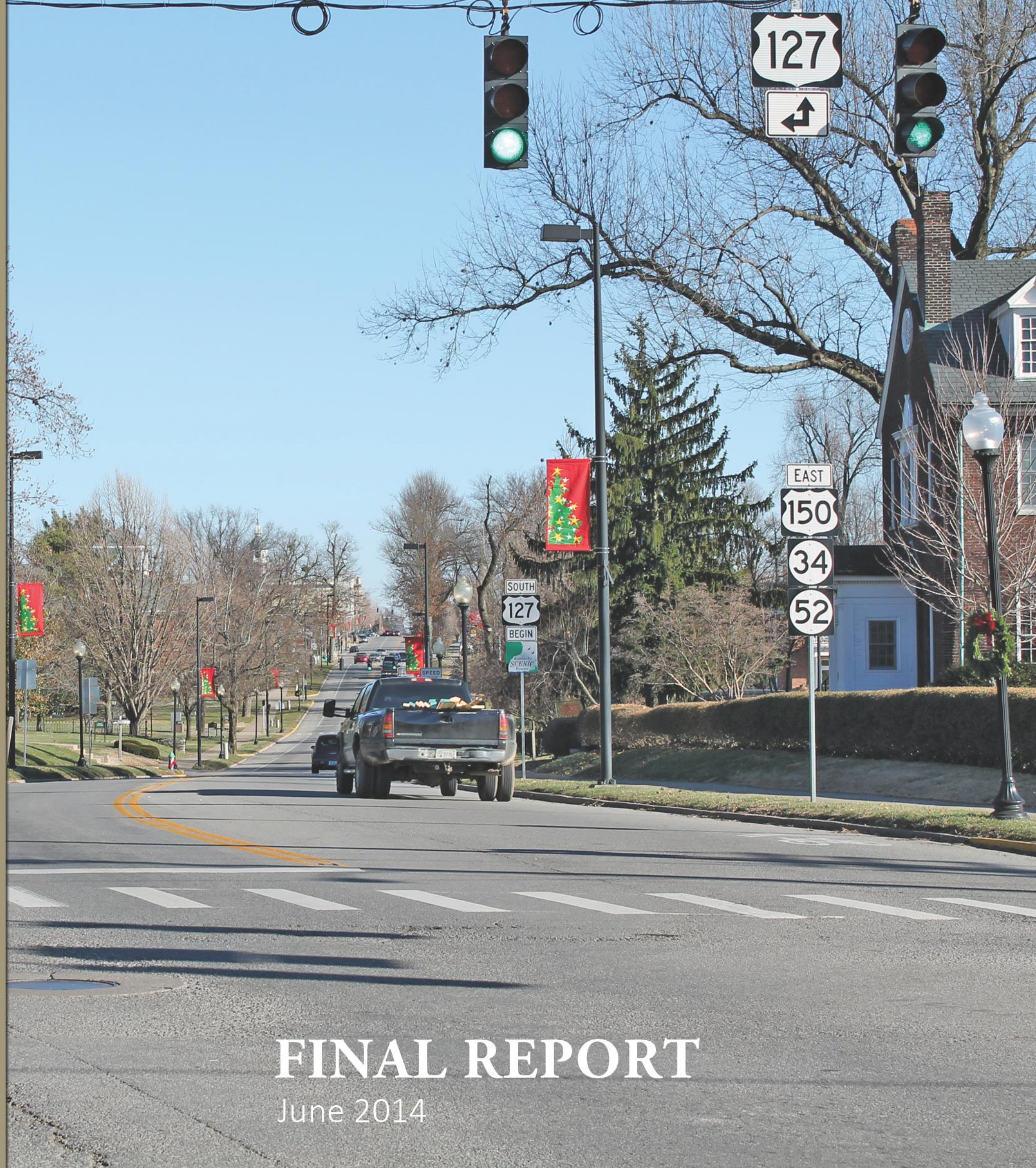


# FINAL REPORT
June 2014

# DANVILLE SMALL URBAN AREA STUDY

SUMMARY OF

# FINDINGS AND RECOMMENDATIONS

Kentucky Transportation Cabinet
Division of Planning
District 7

KENTUCKY TRANSPORTATION CABINET

Kentucky UNBRIDLED SPIRIT

PARSONS BRINCKERHOFF

# DANVILLE SMALL URBAN AREA STUDY
# BOYLE COUNTY

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

# FINAL REPORT

***Prepared for:***

*Kentucky Transportation Cabinet (KYTC) – Division of Planning & District 7*

KENTUCKY TRANSPORTATION CABINET

***Prepared by:***

***Parsons Brinckerhoff***

PARSONS BRINCKERHOFF

June 2014

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# Executive Summary – Danville SUA Study

## Introduction and Study Area

The Kentucky Transportation Cabinet (KYTC) identified the need to perform a Small Urban Area (SUA) study for the City of Danville, Kentucky and a portion of the surrounding unincorporated area of Boyle County. SUA studies are performed for populations of 5,000 to 50,000. The purpose of an SUA study is to identify and examine transportation issues related to safety, congestion, and operations in the study area, and to develop a list of projects to improve those conditions in the study area.

In November 2011, a meeting was held with the KYTC and representatives from Danville / Boyle County to discuss a list of projects they had determined would be beneficial for the community. The KYTC decided to prepare a county-level travel demand model to test these projects and determine what the impact would be on traffic volumes with and without these projects. Following the completion of the model, it was noted by KYTC that a SUA study would be an appropriate follow-up to this project evaluation process with the model, and the model could be a resource to use for evaluating other projects. In May 2013, the KYTC contracted with the consulting firm of Parsons Brinckerhoff (PB) to perform the study through their Statewide Planning Services contract. The Project Development Team (PDT) consisted of: KYTC Central Office Division of Planning, KYTC District 7, the Bluegrass Area Development District (BGADD) and Parsons Brinckerhoff.

## Existing Conditions

Existing highway characteristics and geometrics, traffic volumes, truck traffic, speed, levels of service (LOS) / capacity, and crash numbers, rates and types were evaluated as part of the existing conditions analysis. The key transportation issues identified from this analysis are summarized below:

- Major roadways in the study area, such as US 127, US 150, US 127 / 150B and KY 34 currently have high traffic volumes (15,000 to 20,000-plus average daily traffic volumes).
- Roadways such as US 127, US 127B, US 150 and US 150B have high truck percentages (sections with 16-19 percent trucks).
- Sections of US 150, KY 34, and KY 3366 currently operate at a LOS E or F.
- The majority of roadways in the study area have segments with a critical crash rate factor greater than one.
- Rear end crashes are the most common type of crash on seven of the thirteen US and KY routes in the study area.

Both human and natural environment overviews were performed as part of the existing conditions analysis. Aquatic resources such as rivers, creeks and floodplains exist in the study area. There is also the potential for karst topography. Several species of bats and mussels that are classified as threatened, rare and / or endangered occur in the study area. There are 31 locations listed on the National Register of Historic Places in Danville. Because the majority of project types under evaluation are improvements to existing transportation facilities, it is unlikely that there will be many additional adverse impacts of significance to either the natural or human environments that would prevent one or more of the identified projects from proceeding in further project development phases.

The Environmental Justice (EJ) review showed that there are several areas within the study area with significant minority and/or low-income populations. At this time, the EJ populations are not expected to bear disproportionate adverse affects as a majority of the projects selected fall within the existing right of way. However, more in-depth study during the next phases of project implementation is necessary to confirm this.

The geotechnical review noted that karst features and sinkholes may be encountered in the study area, as well as faulted areas. These features could impact some of the identified projects, but are not so adverse as to preclude further project development stages.

**Public Involvement**

For the Danville SUA study, there was an active and engaged public involvement component. Two meetings were held with the local officials / stakeholders (LO/S). The first meeting solicited feedback regarding potential transportation issues in the study area. The second meeting was held to present the list of projects designed to address the transportation needs of the area and to gain feedback regarding prioritization of these projects. Both meetings were well-attended with an engaged group of representatives. Their input helped further the study and ensured that the needs of the community are represented in the outcomes.

**Alternatives Development and Evaluation**

A detailed, multi-step process was used to develop and evaluate potential projects for the Danville area. The process included technical analysis of the existing conditions review, input from the PDT, input from the LO/S, and field reviews.

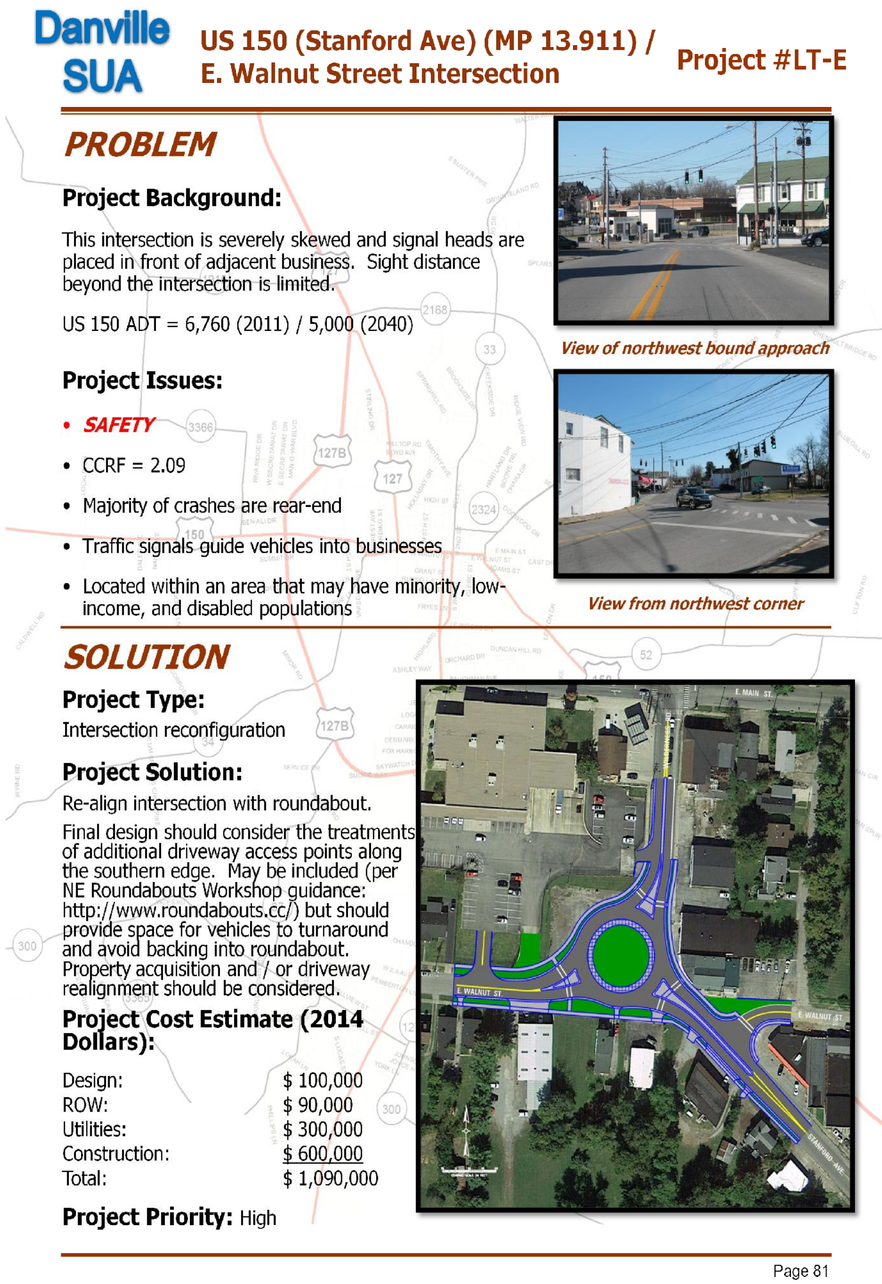
A range of area transportation issues were identified such as poor sight distance, difficulty entering the highway, driver unfamiliarity with the area, lack of or unclear signage, poor aesthetics, congestion, incomplete pedestrian network, high crash rate spots and segments, flooding, lack of turn lanes, poor lane utilization, awkward intersection geometrics and signal timings. Locations where these issues occurred were identified and a list of appropriate projects to address them were developed. Projects were classified as:

- L - Local (to be funded using local funds)
- ST - Short-Term (could be completed quickly with safety, maintenance, or other funds / combinations)
- LT - Long-Term (projects that could be considered for inclusion in the KYTC's Six Year Highway Plan or projects that may have significant impacts / future design complications).

These projects recommended geometric realignment / reconfiguration, aesthetic treatments, sidewalk / path network, traffic signal adjustment, signage, signal timing, additional study, safety improvements, major widening, new road construction, turn lanes, access management and / or community education / communication, as needed.

For each project, a stand-alone project sheet was developed to provide all necessary information for future project development. **Figure ES 1** shows an example project sheet.

**Figure ES 1: Example Project Sheet**



Danville SUA

US 150 (Stanford Ave) (MP 13.911) / E. Walnut Street Intersection

Project #LT-E

## PROBLEM

**Project Background:**

This intersection is severely skewed and signal heads are placed in front of adjacent business. Sight distance beyond the intersection is limited.

US 150 ADT = 6,760 (2011) / 5,000 (2040)

**Project Issues:**

- *SAFETY*
- CCRF = 2.09
- Majority of crashes are rear-end
- Traffic signals guide vehicles into businesses
- Located within an area that may have minority, low-income, and disabled populations

*View of northwest bound approach*

*View from northwest corner*

## SOLUTION

**Project Type:**
Intersection reconfiguration

**Project Solution:**
Re-align intersection with roundabout.

Final design should consider the treatments of additional driveway access points along the southern edge. May be included (per NE Roundabouts Workshop guidance: http://www.roundabouts.cc/) but should provide space for vehicles to turnaround and avoid backing into roundabout. Property acquisition and / or driveway realignment should be considered.

**Project Cost Estimate (2014 Dollars):**

| | |
|---|---|
| Design: | $ 100,000 |
| ROW: | $ 90,000 |
| Utilities: | $ 300,000 |
| Construction: | $ 600,000 |
| Total: | $ 1,090,000 |

**Project Priority:** High

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## Prioritization

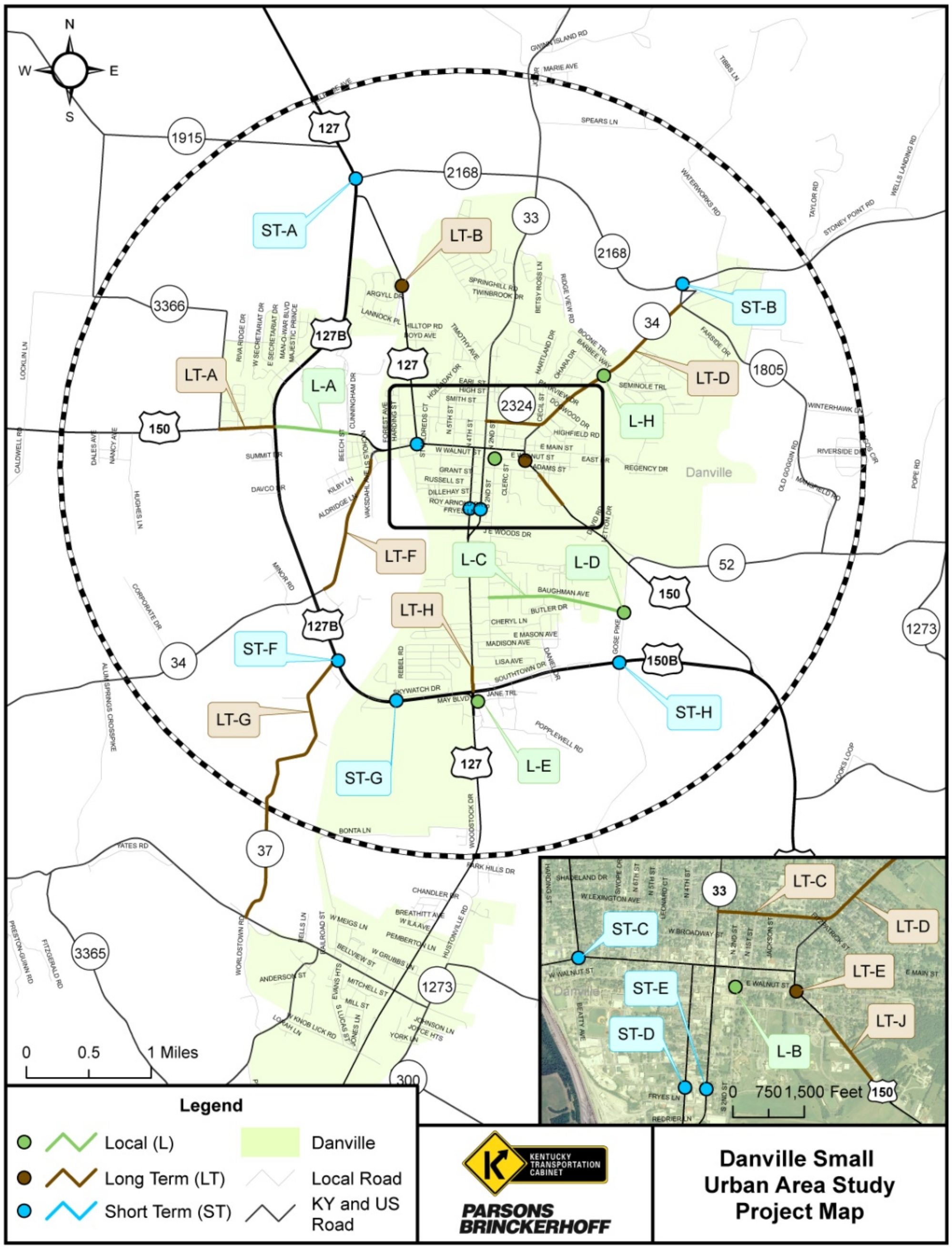
Based on the scoring exercise with the local LO/S and meetings with the PDT, the Local, Short-Term and Long-Term projects were prioritized as outlined in the following table and figure (**Table ES 1 and Figure ES 2**).

### Table ES 1: Project Recommendation and Prioritization

| Project Type | Project ID | Project Description | Cost Estimate* (2014 Dollars) | Priority |
|---|---|---|---|---|
| Local | L-C | Add sidewalk along north side of Baughman Ave | $395,000 | High |
| | L-D | Gose Pike / Baughman Ave: NB left turn lane and new signage | $280,000 | High |
| | L-A | 10-foot multi-use path on north side of US 150 | $174,000 | Medium |
| | L-E | Crosswalk and sidewalk connectivity throughout Wal-Mart shopping area | $530,000 | Medium |
| | L-F | New lighting FAQ and procedure to gain KYTC approval for install | Not Applicable | Medium |
| | L-H | KY 34 / Seminole Trail: Re-align Barbee Way and re-stripe for defined turn lanes on KY 34 | $400,000 | Medium |
| | L-B | 2nd St / E. Walnut St: Extend curb lines on corners | $90,000 | Low |
| | L-G | Bicycle Master Plan; map / brochure development | Study Only: $150,000 | Low |
| Short-Term | ST-B | KY 34 / KY 2168 & KY 34 / KY 2168: Truck route signage | $3,000 | High |
| | ST-A | KY 2168 / US 127: Signal warrant analysis | Not Applicable | Medium |
| | ST-C | US 127 / Maple Ave: Re-stripe and re-align WB approach | $52,000 | Medium |
| | ST-D | US 127 (S 4th St) / Fackler St: Stop bars on side streets | $1,500 | Low |
| | ST-E | US 127 (S 3rd St) / Fackler St: Stop bars on side streets | $1,500 | Low |
| | ST-F | US 127B / KY 37: Review / revise traffic signal timing, phasing and signage | Not Applicable | Low |
| | ST-G | US 127B / Smoky Way: Signal warrant analysis and access management for Fireside Dr | $27,000 | Low |
| | ST-H | US 150B / Gose Pike: Signal operation to coordinate with the Daniel Dr traffic signal | Not Applicable | Low |
| Long-Term | LT-E | US 150 / E. Walnut St: Re-align intersection with a roundabout | $1,090,000 | High |
| | LT-H | US 127 Corridor: Turn lanes, access management, and median delineators | $440,000 | High |
| | LT-J | KY 52 / Admiral Stadium: Lane markings and 12-foot ditch for drainage | $655,000 | High |
| | LT-A | US 150 Corridor: Median, turn lanes, and signal warrant analysis | $685,000 | Medium |
| | LT-B | US 127 / Argyll Dr: Upgrade drainage and clear ditch line | $345,000 | Medium |
| | LT-C | KY 2324 Corridor: Turn lanes at KY 33 intersection and bicycle lanes along corridor | $104,000 | Medium |
| | LT-F | KY 34 Corridor: Widen and re-align access to US 150 (KY 52) | $3,000,000 | Medium |
| | LT-D | KY 34 Corridor: Median, limit turns, realign KY 2324 intersection, and improve sidewalks | $149,000 | Low |
| | LT-G | KY 37 Corridor: High friction pavement applications, re-align curves and add pavement | $2,210,000 | Low |
| | LT-I | Study additional feasible rail crossing locations in the City of Danville | Study Only: $250,000 | Low |

*Includes Design, Right-of-Way, Utilities, and Construction Costs as applicable for each project.

**Figure ES 2: Project Recommendation**




The City of Danville and / or Boyle County will be responsible for further project development for Local projects. Short-Term and Long-Term projects are candidates for inclusion in one or more programming and planning documents: unscheduled needs list, Transportation Improvement Programs, District Transportation Plan, and / or the KYTC's Six Year Highway Plan. More discussion among project participants and sponsors is needed, especially with regard to project funding and timing in order to advance one or more of these identified projects.

# 1.0 INTRODUCTION

## 1.1 Study Background and Purpose

This project is a Small Urban Area (SUA) study for the City of Danville, Kentucky and a portion of the surrounding unincorporated area of Boyle County. SUA studies are conducted for locations with populations between 5,000 and 50,000 people. The incorporated area of Danville is comprised of 16,218 persons as of the year 2010 according to the Kentucky State Data Center[1]. The Danville area is unique as it is considered the "City of Firsts" from a historical perspective and has many historic and natural attractions. Additionally, the City of Danville has hosted two Vice Presidential Debates, in 2000 and 2012. Therefore, understanding and evaluating the impacts and relationship of transportation, tourism, special events and economic development are critical elements of this study.

The purpose of a SUA study is to identify and examine transportation issues related to safety, congestion and operations in the study area and surrounding region. Both Short-Term and Long-Term improvement alternatives were considered and prioritized for future project development.

In November 2011, a meeting was held with the Kentucky Transportation Cabinet (KYTC) and representatives from Danville / Boyle County to discuss a list of projects they had determined would be beneficial for the community. The KYTC decided to prepare a county-level travel demand model to test these projects and determine what the impact would be on traffic volumes with and without these projects. Subsequently, the KYTC completed the model development and presented it to stakeholders at Danville City Hall in February 2013. The presentation slides are included in **Appendix A** for reference. During the model development process, it was noted by KYTC that a SUA study would be an appropriate follow-up to this project evaluation process with the model, and the model could be a resource to use for evaluating other projects. In May 2013, the KYTC contracted with the consulting firm of Parsons Brinckerhoff (PB) to perform the study through their Statewide Planning Services contract. The Project Development Team (PDT) consisted of: KYTC Central Office Division of Planning, KYTC District 7, the Bluegrass Area Development District (BGADD) and Parsons Brinckerhoff.

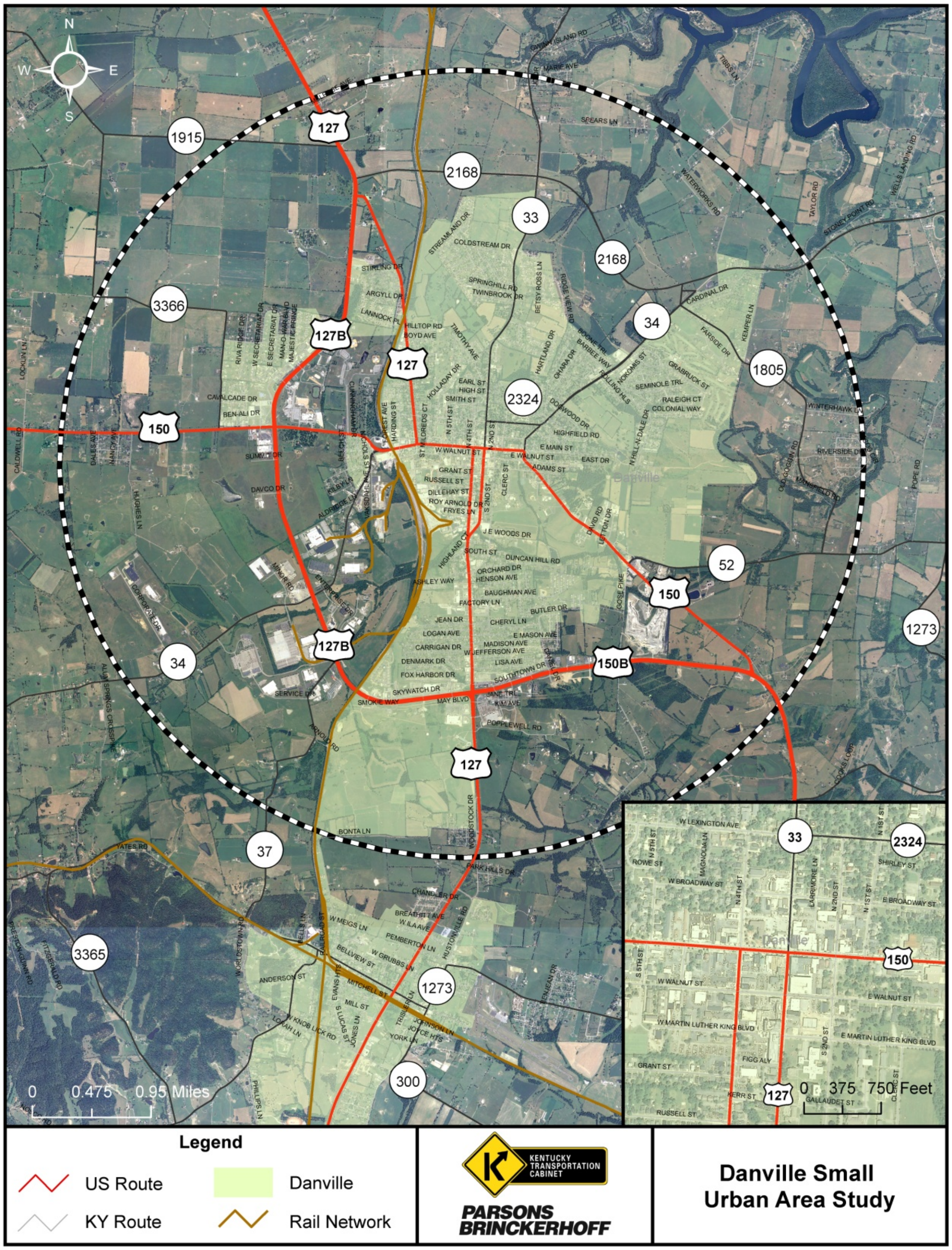
## 1.2 Study Area

The initial study area was agreed upon by the PDT in the first scoping meeting and is designated by an oval boundary which was intended to encompass the incorporated limits of the City of Danville, including some parts of unincorporated Boyle County. While the model was developed at the county level, the SUA study focuses on the urban area of Danville. **Figure 1** on the following page depicts the study area. The

[1] Kentucky State Data Center: http://ksdc.louisville.edu/

study area roadways included in the analysis are all state-maintained roadways (US and KY routes). Some considerations were given to local roadways at the project level; however, detailed analysis such as a determination of traffic operations and safety impacts was not conducted at this time.

**Figure 1**: **Study Area**



## 1.3 Study Process

In order to meet the project purpose of identifying and examining transportation issues related to safety, congestion and operations within the project area, the following tasks were completed:

- Existing Conditions Analysis
- Alternatives Development
- Alternatives Evaluation
- Alternatives Recommendation
- Alternatives Prioritization

An existing conditions analysis was performed to identify any transportation issues / deficiencies as well as to provide a baseline for comparison when evaluating alternatives.

Alternatives considered for this study included Short-Term improvements that could be quickly and effectively implemented at an individual intersection and spot level, and on a larger corridor-wide level. Long-Term improvement options were also studied to address overall future system needs. Associated planning-level cost estimates in current year (2014) dollars were provided for the list of recommended projects. The prioritized list given to the KYTC, City of Danville, and Boyle County will provide these implementing agencies with the information needed for further project development and implementation.

Agency and elected officials' input played a role throughout the project identification and prioritization processes. Two meetings were held with local officials and stakeholders (LO/S), one at the beginning of the project process and another near the end of the study. This group was asked to provide input on project issues and alternative development, evaluation, and prioritization. The input of the LO/S formed an essential link in the planning process, ensuring the needs of the community were taken into account.

The subsequent chapters of this report document these project tasks, thereby providing a complete record of the project process and outcomes.

# 2.0 EXISTING CONDITIONS

The existing conditions analysis was conducted to create a baseline of known and existing information within the study area. Evaluations were conducted for the following:

- Ongoing / Identified Transportation Projects
- Traffic and Safety Operations
- Multimodal Facilities
- Human Environment
- Natural Environment
- Geotechnical

More detail on each is provided in the following sections.

## 2.1 Review of Ongoing / Identified Transportation Projects

The Danville area already has a number of projects either ongoing or currently identified. These improvements were identified from the following:

- KYTC Six Year Highway Plan (2012 – 2018)
- KYTC Statewide Transportation Improvement Program (2013 – 2016)
- KYTC Unscheduled Needs List (UNL) / Project Identification Form (PIF)
- KYTC Danville / Boyle County Model Development

Projects from the Six Year Highway Plan include two bridge replacement projects that are in the Danville area but do not fall within the study area. These projects include:

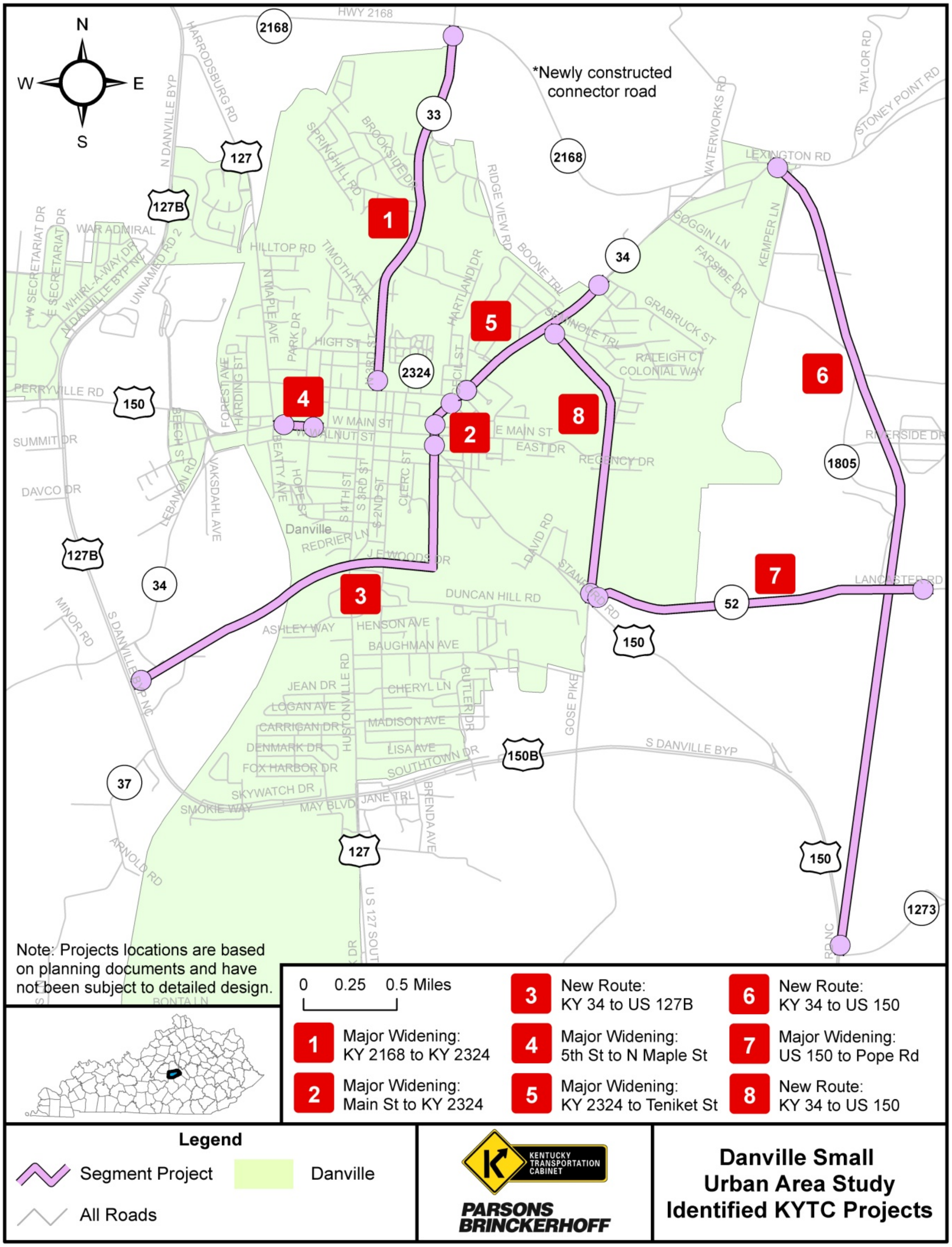
- US 68 Bridge replacement over the Chaplin River, Perryville, KY (Item No. 07-242.00)
- CR 1226 Bridge replacement over N Rolling Fork at the KY 37 Junction (Item No. 07-1133.00)

The only project shown in the Statewide Transportation Improvement Program is the US 68 Bridge replacement which is also in the Six Year Highway Plan.

From the UNL / PIF, there are currently eight identified improvements by the KYTC within the actual Danville study area. **Figure 2** shows the locations of these improvements as well as a brief description.

In addition to the above projects, a major project has recently been completed by the KYTC. Item No. 07-210 is a new four-lane connector roadway from KY 34 to KY 33 and includes a new roundabout at the KY 33 intersection. This project opened at the beginning of the study in September 2013. The connector is labeled on **Figure 2.**

## Figure 2: Identified Improvements from PIFs (KYTC)



Discussion with the Danville City Engineer indicated a desire by the City to locate a new roadway extension as depicted by Project #8. It was noted that some infrastructure currently exists to tie into KY 34. KYTC could then take over Gose Pike and provide some improvements to complete a new eastern bypass of Danville that is close to the City, providing much utility for both local and through traffic. In exchange for KYTC taking over control / maintenance of Gose Pike, the City had proposed to take over control of some of the current state-maintained routes in the downtown area. Further details of this project and the control swap are to be worked out outside this study during the project prioritization process conducted by the BGADD and KYTC District 7.

Five additional projects proposed by Danville / Boyle County representatives were first discussed with the KYTC in November 2011 and tested through the county-level travel demand model development. Those projects include the following:

1. New Route between KY 34 and US 150 – This is similar to Project #6 / Project #8 identified in the PIFs. The City of Danville as noted in the discussion above would like to see a project that provides an eastern bypass of Danville but remains close to the City to provide additional north / south connectivity.

2. New Route between US 150 and 2nd Street – This project would provide a new east / west link serving the area just south of downtown Danville. It was proposed in part to address ways to improve traffic flow on Main Street by removing some of the through trips.

3. New Route between Roy Arnold Boulevard and KY 34 – This project would provide an additional east-west route to the southwest of Danville. It would also provide an additional crossing of the Norfolk Southern Railroad and help to alleviate traffic congestion / flow on other links across the railroad tracks. This project is similar to Project #3 identified in the PIFs but does not extend out as far to the west.

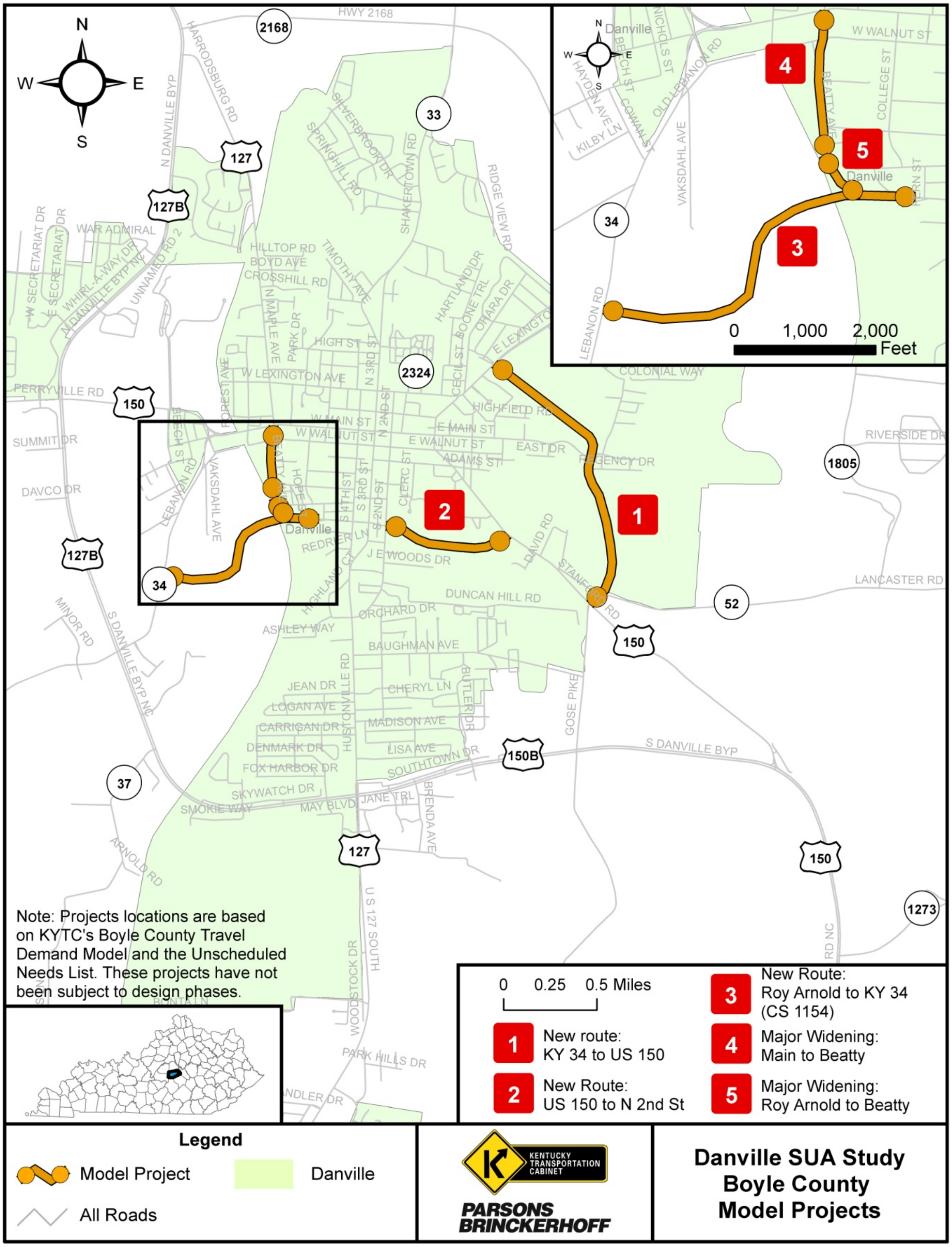
4. Major Widening from Main Street to Beatty Avenue – This project would provide additional capacity / travel lane width to allow for potentially improved traffic flow through the Centre College area.

5. Major Widening from Roy Arnold Boulevard to Beatty Avenue – This project would provide additional capacity / travel lane width to allow for potentially improved traffic flow through the Centre College area.

For reference, these projects are identified on **Figure 3** on the following page.

As these projects have already been identified, this list was considered separate from this study for evaluation purposes. To further improve safety, congestion, and operations within the Danville area, this study builds upon this initial list and will provide a comprehensive set of additional projects to add to the list of potential improvements to the Danville area.

## Figure 3: Danville / Boyle County Model Projects



## 2.2 Existing Transportation Network and Operations Overview

As mentioned at the outset of the study, analysis focused on state-maintained routes within the study area. The following includes the list of roadways evaluated.

Within the study area, major roadways include:

- US 127
- US 127B
- US 150
- US 150B
- KY 34
- KY 37
- KY 52
- KY 33

Other state maintained roads that were evaluated as part of this study included:

- KY 1805
- KY 1915
- KY 2168
- KY 2324
- KY 3366

### 2.2.1 Geometrics

Using KYTC's Highway Information System (HIS) online database, various highway characteristics were collected, including functional class, number of lanes, lane width, shoulder width, median type, median width and posted speed limit. The roadways were broken up into segments based on changes in highway characteristics and / or count stations, and the findings are summarized in **Table 1**.

## Table 1: Study Area Highway Characteristics Summary

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | Functional Class | Facility Type | Lane Width (feet) | Shoulder Width (feet) | Median Type | Median Width (feet) | % No Passing Zone | Posted Speed Limit (MPH) | Truck Percentage* | Most Recent ADT | Count Station | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 127 | 1 | 1.84<br>HUSTONVILLE ROAD | 3.26<br>WALTON AVENUE CROSSING | 1.42 | Rural - Principal Arterial | 4 Lanes | 12 | 11 | None | 0 | 100% | 55 | 2020 (11.4%) | 17,700 | D11 | 2011 |
| | 2 | 3.26<br>WALTON AVENUE CROSSING | 3.44<br>US 150B/US 127B | 0.19 | | | | | Flush | 25 | | 45 | *2970 (16.79%)* | 17,700 | | 2011 |
| | 3 | 3.44<br>US 150B/US 127B | 3.52<br>SOUTHTOWN DRIVE | 0.08 | Urban - Minor Arterial | | | 9 | Raised Non Mountable | 24 | N/A | 35 | *2020 (9.04%)* | 22,300 | A60 | 2012 |
| | 4 | 3.52<br>SOUTHTOWN DRIVE | 3.65<br>LISA AVENUE | 0.13 | | | 11 | | None | 0 | | | 4230 (19.1%) | 22,300 | | 2012 |
| | 5 | 3.65<br>LISA AVENUE | 4.62<br>HIGHLAND COURT | 0.97 | | | | 2 | | | | | 2740 (12.3%) | 22,300 | | 2012 |
| | 6 | 4.62<br>HIGHLAND COURT | 4.67<br>RANDOLPH HILL/US 127 | 0.05 | | 2 Lanes | | | | | | | *2020 (9.04%)* | 22,300 | | 2012 |
| | 7 NB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 0.73 | | | | | | | | | 450 (5.8%) | 7,770 | A87 | 2011 |
| | 7 SB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 0.73 | | | 12 | | | | | | *740 (9.04%)* | 8,230 | B12 | 2011 |
| | 8 | 5.40<br>KY 33/US 150 | 5.69<br>NORTH 5TH STREET | 0.29 | | 4 Lanes | 11 | 0 | | | | 25 | 820 (6.9%) | 11,900 | A17 | 2012 |
| | 9 | 5.69<br>NORTH 5TH STREET | 6.03<br>PERRYVILLE STREET | 0.34 | | 2 Lanes | 17 | | | | | | 940 (7.9%) | 11,900 | | 2012 |
| | 10 | 6.03<br>PERRYVILLE STREET | 6.21<br>WEST LEXINGTON AVENUE | 0.18 | | | 15 | | | | | 35 | *770 (9.04%)* | 8,520 | A16 | 2011 |
| | 11 | 6.21<br>WEST LEXINGTON AVENUE | 6.72<br>CROSSHILL ROAD | 0.51 | | | | | | | | | *550 (9.04%)* | 6,120 | A24 | 2010 |
| | 12 | 6.72<br>CROSSHILL ROAD | 7.25<br>ARGYLL DRIVE | 0.53 | | | 10 | 3 | | | | 45 | *440 (9.04%)* | 4,830 | B20 | 2011 |
| | 13 | 7.25<br>ARGYLL DRIVE | 8.08<br>US 127 BYPASS | 0.84 | Urban - Principal Arterial | | | | | | N/A | 55 | 50 (1.1%) | 4,830 | | 2011 |
| | 14 | 8.08<br>US 127 BYPASS | 8.21<br>KY 2168 | 0.13 | | 4 Lanes | 12 | 10 | Depressed | 24 | | | *1120 (8.08%)* | 13,800 | 037 | 2012 |
| | 15 | 8.21<br>KY 2168 | 10.26<br>KY 1896 | 2.05 | Rural - Principal Arterial | | | | | | 100% | | 1340 (9.7%) | 13,800 | | 2012 |
| US 127B | 1 | 0.00<br>US 127 | 0.17<br>DENMARK DRIVE | 0.17 | Urban - Principal Arterial | 4 Lanes | 12 | 10 | Depressed | 4 | N/A | 45 | *1740 (8.08%)* | 21,500 | P66 | 2010 |
| | 2 | 0.17<br>DENMARK DRIVE | 0.40<br>SKYWATCH DRIVE | 0.23 | | | | | | 28 | | | *1740 (8.08%)* | 21,500 | | 2010 |
| | 3 | 0.40<br>SKYWATCH DRIVE | 1.80<br>KY 34 | 1.40 | | | | | | | | 55 | 3500 (16.3%) | 21,500 | | 2010 |
| | 4 | 1.80<br>KY 34 | 3.20<br>US 150 | 1.39 | | | | | | | | | *1560 (8.1%)* | 19,300 | ATR | 2011 |
| | 5 | 3.20<br>US 150 | 5.27<br>US 127 | 2.07 | | | | | | 24 | | | 1310 (10.5%) | 12,500 | B38 | 2012 |

*Truck percentage in regular font from 2010 Classification Database. Other truck percentages in italics assumed from Table 6 of 2008 Traffic Forecasting Report.

## Table 1: Study Area Highway Characteristics Summary (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | Functional Class | Facility Type | Lane Width (feet) | Shoulder Width (feet) | Median Type | Median Width (feet) | % No Passing Zone | Posted Speed Limit (MPH) | Truck Percentage* | Most Recent ADT | Count Station | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 10.31<br>LOCKLIN LANE | 10.91<br>DALES AVENUE | 0.60 | Rural - Minor Arterial | | | | | | 28% | | *660 (9.94%)* | 6,630 | | 2012 |
| | 2 | 10.91<br>DALES AVENUE | 11.17<br>HUGHES LANE | 0.27 | | | 12 | 9 | | | 0% | 55 | *660 (9.94%)* | 6,630 | | 2012 |
| | 3 | 11.17<br>HUGHES LANE | 12.21<br>BEN ALI DRIVE | 1.04 | | | | | None | 0 | | | *540 (8.08%)* | 6,630 | 036 | 2012 |
| | 4 | 12.21<br>BEN ALI DRIVE | 12.33<br>US 127 BYPASS | 0.12 | | | | | | | | | *540 (8.08%)* | 6,630 | | 2012 |
| | 5 | 12.33<br>US 127 BYPASS | 12.89<br>BEECH STREET | 0.57 | | 2 Lanes | 11 | 9.5 | | | | 45 | 670 (6.2%) | 10,800 | | 2011 |
| | 6 | 12.89<br>BEECH STREET | 13.11<br>HARDING ST | 0.21 | | | | | | | | | 950 (8.8%) | 10,800 | A01 | 2011 |
| | 7 | 13.11<br>HARDING ST | 13.24<br>KY 34 | 0.14 | | | 12 | 3 | Raised Non Mountable | 17 | | | *870 (8.08%)* | 10,800 | | 2011 |
| | 8 | 13.24<br>KY 34 | 13.27<br>LEBANON ROAD | 0.03 | | | | 2 | | | | 35 | *1320 (8.08%)* | 16,300 | A15 | 2010 |
| | 9 | 13.27<br>LEBANON ROAD | 13.51<br>US 127 JUNCTION | 0.23 | Urban - Other Principal Arterial | | | | | | N/A | | *1320 (8.08%)* | 16,300 | | 2010 |
| US 150 | 10 | 13.51<br>US 27 / KY 33 DEPARTURE | 13.66<br>NORTH 1ST STREET | 0.15 | | 4 Lanes | 11 | 0 | | | | 25 | *770 (8.08%)* | 9,480 | A74 | 2012 |
| | 11 | 13.66<br>NORTH 1ST STREET | 13.84<br>KY 34/EAST MAIN STREET | 0.19 | | 2 Lanes | 12 | 2 | | | | | *770 (8.08%)* | 9,480 | | 2012 |
| | 12 | 13.84<br>KY 34/EAST MAIN STREET | 14.06<br>AVENUE OF CHAMPIONS N | 0.22 | | | | | None | 0 | | 35 | *550 (8.08%)* | 6,760 | A68 | 2011 |
| | 13 | 14.06<br>AVENUE OF CHAMPIONS N | 14.18<br>SOUTH ALTA AVENUE | 0.12 | | 2 Lanes | 18 | 0 | | | | | *670 (8.08%)* | 8,260 | | 2011 |
| | 14 | 14.18<br>SOUTH ALTA AVENUE | 14.37<br>AVENUE OF CHAMPIONS | 0.18 | | | | | | | | 45 | *670 (8.08%)* | 8,260 | A70 | 2011 |
| | 15 | 14.37<br>AVENUE OF CHAMPIONS | 15.10<br>GOSE PIKE/KY 52 | 0.74 | | 2 Lanes | 11 | 4 | | | | | *670 (8.08%)* | 8,260 | | 2011 |
| | 16 | 15.10<br>GOSE PIKE/KY 52 | 16.35<br>OLD STANFORD RD | 1.25 | Rural - Minor Arterial | | | | | | | | *330 (9.94%)* | 3,310 | | 2010 |
| | 17 | 16.35<br>OLD STANFORD RD | 16.37<br>STANFORD RD | 0.02 | | 2 Lanes | 21 | 10 | Raised Non Mountable | 4 | 0% | | *330 (9.94%)* | 3,310 | 250 | 2010 |
| | 18 | 16.37<br>STANFORD RD | 16.44<br>US 150B | 0.07 | Rural - Principal Arterial | | | | | | | 55 | *560 (16.79%)* | 3,310 | | 2010 |
| | 19 | 16.44<br>US 150B | 17.57<br>KY 1273 | 1.13 | | 4 Lanes | 12 | 8 | Raised Non Mountable | 36 | N/A | | *1980 (16.79%)* | 11,800 | 278 | 2011 |
| | 1 | 0.00<br>US 127 | 0.49<br>SOUTHTOWN DRIVE | 0.49 | | | | | Depressed | 26 | | 45 | 1540 (10.8%) | 14,300 | B06 | 2011 |
| US 150B | 2 | 0.49<br>SOUTHTOWN DRIVE | 1.20<br>GOSE PIKE | 0.71 | Urban - Principal Arterial | 4 Lanes | 12 | 10 | | | N/A | 55 | 2100 (14.7%) | 14,300 | | 2011 |
| | 3 | 1.20<br>GOSE PIKE | 2.27<br>US 150 | 1.08 | | | | | Raised Non Mountable | 36 | | | *680 (8.08%)* | 8,410 | 276 | 2012 |

*Truck percentage in regular font from 2010 Classification Database. Other truck percentages in italics assumed from Table 6 of 2008 Traffic Forecasting Report.

## Table 1: Study Area Highway Characteristics Summary (Cont.)

| Route # | Section | Begin Milepoint | End Milepoint | Section Length (miles) | Functional Class | Facility Type | Lane Width (feet) | Shoulder Width (feet) | Median Type | Median Width (feet) | % No Passing Zone | Posted Speed Limit (MPH) | Truck Percentage* | Most Recent ADT | Count Station | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | 1 | 0.00<br>US 150/US 127 | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 0.45 | Urban - Minor Arterial | 2 Lanes | 12 | 0 | None | 0 | N/A | 25 | *520 (9.04%)* | 5,800 | A46 | 2011 |
| | 2 | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 0.72<br>COFFEE TREE DR | 0.27 | | | 11 | 3 | | | N/A | 35 | *620 (9.04%)* | 6,900 | A34 | 2012 |
| | 3 | 0.72<br>COFFEE TREE DR | 1.27<br>SPRINGHILL ROAD | 0.55 | | | 10 | | | | | | *570 (9.04%)* | 6,310 | A27 | 2010 |
| | 4 | 1.27<br>SPRINGHILL ROAD | 1.65<br>RIDGE VIEW ROAD | 0.38 | | | | 2.5 | | | | 45 | *460 (9.04%)* | 5,110 | B22 | 2011 |
| | 5 | 1.65<br>RIDGE VIEW ROAD | 2.29<br>KY 2168 | 0.64 | | | | 5 | | | | 55 | *460 (9.04%)* | 5,110 | | 2011 |
| | 6 | 2.29<br>KY 2168 | 3.17<br>BUSTER PIKE | 0.88 | Rural - Major Collector | | | 3 | | | 33% | | *490 (9.68%)* | 5,110 | | 2011 |
| 34 | 1 | 10.39<br>ALUM SPRINGS CROSS PIKE | 11.01<br>CORPORATE DRIVE | 0.61 | Rural - Major Collector | 2 Lanes | 10 | 8 | None | 0 | 0% | 55 | *550 (9.67%)* | 5,690 | B36 | 2012 |
| | 2 | 11.01<br>CORPORATE DRIVE | 12.26<br>US 127 Bypass | 1.26 | Urban - Collector | | 12 | | | | N/A | | *420 (7.35%)* | 5,690 | | 2012 |
| | 3 | 12.26<br>US 127 Bypass | 13.19<br>COWAN STREET | 0.93 | | | | | | | | 45 | 710 (12.6%) | 5,650 | B21 | 2011 |
| | 4 | 13.19<br>COWAN STREET | 13.63<br>US 150 Junction | 0.44 | | | 10 | 3 | | | | 35 | *420 (7.35%)* | 5,650 | | 2011 |
| | 5 | 13.63<br>US 150 Departure | 14.15<br>PARKVIEW DRIVE | 0.52 | Urban - Minor Arterial | | 11 | 0 | | | N/A | | *1370 (9.04%)* | 15,200 | A81 | 2012 |
| | 6 | 14.15<br>PARKVIEW DRIVE | 14.83<br>GRABRUCK STREET | 0.69 | | | 11 | 2 | Raised Mountable | 24 | | 45 | *1390 (9.04%)* | 15,400 | A83 | 2010 |
| | 7 | 14.83<br>GRABRUCK STREET | 15.37<br>KY 1805 | 0.54 | | | 12 | | None | 0 | | 55 | *1130 (9.04%)* | 12,500 | B23 | 2010 |
| | 8 | 15.37<br>KY 1805 | 15.96<br>LEXINGTON COURT | 0.59 | | | | | | | | | *770 (9.04%)* | 8,570 | 053 | 2012 |
| | 9 | 15.96<br>LEXINGTON COURT | 16.59<br>STONEY POINT ROAD | 0.63 | Rural - Minor Arterial | | | | | | 30% | | *850 (9.94%)* | 8,570 | | 2012 |
| 37 | 1 | 16.30<br>KY 300 | 18.05<br>ARNOLD ROAD | 1.74 | Rural - Minor Collector | 2 Lanes | 8 | 2 | None | 0 | 0% | 35 | *90 (9.94%)* | 860 | 260 | 2012 |
| | 2 | 18.05<br>ARNOLD ROAD | 18.35<br>SERVICE DRIVE | 0.30 | Urban - Collector Street | | | | | | N/A | | *60 (7.35%)* | 860 | | 2012 |
| | 3 | 18.35<br>SERVICE DRIVE | 18.73<br>US 127 Bypass | 0.38 | | | 10 | | | | | | *60 (7.35%)* | 860 | | 2012 |
| 52 | 1 | 0.00<br>US 150 | 1.59<br>KY 1805 | 1.59 | Rural - Minor Arterial | 2 Lanes | 11 | 3 | None | 0 | 35% | 55 | 520 (10.1%) | 5,110 | 06 | 2009 |
| | 2 | 1.59<br>KY 1805 | 2.34<br>POPE ROAD | 0.75 | | | | | | | 0% | | *350 (9.94%)* | 3,530 | 07 | 2011 |

*Truck percentage in regular font from 2010 Classification Database. Other truck percentages in italics assumed from Table 6 of 2008 Traffic Forecasting Report.

## Table 1: Study Area Highway Characteristics Summary (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | Functional Class | Facility Type | Lane Width (feet) | Shoulder Width (feet) | Median Type | Median Width (feet) | % No Passing Zone | Posted Speed Limit (MPH) | Truck Percentage * | Most Recent ADT | Count Station | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KY 1805 | 1 | 0.00<br>KY 52 | 0.96<br>RIVERSIDE DRIVE | 0.96 | Rural - Minor Collector | 2 Lanes | 9 | 3 | None | 0 | 0% | 55 | *90 (9.68%)* | 960 | 012 | 2010 |
| | 2 | 0.96<br>RIVERSIDE DRIVE | 1.35<br>WINTERHAWK LANE | 0.39 | | | | | | | 64% | | *90 (9.68%)* | 960 | | 2010 |
| | 3 | 1.35<br>WINTERHAWK LANE | 2.02<br>KEMPER LANE | 0.68 | Urban - Collector Street | | | | | | N/A | | *90 (7.35%)* | 1,160 | 019 | 2011 |
| | 4 | 2.02<br>KEMPER LANE | 2.71<br>KY 34 | 0.69 | | | | | | | | 35 | 70 (6.4%) | 1,160 | | 2011 |
| KY 1915 | 1 | 0.00<br>US 127 | 1.88<br>KY 3366 | 1.88 | Rural - Local | 2 Lanes | 7 | 2 | None | 0 | 100% | 55 | *20 (10.19%)* | 170 | 022 | 2011 |
| KY 2168 | 1 | 0.00<br>US 127 | 1.46<br>KY 33 | 1.46 | Urban - Collector Street | 2 Lanes | 12 | 10 | None | 0 | N/A | 55 | 120 (4.5%) | 2,760 | B51 | 2012 |
| KY 2324 | 1 | 0.00<br>KY 33 | 0.42<br>KY 34 | 0.42 | Urban - Minor Arterial | 2 Lanes | 15 | 0 | None | 0 | N/A | 35 | *1080 (9.04%)* | 11,900 | A79 | 2012 |
| KY 3366 | 1 | 0.00<br>US 150 | 0.72<br>VENETIAN WAY | 0.72 | Rural - Local | 2 Lanes | 9 | 3 | None | 0 | 0% | 45 | *30 (10.19%)* | 290 | 020 | 2011 |
| | 2 | 0.72<br>VENETIAN WAY | 2.06<br>LOCKLIN LANE | 1.33 | | | | | | | 29% | 55 | *30 (10.19%)* | 290 | | 2011 |

*Truck percentage in regular font from 2010 Classification Database. Other truck percentages in italics assumed from Table 6 of 2008 Traffic Forecasting Report.

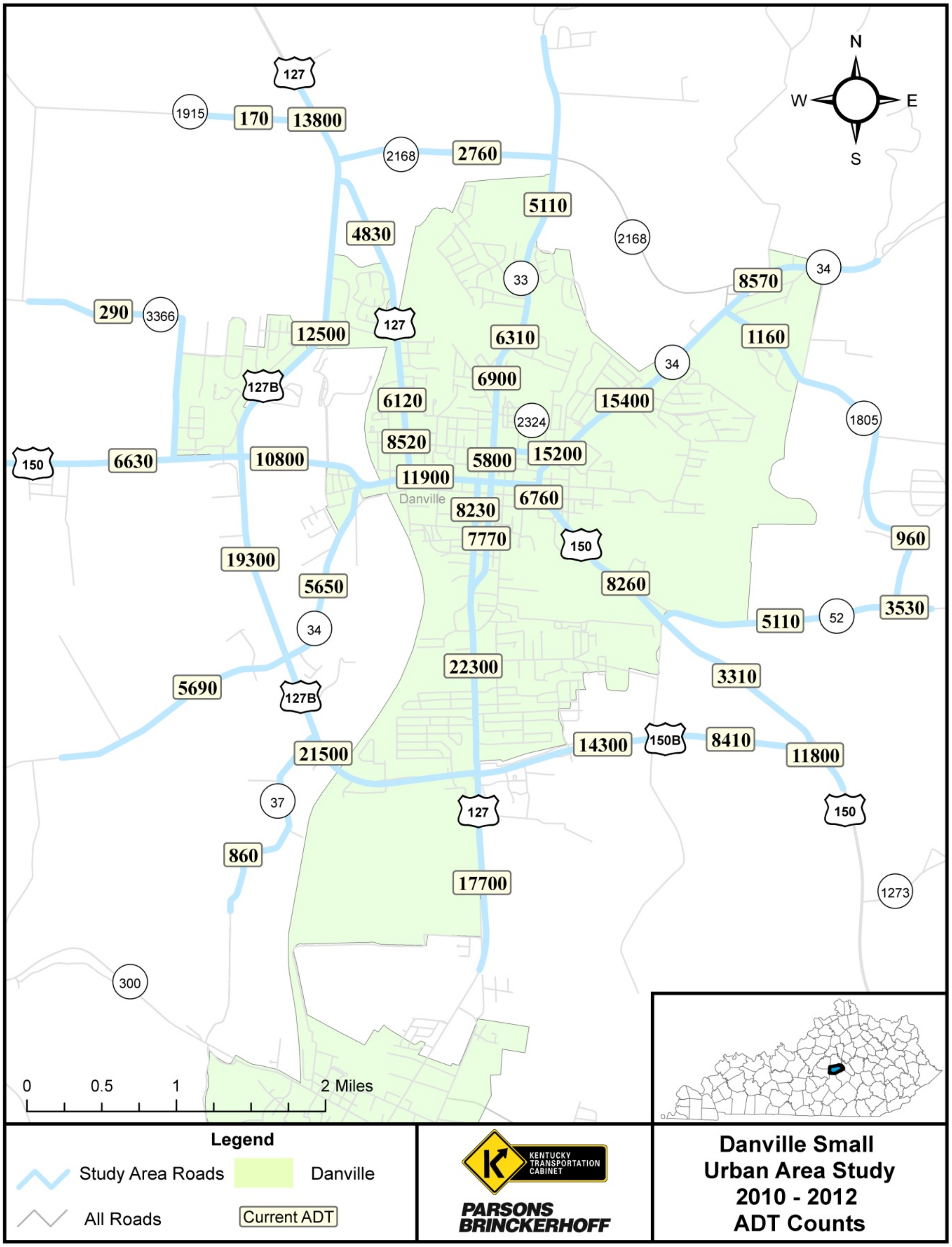
### 2.2.2 Average Daily Traffic Volumes

The average daily traffic (ADT) volumes used for this project included traffic counts from the KYTC CTS database[2] along with updated hourly count data from KYTC Central Office. These counts were conducted during the years of 2009 – 2012. **Table 1** shows the most recent ADT along with the corresponding count station while **Figure 4** shows the most recent ADT on a map. It should be noted that no volumes are shown for KY 2168 between KY 34 and KY 33, as this is a new connector that opened at the beginning of this study and traffic counts had not yet been conducted.

Truck percentages were determined from the KYTC vehicle classification database where data was available. If truck percentages were not available for a specific roadway section, then a truck percentage was assumed based on the 2008 Traffic Forecasting Report developed by the Kentucky Transportation Center[3]. Truck percentages are shown in **Table 1**. Those shown in italics correspond with values assumed based on the Traffic Forecasting Report.

[2] KYTC CTS Database – http://www.planning.kytc.ky.gov/data/cts/cts.asp
[3] Traffic Forecasting Report – 2008, Kentucky Transportation Center Research Report KTC-07-06/PL14-07-01F

## Figure 4: Current Average Daily Traffic Volumes



### 2.2.3 Level of Service and Capacity Analysis

#### 2.2.3.1 Methodology

**Figure 5: Levels of Service**


Presentation Based On HIGHWAY CAPACITY MANUAL,
Special Report 209, Transportation Research Board, 1985

Using the gathered existing geometric and existing highway information, the Highway Capacity Software 2010 (HCS 2010) was used to determine level of service (LOS) and volume to capacity ratios (v/c ratios) where applicable. LOS is used to provide a rating scale for congestion and operations of a roadway.

LOS A represents a free flowing facility with little time spent following another vehicle and plenty of opportunities for passing on a two-lane facility. With each subsequent level of service, percent time spent following increases and opportunities to pass and travel speeds decrease. Conditions deteriorate until reaching LOS F, which represents a congested roadway that is over capacity with no opportunities to pass and low travel speeds. Refer to **Figure 5** for a graphical representation of what each LOS looks like from a capacity perspective at an intersection which generally represents the range of congestion for a two-lane and multi-lane facility as well.

LOS D is the threshold for desirable traffic operations in this study, based on guidance from the AASHTO Policy on Geometric Design of Highways and Streets[4]. While there are various roadway types in the study area, including urban and suburban freeways and arterials, as well as rural freeways (which have a desired LOS of B or C), the majority of roadways fall under the categories of urban and suburban collector and local roads, as well as rural rolling local roads, which have a desired LOS of D. It was

[4] ***Policy on Geometric Design of Highways and Streets*, AASHTO.**

determined that all roadways should be evaluated using the same criteria and that operations below this threshold should be noted as undesirable and require improvement.

Two-Lane Highway Analysis

For the two-lane highways (refer to **Table 1** for a list of two-lane highways): a corridor LOS analysis was prepared using the HCS 2010 two-lane road analysis module. This is based on the *Highway Capacity Manual 2010* (HCM)[5]. For this method, there are three classes of roadways: Class I highways which include higher speed arterials and daily commuter routes, Class II highways which include lower speed collector roadways and roads primarily designed to provide access, and Class III highways which serve moderately developed areas. Class III highways may be portions of Class I or II highways that pass through small towns or developed recreational areas (an example can be seen below with US 150 and US 127). Driver expectations regarding speed and flow are important in determining a highway's class, and thus its desired LOS.

All major study area state-maintained two-lane routes were classified as a Class I facility which includes:

- US 127
- US 150
- KY 52

Facilities identified as Class II roadways included:

- KY 1805
- KY 1915
- KY 2168
- KY 3366
- KY 37

Facilities identified as Class III roadways included sections of:

- US 127
- US 150
- KY 33
- KY 34
- KY 2324

[5] ***Highway Capacity Manual 2010***, Transportation Research Board.

Levels of service for Class I roadways are based on the estimated average travel speeds and percent time spent following other vehicles, as shown in **Table 2**. Levels of service for Class II highways are defined only in terms of a vehicle's percent time spent following. Average travel speed is not considered since drivers typically will tolerate lower speeds on a Class II facility because of its function as an access roadway (serving shorter trips and fewer through trips). For a Class III facility, the performance measure changes to percent of free flow speed as passing restrictions are not a major concern; rather the ability to make steady progress at or near the speed limit dictates traffic operations. Refer to the HCM for more details.

**Table 2: LOS Criteria for Two-Lane Highways**

| LOS | Class I Highways<br>Percent Time Spent Following (%) | Class I Highways<br>Average Travel Speed (mi/h) | Class II Highways<br>Percent Time Spent Following (%) | Class III Highways<br>Percent of Free Flow Speed (%) |
|---|---|---|---|---|
| A | ≤ 35 | >55 | ≤ 40 | >91.7 |
| B | >35 – 50 | >50 – 55 | >40 – 55 | >83.3 – 91.7 |
| C | >50 – 65 | >45 – 50 | >55 – 70 | >75.0 – 83.3 |
| D | >65 – 80 | >40 – 45 | >70 – 85 | >66.7 – 75.0 |
| E | >80 | ≤40 | >85 | ≤66.7 |
| F | LOS F applies whenever the flow rate exceeds the capacity | | | |

Source: Highway Capacity Manual (2010)

For Class I roadways, the LOS D threshold corresponds to an average travel speed of > 40 miles per hour with ≤ 80 percent time spent following another vehicle. For a Class II highway, the LOS D threshold corresponds to ≤ 85 percent time spent following another vehicle. For Class III roadways, LOS D corresponds to a percent of free flow speed > 66.7.

Multilane Highway Analysis

To analyze traffic operations for the four-lane or greater highway sections (US 127, US 127B, US 150 and US 150B), the HCS 2010 multilane analysis package was used. This is also based on the HCM methodology.

Levels of service for multilane highway sections are based on density in terms of passenger cars per mile per lane (pc/mi/ln) as shown in **Table 3**. Density is used to define level of service because it is an indicator of freedom to maneuver within the traffic stream and the proximity to other vehicles. Speed in terms of mean passenger-car speed and volume-to-capacity (v/c) ratios are interrelated with density and can be used to characterize a multilane highway segment. Similar to the two-

**Table 3: LOS Criteria for Multilane Highways**

| LOS | Density Range (pc/mi/ln) |
|---|---|
| A | 0 – 11 |
| B | > 11 – 18 |
| C | > 18 – 26 |
| D | > 26 – 35 |
| E (55 mph) | > 35 – 41 |
| E (45 mph) | > 35 – 45 |
| F (55 mph) | > 41 |
| F (45 mph) | > 45 |

Source: Highway Capacity Manual (2010)

lane highway analysis, LOS D is the threshold for desirable traffic operations used in this study. For multilane highways, a LOS D corresponds to a density between 26 and 35 passenger cars per mile per lane. Refer to the HCM for more specific information.

#### 2.2.3.2 Current Levels of Service and V/C Ratios

The most recent 24-hour KYTC traffic counts shown in **Table 1** were used to evaluate corridor operating conditions. Peak hour traffic volumes for highway segments were estimated based on the average daily traffic volumes for those segments using K-factors (factor based on the $30^{th}$ highest hour of the year) derived from the KYTC counts. The current lane widths, shoulder widths, percent passing and other design factors were also used. The segment levels of service are listed in **Table 4** and are shown in **Figure 6.** Where free flow speed (speed limit) is less than 45 mph, HCS 2010 (multi lane and two-lane) analysis is unable to compute a level of service. Because of this, **Table 4** displays grayed boxes with a dash and **Figure 6** displays gray segments in the lower speed limit (less than 45 mph) sections through town.

Volume to capacity (v/c) ratios were also determined for study area roadways. These are listed in **Table 4**. The target v/c ratio for an urban area is 1.0 and for a rural area 0.9. If the ratio is greater than these target values and congestion is evident, additional lanes / capacity may be considered. A review of the values for all study area roadways shows all v/c ratios are below the target ratios.

## Table 4: Current Levels of Service

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | ADT | V/C Ratio | LOS |
|---|---|---|---|---|---|---|---|
| US 127 | 1 | 1.84<br>HUSTONVILLE ROAD | 3.26<br>WALTON AVENUE CROSSING/CASSADY AVENUE | 1.42 | 17,700 | 0.37 | B |
| US 127 | 2 | 3.26<br>WALTON AVENUE CROSSING/CASSADY AVENUE | 3.44<br>US 150B/US 127B | 0.19 | 17,700 | 0.37 | B |
| US 127 | 3 | 3.44<br>US 150B/US 127B | 3.52<br>SOUTHTOWN DRIVE | 0.08 | 22,300 | - | - |
| US 127 | 4 | 3.52<br>SOUTHTOWN DRIVE | 3.65<br>LISA AVENUE | 0.13 | 22,300 | - | - |
| US 127 | 5 | 3.65<br>LISA AVENUE | 4.62<br>HIGHLAND COURT | 0.97 | 22,300 | - | - |
| US 127 | 6 | 4.62<br>HIGHLAND COURT | 4.67<br>RANDOLPH HILL/US 127 | 0.05 | 22,300 | - | - |
| US 127 | 7 NB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 0.73 | 7,770 | - | - |
| US 127 | 7 SB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 0.73 | 8,230 | - | - |
| US 127 | 8 | 5.40<br>KY 33/US 150 | 5.69<br>NORTH 5TH STREET | 0.29 | 11,900 | - | - |
| US 127 | 9 | 5.69<br>NORTH 5TH STREET | 6.03<br>PERRYVILLE STREET | 0.34 | 11,900 | - | - |
| US 127 | 10 | 6.03<br>PERRYVILLE STREET | 6.21<br>WEST LEXINGTON AVENUE | 0.18 | 8,520 | - | - |
| US 127 | 11 | 6.21<br>WEST LEXINGTON AVENUE | 6.72<br>CROSSHILL ROAD | 0.51 | 6,120 | - | - |
| US 127 | 12 | 6.72<br>CROSSHILL ROAD | 7.25<br>ARGYLL DRIVE | 0.53 | 4,830 | 0.25 | D |
| US 127 | 13 | 7.25<br>ARGYLL DRIVE | 8.08<br>US 127 BYPASS | 0.84 | 4,830 | 0.23 | C |
| US 127 | 14 | 8.08<br>US 127 BYPASS | 8.21<br>KY 2168 | 0.13 | 13,800 | 0.28 | A |
| US 127 | 15 | 8.21<br>KY 2168 | 10.26<br>KY 1896 | 2.05 | 13,800 | 0.28 | A |
| US 127B | 1 | 0.00<br>US 127 | 0.17<br>DENMARK DRIVE/MAY BOULEVARD | 0.17 | 21,500 | 0.43 | C |
| US 127B | 2 | 0.17<br>DENMARK DRIVE/MAY BOULEVARD | 0.40<br>SKYWATCH DRIVE | 0.23 | 21,500 | 0.43 | C |
| US 127B | 3 | 0.40<br>SKYWATCH DRIVE | 1.80<br>KY 34 | 1.40 | 21,500 | 0.47 | B |
| US 127B | 4 | 1.80<br>KY 34 | 3.20<br>US 150 | 1.39 | 19,300 | 0.38 | B |
| US 127B | 5 | 3.20<br>US 150 | 5.27<br>US 127 | 2.07 | 12,500 | 0.26 | A |

**LOS A. B or C**
**LOS D**
**LOS E or F**
**Cannot Calculate**

**Notes:**
**ADT = 2010 – 2012 Average Daily Traffic (Count) from CTS or Spot Counts from KYTC**
**Level of Service (LOS) calculated using Highway Capacity Software 2010 (HCS 2010)**
**LOS "-" denotes location HCS 2010 cannot compute due to roadway characteristics (Speed Limit or Lane Width)**

# Table 4: Current Levels of Service (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | ADT | V/C Ratio | LOS |
|---|---|---|---|---|---|---|---|
| US 150 | 1 | 10.31<br>CALDWELL ROAD/LOCKLIN LANE | 10.91<br>DALES AVENUE | 0.60 | 6,630 | 0.31 | D |
| | 2 | 10.91<br>DALES AVENUE | 11.17<br>HUGHES LANE | 0.27 | 6,630 | 0.31 | D |
| | 3 | 11.17<br>HUGHES LANE | 12.21<br>THOROUGHBRED DRIVE/BEN ALI DRIVE | 1.04 | 6,630 | 0.31 | D |
| | 4 | 12.21<br>THOROUGHBRED DRIVE/BEN ALI DRIVE | 12.33<br>US 127 BYPASS | 0.12 | 6,630 | 0.31 | E |
| | 5 | 12.33<br>US 127 BYPASS | 12.89<br>BEECH STREET | 0.57 | 10,800 | 0.46 | D |
| | 6 | 12.89<br>BEECH STREET | 13.11<br>HARDING ST/QUISENBERRY AVENUE | 0.21 | 10,800 | 0.46 | D |
| | 7 | 13.11<br>HARDING ST/QUISENBERRY AVENUE | 13.24<br>KY 34 | 0.14 | 10,800 | - | - |
| | 8 | 13.24<br>KY 34 | 13.27<br>LEBANON ROAD | 0.03 | 16,300 | - | - |
| | 9 | 13.27<br>LEBANON ROAD | 13.51<br>US 127 JUNCTION | 0.23 | 16,300 | - | - |
| | 10 | 13.51<br>US 27 / KY 33 DEPARTURE | 13.66<br>NORTH 1ST STREET | 0.15 | 9,480 | - | - |
| | 11 | 13.66<br>NORTH 1ST STREET | 13.84<br>KY 34/EAST MAIN STREET | 0.19 | 9,480 | - | - |
| | 12 | 13.84<br>KY 34/EAST MAIN STREET | 14.06<br>AVENUE OF CHAMPIONS N | 0.22 | 6,760 | - | - |
| | 13 | 14.06<br>AVENUE OF CHAMPIONS N | 14.18<br>SOUTH ALTA AVENUE | 0.12 | 8,260 | - | - |
| | 14 | 14.18<br>SOUTH ALTA AVENUE | 14.37<br>AVENUE OF CHAMPIONS | 0.18 | 8,260 | 0.37 | D |
| | 15 | 14.37<br>AVENUE OF CHAMPIONS | 15.10<br>GOSE PIKE/KY 52 | 0.74 | 8,260 | 0.37 | D |
| | 16 | 15.10<br>GOSE PIKE/KY 52 | 16.35<br>OLD STANFORD RD | 1.25 | 3,310 | 0.19 | D |
| | 17 | 16.35<br>OLD STANFORD RD | 16.37<br>STANFORD RD | 0.02 | 3,310 | 0.19 | D |
| | 18 | 16.37<br>STANFORD RD | 16.44<br>US 150B | 0.07 | 3,310 | 0.21 | D |
| | 19 | 16.44<br>US 150B | 17.57<br>KY 1273 | 1.13 | 11,800 | 0.19 | A |

LOS A. B or C
LOS D
LOS E or F
Cannot Calculate

**Notes:**
**ADT = 2010 – 2012 Average Daily Traffic (Count) from CTS or Spot Counts from KYTC**
**Level of Service (LOS) calculated using Highway Capacity Software 2010 (HCS 2010)**
**LOS "-" denotes location HCS 2010 cannot compute due to roadway characteristics (Speed Limit or Lane Width)**

## Table 4: Current Levels of Service (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | ADT | V/C Ratio | LOS |
|---|---|---|---|---|---|---|---|
| US 150B | 1 | 0.00<br>US 127 | 0.49<br>SOUTHTOWN DRIVE | 0.49 | 14,300 | 0.30 | B |
| | 2 | 0.49<br>SOUTHTOWN DRIVE | 1.20<br>GOSE PIKE | 0.71 | 14,300 | 0.31 | A |
| | 3 | 1.20<br>GOSE PIKE | 2.27<br>US 150 | 1.08 | 8,410 | 0.17 | A |
| KY 33 | 1 | 0.00<br>US 150/US 127 | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 0.45 | 5,800 | - | - |
| | 2 | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 0.72<br>ST JAMES DRIVE | 0.27 | 6,900 | - | - |
| | 3 | 0.72<br>ST JAMES DRIVE | 1.27<br>SPRINGHILL ROAD | 0.55 | 6,310 | - | - |
| | 4 | 1.27<br>SPRINGHILL ROAD | 1.65<br>RIDGE VIEW ROAD | 0.38 | 5,110 | 0.26 | D |
| | 5 | 1.65<br>RIDGE VIEW ROAD | 2.29<br>KY 2168 | 0.64 | 5,110 | 0.26 | C |
| | 6 | 2.29<br>KY 2168 | 3.17<br>S BUSTER Y PIKE | 0.88 | 5,110 | 0.26 | C |
| KY 34 | 1 | 10.39<br>ALUM SPRINGS CROSS PIKE | 11.01<br>CORPORATE DRIVE | 0.61 | 5,690 | 0.28 | C |
| | 2 | 11.01<br>CORPORATE DRIVE | 12.26<br>US 127 BYPASS | 1.26 | 5,690 | 0.28 | C |
| | 3 | 12.26<br>US 127 BYPASS | 13.19<br>COWAN STREET | 0.93 | 5,650 | 0.28 | D |
| | 4 | 13.19<br>COWAN STREET | 13.63<br>US 150 JUNCTION | 0.44 | 5,650 | - | - |
| | 5 | 13.63<br>US 150 DEPARTURE | 14.15<br>PARKVIEW DRIVE | 0.52 | 15,200 | - | - |
| | 6 | 14.15<br>PARKVIEW DRIVE | 14.83<br>GRABRUCK STREET | 0.69 | 15,400 | 0.64 | E |
| | 7 | 14.83<br>GRABRUCK STREET | 15.37<br>KY 1805 | 0.54 | 12,500 | 0.52 | D |
| | 8 | 15.37<br>KY 1805 | 15.96<br>LEXINGTON COURT | 0.59 | 8,570 | 0.38 | C |
| | 9 | 15.96<br>LEXINGTON COURT | 16.59<br>STONEY POINT ROAD | 0.63 | 8,570 | 0.38 | C |

**LOS A. B or C** **LOS E or F**
**LOS D** **Cannot Calculate**

**Notes:**
**ADT = 2010 – 2012 Average Daily Traffic (Count) from CTS or Spot Counts from KYTC**
**Level of Service (LOS) calculated using Highway Capacity Software 2010 (HCS 2010)**
**LOS "-" denotes location HCS 2010 cannot compute due to roadway characteristics (Speed Limit or Lane Width)**

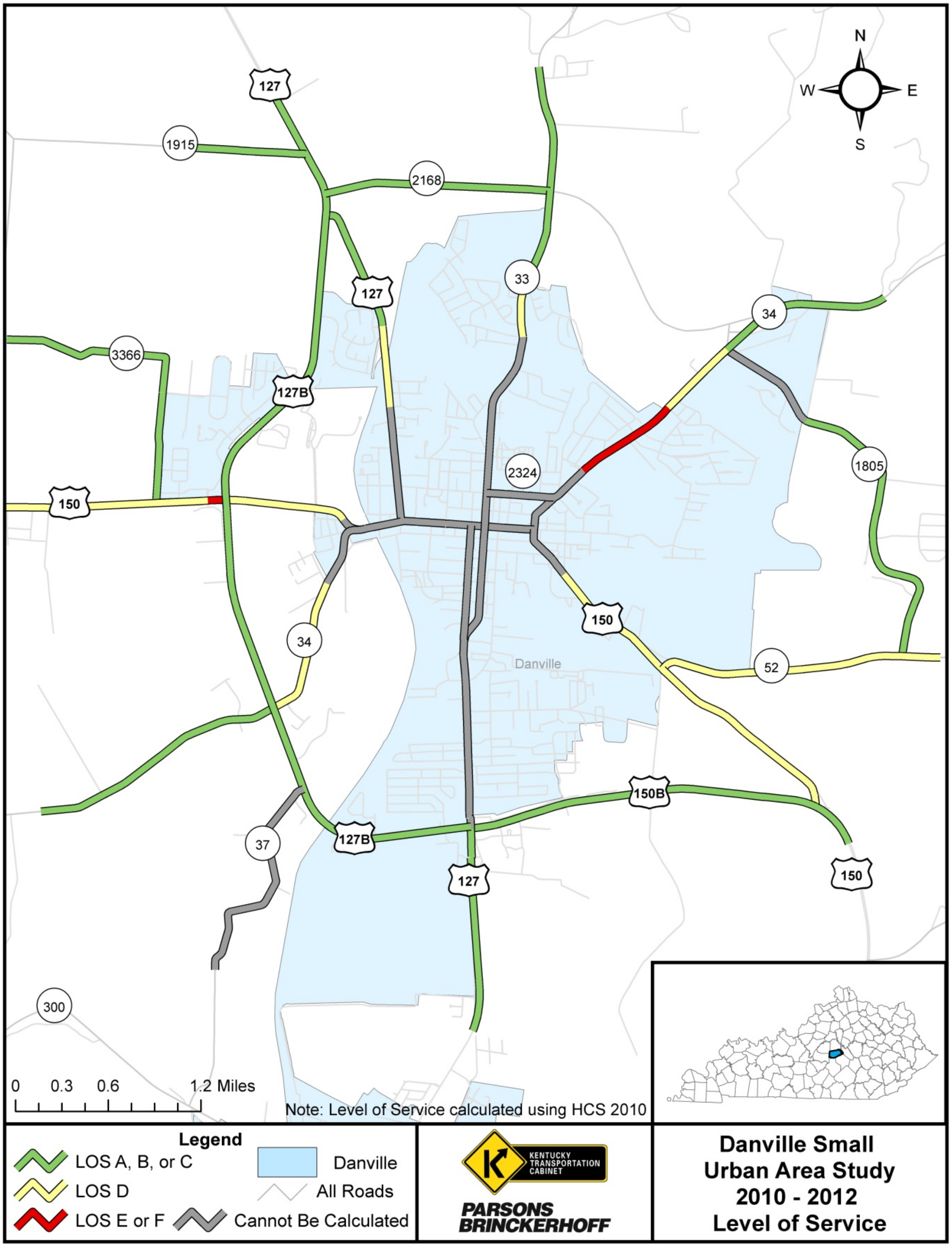
## Table 4: Current Levels of Service (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Section Length (miles) | ADT | V/C Ratio | LOS |
|---|---|---|---|---|---|---|---|
| KY 37 | 1 | 16.30<br>KY 300 | 18.05<br>ARNOLD ROAD | 1.74 | 860 | - | - |
| KY 37 | 2 | 18.05<br>ARNOLD ROAD | 18.35<br>SERVICE DRIVE | 0.30 | 860 | - | - |
| KY 37 | 3 | 18.35<br>SERVICE DRIVE | 18.73<br>US 127 BYPASS | 0.38 | 860 | - | - |
| KY 52 | 1 | 0.00<br>US 150 | 1.59<br>KY 1805 | 1.59 | 5,110 | 0.26 | D |
| KY 52 | 2 | 1.59<br>KY 1805 | 2.34<br>POPE ROAD | 0.75 | 3,530 | 0.20 | D |
| KY 1805 | 1 | 0.00<br>KY 52 | 0.96<br>RIVERSIDE DRIVE/OLD GOGGIN ROAD | 0.96 | 960 | 0.06 | B |
| KY 1805 | 2 | 0.96<br>RIVERSIDE DRIVE/OLD GOGGIN ROAD | 1.35<br>WINTERHAWK LANE | 0.39 | 960 | 0.06 | B |
| KY 1805 | 3 | 1.35<br>WINTERHAWK LANE | 2.02<br>KEMPER LANE | 0.68 | 1,160 | 0.07 | B |
| KY 1805 | 4 | 2.02<br>KEMPER LANE | 2.71<br>KY 34 | 0.69 | 1,160 | - | - |
| KY 1915 | 1 | 0.00<br>US 127 | 1.88<br>KY 3366 | 1.88 | 170 | 0.01 | A |
| KY 2168 | 1 | 0.00<br>US 127 | 1.46<br>KY 33 | 1.46 | 2,760 | 0.15 | C |
| KY 2324 | 1 | 0.00<br>KY 33 | 0.42<br>KY 34 | 0.42 | 11,900 | - | - |
| KY 3366 | 1 | 0.00<br>US 150 | 0.72<br>VENETIAN WAY | 0.72 | 290 | 0.02 | A |
| KY 3366 | 2 | 0.72<br>VENETIAN WAY | 2.06<br>LOCKLIN LANE | 1.33 | 290 | 0.02 | A |

**LOS A. B or C** **LOS E or F**
**LOS D** **Cannot Calculate**

**Notes:**
**ADT = 2010 – 2012 Average Daily Traffic (Count) from CTS or Spot Counts from KYTC**
**Level of Service (LOS) calculated using Highway Capacity Software 2010 (HCS 2010)**
**LOS "-" denotes location HCS 2010 cannot compute due to roadway characteristics (Speed Limit or Lane Width)**

## Figure 6: Current Levels of Service



### 2.2.4 Crash Analysis

#### 2.2.4.1 Crash Analysis Methodology

Crash data was obtained from the Kentucky State Police Collision Analysis for the Public database for a three-year period from January 1, 2010 through December 31, 2012.

Crash rates were computed for specific sections of each major study area highway using the methodology provided in the crash analysis report periodically published by the Kentucky Transportation Center (KTC)[6]. The report used for this study was the most current version available at the time the analysis was completed. The section crash rates are based on the number of crashes on a specified section, the ADT on the roadway, the timeframe of analysis, and the length of the section. They are expressed in terms of crashes per 100 million vehicle-miles. A section's crash rate was then compared to a statewide critical crash rate[7] derived from critical crash rate tables for highway sections in the KTC crash report (Appendix D of KTC crash report). This comparison is expressed as a ratio of the section crash rate to the critical crash rate and is referred to as the critical crash rate factor. Sections with a critical crash rate factor greater than one indicate a notable safety concern.

The section crash rate is also compared directly to the statewide average crash rate presented in the KTC crash report. The statewide averages consider all crashes for a specified period that are listed in the Collision Report Analysis for Safer Highways (CRASH) database maintained by the Kentucky State Police and stratified by functional classification (Table B-2 in KTC crash report). Section rates that exceed the statewide average crash rate but not the critical crash rate may be problem areas, but they are not statistically proven to be higher crash areas. Therefore, this second comparison is used to identify a second tier of highway sections that may have crash problems and could be considered for safety improvements if warranted based on further analysis.

#### 2.2.4.2 Section Crash Analysis

For the major roadways within the study area, many of the observed section crash rates exceed the critical crash rate for that roadway type. The critical crash rate factors range from 0.00 to 6.49. On each of the following routes at least one section exceeds the statewide critical rate (US 127, US 127B, US 150, US 150B, KY 33, KY 37, KY 52 and KY 2324). There are many other sections that are not confirmed high crash rate sections (i.e., they do not exceed the critical crash rate), but the current crash rates exceed the statewide average crash rate. **Table 5** shows the crash statistics for the segments analyzed and **Figure 7** shows the segments on a map.

[6] *Analysis of Traffic Crash Data in Kentucky (2007 – 2011)*, Kentucky Transportation Center Research Report KTC-12-13/KSP2-11-1F.
[7] The critical crash rate is the threshold above which an analyst can be statistically certain (at a 99.5% confidence level) that the section crash rate exceeds the average crash rate for a similar roadway and is not mistakenly shown as higher than the average due to randomly occurring crashes.

## Table 5: Crash Rates by Segment

| Route | Section | Begin Milepoint | End Milepoint | Total Crashes | Average Daily Traffic | Section Length (miles) | Exposure "M" (100 or 1 MVM) | Statewide Average Crash Rate | Section Crash Rate | Statewide Critical Crash Rate | Critical Crash Rate Factor | Manner of Collision | Light Condition | Weather |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 127 | 1 | 1.84<br>HUSTONVILLE ROAD | 3.26<br>WALTON AVENUE CROSSING/CASSADY AVENUE | 21 | 17,700 | 1.42 | 0.274 | 98 | 77 | 256.70 | 0.30 | Rear End (42.9%) | Daylight (52.4%) | Clear (61.9%) |
| | 2* | 3.26<br>WALTON AVENUE CROSSING/CASSADY AVENUE | 3.44<br>US 150B/US 127B | 51 | 17,700 | 0.19 | 2.631 | 98 | 19 | 0.52 | 5.02 | Rear End (49.0%) | Daylight (66.7%) | Clear (78.4%) |
| | 3* | 3.44<br>US 150B/US 127B | 3.52<br>SOUTHTOWN DRIVE | 68 | 22,300 | 0.08 | 2.788 | 325 | 24 | 1.14 | 2.44 | Angle (39.7%) | Daylight (79.4%) | Clear (66.2%) |
| | 4* | 3.52<br>SOUTHTOWN DRIVE | 3.65<br>LISA AVENUE | 42 | 22,300 | 0.13 | 1.722 | 325 | 24 | 1.86 | 0.92 | Rear End (42.9%) | Daylight (78.6%) | Clear (50%) |
| | 5 | 3.65<br>LISA AVENUE | 4.62<br>HIGHLAND COURT | 122 | 22,300 | 0.97 | 0.237 | 325 | 515 | 546.60 | 0.94 | Rear End (38.5%) | Daylight (85.2%) | Clear (64.8%) |
| | 6* | 4.62<br>HIGHLAND COURT | 4.67<br>RANDOLPH HILL/US 127 | 2 | 22,300 | 0.05 | 0.082 | 325 | 24 | 1.27 | 0.06 | Rear End/Angle (50.0%) | Daylight/Dark - Hwy Lighted/On (50.0%) | Raining (100.0%) |
| | 7 NB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 76 | 7,770 | 0.73 | 0.062 | 325 | 1224 | 443.30 | 2.76 | Angle (32.9%) | Daylight (78.9%) | Clear (63.2%) |
| | 7 SB | 4.67<br>RANDOLPH HILL/US 127 | 5.40<br>KY 33/US 150 | 188 | 8,230 | 0.73 | 0.066 | 325 | 2858 | 440.40 | 6.49 | Sideswipe Same Direction (47.3%) | Daylight (88.3%) | Clear (67.6%) |
| | 8* | 5.40<br>KY 33/US 150 | 5.69<br>NORTH 5TH STREET | 81 | 11,900 | 0.29 | 6.191 | 325 | 13 | 2.05 | 3.04 | Sideswipe Same Direction (34.6%) | Daylight (85.2%) | Clear (63.0%) |
| | 9 | 5.69<br>NORTH 5TH STREET | 6.03<br>PERRYVILLE STREET | 61 | 11,900 | 0.34 | 0.044 | 325 | 1377 | 434.10 | 3.17 | Rear End (55.7%) | Daylight (78.7%) | Clear (70.5%) |
| | 10* | 6.03<br>PERRYVILLE STREET | 6.21<br>WEST LEXINGTON AVENUE | 6 | 8,520 | 0.18 | 0.643 | 325 | 9 | 1.53 | 0.42 | Rear End (33.3%) | Daylight (66.7%) | Clear (66.7%) |
| | 11 | 6.21<br>WEST LEXINGTON AVENUE | 6.72<br>CROSSHILL ROAD | 14 | 6,120 | 0.51 | 0.034 | 325 | 408 | 491.20 | 0.83 | Angle (21.4%) | Daylight (78.6%) | Clear (78.6%) |
| | 12 | 6.72<br>CROSSHILL ROAD | 7.25<br>ARGYLL DRIVE | 5 | 4,830 | 0.53 | 0.028 | 325 | 180 | 514.20 | 0.35 | Rear End (60.0%) | Daylight (60.0%) | Clear (40.0%) |
| | 13 | 7.25<br>ARGYLL DRIVE | 8.08<br>US 127 BYPASS | 12 | 4,830 | 0.84 | 0.044 | 112 | 271 | 471.70 | 0.57 | Rear End (58.3%) | Daylight (91.7%) | Clear (58.3%) |
| | 14* | 8.08<br>US 127 BYPASS | 8.21<br>KY 2168 | 4 | 13,800 | 0.13 | 0.264 | 112 | 15 | 1.25 | 0.21 | Single Vehicle (50.0%) | Daylight (75.0%) | Clear (100.0%) |
| | 15 | 8.21<br>KY 2168 | 10.26<br>KY 1896 | 11 | 13,800 | 2.05 | 0.310 | 98 | 36 | 307.90 | 0.12 | Rear End (36.4%) | Daylight (81.8%) | Clear (72.7%) |
| US 127B | 1* | 0.00<br>US 127 | 0.17<br>DENMARK DRIVE/MAY BOULEVARD | 62 | 21,500 | 0.17 | 2.634 | 112 | 24 | 1.15 | 2.29 | Rear End (77.4%) | Daylight (85.5%) | Clear (67.7%) |
| | 2* | 0.17<br>DENMARK DRIVE/MAY BOULEVARD | 0.40<br>SKYWATCH DRIVE | 29 | 21,500 | 0.23 | 1.232 | 112 | 24 | 1.15 | 1.07 | Rear End (44.8%) | Daylight (89.7%) | Clear (75.9%) |
| | 3 | 0.40<br>SKYWATCH DRIVE | 1.80<br>KY 34 | 100 | 21,500 | 1.40 | 0.330 | 112 | 303 | 316.50 | 0.96 | Rear End (42.0%) | Daylight (78.0%) | Clear (63.0%) |
| | 4 | 1.80<br>KY 34 | 3.20<br>US 150 | 46 | 19,300 | 1.39 | 0.295 | 112 | 156 | 320.10 | 0.49 | Rear End (52.2%) | Daylight (89.1%) | Clear (76.1%) |
| | 5 | 3.20<br>US 150 | 5.27<br>US 127 | 42 | 12,600 | 2.07 | 0.285 | 112 | 147 | 319.80 | 0.46 | Rear End (35.7%) | Daylight (92.9%) | Clear (57.1%) |

**Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)**
**Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate**
**Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate**

Notes:
Analysis Period: 3 Years (1/1/2010 to 12/31/2012)
Crash rates are expressed in crashes per 100 MVM (100 million vehicle miles traveled)
Exposure (M) = [(ADT) x (365) x (Time Frame of Analysis (Years)) x (Section Length)] / 100,000,000
Section Crash Rate = Total Crashes / Exposure
Critical Crash Rate Factor = Section Crash Rate / Statewide Critical Crash Rate
ADT = Average Daily Traffic, MVM = Million Vehicle Miles
For the Manner of Collision, Light Condition, and Weather, the type and percentage reflect the most commonly occurring type

*Denotes that the calculation was based on a spot rate analysis as segments less than 0.30 mile are classified as spots.

Sources:
Crash data for 1/1/2010 to 12/31/2012 from KYTC Data
Statewide Rates from KTC Research Report KTC-12-13/KSP2-11-1F, Analysis of Traffic Crash Data in Kentucky (2007 – 2011)

## Table 5: Crash Rates by Segment (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Total Crashes | Average Daily Traffic | Section Length (miles) | Exposure "M" (100 or 1 MVM) | Statewide Average Crash Rate | Section Crash Rate | Statewide Critical Crash Rate | Critical Crash Rate Factor | Manner of Collision | Light Condition | Weather |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 150 | 1 | 10.31<br>CALDWELL ROAD/LOCKLIN LANE | 10.91<br>DALES AVENUE | 4 | 6,630 | 0.60 | 0.044 | 185 | 92 | 352.90 | 0.26 | Single Vehicle (50.0%) | Daylight (75.0%) | Clear (75.0%) |
| | 2* | 10.91<br>DALES AVENUE | 11.17<br>HUGHES LANE | 3 | 6,630 | 0.27 | 0.413 | 185 | 7 | 1.24 | 0.33 | Rear End/Rear to Rear/Single Vehicle (33.3%) | Daylight (66.7%) | Clear (66.7%) |
| | 3 | 11.17<br>HUGHES LANE | 12.21<br>THOROUGHBRED DRIVE/BEN ALI DRIVE | 14 | 6,630 | 1.04 | 0.076 | 401 | 185 | 425.10 | 0.44 | Rear End (35.7%) | Daylight (64.3%) | Clear (71.4%) |
| | 4* | 12.21<br>THOROUGHBRED DRIVE/BEN ALI DRIVE | 12.33<br>US 127 BYPASS | 31 | 6,630 | 0.12 | 4.267 | 401 | 7 | 1.63 | 2.63 | Rear End (61.3%) | Daylight (90.3%) | Clear (77.4%) |
| | 5 | 12.33<br>US 127 BYPASS | 12.89<br>BEECH STREET | 24 | 10,800 | 0.57 | 0.067 | 401 | 358 | 434.70 | 0.82 | Rear End (66.7%) | Daylight (70.8%) | Clear (79.2%) |
| | 6* | 12.89<br>BEECH STREET | 13.11<br>HARDING ST/QUISENBERRY AVENUE | 6 | 10,800 | 0.21 | 0.507 | 401 | 12 | 1.46 | 0.35 | Rear End (50.0%) | Daylight (100.0%) | Clear (100.0%) |
| | 7* | 13.11<br>HARDING ST/QUISENBERRY AVENUE | 13.24<br>KY 34 | 4 | 10,800 | 0.14 | 0.338 | 401 | 12 | 1.46 | 0.23 | Rear End (50.0%) | Daylight (75.0%) | Clear/Cloudy/Raining/Snowing (25.0%) |
| | 8* | 13.24<br>KY 34 | 13.27<br>LEBANON ROAD | 2 | 16,300 | 0.03 | 0.112 | 401 | 18 | 1.34 | 0.08 | Angle/Rear End (50.0%) | Daylight (100.0%) | Clear (100.0%) |
| | 9* | 13.27<br>LEBANON ROAD | 13.51<br>US 127 JUNCTION | 12 | 16,300 | 0.23 | 0.672 | 401 | 18 | 1.34 | 0.50 | Rear End (75.0%) | Daylight (66.7%) | Clear (91.7%) |
| | 10* | 13.51<br>US 27 / KY 33 DEPARTURE | 13.66<br>NORTH 1ST STREET | 31 | 9,480 | 0.15 | 2.985 | 401 | 10 | 2.13 | 1.40 | Rear End (32.3%) | Daylight (90.3%) | Clear (80.6%) |
| | 11* | 13.66<br>NORTH 1ST STREET | 13.84<br>KY 34/EAST MAIN STREET | 12 | 9,480 | 0.19 | 1.156 | 401 | 10 | 1.49 | 0.78 | Angle/Sideswipe Same Direction (33.3%) | Daylight (100.0%) | Clear (66.7%) |
| | 12* | 13.84<br>KY 34/EAST MAIN STREET | 14.06<br>AVENUE OF CHAMPIONS N | 25 | 6,760 | 0.22 | 3.377 | 401 | 7 | 1.62 | 2.09 | Rear End (44.0%) | Daylight (72.0%) | Clear (64.0%) |
| | 13* | 14.06<br>AVENUE OF CHAMPIONS N | 14.18<br>SOUTH ALTA AVENUE | 4 | 8,260 | 0.12 | 0.442 | 401 | 9 | 1.54 | 0.29 | Angle (75.0%) | Daylight (75.0%) | Clear (50.0%) |
| | 14* | 14.18<br>SOUTH ALTA AVENUE | 14.37<br>AVENUE OF CHAMPIONS | 3 | 8,260 | 0.18 | 0.332 | 401 | 9 | 1.54 | 0.22 | Backing/Rear End/Sideswipe Opp Direction (33.3%) | Daylight (100.0%) | Clear (66.7%) |
| | 15 | 14.37<br>AVENUE OF CHAMPIONS | 15.10<br>GOSE PIKE/KY 52 | 17 | 8,260 | 0.74 | 0.067 | 401 | 255 | 438.50 | 0.58 | Rear End (36.4%) | Daylight (47.1%) | Clear (82.4%) |
| | 16 | 15.10<br>GOSE PIKE/KY 52 | 16.35<br>OLD STANFORD RD | 6 | 3,310 | 1.25 | 0.045 | 185 | 132 | 350.40 | 0.38 | Angle (50.0%) | Daylight (66.7%) | Clear (83.3%) |
| | 17* | 16.35<br>OLD STANFORD RD | 16.37<br>STANFORD RD | 0 | 3,310 | 0.02 | 0.000 | 185 | 0 | 1.55 | 0.00 | N/A | N/A | N/A |
| | 18* | 16.37<br>STANFORD RD | 16.44<br>US 150B | 2 | 3,310 | 0.07 | 0.552 | 98 | 4 | 1.55 | 0.36 | Angle/Single Vehicle (50.0%) | Daylight/Dark - Hwy Not Lighted (50.0%) | Cloudy/Snowing (50.0%) |
| | 19 | 16.44<br>US 150B | 17.57<br>KY 1273 | 14 | 11,800 | 1.13 | 0.146 | 98 | 96 | 145.60 | 0.66 | Single Vehicle (57.1%) | Daylight (78.6%) | Clear (64.3%) |
| US 150B | 1 | 0.00<br>US 127 | 0.49<br>SOUTHTOWN DRIVE | 45 | 14,300 | 0.49 | 0.077 | 112 | 585 | 497.90 | 1.18 | Angle (40.0%) | Daylight (80.0%) | Clear (77.8%) |
| | 2 | 0.49<br>SOUTHTOWN DRIVE | 1.20<br>GOSE PIKE | 21 | 14,300 | 0.71 | 0.111 | 112 | 190 | 361.30 | 0.53 | Angle (47.6%) | Daylight (71.4%) | Clear (71.4%) |
| | 3 | 1.20<br>GOSE PIKE | 2.27<br>US 150 | 20 | 8,410 | 1.08 | 0.099 | 112 | 202 | 380.60 | 0.53 | Angle (45.0%) | Daylight (65.0%) | Clear (75.0%) |

**Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)**
**Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate**
**Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate**

Notes:
Analysis Period: 3 Years (1/1/2010 to 12/31/2012)
Crash rates are expressed in crashes per 100 MVM (100 million vehicle miles traveled)
Exposure (M) = [(ADT) x (365) x (Time Frame of Analysis (Years)) x (Section Length)] / 100,000,000
Section Crash Rate = Total Crashes / Exposure
Critical Crash Rate Factor = Section Crash Rate / Statewide Critical Crash Rate
ADT = Average Daily Traffic, MVM = Million Vehicle Miles
For the Manner of Collision, Light Condition, and Weather, the type and percentage reflect the most commonly occurring type

*Denotes that the calculation was based on a spot rate analysis as segments less than 0.30 mile are classified as spots.

Sources:
Crash data for 1/1/2010 to 12/31/2012 from KYTC Data
Statewide Rates from KTC Research Report KTC-12-13/KSP2-11-1F, Analysis of Traffic Crash Data in Kentucky (2007 – 2011)

## Table 5: Crash Rates by Segment (Cont.)

| Route | Section | Begin Milepoint | End Milepoint | Total Crashes | Average Daily Traffic | Section Length (miles) | Exposure "M" (100 or 1 MVM) | Statewide Average Crash Rate | Section Crash Rate | Statewide Critical Crash Rate | Critical Crash Rate Factor | Manner of Collision | Light Condition | Weather |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KY 33 | 1 | 0.00<br>US 150/US 127 | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 40 | 5,800 | 0.45 | 0.028 | 325 | 1406 | 497.90 | 2.82 | Rear End (50.0%) | Daylight (85.0%) | Clear (72.5%) |
| KY 33 | 2* | 0.45<br>BELL PLACE/OLD SHAKERTOWN ROAD | 0.72<br>ST JAMES DRIVE | 9 | 6,900 | 0.27 | 1.191 | 325 | 8 | 1.54 | 0.77 | Sideswipe Same Direction (33.3%) | Daylight (55.6%) | Clear (55.6%) |
| KY 33 | 3 | 0.72<br>ST JAMES DRIVE | 1.27<br>SPRINGHILL ROAD | 9 | 6,310 | 0.55 | 0.038 | 325 | 236 | 483.40 | 0.49 | Single Vehicle (66.7%) | Daylight (77.8%) | Clear (44.4%) |
| KY 33 | 4 | 1.27<br>SPRINGHILL ROAD | 1.65<br>RIDGE VIEW ROAD | 14 | 5,110 | 0.38 | 0.021 | 325 | 662 | 509.20 | 1.30 | Rear End (35.7%) | Daylight (85.7%) | Clear/Raining (35.7%) |
| KY 33 | 5 | 1.65<br>RIDGE VIEW ROAD | 2.29<br>KY 2168 | 5 | 5,110 | 0.64 | 0.036 | 325 | 140 | 491.00 | 0.28 | Single Vehicle (100.0%) | Daylight (80.0%) | Clear (60.0%) |
| KY 33 | 6 | 2.29<br>KY 2168 | 3.17<br>S BUSTER Y PIKE | 5 | 5,110 | 0.88 | 0.049 | 222 | 102 | 334.80 | 0.30 | Single Vehicle (40.0%) | Daylight (80.0%) | Clear (60.0%) |
| KY 34 | 1 | 10.39<br>ALUM SPRINGS CROSS PIKE | 11.01<br>CORPORATE DRIVE | 8 | 5,690 | 0.61 | 0.038 | 222 | 209 | 364.60 | 0.57 | Angle (50.0%) | Daylight (50.0%) | Clear/Cloudy (37.5%) |
| KY 34 | 2 | 11.01<br>CORPORATE DRIVE | 12.26<br>US 127 BYPASS | 13 | 5,690 | 1.26 | 0.078 | 169 | 166 | 426.30 | 0.39 | Rear End/Single Vehicle (30.8%) | Daylight (76.9%) | Clear (84.6%) |
| KY 34 | 3 | 12.26<br>US 127 BYPASS | 13.19<br>COWAN STREET | 12 | 5,650 | 0.93 | 0.057 | 169 | 209 | 446.70 | 0.47 | Single Vehicle (33.3%) | Daylight (83.3%) | Clear (75.0%) |
| KY 34 | 4 | 13.19<br>COWAN STREET | 13.63<br>US 150 JUNCTION | 9 | 5,650 | 0.44 | 0.027 | 169 | 331 | 500.30 | 0.66 | Rear End (44.4%) | Daylight (77.8%) | Clear (44.4%) |
| KY 34 | 5 | 13.63<br>US 150 DEPARTURE | 14.15<br>PARKVIEW DRIVE | 35 | 15,200 | 0.52 | 0.086 | 325 | 405 | 414.80 | 0.98 | Rear End (60.0%) | Daylight (82.9%) | Clear (71.4%) |
| KY 34 | 6 | 14.15<br>PARKVIEW DRIVE | 14.83<br>GRABRUCK STREET | 21 | 15,400 | 0.69 | 0.116 | 325 | 182 | 402.00 | 0.45 | Angle/Rear End (28.6%) | Daylight (81.0%) | Clear (7632%) |
| KY 34 | 7 | 14.83<br>GRABRUCK STREET | 15.37<br>KY 1805 | 3 | 12,500 | 0.54 | 0.073 | 325 | 41 | 428.10 | 0.10 | Single Vehicle (66.7%) | Daylight (100.0%) | Clear/Cloudy /Raining (33.3%) |
| KY 34 | 8 | 15.37<br>KY 1805 | 15.96<br>LEXINGTON COURT | 8 | 8,570 | 0.59 | 0.055 | 325 | 145 | 450.50 | 0.32 | Single Vehicle (50.0%) | Daylight/Dark - Hwy Lighted/Off/Dark - Hwy Not Lighted (25.0%) | Clear (50.0%) |
| KY 34 | 9 | 15.96<br>LEXINGTON COURT | 16.59<br>STONEY POINT ROAD | 11 | 8,570 | 0.63 | 0.059 | 185 | 186 | 330.70 | 0.56 | Rear End (63.6%) | Daylight (72.7%) | Clear (54.5%) |
| KY 37 | 1 | 16.30<br>KY 300 | 18.05<br>ARNOLD ROAD | 24 | 860 | 1.74 | 0.016 | 257 | 1461 | 463.40 | 3.15 | Sideswipe Opp Direction (45.8%) | Daylight (37.5%) | Clear (62.5%) |
| KY 37 | 2 | 18.05<br>ARNOLD ROAD | 18.35<br>SERVICE DRIVE | 0 | 860 | 0.30 | 0.003 | 169 | 0 | 880.40 | 0.00 | N/A | N/A | N/A |
| KY 37 | 3 | 18.35<br>SERVICE DRIVE | 18.73<br>US 127 BYPASS | 5 | 860 | 0.38 | 0.004 | 169 | 1383 | 880.40 | 1.57 | Single Vehicle (60.0%) | Daylight (40.0%) | Clear (80.0%) |

**Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)**
**Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate**
**Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate**

Notes:
Analysis Period: 3 Years (1/1/2010 to 12/31/2012)
Crash rates are expressed in crashes per 100 MVM (100 million vehicle miles traveled)
Exposure (M) = [(ADT) x (365) x (Time Frame of Analysis (Years)) x (Section Length)] / 100,000,000
Section Crash Rate = Total Crashes / Exposure
Critical Crash Rate Factor = Section Crash Rate / Statewide Critical Crash Rate
ADT = Average Daily Traffic, MVM = Million Vehicle Miles
For the Manner of Collision, Light Condition, and Weather, the type and percentage reflect the most commonly occurring type

*Denotes that the calculation was based on a spot rate analysis as segments less than 0.30 mile are classified as spots.

Sources:
Crash data for 1/1/2010 to 12/31/2012 from KYTC Data
Statewide Rates from KTC Research Report KTC-12-13/KSP2-11-1F, Analysis of Traffic Crash Data in Kentucky (2007 – 2011)

# Table 5: Crash Rates by Segment (Cont.)

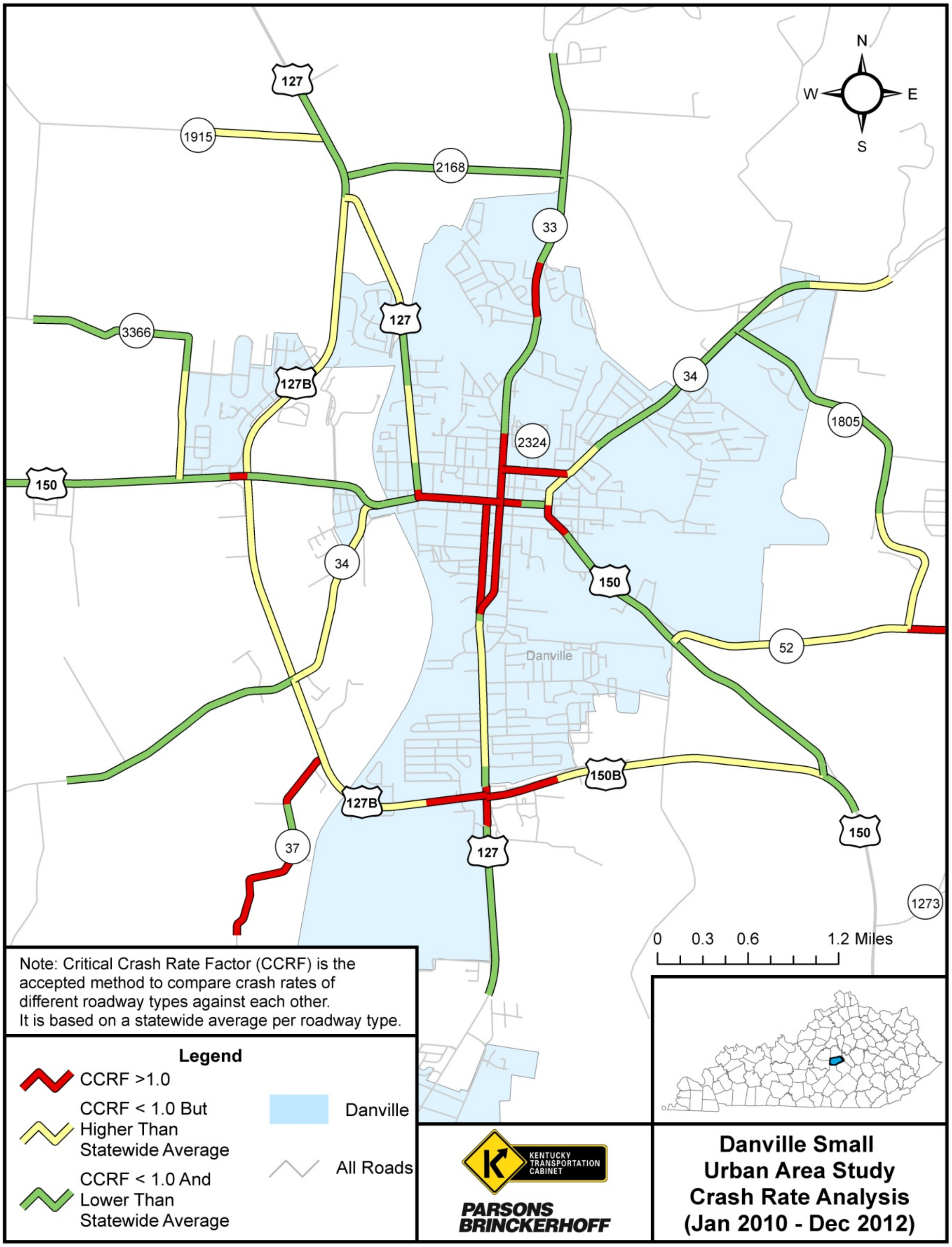
| Route | Section | Begin Milepoint | End Milepoint | Total Crashes | Average Daily Traffic | Section Length (miles) | Exposure "M" (100 or 1 MVM) | Statewide Average Crash Rate | Section Crash Rate | Statewide Critical Crash Rate | Critical Crash Rate Factor | Manner of Collision | Light Condition | Weather |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KY 52 | 1 | 0.00<br>US 150 | 1.59<br>KY 1805 | 21 | 5,110 | 1.59 | 0.089 | 185 | 237 | 307.20 | 0.77 | Rear End (33.3%) | Daylight (57.1%) | Clear/Cloudy (28.6%) |
| | 2 | 1.59<br>KY 1805 | 2.34<br>POPE ROAD | 12 | 3,530 | 0.75 | 0.029 | 185 | 413 | 391.40 | 1.05 | Single Vehicle (66.7%) | Daylight (66.7%) | Clear (41.7%) |
| KY 1805 | 1 | 0.00<br>KY 52 | 0.96<br>RIVERSIDE DRIVE/OLD GOGGIN ROAD | 4 | 960 | 0.96 | 0.010 | 257 | 398 | 527.00 | 0.76 | Angle/Single Vehicle (50.0%) | Daylight (100.0%) | Clear (50.0%) |
| | 2 | 0.96<br>RIVERSIDE DRIVE/OLD GOGGIN ROAD | 1.35<br>WINTERHAWK LANE | 0 | 960 | 0.39 | 0.004 | 257 | 0 | 660.10 | 0.00 | N/A | N/A | N/A |
| | 3 | 1.35<br>WINTERHAWK LANE | 2.02<br>KEMPER LANE | 1 | 1,160 | 0.68 | 0.009 | 169 | 117 | 734.80 | 0.16 | Single Vehicle (100.0%) | Daylight (100.0%) | Clear (100.0%) |
| | 4 | 2.02<br>KEMPER LANE | 2.71<br>KY 34 | 0 | 1,160 | 0.69 | 0.009 | 169 | 0 | 730.40 | 0.00 | N/A | N/A | N/A |
| KY 1915 | 1 | 0.00<br>US 127 | 1.88<br>KY 3366 | 1 | 170 | 1.88 | 0.004 | 219 | 285 | 869.90 | 0.33 | Single Vehicle (100.0%) | Dawn (100.0%) | Clear (100.0%) |
| KY 2168 | 1 | 0.00<br>US 127 | 1.46<br>KY 33 | 5 | 2,760 | 1.46 | 0.044 | 169 | 113 | 474.70 | 0.24 | Rear End (40.0%) | Daylight (80.0%) | Clear (80.0%) |
| KY 2324 | 1 | 0.00<br>KY 33 | 0.42<br>KY 34 | 28 | 11,850 | 0.42 | 0.055 | 325 | 510 | 434.60 | 1.17 | Rear End (78.6%) | Daylight (85.7%) | Clear (67.9%) |
| KY 3366 | 1 | 0.00<br>US 150 | 0.72<br>VENETIAN WAY | 1 | 290 | 0.72 | 0.002 | 219 | 437 | 979.70 | 0.45 | Rear End (100.0%) | Daylight (100.0%) | Clear (100.0%) |
| | 2 | 0.72<br>VENETIAN WAY | 2.06<br>LOCKLIN LANE | 0 | 290 | 1.33 | 0.004 | 219 | 0 | 742.30 | 0.00 | N/A | N/A | N/A |

**Critical Crash Rate Factor >1, Section Crash Rate Exceeds Statewide Critical Rate (High Crash Rate Section)**
**Critical Crash Rate Factor <1, Section Crash Rate Exceeds Statewide Average Rate**
**Critical Crash Rate Factor <1, Section Crash Rate Lower Than Statewide Average Rate**

Notes:
Analysis Period: 3 Years (1/1/2010 to 12/31/2012)
Crash rates are expressed in crashes per 100 MVM (100 million vehicle miles traveled)
Exposure (M) = [(ADT) x (365) x (Time Frame of Analysis (Years)) x (Section Length)] / 100,000,000
Section Crash Rate = Total Crashes / Exposure
Critical Crash Rate Factor = Section Crash Rate / Statewide Critical Crash Rate
ADT = Average Daily Traffic, MVM = Million Vehicle Miles
For the Manner of Collision, Light Condition, and Weather, the type and percentage reflect the most commonly occurring type

Sources:
Crash data for 1/1/2010 to 12/31/2012 from KYTC Data
Statewide Rates from KTC Research Report KTC-12-13/KSP2-11-1F, Analysis of Traffic Crash Data in Kentucky (2007 – 2011)

## Figure 7: Crash Rates by Segment



#### 2.2.4.3 Crash Type Analysis

Due to the number of crashes within the primary study area, an additional crash analysis was conducted to look at severity and crash type.

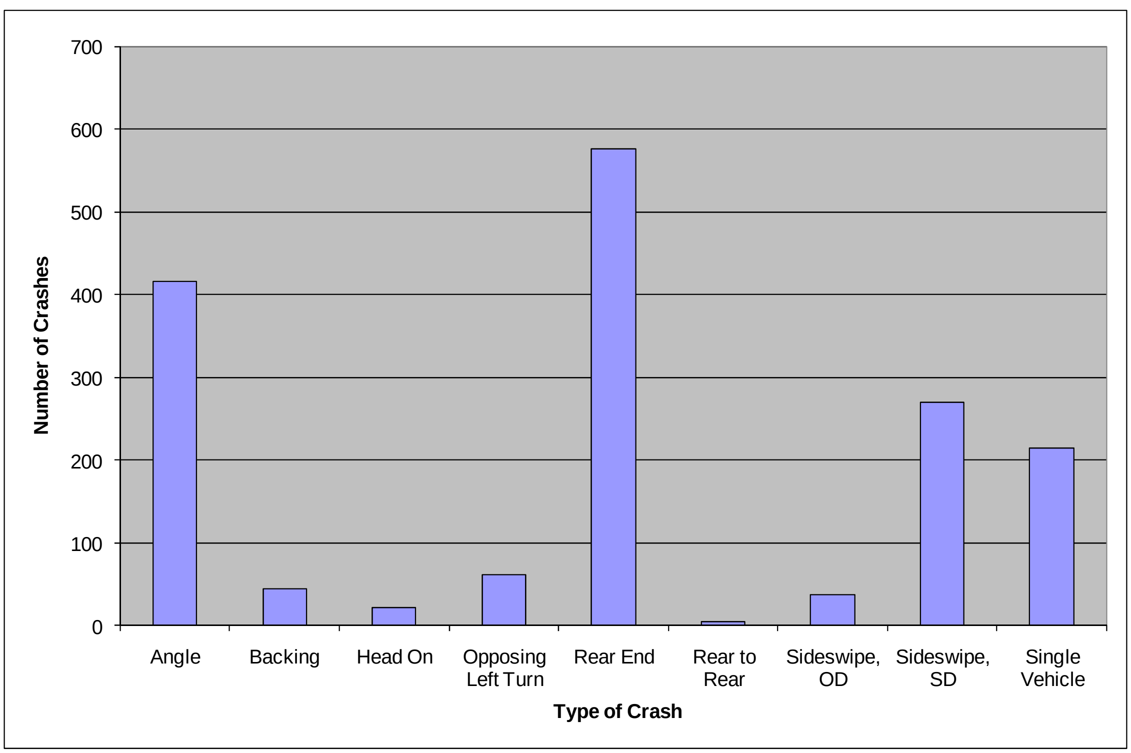
A breakdown of the crash severity for the entire area is provided below.

| Severity | Number of Crashes | Percentage |
|---|---|---|
| Property Damage Only | 1,359 | 82.5% |
| Injury | 281 | 17.1% |
| Fatality | 7 | 0.4% |
| | 1,647 | 100.0% |

The majority of crashes were property damage only (PDO) crashes (1,359). Just over one-sixth of the crashes involved at least one injury, and seven fatal crashes occurred between January 1, 2010 and December 31, 2012. Of the seven crashes that involved a fatality, both US 127 and US 150 had two separate fatal incidents. Three of the seven fatal crashes were single vehicle crashes, two were angle crashes, one was a head on crash, and one was a sideswipe opposite direction. Weather (wet / raining) may have been a contributing factor to only one of the seven fatal crashes.

A review of all crash types for the study area was performed to determine the most frequent type. **Figure 8** shows the results.

**Figure 8: Crash Types (January 2010 – December 2012)**



The majority of crashes were rear end crashes (approximately 35%), although there were also a significant number of angle, sideswipe, and single vehicle crashes.

The crash data for manner of collision, light condition, and weather was further stratified for each section and analyzed to determine the most commonly occurring type. This is listed in **Table 5** following the crash rate calculations. For additional graphical depiction of primary manner of collision and severity by roadway, refer to the graphics included in **Appendix B**. A listing of the crash records is also contained in **Appendix B** for reference.

### 2.2.5 Multimodal Facilities (Transit, Rail, Bicycle and Pedestrian)

The Bluegrass Community Action Partnership (BGCAP) provides the DanTran, a fully accessible fixed route bus service that operates Monday through Friday through town with more limited service on Saturdays. There is also an intercity route that serves passengers traveling from Danville to Lexington, called the Bluegrass Ultra-Transit Service (BUS). The BUS Stop is located in the Danville Parking facility and is the system's transfer point and houses the DanTran vehicle.

Norfolk Southern Railroad operates a rail line extending north to south through the study area, just east of the downtown area. Facilities also include a rail yard east / south of the downtown Danville area. Four crossings currently exist to facilitate traffic flow east / west through the city. They include:

- KY 2168
- US 127
- US 150
- US 127 (Bypass)

Pedestrian facilities are intermittent throughout the study area, with some roadways having sidewalks, though discontinuous in places. Others may exist but are narrow or in need of repair.

The City of Danville has several initiatives that are ongoing to build and enhance bicycle and pedestrian facilities throughout the county. They include the following:

- Master Planning for a Community Trails Network – Trails Summit (April 2012)
- Community Trails Committee – Master Plan for Future Projects (April 24, 2012)[8]
- Boyle County Trails Project[9]

[8] http://transportation.ky.gov/Bike-Walk/Documents/DanvilleBoyle%20Prelim%20Report%202012.pdf

[9] http://danvillekentucky.com/pages/BoyleCountyTrailsProject1/

- Clarks Run Trail Master Plan[10]

- Safe Routes to School Connectivity Master Plan (May 25, 2012)[11]

References to these online documents are provided for use for future planning efforts.

## 2.3 Human Environment Overview

An overview was conducted to determine the general characteristics of the human environment in the study area. The analysis addressed the following:

- General socioeconomic characteristics
- Underground storage tanks and other hazardous materials sites
- Cultural / historic and archaeological characteristics
- Environmental Justice

The following sections provide a summary of findings. The full environmental overview is included in **Appendix C**. **Appendix D** contains the Environmental Justice assessment performed by the BGADD.

### 2.3.1 Socioeconomic Profile

#### 2.3.1.1 Population Growth

The City of Danville and the surrounding areas of Boyle County have experienced moderate growth since the year 2000. **Table 6** shows population data from the 2000 and 2010 United States Census for Boyle County. The 2000 U.S. Census shows Boyle County having a population of 27,697. This increased to 28,432 by 2010 and is projected to continue to stay at a similar level through the year 2040.

**Table 6: Study Area Populations**

| | 2000 | 2010 | 2040 | % Growth (2000 – 2010) | % Growth (2010 – 2040) |
|---|---|---|---|---|---|
| Boyle County | 27,697 | 28,432 | 28,390 | 2.59% | 0.00% |

Source: U.S. Bureau of the Census, Decennial Surveys

[10] http://danvillekentucky.com/pages/BoyleCountyTrailsProject1/

[11] http://danvillekentucky.com/pages/BoyleCountyTrailsProject1/

#### 2.3.1.2 Local Economy

Unemployment information was obtained from the Kentucky Education and Workforce Development Cabinet[12]. In January 2013, Boyle County's unemployment rate was 9.9%, which is higher than the January 2013 rate for Kentucky which was at 8.7%.

The top two industries in Boyle County account for more than 60% of the jobs. The highest is the Services industry, with Trade, Transportation and Utilities second as shown on **Table 7**.

**Table 7: Boyle County Employment by Major Industry (2011)**

| Boyle County | Employment | Percent |
|---|---|---|
| All Industries | 13,751 | 100.0% |
| Agriculture, Forestry, Fishing and Hunt | 0 | 0.0% |
| Mining | 0 | 0.0% |
| Construction | 299 | 2.2% |
| Manufacturing | 1,928 | 14.0% |
| Trade, Transportation, and Utilities | 3,081 | 22.4% |
| Information | 136 | 1.0% |
| Financial Activities | 432 | 3.1% |
| Services | 5,693 | 41.4% |
| Public Administration | 718 | 5.2% |
| Other | 1,464 | 10.7% |

Source: U.S. Department of Labor, Bureau of Labor Statistics

[12] Kentucky Education and Workforce Development Cabinet. http://workforce.ky.gov/Jan13charts.pdf.

As shown in **Table 8**, large private employers in the area include: American Greetings, R R Donnelley, Dana Corporation, and Berry Plastics Corporation.

### Table 8: Major Employers in Boyle County

| Frim | Product(s)/Service(s) | Emp. | Year Established |
|---|---|---|---|
| Advocate Messenger | Newspaper publishing & offset printing | 48 | 1865 |
| Allen Company Inc | Mixed asphalt | 20 | 1984 |
| American Greetings | Distribution and paper product packaging center | 715 | 1967 |
| Berry Plastics Corporation | Polyethylene film & stretch wrap for commercial and medical use | 193 | 1978 |
| Burkmann Industries Inc | Animal feed, corporate headquarters | 32 | 1979 |
| Caterpillar Inc | Undercarriage components for D6 through D11 track type tractors including pins, bushings and sleeve bearings. Assembly of hinge pin components for 992 front end loaders. | 95 | 1998 |
| Central Kentucky Federal Savings Bank | Headquarters/corporate office | 26 | 1968 |
| Dana Corporation | Diesel & gas engine gaskets | 257 | 1987 |
| Denyo Manufacturing Corp | Diesel driven generators | 111 | 1995 |
| Green Boiler Technologies Inc | Boilers, water heaters and ancillary equipment for commercial, industrial and institutional markets. | 42 | 1947 |
| Hobart Corp | Commercial kitchen warewash manufacturing | 85 | 1997 |
| Intelligrated Inc | Conveyor equipment & systems | 106 | 1974 |
| Meggitt Aircraft Braking Systems Kentucky Corporation | Manufacture carbon brake discs for the airline industry; aircraft brake components to OE manufacturers and end-user airlines. | 70 | 2006 |
| National Office Furniture | Finished wood upholstered furniture | 125 | 1946 |
| Panasonic Appliances Co of America | Engineering/design center, technology & product development, marketing, service parts (distribution), accounting. | 105 | 1990 |
| Pioneer Voc/Ind Service Inc | Sheltered workshop: foam packaging, fabricating & mechanical subcontract assembling, sewing operation | 27 | 1969 |
| R R Donnelley | Print and bind magazines, catalogs and inserts for major publishers. | 705 | 1985 |
| The Timberland Company | Full service fulfillment center distributing footwear, apparel and accessories across the wholesale, retail and e-commerce channels. | 75 | 1994 |
| Transnav Technologies Kentucky | Plastics injection molding company. Current core business automotive | 46 | 2002 |
| UPS | Small package distribution | 22 | N/A |
| Source: Kentucky Cabinet for Economic Development (7/12/2013) | | | |

### 2.3.2 Underground Storage Tanks and Hazardous Materials

There are 182 underground storage tank (UST) sites identified within the 4-mile radius from downtown Danville.

There are five federally listed locations of potentially hazardous waste sites within the study. The purchase of right-of-way from within the designated boundary of a site could result in the owner acquiring liability for future cleanup and monitoring and may require corrective action before it could be utilized as a roadway. Additionally, Kentucky databases list thirteen (13) hazardous waste sites, six (6) solid waste facilities, two (2) historic landfills, ten (10) petroleum storage tanks from SB193, one (1) manufactured gas plant and two (2) orphan sites. The specific locations for these sites are identified on the EDR DataMap included in **Appendix C**.

### 2.3.3 Previously Documented Cultural Historic and Archaeological Sites

The following is a summary of the Kentucky Heritage Council database for the City of Danville and the surrounding study area. There are two designated National Historic Landmarks, nine National Register of Historic Places (NRHP)-listed historic districts, 306 contributing elements of the historic districts, 31 individually listed NRHP properties, 25 properties that have been determined eligible for listing in the NRHP, and 63 previously surveyed properties that have an undetermined status in the database that are located in the study area. These are listed in a table and identified on a corresponding map in the Cultural Historic Resource Records Review included in **Appendix C**. There are likely many more sites within the study area that have potential to be nationally registered. This study recommends few new roadways apart from what the KYTC has already planned; therefore, it is unlikely that any potential historic locations will be affected. It is suggested that further study and documentation be completed to avoid or mitigate impacts if any recommended project exists in areas where there may be impacts to potential sites.

A review of the OSA Geographic Information Systems (GIS) data was performed to identify archaeological resources within the study area. The review revealed the following:

- 10 previous professional archaeological surveys
- 1 previous professional archaeological survey / NRHP evaluation project
- 1 previous NRHP mitigation project
- 26 archaeological sites recorded in the area

The 26 sites include a historic station, prehistoric mounds, sites with historic and prehistoric components, and prehistoric open habitations without mounds.

### 2.3.4 Environmental Justice

The Environmental Justice (EJ) assessment prepared by the BGADD provides a "first look" into the socioeconomic characteristics that exist within the study area. Further examination of the impacts for specific identified project locations may be required at the next phase of project development beyond this study.

The report examined potential disproportionate adverse community impacts on selected groups (minority, low-income, elderly, and disabled populations) within the defined project study area for the proposed transportation improvement(s). A summary of the assessment is provided below. For a more in-depth analysis, refer to **Appendix D** which contains the entire EJ analysis report.

The BGADD's purpose of the assessment was to assist the KYTC in carrying out the Division of Planning's mission "…to collect, maintain, analyze and report accurate data for making sound fiscally responsible recommendations regarding the maintenance, operation and improvement of our transportation network" and to fulfill applicable federal EJ commitments. KYTC's purpose for assessing EJ impacts is to identify minority, low-income, elderly, or disabled populations that may be affected by recommended projects.

The assessment focused on identifying, through a demographic analysis, the extent to which EJ populations and other groups of concern reside in or near the study area and may be impacted by improvement projects. Subsequent actions (determination of disproportionately high and / or adverse effects; proposing measures to avoid, minimize, and / or mitigate such effects; and providing specific opportunities for public involvement) may be undertaken, as appropriate, contingent upon the results of the demographic analysis.

For reference, there are 18 block groups within 6 census tracts within the study area.

<u>Population by Race</u>
Boyle County's population by minority origin percentage (13.2%) is lower than both the national (36.3%) and state (13.7%) averages. There are some locations within the study area that do however merit further discussion. In total, eight block groups were identified with percentages significantly above the reference threshold with percentages ranging from 19.1% to 48.2%. Projects that are within these areas are noted on the project sheets included in the later sections of this report. Field observations and discussion with local community members revealed that proposed projects being evaluated as part of this study should not adversely affect the minority populations near them.

<u>Population by Poverty</u>
The total percent of the population below the poverty level for Boyle County is 17.5%. This is just below the state percent (18.6%) and above the U.S. percent (14.9%). Within the study area, there are elevated percentages in the populations below poverty level in nine block groups. The percentages range from 24.6% to 56.7%. Projects that are

within these areas are noted on the project sheets included in the later sections of this report.

Population by Persons 60 and Over
The findings of this assessment indicate that Boyle County as a whole has a higher than average population over 60 years (23.0%) compared to both the state (19.2%) and the national (18.6%) percentages. Six block groups were identified with populations significantly above the established threshold. These percentages range from 28.8% to 36.0%. The aging population of Boyle County is consistent with the low growth rate in overall population for the county. In addition, Danville has been identified anecdotally as a retirement community within Kentucky.

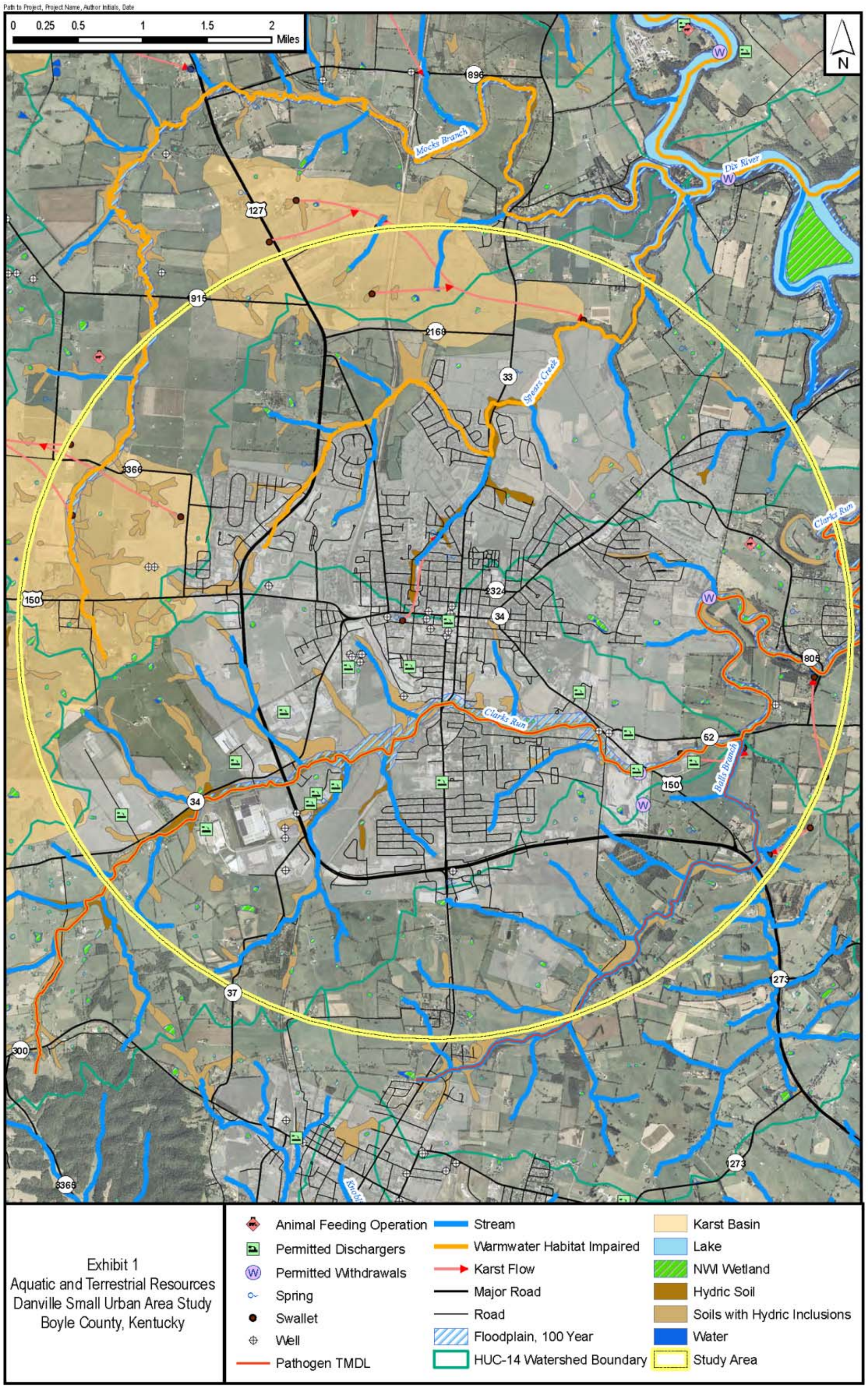
As with the other analysis categories, projects that are within these areas are noted on the project sheets included in the later sections of this report.

Population by Disability Status
The findings of this assessment indicate that Boyle County as a whole has a higher than average population claiming disability status (15.9%) compared to both the state (15.4%) and the national (10.1%) percentages. Eight block groups were identified with populations significantly above the reference threshold. The percentages range from 20.4% to 34.3%. It is anticipated that the implementation of projects would not have a disproportionate effect on the population of persons with severe disability residing in the study area. Any specific projects that are within one of these block groups are noted on the individual project sheets.

### 2.4 Natural Environment Overview

A broad environmental overview was conducted to determine the characteristics of the natural environment in the study area. Resources addressed included aquatic resources such as rivers and creeks, wetlands, floodplains and potential for karst topography, as well as threatened, rare and/or endangered species. Also addressed are air quality and traffic noise. The following sections and figure (**Figure 9**) provide a summary of impacts. Refer to **Appendix C** for the complete environmental overview.

## Figure 9: Natural Environment Characteristics




Source: Existing Conditions Overview: Ecology & UST / Hazardous Materials Report prepared by Third Rock Consultants, LLC for the Danville SUA study

### 2.4.1 Aquatic Resources

The study area is located in the Dix River Watershed (HUC# 05100205). Other streams in the area include Clarks Run, Balls Branch, Mocks Branch, Spears Creek, and the Dix River. Also noted in the report is that numerous unnamed intermittent and perennial streams are located within the study area. There are no Outstanding State Resource Waters or Wild Rivers within the study area.

### 2.4.2 Wetlands

According to National Wetlands Inventory data, the wetlands in the study area consist of palustrine farm ponds with unconsolidated bottoms.

### 2.4.3 Floodplains

Floodplains in the study area were examined from FEMA Flood Hazard Mapping. Areas adjacent to Clarks Run along with other streams and unnamed tributaries are designated as 100-year floodplains. Any improvements in the surrounding areas of these resources may need a permit and certifications from the U.S. Army Corps of Engineers and KY Division of Water. However, because many of the improvements are to transportation infrastructure, there are likely to be minimal to no impacts on the adjacent tributaries, streams, rivers, etc. Where these improvements occur within an existing floodplain, they present minimal additional risk since they augment or replace the existing infrastructure that is already at risk.

### 2.4.4 Karst Topography

The west and northern portions of the area have a potential for karst (sinkhole) features which should be taken into account for each project that is recommended. Refer to **Figure 9** for specific locations where karst topography may exist.

### 2.4.5 Threatened, Rare, and Endangered Species

There are three federally listed species in the study area listed by the U.S. Fish and Wildlife Service, all of which are listed as being endangered. The list includes one mammal (Indiana Bat), one mussel (clubshell mussel) and one plant species (running buffalo clover).

There are 17 state listed species in the study area which includes two plants, 11 birds, three insects and one reptile.

For additional details on these species and their status, refer to the Existing Conditions: Ecology & UST / Hazardous Materials Report provided in **Appendix C**.

### 2.4.6 Air Quality

Boyle County is currently designated as being in attainment status for air quality. As this study looks to improve existing transportation infrastructure and does not add substantial new capacity, it is not expected that any projects as a result of this study would have a negative impact on the current attainment status of Boyle County.

### 2.4.7 Traffic Noise

A specific noise analysis was not conducted for this study. While there are potentially sensitive noise receptors such as churches, schools, cemeteries, etc., throughout the study area, projects suggested as a result of this study are not likely to increase substantially the existing level of traffic noise in the study area as they do not increase capacity.

## 2.5 Geotechnical Overview

The Geotechnical Branch of KYTC completed a review of the project study area. A summary of the findings is given below:

The study area is located within the Danville, Bryantsville, Stanford, and Junction City Geologic Quadrangles. The predominant formation in the area is the Lexington Limestone Formation. This formation is susceptible to developing karst related issues. It is noted that numerous mapped sinkholes are present in the study area. The other formation of note is the Clays Ferry Formation in the southern portion of the study area. This is limestone and shale which can be susceptible to weathering. Rock cut slopes in the area require site specific design.

A site review was made for two projects – KY 34 widening from the US 127 Bypass to US 150 and the multi-use path on the north side of US 150 connecting the school complex to the park. No geotechnical issues were visually observed.

For the full geotechnical documentation, refer to **Appendix E**.

# 3.0 PUBLIC INVOLVEMENT

Public involvement for this study was comprised of multiple meetings with the local officials and stakeholders (LO/S) in Danville and Boyle County. Copies of the meeting summaries are included in **Appendix F** for reference. The results and feedback are incorporated into the entire report, particularly the development and prioritization of alternatives.

The LO/S meetings for this project were held to derive input on project issues, improvement alternatives, and project rankings. The meetings were well attended with active participation throughout. Stakeholders invited included attendees from the Danville / Boyle County Model presentation in February 2013. Attendees to the meetings included the following or representatives of the following:

- Mayor of Danville
- Boyle County Judge / Executive
- Danville – Boyle County Planning and Zoning
- City Transportation Committee members
- Centre College
- Boyle County EMA
- Danville Fire Department
- Ephraim McDowell Health
- Boyle County Schools
- Danville Police
- Danville Chamber of Commerce
- Danville City Engineer
- Boyle County Public Works
- Danville City Manager

Two meetings were held to encourage participation and obtain feedback from the local officials and stakeholders.

The first LO/S meeting was held on September 26, 2013 at Danville City Hall. Thirty people were in attendance. The purpose of this meeting was to define the role of the LO/S, present the existing conditions information, and solicit preliminary feedback regarding potential transportation issues and possible solutions. Numerous locations for potential projects were identified by attendees and were documented. Surveys were also distributed to attendees and available online to complete. The surveys asked questions about specific problems, areas they occur, and types of improvements needed. Four surveys were returned at the meeting and six were provided through the online survey. The completed surveys are included with the meeting documentation in **Appendix F** for reference.

A second meeting was held with LO/S on April 9, 2014 at Danville City Hall. Twenty-five people were in attendance. The purpose of this meeting was to present the proposed projects to the LO/S and obtain feedback, specifically regarding prioritization of the projects. Some changes were recommended to some of the projects presented. The attendees were also provided a worksheet to use to score the projects to help with the project prioritization process. Thirteen surveys were completed and returned at the meeting. A representative of the Danville Transportation Committee took some of the surveys with him and requested time to have absent members to fill out. At the time of the report, no additional surveys had been returned to KYTC District 7. The surveys that were collected are included in **Appendix F** for reference along with the meeting documentation.

Additionally, an interim meeting was held with a select group of stakeholders on November 13, 2013 at Danville's City Hall. The meeting was to discuss potential employment, residential, and school enrollment, as well as other important development and potential changes in growth and patterns within the area. This discussion was to provide any additional information that could be used for the Danville-Boyle County travel demand model to forecast volumes to the year 2040 (study horizon year). Attendees at the meeting included a representative from the Danville-Boyle County Planning and Zoning and Boyle County schools. Themes for the meeting included a discussion about access to the Boyle County schools complex, updates to the Danville-Boyle County Comprehensive Plan, potential areas for new growth, and locations of concerns in the study area based on expected growth / safety.

# 4.0 ALTERNATIVES DEVELOPMENT AND EVALUATION

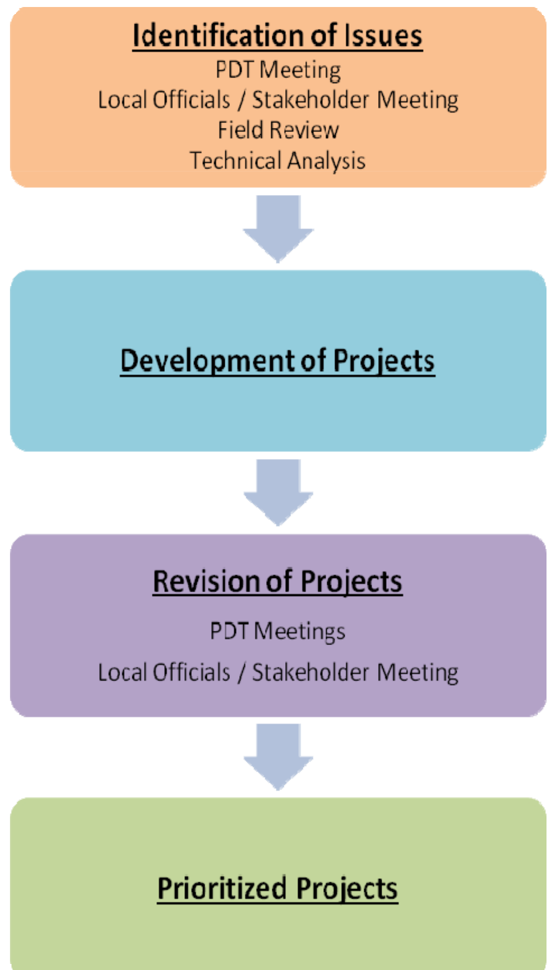
A detailed, multi-step process was used to develop and evaluate potential projects for the Danville SUA study. The process included technical analysis from the existing conditions review, input from the PDT, input from the local officials and stakeholders, and field reviews. The framework for developing and evaluating improvement projects is shown in **Figure 10.**

## 4.1 Identification of Issues

The first step in the project development process was to identify transportation issues related to safety, congestion and operations in the Danville area. These issues could range from specific spot locations where transportation improvements could be needed, to needs from a broader system perspective. Input from multiple sources was used to determine transportation issues within the study area. These include the following:

- PDT Meeting #1 – September 26, 2013
- LO/S Meeting #1 – September 26, 2013
- Field Review – September 26, 2013
- PDT Meeting #2 – January 22, 2014
- LO/S Meeting #2 – April 9, 2014
- PDT Meeting #3 – April 9, 2014

**Figure 10: Project Development Steps**




At the first series of meetings and field review on September 26, 2013, several locations and issues were identified regarding the overall transportation network in Danville as well as specific spot locations. These locations and issues are listed on **Table 9**. The attendees for the LO/S meeting were very engaged in the project process and provided a number of issues / problem locations. They were also given survey evaluation forms which were turned in at the meeting or submitted online. Generally, all issues mentioned from these meetings were added to the list for evaluation. Additional detail about each issue can be found in the specific meeting minutes and surveys in **Appendix F**.

Based on the technical analysis discussed in the existing conditions section, areas / spots with poor levels of service and / or high crash rates were also included in the list of issues and locations.

# Table 9: Development of Projects

| Location | Issues | Initial List of Improvements | | Revised List of Improvement Projects | |
|---|---|---|---|---|---|
| | | Project # | Improvement Project | Project # | Improvement Project |
| 2nd St / E Walnut St | Incidents with roadside fixed objects | L-1 | Clear Zone Improvements | L-B | Extend curb lines on all four corners |
| Gose Pike / Baughman Ave | High crash intersection (per Emergency Responders) | L-2 | Intersection / Safety Improvement | L-D | Add NB left turn lane and restripe. Install W3-1 advance stop sign warning and upgrade double arrow to oversize sign (60x30) |
| Baughman Ave (Gose Pike to US 127) | Lack of pedestrian amenities | L-3 | Safety Improvement | L-C | Add sidewalk along north side of Baughman Ave within the residential portion of the corridor |
| Walton Ave / Walton Crossing / Jane Trail | Pedestrian amenities needed | L-4 | Safety Improvement | L-E | Crosswalk and sidewalk connectivity provided throughout shopping area |
| Walton Ave / Jane Trail | Pedestrian amenities needed | L-5 | Safety Improvement | Combined with L-4 (L-E) | |
| Study Area | Lighting across the city | n/a | Policy / Procedural | L-F | New lighting FAQ and procedure to gain KYTC approval for install |
| KY 34 / KY 2168 | Education and signage for trucks and visitors | ST-1 | Signage | ST-C | Provide adequate signage to detour through, recreational and truck traffic away from downtown |
| KY 34 / Seminole Trail | Congestion and lack of pedestrians amenities | ST-2 | Safety Improvement / Capacity Enhancement | ST-D | Re-align Barbee Way and re-stripe on KY 34 for defined turn lanes. Crosswalks are provided along KY 34 |
| KY 2168 / US 127 | Increased traffic volumes results in fewer safe opportunities to makes left turns. Additionally location of a fatal crash | ST-3 | Signal Warrant Analysis | ST-A | Conduct a signal warrant analysis to evaluate the need for a traffic signal |
| US 127 / Argyll Dr | Subdivision access on high speed road with limited sight distance and flooding issues | ST-4 | Intersection Improvement | ST-B | Upgrade drainage and provide cleared ditch line for improved sight distance |
| US 127 (Main St) / Maple Ave | Proximity to downtown, college and mixed traffic with out of town visitors is creating operational issues | ST-5 | Intersection Improvement | ST-E | Re-stripe / further delineate westbound approach; add grass median on either side of mid-block crossing on Maple Ave. |
| KY 34 (KY 2324 to E Main St) | Paint has faded resulting in driver confusion | ST-6 | Corridor Improvement | Combined with LT-1 (LT-D) | |
| KY 52 (US 150) / Admiral Stadium | Special event generator with left turns into the complex that shut down northbound flow on KY 52. Also issues with flooding | ST-7 | Lane Markings and Drainage Improvements | ST-F | Refresh lane markings and provide 12 foot ditch on west side of roadway |
| US 150B / Gose Pike | Issue regarding the frequency of traffic being stopped for Gose Pike traffic | ST-8 | Signal Timing | ST-K | Signal operation and timing to coordinate with the Daniel Drive traffic signal |
| US 127 (S 3rd St) / Fackler St | Two way stop controlled intersection. ROW issues resulting in poor sight distance which is reportedly causing crashes at intersection | ST-9 | Re-paving / Lane Markings | ST-H | Re-paving scheduled by KYTC includes removing parking and adding a bicycle lane. Provide stop bars on the pavement of the side streets |
| US 127 (S 4th St) / Fackler St | Two way stop controlled intersection which is reportedly experiencing many crashes at the intersection | ST-10 | Re-paving / Lane Markings | ST-G | Re-paving scheduled by KYTC includes removing parking and adding a bicycle lane. Provide stop bars on the pavement of the side streets |
| US 127 / Southtown Dr | Congested and high crash section before bypass intersection | ST-11 | Access Management Treatments | Combined with LT-5 (LT-H) | |
| US 127B / Smoky Way | Full access driveway at a two-way stop controlled intersection along a high speed corridor | ST-12 | Signal Warrant Analysis / Access Management Treatments | ST-J | Eliminate full access and implement right-in and right-out access for shopping center and restaurants at Fireside Dr. Conduct signal warrant analysis for Smoky Way intersection |
| US 127B / KY 37 | Signalized intersection close to railroad crossing with sight line confusion | ST-13 | Intersection Improvement | ST-I | Review / revise traffic signal timing, phasing and signage |
| US 150 (US 127B to Cunningham Dr) | Multi-use path needed to connect schools to park | ST-14 | Safety Improvements | L-A | 10 foot multi-use path on north side of US 150 |
| US 150 / KY 3366 | High crash area with many rear-end crashes | ST-15 | Intersection Improvement | Combined with LT-9 (LT-A) | |
| US 150 / E Walnut St | Greatly skewed intersection, in which the north and south bound lanes are aligned into an adjacent business at the traffic signal | ST-16 | Intersection Reconfiguration | LT-E | Re-align intersection with a roundabout |
| KY 37 (KY 300 to US 127B) | High crash rate factor on narrow and curvy rural road with truck traffic. | ST-17 | Corridor Safety Improvement | LT-G | High friction pavement applications, re-align sharp curve, and add pavement / shoulders near US 127B |
| KY 34 (KY 2324 to KY 1805) | Multiple access points and lack of sidewalks create high number of conflict points and unsafe connectivity for pedestrians | LT-1 | Corridor Improvement | LT-D | Access management treatments where feasible with a median and limiting turns in the less residential portions closer to KY 2168. Re-align intersection with KY 2324 and provide clear route signage for wayfinding. Improve sidewalks to current standards and provide connectivity through corridor where applicable |
| KY 2324 / KY 34 | Intersection with geometric constraints surrounded by historic district | LT-2 | Safety and Capacity Improvement | Combined with LT-1 (LT-D) | |
| KY 2324 / KY 33 | Intersection with geometric constraints surrounded by historic district | LT-3 | Intersection Reconstruction | LT-B | Re-stripe (11 foot lanes) providing designated left turn lane or right turn lanes. Consider purchasing small piece of ROW from adjacent property owners for a right turn pocket. |
| KY 2324 (KY 33 to KY 34) | Historic area with much congestion | LT-4 | Capacity Improvement | LT-C | Narrowing the lane widths and providing a center two-way left-turn lane or providing additional clear zone area |
| US 127 (Lisa Ave to US 127B) | Highly congested area with multiple access points. Pedestrian connectivity is limited and in some places there are no facilities | LT-5 | Corridor Improvement | LT-H | SB right turn lane from US 127 to US 127B and increase channelized section of the EB right turn lane onto US 127. Access management treatments by limiting full access and installing curb delineators. |
| US 127 / US 127B | Additional turn lanes and congestion | LT-6 | Turn Lanes | Combined with LT-5 (LT-H) | |
| US 150 / US 127B | High crash area and lack of sidewalks | LT-7 | Signal Timing | Combined with LT-9 (LT-A) | |
| Study Area | No current maps / materials available for routes | LT-8 | Planning Study / Wayfinding Maps | L-G | Bicycle Master Plan; map / brochure development |
| US 150 (KY 3366 to US 127B) | High speed section of US 150 also has a high crash rate factor | LT-9 | Corridor Improvement | LT-A | 1) Narrowing lane widths and constructing a median. 2) Additional striping for turn lanes at the US 127 B intersection and providing a designated left turn pocket from US 150 onto KY 3366. 3) Perform a signal warrant analysis for the US 150 / KY 3366 intersection |
| US 127B / US 150B Corridor | Many full access driveways are spread out along the southern part of the Danville Bypass. Most of which are pointed to in stakeholder comments about being difficult to enter the highway through. | LT-10 | Access Management / Operational Treatments | Removed from further study as there are individual projects that address problem areas along the corridor. | |
| KY 34 (US 127B to US 150) | KY 34 widening needed | LT-11 | Road Widening | LT-F | Widen the existing KY 34 corridor |
| Study Area | Additional rail crossing for improved operations | LT-12 | Planning Study | LT-I | Study additional feasible rail crossing locations in the City of |

### 4.2 Development of Projects

A list of projects was developed to address these issues where possible. Areas with specific emphasis were those with numerous responses by the local officials and stakeholders (in the written survey responses). They include the following locations:

- Main Street and 3rd Street – Congestion, crashes and difficult pedestrian crossing (mentioned eight times)
- Houstonville Road and US 127B – Congestion, crashes, confusing intersection, difficult pedestrian crossing, and bike detection (mentioned seven times)
- E. Lexington Road Corridor – Congestion, crashes and lack of sidewalks / bike path (mentioned six times)

Other areas of emphasis included locations where the technical analysis showed an overlap with identified issues and identified safety and / or operations issue based on the existing conditions analysis. Some of these areas include:

- US 150 segment at US 127 B – Level of Service is E and there is a CCRF of 2.63 on this section.
- KY 34 from Parkview Drive to Grabruck Street – Level of Service is E
- US 127 and US 127B intersection – High CCRF on all approaches to this intersection (ranging from 1.07 to 5.02)
- KY 37 – High CCRF (ranging from 1.57 to 3.15)
- US 127 and KY 2168 intersection – Fatality at this intersection

Additional projects were developed in response to other transportation and safety issues.

As directed at the outset of the study, projects were categorized by implementation type, i.e. Local (L), Short-Term (ST) and Long-Term (LT). More specifically:

- Local projects are projects that are identified but need to be implemented / funded using local funding.
- Short-Term projects are projects that the State can fund, can be completed relatively quickly, and use Safety or Maintenance funds, (i.e. they do not need to be included in the Six Year Highway Plan).
- Long-Term projects are projects funded by the State, but require a more significant amount of time to complete and require more funding, and therefore will be considered for addition to the Six Year Highway Plan or other long-range planning documents.

Further clarification of a Long-Term project was discussed at the final PDT meeting (April 9, 2014). It was determined that a project may also be assigned to the Long-Term category if there are additional project concerns / constraints that may result in a higher level of difficulty with regard to design and/or implementation. Such considerations include projects within historic districts or those that may impact a cultural / historic resource or other sensitive environmental feature. Therefore, while the planning level-cost estimate may be a lower dollar amount, the level of difficulty for implementation may lead to a project being classified in the Long-Term category.

Each project initially was assigned a project number within each category of projects. It should be noted that the initial letter designation was not a reflection of priority. Table 9 shows the developed list of projects that resulted from the initial list of issues. The issue is listed in the first column with the resulting project listed in the middle column next to it.

At the beginning stages of the project development process, it was noted by KYTC D-7 staff that US 127 was scheduled for repaving. As a result, the District staff was working on a road diet project along Main Street from 1$^{st}$ Street to 5$^{th}$ Street. Along the one-way portions of US 127, bicycle lanes were to be added. As a result of these identified projects, additional projects were not pursued for these locations. Subsequently at the end of the study, the road diet was removed from consideration as a project.

## 4.3 Revision of Projects

### 4.3.1 Future Year Traffic Analysis

As part of the project development / revision process, future year traffic volumes were determined for the study area with particular emphasis on locations that may have capacity issues. Any recommendations should be made to ensure future year demand is met. At this high level of study, only road segments with capacity concerns were evaluated since turning movement forecasts were not developed for the intersections.

Traffic forecasting information for the future year was provided by KYTC with input from Parsons Brinckerhoff and select stakeholders. The Danville / Boyle County travel demand model was used by KYTC and updated per stakeholder comment, population and employment data, and project information. Model output was used to determine growth rates for study area roadways which were then forecasted to the future year 2040. **Figure 11** provides an overview of the future year traffic volumes within the study area.

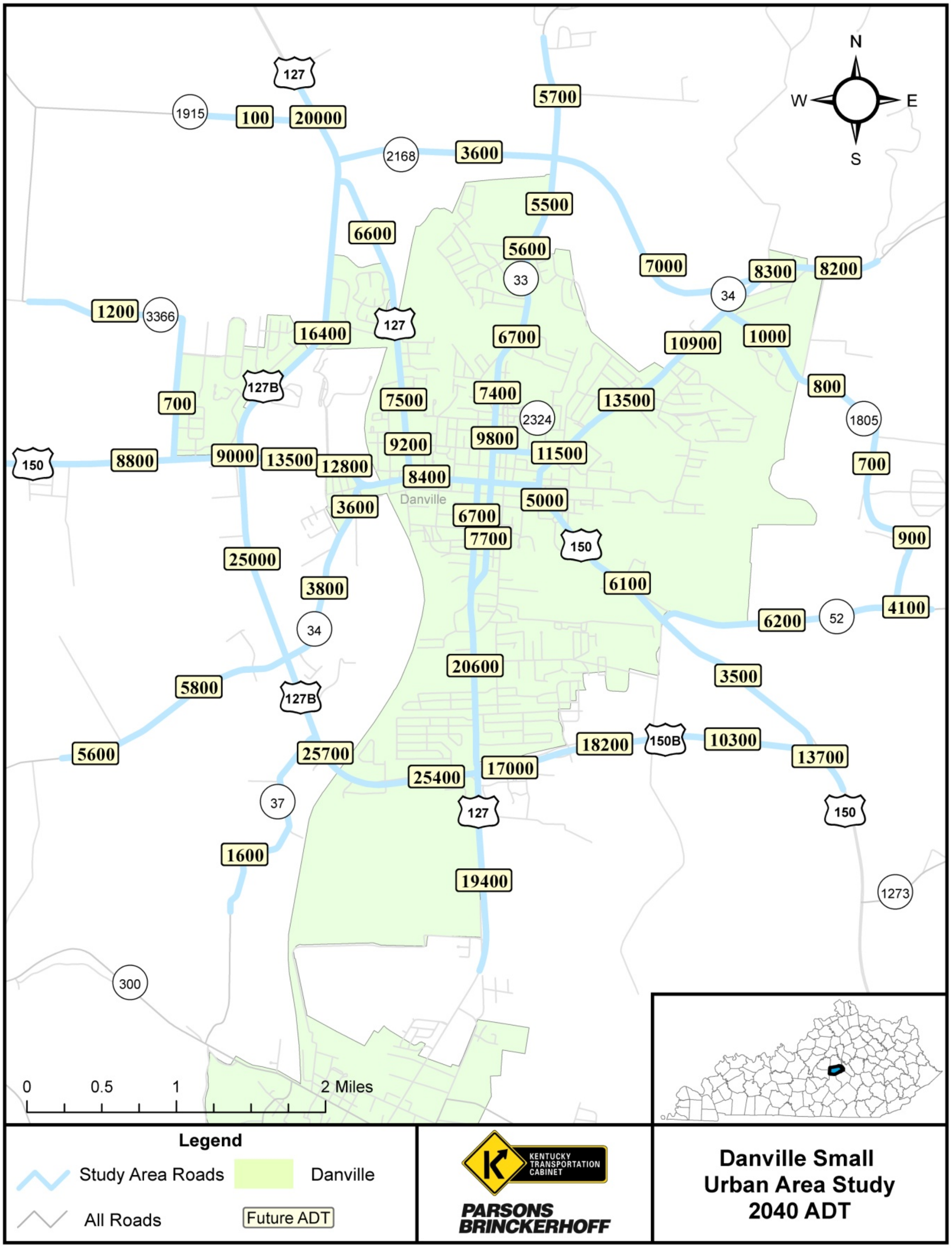
These volumes were used to update the traffic and capacity analysis. **Figure 12** shows the future year (2040) traffic operations for the study area.

The primary projects of concern that have capacity implications include the following:

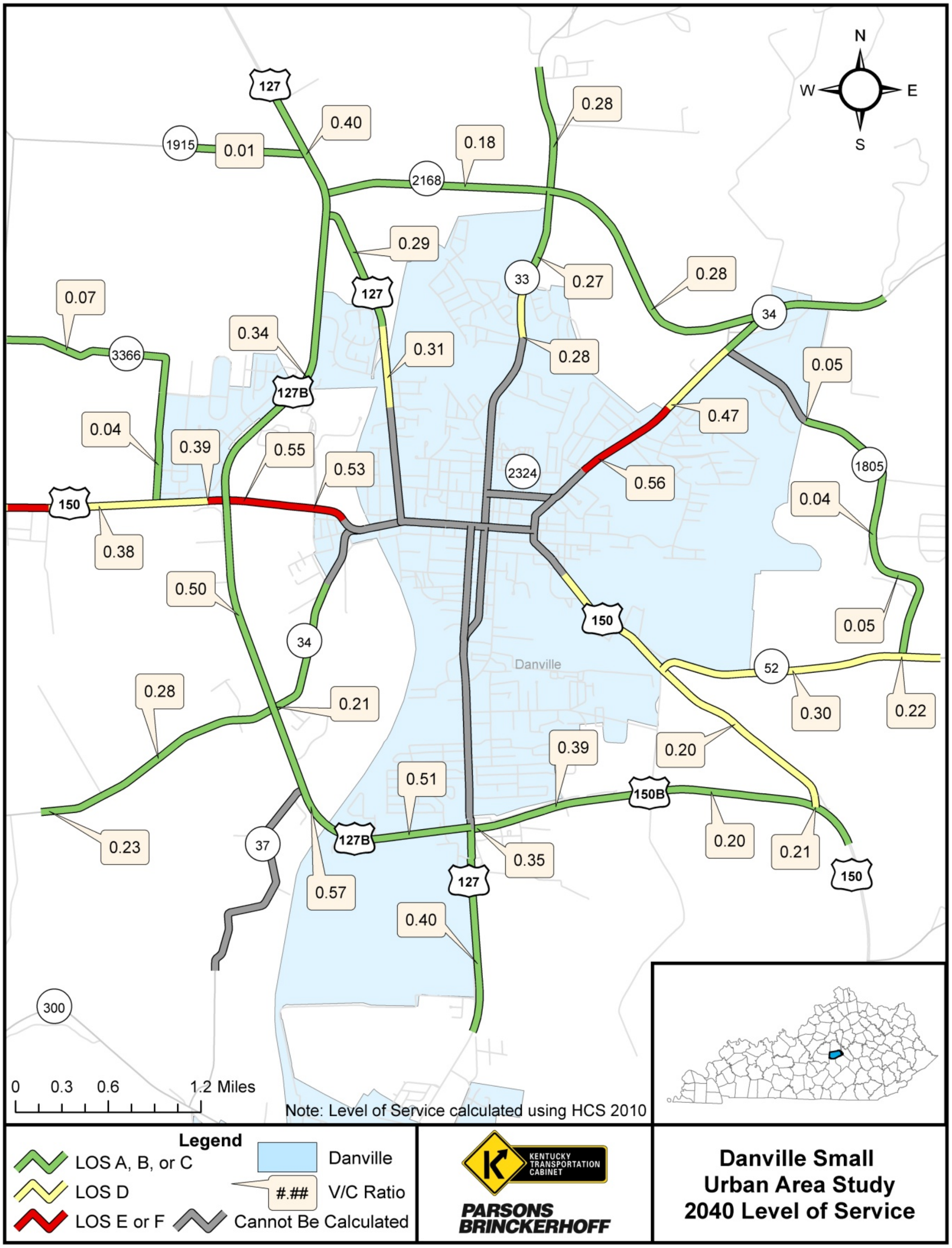
- US 150 Corridor (KY 3366 to US 127B)
- KY 2324 Corridor (KY 33 to KY 34)
- KY 34 Corridor (KY 2324 to KY 1805)
- KY 34 Corridor (US 127B to US 150)
- KY 37 Corridor (KY 300 to US 127B)

To ensure appropriate design of the projects, the future year traffic volumes and LOS were evaluated for these projects and included in the final project sheets.

# Figure 11: 2040 Average Daily Traffic Volumes



## Figure 12: 2040 Levels of Service and Capacity



### 4.3.2 First Revision

Following the initial development of improvement projects, additional work was completed to determine the resulting impacts. This detailed analysis considered:

Traffic Impacts – For all Short-Term and Long-Term projects, traffic was evaluated by looking at current and future year ADT and LOS. Traffic operations (volume and LOS) were not evaluated for the Local projects as detailed information was not available for them.

Safety Impacts – To evaluate safety impacts for each of the proposed projects, a qualitative assessment of the project's improvements with respect to safety was performed, along with the calculation of a critical crash rate factor for that project.

Data used to calculate critical crash rate factors was not available for Local projects; therefore, it was not considered in the evaluation process of the projects in this category. Some projects were noted as high crash locations by the stakeholders or local officials. For Short-Term and Long-Term projects, the critical crash rate factor was calculated for the segment if the project was corridor-wide or for a spot if the project was at a specific location.

Human and Natural Environment Impacts – Each project's impacts on both the human and natural environment were evaluated. Impacts with regards to wetlands, karst topography, Environmental Justice and landfills / USTs were evaluated. An additional memorandum was provided and included in **Appendix C** related to any known environmental impacts based on the identified projects.

Discussions with the PDT also helped with the revision / re-categorization of projects. This initial list of revised projects is provided in **Table 9** (on page 45, furthest column on the right). The numbering system was also revised at this point to be based on a letter assignment. Projects are now identified by a letter and generally ordered from north to south / east to west across the study area within each category. **Table 10** (on page 52) provides a list of the projects in order for reference.

### 4.3.3 Second Revision

Following PDT Meeting #2, the revised set of projects was further defined through the development of planning-level cost estimates for each project. Parsons Brinckerhoff developed the construction and design costs based on design experience and KYTC's unit prices. The KYTC District 7 staff estimated right-of-way and utility relocation costs where applicable.

The first revised set of projects as shown in **Table 10** were presented at the second LO/S meeting and scored by those in attendance. **Figures 13 – 15** show the results from the surveys returned at the meeting. It should be noted that based upon discussion at the meeting the decision was made to switch Project ST-D: KY 34 /

Seminole Trail from Short-Term to Local. It became apparent that all of the work proposed for this project was on side streets and would therefore fall under local jurisdiction.

Based upon recommendations made at the LO/S meeting and the third (and final) PDT meeting, it was agreed that some projects should be revised and a few re-categorized. Some of the most notable changes included the following:

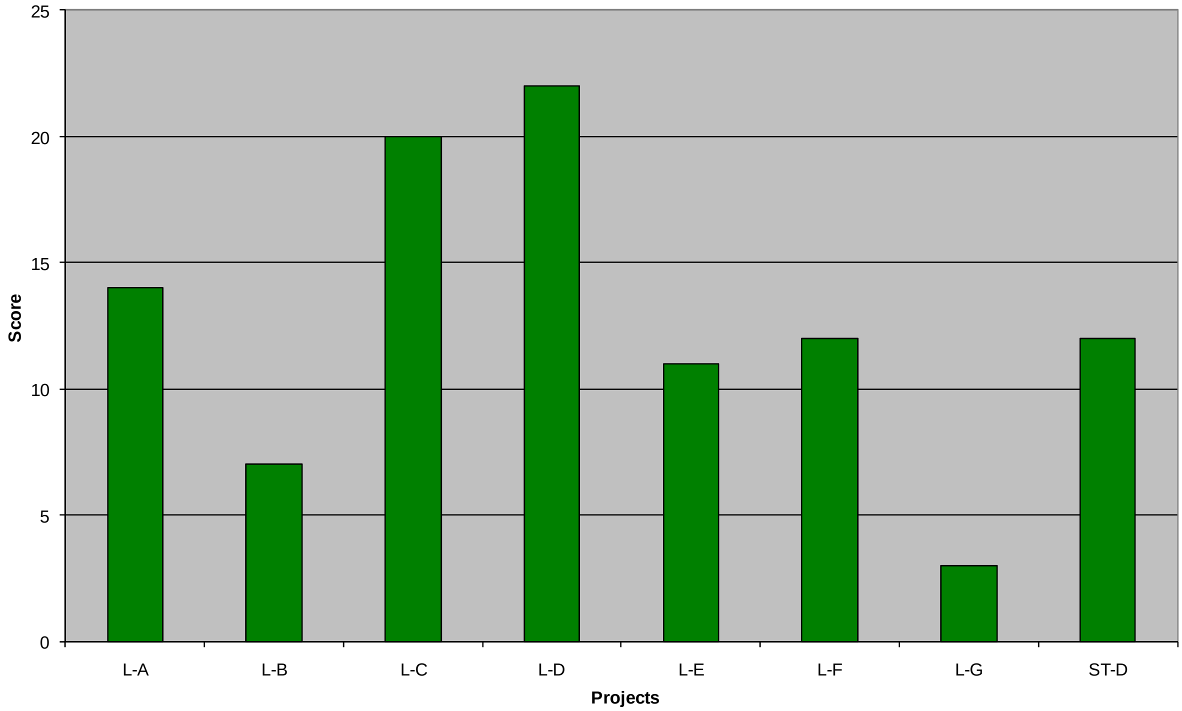
- ST-F: KY 52 / Admiral Stadium. It was requested at the LO/S meeting to extend the project an additional 1,500 feet in order to fully address the drainage problem along the corridor. The cost and scope of the project changed such that it was moved to the Long-Term category (LT-J).
- ST-B: US 127 / Argyll Drive. This project has a higher cost component and scope of work than what is expected under the discussed definition of a Short-Term improvement and it was moved to the Long-Term category (LT-B).
- ST-J: Project was revised to allow for left turns from the fire house through the median. It was relabeled as ST-G.
- LT-C: This project was combined with LT-B to form one project for the corridor. The scope of LT-B is changed so that bicycle lanes can be included in the typical section and installed with paint along the corridor to minimize the cost.

The final revised set of projects is shown in **Table 10** as noted under the “Revised Project ID” heading.

## Table 10: Revised Set of Projects

<table>
<tr><th>Project Type</th><th>Project ID</th><th>Project Description</th><th>Revised Project ID</th></tr>
<tr><td rowspan="7">Local</td><td>L-A</td><td>10-foot multi-use path on north side of US 150</td><td>L-A</td></tr>
<tr><td>L-B</td><td>2nd St / E. Walnut St: Extend curb lines on corners</td><td>L-B</td></tr>
<tr><td>L-C</td><td>Add sidewalk along north side of Baughman Ave</td><td>L-C</td></tr>
<tr><td>L-D</td><td>Gose Pike / Baughman Ave: NB left turn lane and new signage</td><td>L-D</td></tr>
<tr><td>L-E</td><td>Crosswalk and sidewalk connectivity throughout Wal-Mart shopping area</td><td>L-E</td></tr>
<tr><td>L-F</td><td>New lighting FAQ and procedure to gain KYTC approval for install</td><td>L-F</td></tr>
<tr><td>L-G</td><td>Bicycle Master Plan; map / brochure development</td><td>L-G</td></tr>
<tr><td rowspan="11">Short-Term</td><td>ST-A</td><td>KY 2168 / US 127: Signal warrant analysis</td><td>ST-A</td></tr>
<tr><td>ST-B</td><td>US 127 / Argyll Dr: Upgrade drainage and clear ditch line</td><td>LT-B</td></tr>
<tr><td>ST-C</td><td>KY 34 / KY 2168: Truck route signage</td><td>ST-B</td></tr>
<tr><td>ST-D</td><td>KY 34 / Seminole Trail: Re-align Barbee Way and re-stripe for defined turn lanes on KY 34</td><td>L-H</td></tr>
<tr><td>ST-E</td><td>US 127 / Maple Ave: Re-stripe WB approach and grass median along Maple Ave</td><td>ST-C</td></tr>
<tr><td>ST-F</td><td>KY 52 / Admiral Stadium: Lane markings and 12-foot ditch for drainage</td><td>LT-J</td></tr>
<tr><td>ST-G</td><td>US 127 (S 4th St) / Fackler St: Stop bars on side streets</td><td>ST-D</td></tr>
<tr><td>ST-H</td><td>US 127 (S 3rd St) / Fackler St: Stop bars on side streets</td><td>ST-E</td></tr>
<tr><td>ST-I</td><td>US 127B / KY 37: Review / revise traffic signal timing, phasing and signage</td><td>ST-F</td></tr>
<tr><td>ST-J</td><td>US 127B / Smoky Way: Signal warrant analysis and access management for Fireside Dr</td><td>ST-G</td></tr>
<tr><td>ST-K</td><td>US 150B / Gose Pike: Signal operation to coordinate with the Daniel Dr traffic signal</td><td>ST-H</td></tr>
<tr><td rowspan="9">Long-Term</td><td>LT-A</td><td>US 150 Corridor: Median, turn lanes, and signal warrant analysis</td><td>LT-A</td></tr>
<tr><td>LT-B</td><td>KY 2324 / KY 33: Left turn pocket on KY 33 and right turn lane on KY 2324</td><td rowspan="2">LT-C</td></tr>
<tr><td>LT-C</td><td>KY 2324 Corridor: Narrowing the lane widths and provide additional clear zone area</td></tr>
<tr><td>LT-D</td><td>KY 34 Corridor: Median, limit turns, realign KY 2324 intersection, and improve sidewalks</td><td>LT-D</td></tr>
<tr><td>LT-E</td><td>US 150 / E. Walnut St: Re-align intersection with a roundabout</td><td>LT-E</td></tr>
<tr><td>LT-F</td><td>KY 34 Corridor: Widen and re-design access to US 150 (KY 52)</td><td>LT-F</td></tr>
<tr><td>LT-G</td><td>KY 37 Corridor: High friction pavement applications, re-align curve and add pavement</td><td>LT-G</td></tr>
<tr><td>LT-H</td><td>US 127 Corridor: Turn lanes, access management, and median delineators</td><td>LT-H</td></tr>
<tr><td>LT-I</td><td>Study additional feasible rail crossing locations in the City of Danville</td><td>LT-I</td></tr>
</table>

**Figure 13: LO/S Prioritization for Local Projects**




Note: Project ST-D shown above was later re-named to L-H as it was moved from the Short-Term projects to the Local projects.

**Figure 14: LO/S Prioritization for Short-Term Projects**

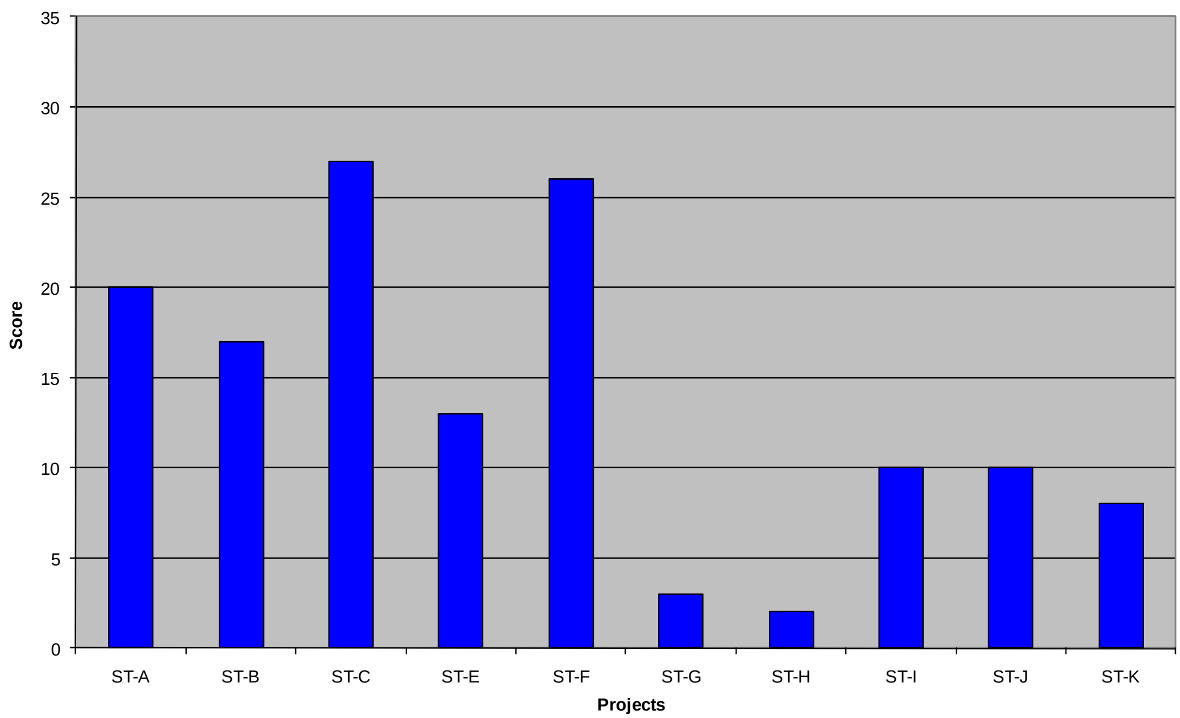
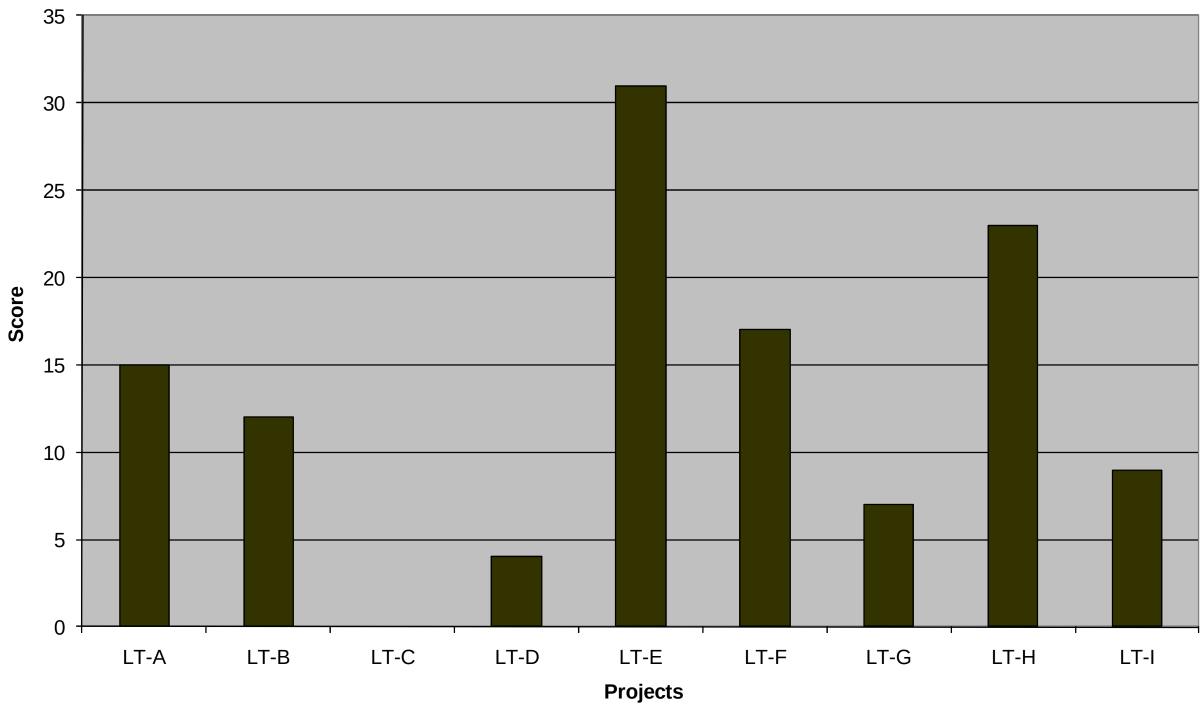


**Figure 15: LO/S Prioritization for Long-Term Projects**




Several additional projects were discussed at the LO/S meeting that were not originally included in the list of identified projects. They include the following:

- Consider a project on KY 52 at the intersection of US 150 and also eastbound towards the study area boundary.
- Wilderness Road (KY 34 between Main and KY 2324) – consider making it a one way northbound roadway.
- Corridor study extension of Gose Pike to KY 34 closer into town (inner ring bypass around downtown). From KY 150 and KY 52 intersection to somewhere along KY 34 near Rolling Hills.

It was determined at the PDT meeting that followed the LO/S meeting that the first project may be added to the Boyle County list of projects from KYTC District 7. The second project area is included in LT-D. A proposal to look at a one-way street could be included in the re-design of the corridor during the next project phase. The third project has been identified previously as noted in Section 2.1 of this study.

# 5.0 RECOMMENDATION AND PRIORITIZATION

## 5.1 Recommended Projects

Based on all input from the PDT, the LO/S, field reviews, and technical analysis, 26 projects were recommended as a result of this study. They are broken down by the following categories:

- 8 Local
- 8 Short-Term
- 10 Long-Term

**Table 11** below shows the final list of projects.

### Table 11: Final List of Projects

| Project Type | Project ID | Project Description | Cost Estimate* (2014 Dollars) |
|---|---|---|---|
| Local | L-A | 10-foot multi-use path on north side of US 150 | $174,000 |
| | L-B | 2nd St / E. Walnut St: Extend curb lines on corners | $90,000 |
| | L-C | Add sidewalk along north side of Baughman Ave | $395,000 |
| | L-D | Gose Pike / Baughman Ave: NB left turn lane and new signage | $280,000 |
| | L-E | Crosswalk and sidewalk connectivity throughout Wal-Mart shopping area | $530,000 |
| | L-F | New lighting FAQ and procedure to gain KYTC approval for install | Not Applicable |
| | L-G | Bicycle Master Plan; map / brochure development | Study Only: $150,000 |
| | L-H | KY 34 / Seminole Trail: Re-align Barbee Way and re-stripe for defined turn lanes on KY 34 | $400,000 |
| Short-Term | ST-A | KY 2168 / US 127: Signal warrant analysis | Not Applicable |
| | ST-B | KY 34 / KY 2168: Truck route signage | $3,000 |
| | ST-C | US 127 / Maple Ave: Re-stripe WB approach and grass median along Maple Ave | $52,000 |
| | ST-D | US 127 (S 4th St) / Fackler St: Stop bars on side streets | $1,500 |
| | ST-E | US 127 (S 3rd St) / Fackler St: Stop bars on side streets | $1,500 |
| | ST-F | US 127B / KY 37: Review / revise traffic signal timing, phasing and signage | Not Applicable |
| | ST-G | US 127B / Smoky Way: Signal warrant analysis and access management for Fireside Dr | $27,000 |
| | ST-H | US 150B / Gose Pike: Signal operation to coordinate with the Daniel Dr traffic signal | Not Applicable |
| Long-Term | LT-A | US 150 Corridor: Median, turn lanes, and signal warrant analysis | $685,000 |
| | LT-B | US 127 / Argyll Dr: Upgrade drainage and clear ditch line | $345,000 |
| | LT-C | KY 2324 Corridor: Turn lanes at KY 33 intersection and bicycle lanes along corridor | $104,000 |
| | LT-D | KY 34 Corridor: Median, limit turns, realign KY 2324 intersection, and improve sidewalks | $149,000 |
| | LT-E | US 150 / E. Walnut St: Re-align intersection with a roundabout | $1,090,000 |
| | LT-F | KY 34 Corridor: Widen and re-design access to US 150 (KY 52) | $3,000,000 |
| | LT-G | KY 37 Corridor: High friction pavement applications, re-align curve and add pavement | $2,210,000 |
| | LT-H | US 127 Corridor: Turn lanes, access management, and median delineators | $440,000 |
| | LT-I | Study additional feasible rail crossing locations in the City of Danville | Study Only: $250,000 |
| | LT-J | KY 52 / Admiral Stadium: Lane markings and 12-foot ditch for drainage | $655,000 |

*Includes Design, Right-of-Way, Utilities, and Construction Costs as applicable

These projects in their final form are presented in the following pages. Each project sheet contains the issues related to the project as well as the improvement and cost estimate. The sheets were developed with the intention of providing stand-alone project information that can be used for future project development.

**Figure 16** shows the full range of all projects (Local, Short-Term, and Long-Term). **Figures 17 – 19** showcase the location of each group of projects for reference.

## Figure 16: Overall Project Map

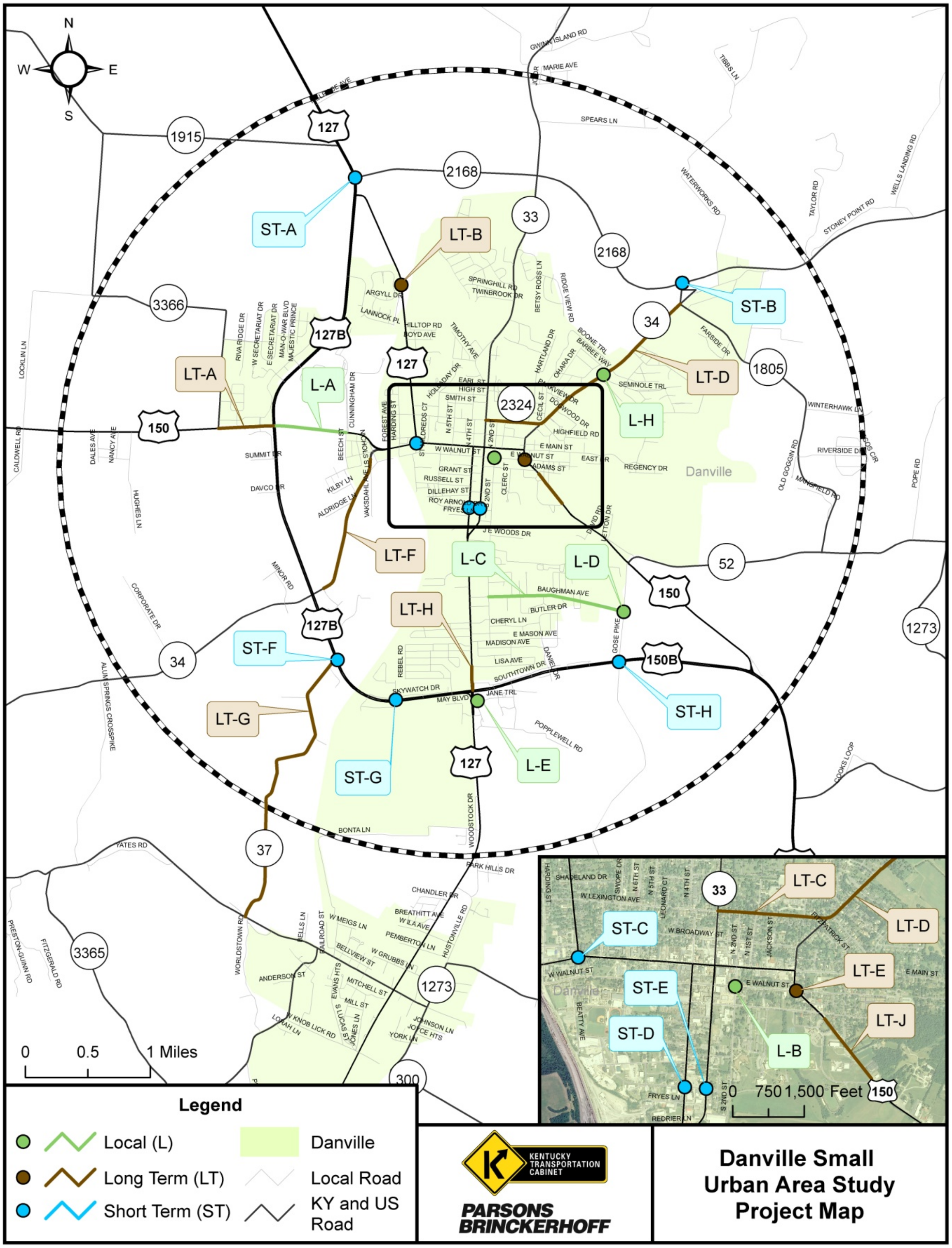
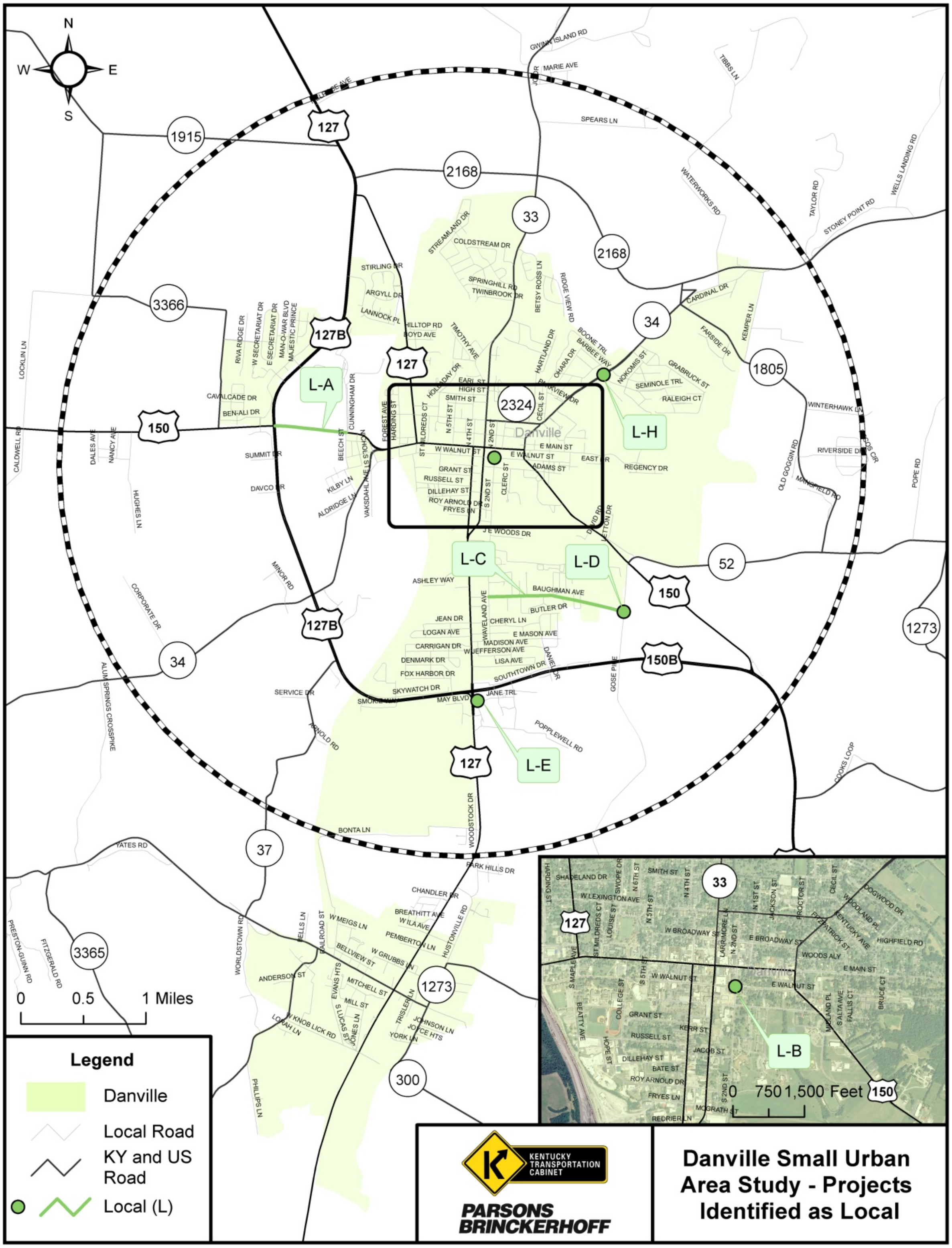
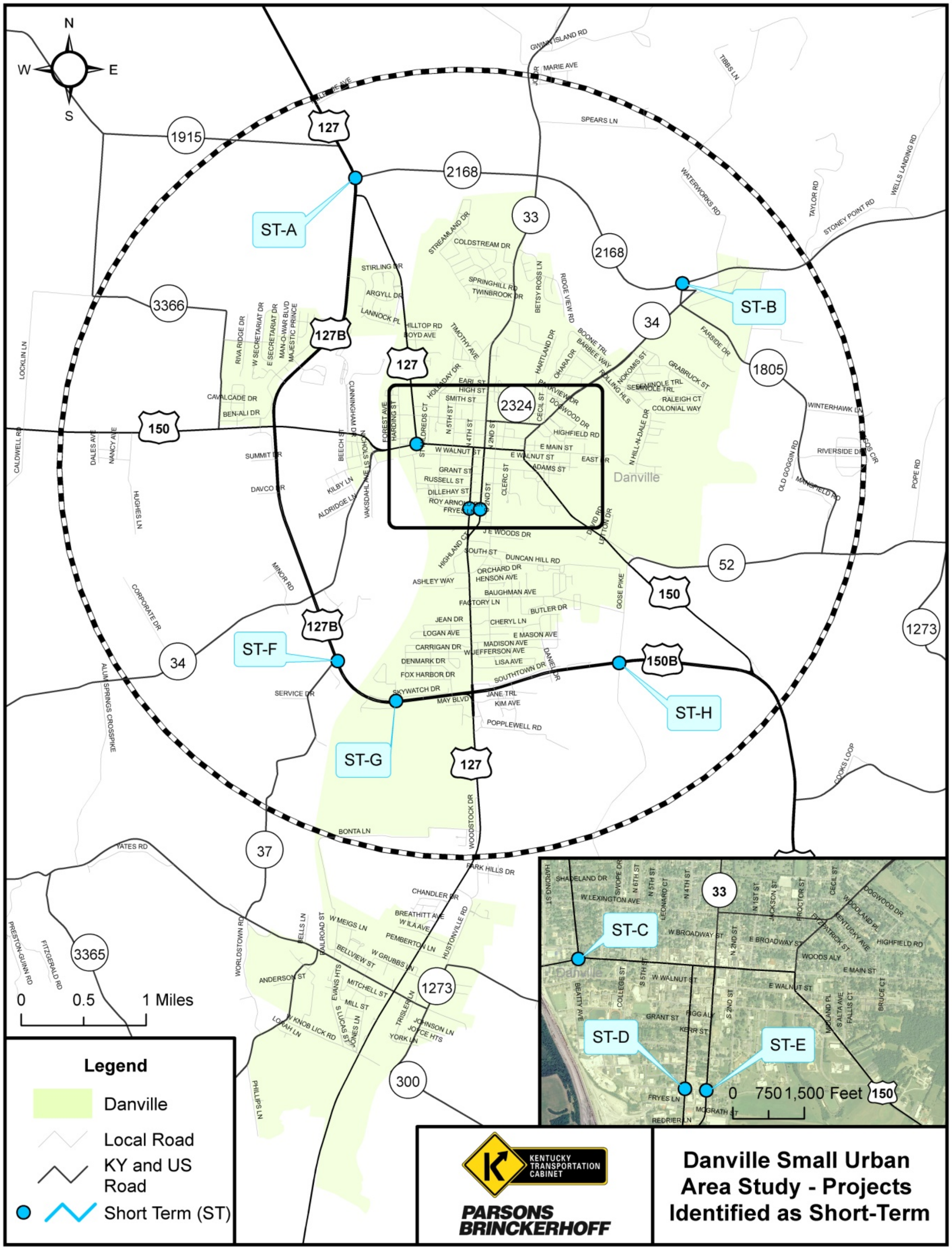


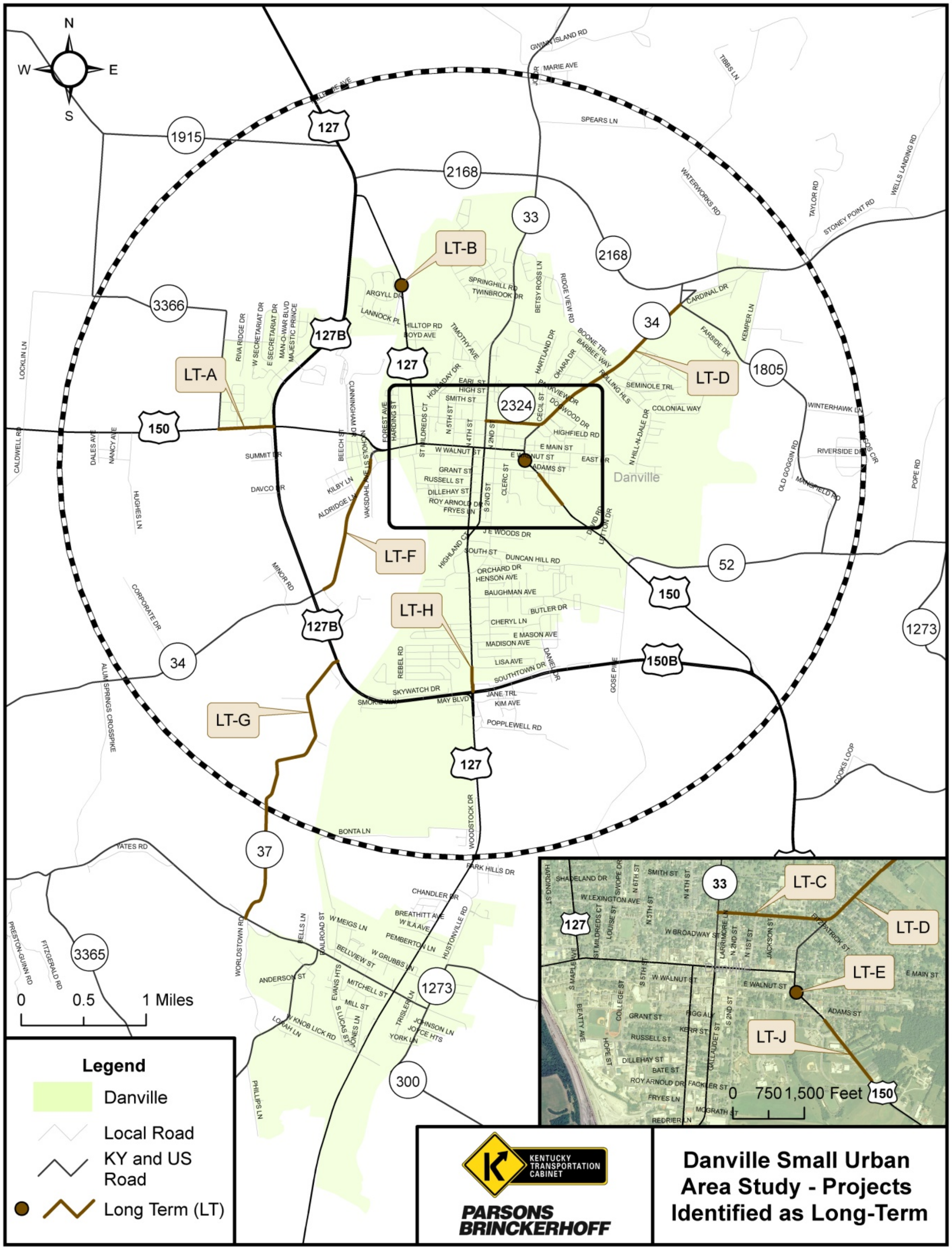
**Figure 17: Local Project Locations**



## Figure 18: Short-Term Project Locations



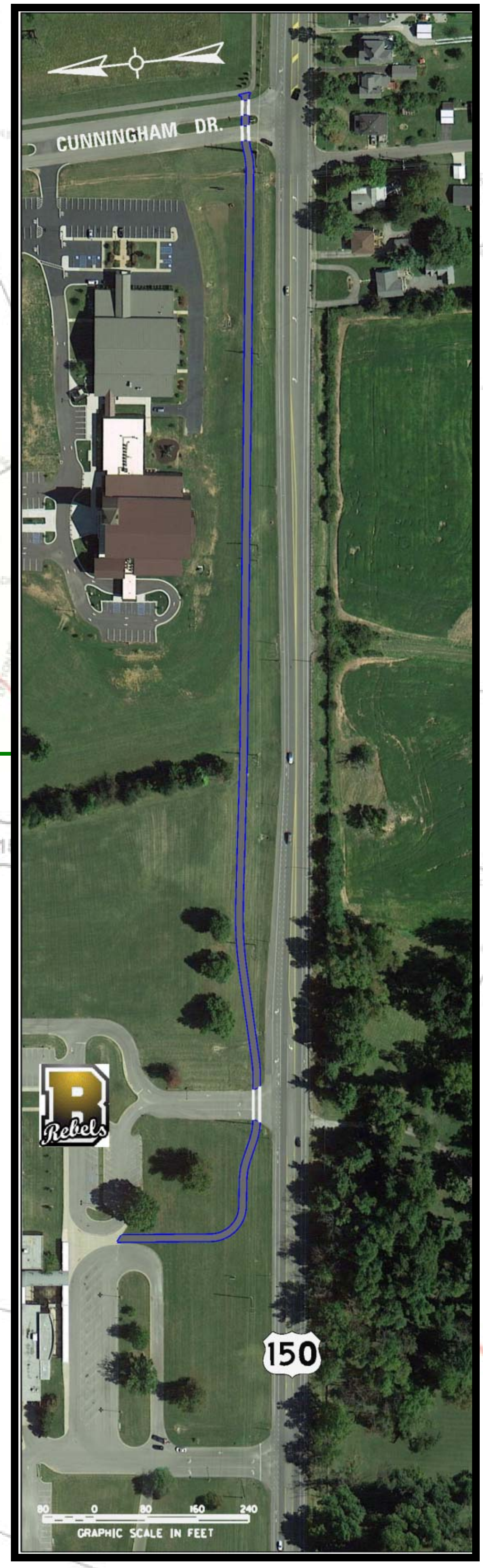
# Figure 19: Long-Term Project Locations



# US 150 Corridor: US 127B (MP 13.326) to Cunningham Dr (MP 12.911)

**Project #L-A**

## PROBLEM




### Project Background:

Pedestrian connectivity around school complex currently does not exist. Sidewalks end at Cunningham Dr and only bike lanes continue to the bypass. This deters any possible students from walking to school to promote healthier lifestyles.

US 150 ADT = 10,800 (2011) / 13,500 (2040)
LOS = D (2011) / E (2040)
v/c ratio = 0.46 (2011) / 0.55 (2040)

### Project Issues:

- Lack of sidewalks
- Difficult pedestrian crossing

## SOLUTION

### Project Type:

Multimodal Improvement

### Project Solution:

Construct 10-foot multi-use path on north side of US 150 for connectivity to the school, church and park complex.

KYTC does not construct sidewalk and trail systems as individual projects but can assist with seeking additional funding sources through grants and the Safe Routes to School program.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 25,000 |
| ROW: | $ 55,000 |
| Construction: | $ 94,000 |
| Total: | $ 174,000 |

### Project Priority:

Medium

# 2nd St / E. Walnut St Intersection Project #L-B

## PROBLEM

### Project Background:

Tight right-of-way results in utility / signal / lighting poles being located in close proximity to the travel lanes.

*View from northwest corner*

### Project Issues:

- ***SAFETY***
- Utility poles being struck by vehicles
- High usage pedestrian area
- Located within an area that may have minority and low-income populations

*Westbound approach*

## SOLUTION

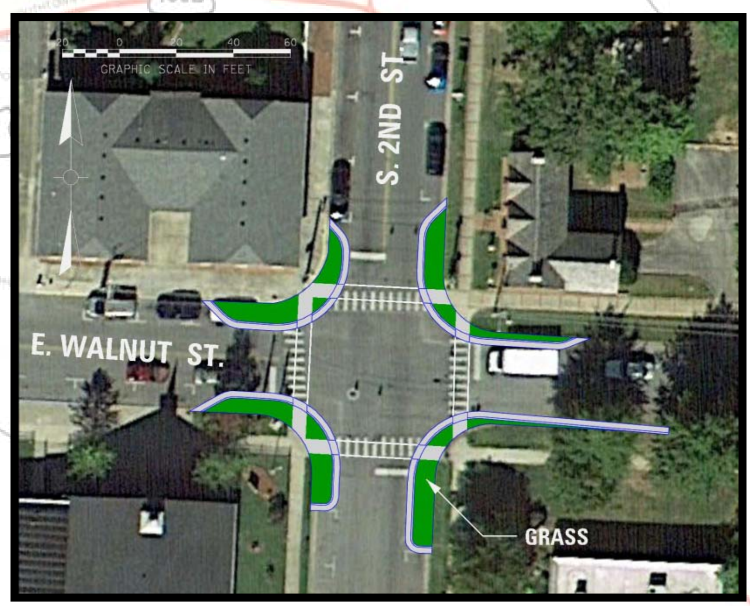
### Project Type:

Clear Zone Improvements

### Project Solution:

Extend curb lines on all four corners of intersection thereby increasing the distance between the travel lanes and the utility / signal / lighting poles. To accomplish this, two parking spaces will be removed on E. Walnut St. Can use grass or concrete depending on preferences. Grass is currently shown and included in the cost estimate.

Look for ways to incorporate this project in an overall streetscape project.




### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 15,000 |
| Utilities: | $ 25,000 |
| Construction: | $ 50,000 |
| Total: | $ 90,000 |

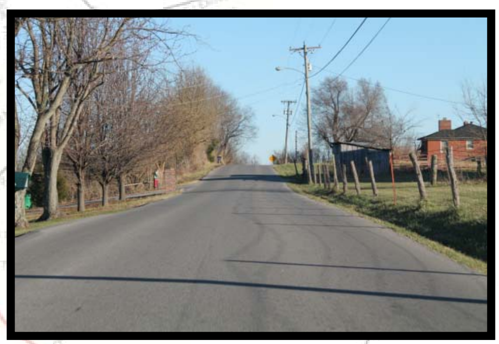
**Project Priority:** Low

# Baughman Ave Corridor (Gose Pike to US 127)



## PROBLEM

*Traveling eastbound on Baughman Ave*



*Traveling eastbound on Baughman Ave*

### Project Background:

High crash corridor (per Emergency Responder comment) with limited shoulder, pedestrian amenities and sight distance along the corridor.

### Project Issues:

- ***SAFETY***
- Sight distance
- Lack of sidewalks
- High crash frequency (per Emergency Responders)
- Located within an area that may have minority, elderly, and disabled populations
- Stream crossing of unnamed tributary of Clarks Run

## SOLUTION


### Project Type:

Safety Improvement

### Project Solution:

Add sidewalk along north side of Baughman Ave within the residential portion of the corridor.

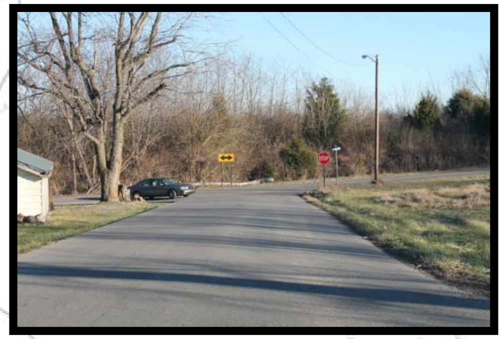
### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 40,000 |
| ROW: | $ 95,000 |
| Construction: | $ 260,000 |
| Total: | $ 395,000 |

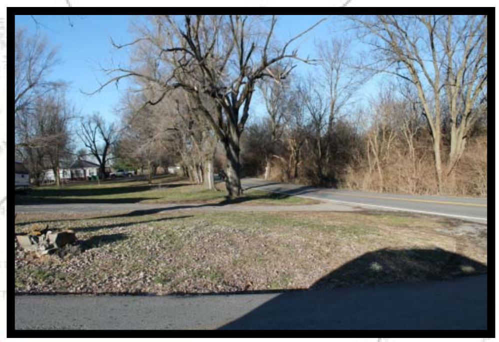
### Project Priority:

High

# PROBLEM



*Eastbound approach*



*View from eastbound stop bar*

## Project Background:

High crash area with limited shoulder and sight distance issue(s) along the corridor.

## Project Issues:

- *SAFETY*
- Sight distance
- High crash frequency (per Emergency Responders)
- Signage
- Public comment (survey and Stakeholder Meeting)

# SOLUTION


## Project Type:

Intersection / Safety Improvement

## Project Solution:

Geometrics – Add northbound left turn lane and restripe to further delineate travel lanes.

Signage – Install W3-1 (advance stop sign warning) and upgrade double arrow to oversize sign (60x30).

## Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 40,000 |
| Utilities: | $ 40,000 |
| Construction: | $ 200,000 |
| Total: | $ 280,000 |

## Project Priority:

High

**Danville SUA**

## Walton Ave / Walton Crossing Ave / Jane Trail

## Project #L-E

# *PROBLEM*

### Project Background:

Access and flow to the Wal-Mart and adjoining businesses can be difficult for traffic and pedestrians / bicyclists to navigate.

### Project Issues:

- ***SAFETY***
- Lack of sidewalks
- Difficult pedestrian crossings
- Lack of connectivity throughout development


# *SOLUTION*

### Project Type:

Safety Improvement

### Project Solution:

Limit left turns from Jane Trail onto US 127. Sidewalk extensions from restaurant to west side of Wal-Mart with a pedestrian crossing marked. Additional pedestrian crossings marked on the east side of Walton Ave near Jane Trail. Provide a new full-length sidewalk along Jane Trail and north of Jane Trail along Brent Ave.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 50,000 |
| Utilities: | $ 40,000 |
| Construction: | $ 440,000 |
| Total: | $ 530,000 |

### Project Priority:

Medium

# PROBLEM

### Project Background:

Throughout the study area there have been numerous instances where street lighting needs have been noted by various stakeholders / local officials.

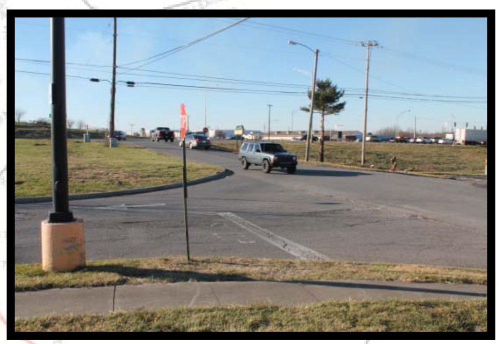
*KY 2168 / US 127 Intersection*

### Project Issues:

- *SAFETY*

### Locations of Concern:

- Wal-Mart Shopping Center Area
- New KY 34 / KY 2168 Intersection
- KY 2168 / US 127 Intersection
- US 150 / E. Walnut Street Intersection



*Intersection near Wal-Mart Shopping Center*

# SOLUTION

### Project Type:

Policy / Procedural

### Project Solution:

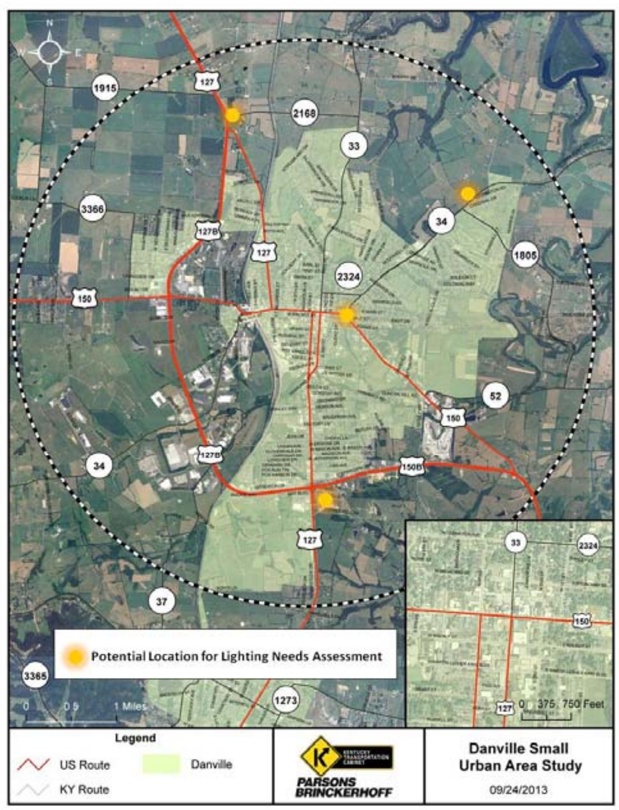
Roadway lighting plans shall be designed by a prequalified engineer and reviewed and approved by the KYTC Division of Traffic.

### Project Cost Estimate (2014 Dollars):

Not Applicable

### Project Priority:

Medium



# PROBLEM

## Project Background:

There is public opinion and support regarding the need for multimodal improvements, especially those to accommodate bicycles and to publicize bicycle routes in the area. Most recent work to provide multimodal improvements is a Community Trails Committee Master Plan for Future Projects Report (April 24, 2012) from a Community Trails Summit.


## Project Issues:

- ***SAFETY***
- ***CONGESTION***
- No current maps/materials available for routes
- Lack of route designation (infrastructure/detection)

# SOLUTION

## Project Type:

Planning Study / Wayfinding Maps

## Project Solution:

Plan for and designate appropriate corridors for alternative modes of transportation. On designated routes install bicycle detection and also appropriate uses of sharrows, bicycle lanes and multi-use paths. Develop map and brochures that can be distributed or posted online for bicycle and multi-use paths.

## Project Cost Estimate (2014 Dollars):

Study Only: $150,000

## Project Priority:

Low

# KY 34 (MP 14.534) / Seminole Trail Intersection

**Project #L-H**

## PROBLEM

### Project Background:

Busy access point with high vehicle and pedestrian volumes. Previously considered for a traffic signal installation but did not meet signal warrants.

KY 34 ADT = 15,400 (2010) / 13,500 (2040)

LOS = E (2010) / E (2040)

v/c ratio = 0.64 (2010) / 0.56 (2040)

*View from east corner*


*View from northwest bound stop bar*

### Project Issues:

- **CONGESTION**
- Pedestrian crossing
- Lack of sidewalks
- Located within an area that may have minority, low-income, elderly, and disabled populations

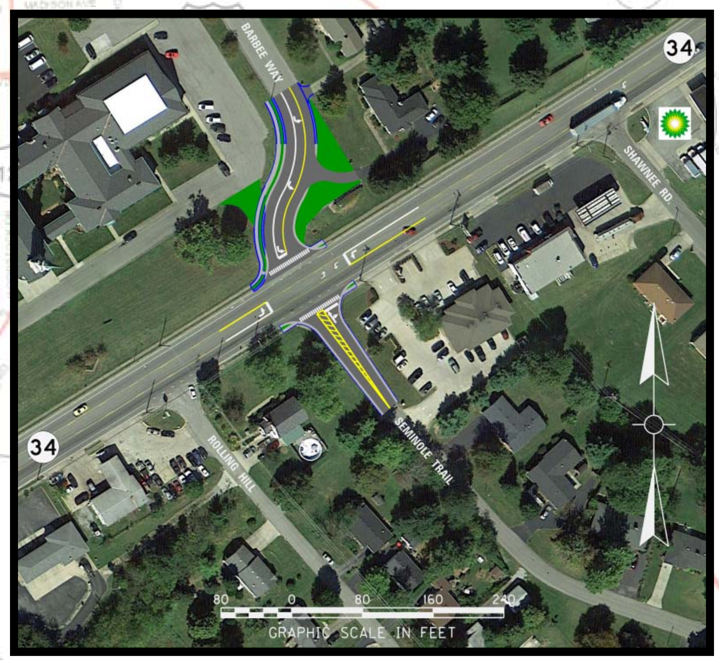
## SOLUTION

### Project Type:

Safety Improvement / Capacity Enhancement

### Project Solution:

Re-align Barbee Way for improved traffic flow and re-striping for defined turn lanes on KY 34. Crosswalks are not included across KY 34 at this time as this would create an unsafe condition for pedestrians crossing a high-speed roadway without signal protection.




### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 35,000 |
| ROW: | $ 140,000 |
| Utilities: | $ 75,000 |
| Construction: | $ 150,000 |
| Total: | $ 400,000 |

**Project Priority:** Medium

# KY 2168 (MP 0.000) / US 127 (MP 8.213) Intersection



## PROBLEM

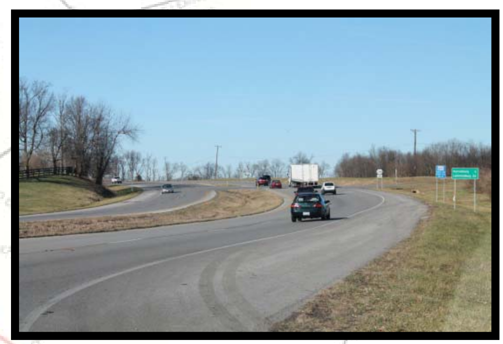
### Project Background:

Increased traffic volumes result in fewer safe opportunities to make left turns.

### Project Issues:

- CONGESTION
- SAFETY
- Location of fatal crash

*Westbound approach*



*Looking north from US 127B and US 127 split, south of intersection*

## SOLUTION

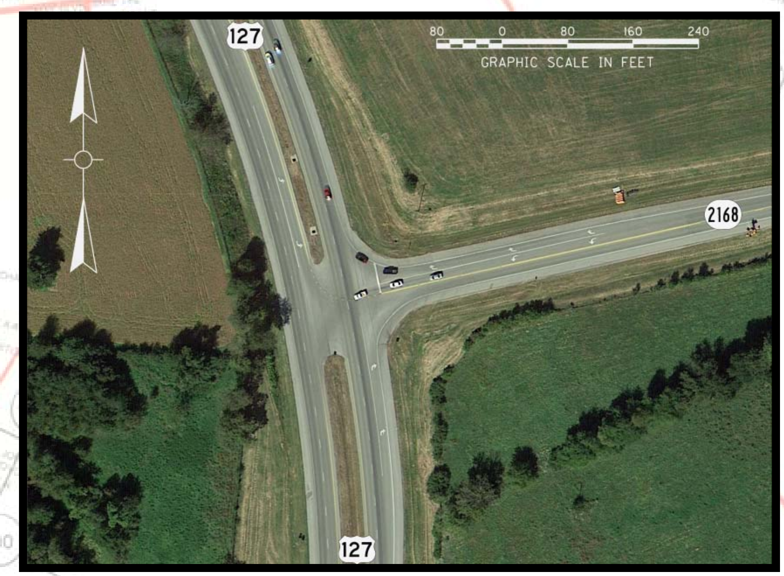
### Project Type:

Signal Warrant Analysis

### Project Solution:

Turning movement counts scheduled for Spring 2014

Conduct a signal warrant analysis to evaluate the need for a traffic signal at this location.




### Project Cost Estimate (2014 Dollars):

Not Applicable

### Project Priority:

Medium

# KY 34 / KY 2168 Intersection & KY 33 / KY 2168 Intersection

**Project #ST-B**

## PROBLEM

### Project Background:

New traffic signal installed as a part of completion of the bypass. Before completion of the project, truck traffic would travel through town.

*Southwest -bound approach*

### Project Issues:

- Sign new truck route
- More signage for visitors

*Current signage and signals heads*

## SOLUTION

### Project Type:

Signage


### Project Solution:

Provide adequate signage to detour through, recreational and truck traffic away from downtown and utilize the bypass. Signage should be at both the KY 34 and KY 33 intersections with KY 2168.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Construction: | $3,000 |
| Total: | $3,000 |

**Project Priority:** High

# PROBLEM

## Project Background:

Intersection proximity to downtown, college and mixed traffic with out of town visitors creating operational issues.

*View from eastbound approach*

## Project Issues:

- ***SAFETY***
- High Crash (CCRF = 3.14; Rear-end)
- Driver confusion – left turn from right lane on westbound approach
- Congestion
- Pedestrian usage
- Located within an area that may have minority, low-income, and elderly populations

*View from westbound approach*

# SOLUTION

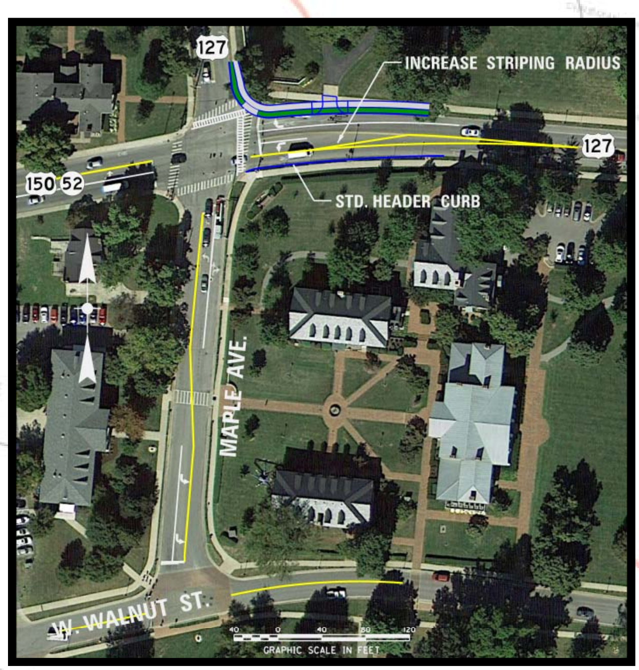
## Project Type:

Intersection Improvement

## Project Solution:

Re-paving scheduled by KYTC (FY 2014).

Re-stripe / further delineate westbound approach and shift curb / sidewalk to further re-align approach.




## Project Cost Estimate (2014 Dollars):

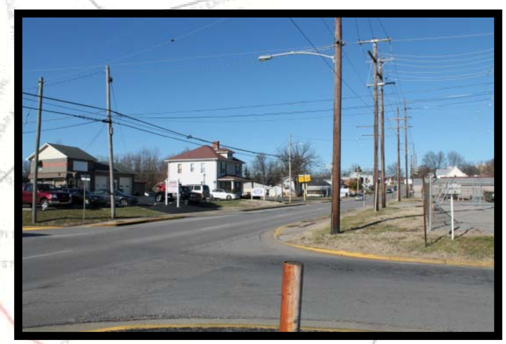
| | |
|---|---|
| Design: | $ 10,000 |
| Construction: | $ 42,000 |
| Total: | $ 52,000 |

## Project Priority:

Medium

# PROBLEM


*View from southwest corner*



*View from westbound stop bar*

## Project Background:

Two-way stop controlled intersection with right-of-way issues experiencing many crashes.

US 127 (S 4th St) = 8,230 (2011) / 6,700 (2040)

## Project Issues:

- High crash (CCRF = 6.49; Sideswipe Same Direction)
- Sight distance
- Located within an area that may have minority and low-income populations

# SOLUTION

## Project Type:

Re-paving / Lane Markings

## Project Solution:

KYTC has re-paving scheduled. Parking north and south of Fackler St will be removed with the pavement striped for a bicycle lane. This project provides additional stop bars on the pavement of the side streets. New pavement markings should utilize retro-reflective paint.


## Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Construction: | <u>$ 1,500</u> |
| Total: | $ 1,500 |

## Project Priority:

Low

# Danville SUA

# US 127 (S 3rd St) (MP 4.943) / Fackler St

## Project #ST-E

## PROBLEM

### Project Background:

Two-way stop controlled intersection with right-of-way issues resulting in poor sight distance and numerous crashes.

US 127 (S 3rd St) = 7,770 (2011) / 7,700 (2040)

### Project Issues:

- High crash (CCRF = 2.76; Angle)
- Sight distance issues
- Located within an area that may have a minority and low-income population

*Full car length past eastbound stop bar*

*View from northwest corner*

## SOLUTION

### Project Type:

Re-paving / Lane Markings

### Project Solution:

KYTC has re-paving scheduled. Parking south of Fackler St will be removed with the pavement striped for a bicycle lane. This project provides additional stop bars on the pavement of the side streets. New pavement markings should utilize retro-reflective paint.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Construction: | <u>$ 1,500</u> |
| Total: | $ 1,500 |

### Project Priority:

Low

# PROBLEM

Close proximity of intersection to railroad crossing

View of KY 37 approach

## Project Background:

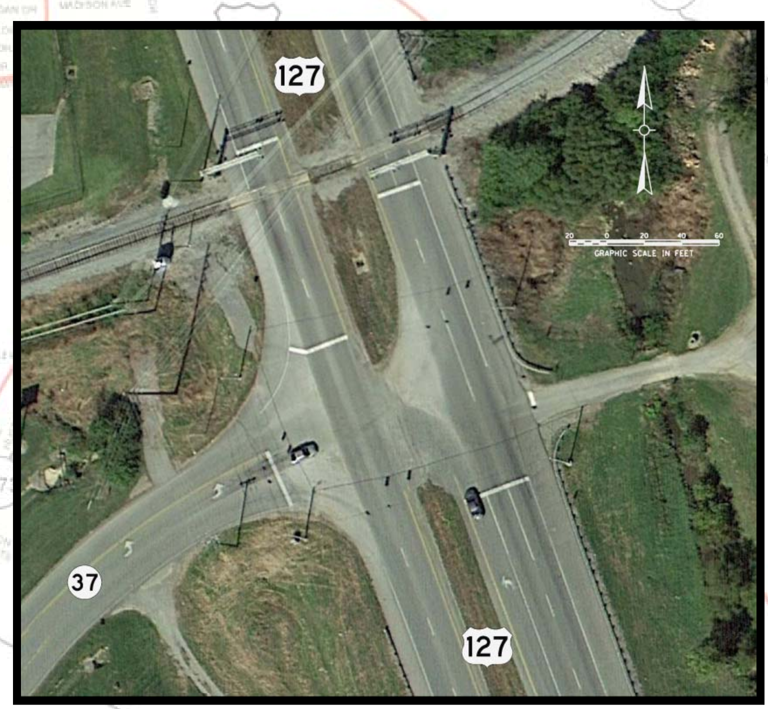
Signalized intersection close to railroad crossing with potential sight line confusion between railroad signals and traffic light signal heads.

US 127B ADT = 21,500 (2010) / 25,700 (2040)
LOS = B (2010) / C (2040)

## Project Issues:

- Traffic signal is confusing
- Lack of sidewalks
- Difficult pedestrian crossing but no pedestrian destinations nearby

# SOLUTION




## Project Type:

Intersection Improvements

## Project Solution:

Review / revise traffic signal timing, phasing and signage to guide travelers to their intended path.

## Project Cost Estimate (2014 Dollars):

Not Applicable

## Project Priority:

Low

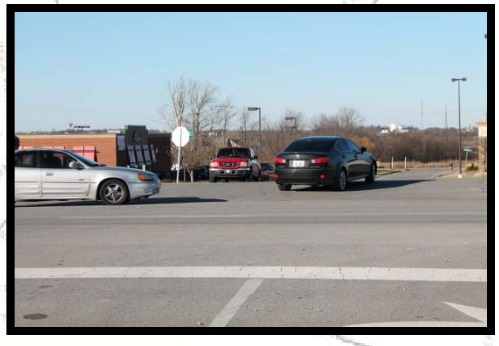
## PROBLEM

*View from northbound approach*

### Project Background:

Full access driveway at a two-way stop controlled intersection along a high speed corridor.

US 127B ADT = 21,500 (2010) / 25,400 (2040)
LOS = C (2010) / C (2040)



*Left turning traffic*

### Project Issues:

- High crash (CCRF = 1.07; Rear-end)
- Issues entering roadway (left-turn)
- Signage

## SOLUTION

### Project Type:

Signal Warrant Analysis / Access Management Treatments

### Project Solution:

Eliminate full access and implement right-in and right-out (RIRO) access for shopping center and restaurants at Fireside Dr. Grass pavers can be installed in the median to allow fire trucks to cross over and make left turns. Conduct signal warrant analysis for Smoky Way intersection.

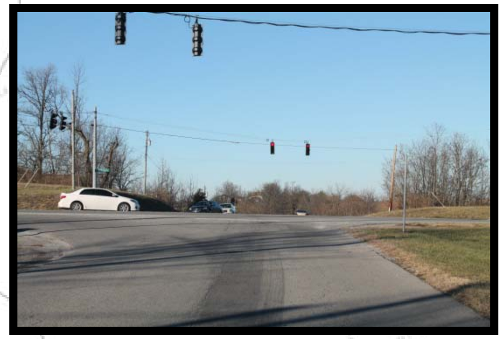
### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 5,000 |
| Construction: | $ 22,000 |
| Total: | $ 27,000 |

### Project Priority:

Low

## PROBLEM



*Northbound approach*

### Project Background:

Through vehicles on US 150B frequently stopped for Gose Pike traffic.

US 150B ADT = 14,300 (2011) / 18,200 (2040)
LOS = A (2011) / A (2040)

### Project Issues:

- Green time distribution for through traffic
- Coordination with other signals
- Public comment (Stakeholder Survey)

*Looking north from south of US 150B*

## SOLUTION

### Project Type:

Signal Timing

### Project Solution:

Signal operation and timing to coordinate with the Daniel Drive traffic signal located approximately 0.5 miles west of this intersection.

### Project Cost Estimate (2014 Dollars):

Not Applicable

### Project Priority:

Low

# US 150 Corridor: KY 3366 (MP 11.883) to US 127B (MP 12.326)

**Project #LT-A**

## PROBLEM

### Project Background:

Perryville Road serves as a commuting corridor for communities west of Danville. Additionally, land uses and development around the intersection with US 127B has resulted in inefficient traffic operations.

US 150 ADT = 6,630 (2012) / 9,000 (2040)
LOS = E (2012) / E (2040)
v/c ratio = 0.31 (2012) / 0.39 (2040)

### Project Issues:

- ***SAFETY***
- ***CONGESTION***
- High speed and CCRF = 2.63
- Majority of crashes are rear-end collisions
- Difficult for vehicles to enter roadway


## SOLUTION

### Project Type:

Corridor Improvement

### Project Solution:

Narrowing lanes and constructing an aesthetically pleasing median. Additional striping / retro-reflective paint markings for turn lanes at the US 127B intersection and providing a designated left turn pocket from US 150 onto KY 3366. Recommend a signal warrant analysis to determine if warrants are met for the installation at the KY 3366 intersection. If a signal is warranted, coordination with the existing traffic signal at US 127B is recommended.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 50,000 |
| ROW: | $ 65,000 |
| Utilities: | $ 30,000 |
| Construction: | $ 540,000 |
| Total: | $ 685,000 |

**Project Priority:** Medium

# PROBLEM

## Project Background:

Subdivision access on high speed road with limited sight distance and flooding issues.

North of Argyll Dr:
US 127 ADT = 4,830 (2011) / 6,600 (2040)
LOS = C (2011) / C (2040)
v/c ratio = 0.23 (2011) / 0.29 (2040)

South of Argyll Dr:
US 127 ADT = 4,830 (2011) / 6,600 (2040)
LOS = D (2011) / D (2040)
v/c ratio = 0.25 (2011) / 0.31 (2040)

*View of culvert in northwest corner*


*View from eastbound stop bar*

## Project Issues:

- ***SAFETY***
- Flooding / possible wetland
- Sight distance issues
- Public comment (survey and Stakeholder Meeting)

# SOLUTION

## Project Type:

Drainage / Sight Distance Improvements

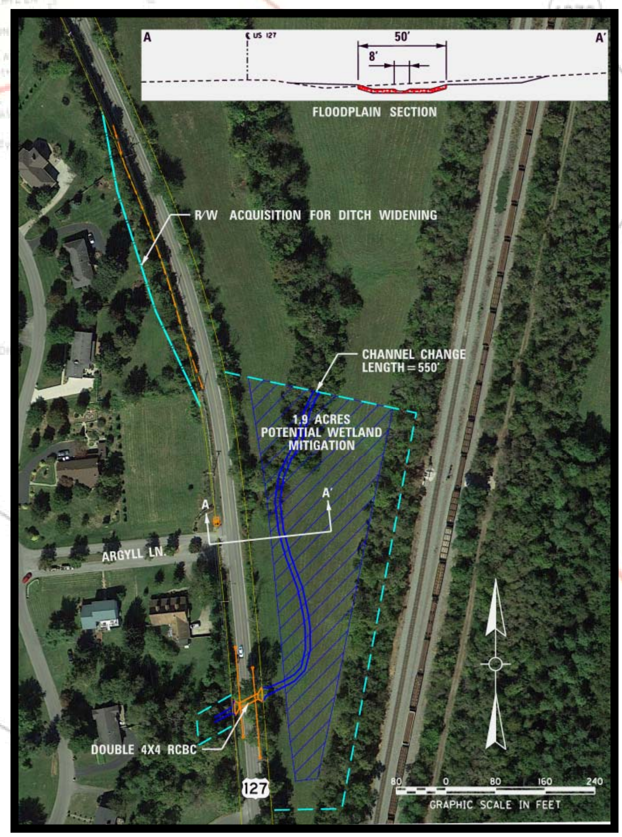
## Project Solution:

Upgrade drainage (install double 4x4 reinforced concrete box culvert) to insure water doesn't pond or breach roadway. Provide cleared ditch line for improved sight distance approaching the side street.

## Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 25,000 |
| ROW: | $ 20,000 |
| Utilities: | $ 70,000 |
| Construction: | $ 230,000 |
| Total: | $ 345,000 |

**Project Priority:** Medium



# KY 2324 Corridor: KY 33 (MP 0.000) to KY 34 (MP 0.423)



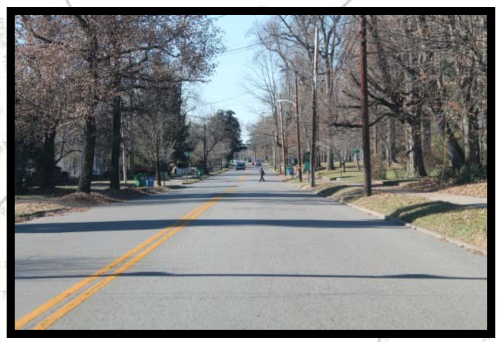
## PROBLEM

### Project Background:

Historic area with limited capacity and much congestion because of high traffic volumes.

KY 2324 ADT = 11,900 (2012) / 19,000 (2040)


*Looking west along corridor*



*Traveling west along corridor*

### Project Issues:

- ***CONGESTION***
- CCRF = 1.17
- Majority of crashes are rear-end collisions
- Lexington-Broadway Historic District with individually eligible properties in the area
- Located within an area that may have minority, low-income, and elderly populations

## SOLUTION


### Project Type:

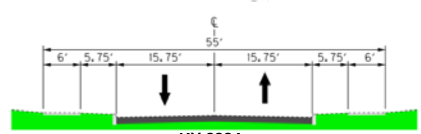
Corridor / Intersection Improvements

### Project Solution:

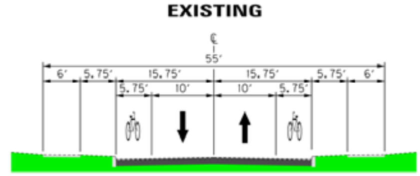
This improvement calls for narrowing the lane widths and providing a designated bicycle lane. At the KY 2324 / KY 33 intersection re-stripe lanes to provide left turn pockets on KY 33 and a right turn lane on KY 2324.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 15,000 |
| Utilities: | $ 25,000 |
| Construction: | $ 64,000 |
| Total: | $ 104,000 |




KY 2324
EXISTING




KY 2324
PROPOSED

**Project Priority:** Medium

## PROBLEM

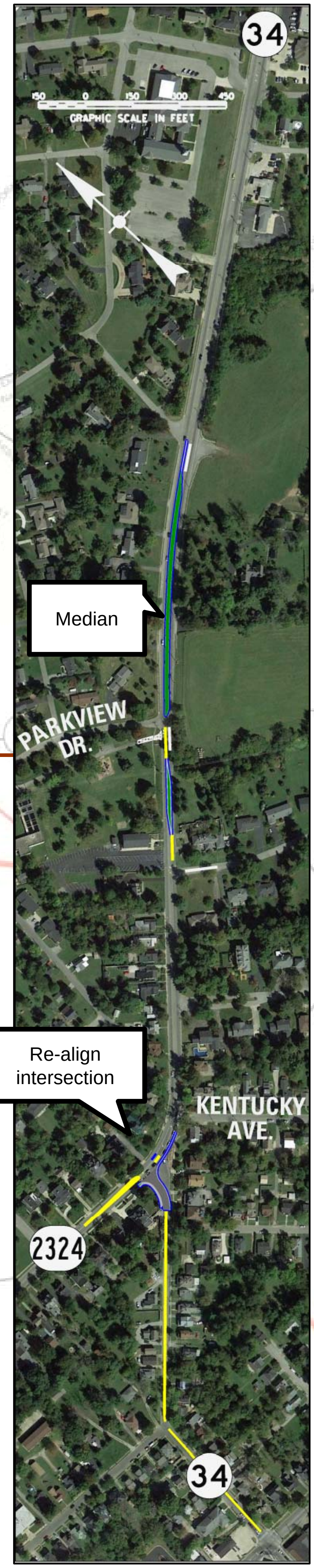
### Project Background:

Multiple access points and lack of sidewalks create high number of conflict points and unsafe connectivity for pedestrians.

KY 34 ADT = 15,400 (2010) / 13,500 (2040)
LOS = E (2010) / E (2040)
v/c ratio = 0.64 (2010) / 0.56 (2040)

### Project Issues:

- ***SAFETY***
- Numerous access points
- Faded pavement markings
- Wayfinding / signage
- Lack of sidewalks / sub-standard widths
- Located within an area that may have minority, low-income, elderly and disabled populations




## SOLUTION

### Project Type:

Corridor Improvement

### Project Solution:

Access management treatments where feasible, including installing a median and limiting turns in the less residential portions closer to KY 2168.

Realign intersection with KY 2324 and provide clear route signage for wayfinding.

Improve sidewalks to current standards and provide connectivity through corridor where applicable.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 25,000 |
| Utilities: | $ 30,000 |
| Construction: | $ 94,000 |
| Total: | $ 149,000 |

**Project Priority:** Low

Danville SUA

# US 150 (Stanford Ave) (MP 13.911) / E. Walnut Street Intersection

**Project #LT-E**

## PROBLEM

*View of northwest bound approach*

*View from northwest corner*

### Project Background:

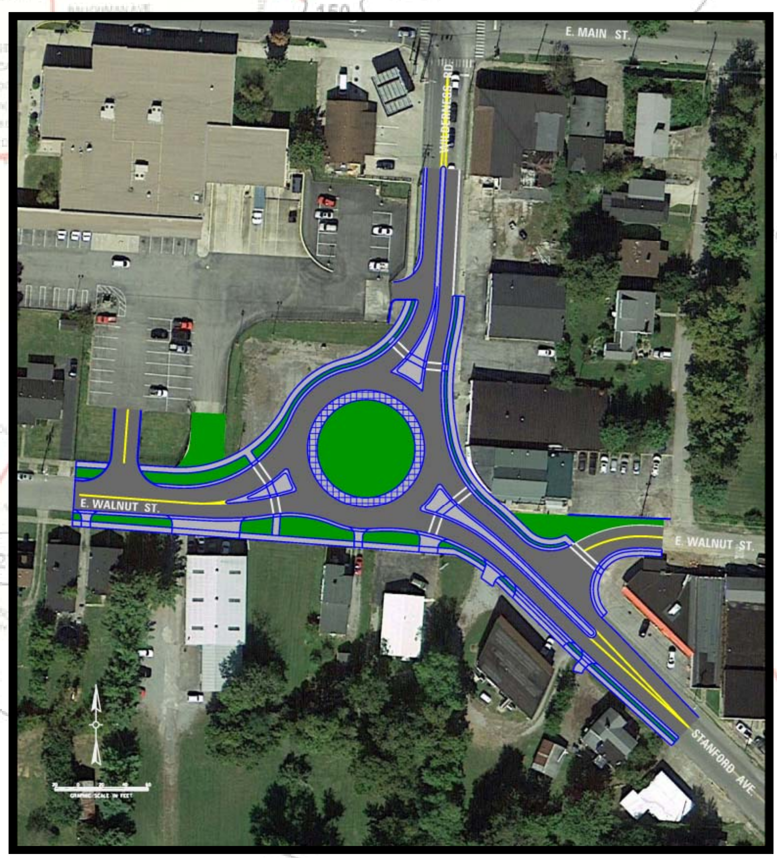
This intersection is severely skewed and signal heads are placed in front of adjacent business. Sight distance beyond the intersection is limited.

US 150 ADT = 6,760 (2011) / 5,000 (2040)

### Project Issues:

- ***SAFETY***
- CCRF = 2.09
- Majority of crashes are rear-end
- Traffic signals guide vehicles into businesses
- Located within an area that may have minority, low-income, and disabled populations

## SOLUTION




### Project Type:

Intersection reconfiguration

### Project Solution:

Re-align intersection with roundabout.

Final design should consider the treatments of additional driveway access points along the southern edge. May be included (per NE Roundabouts Workshop guidance: http://www.roundabouts.cc/) but should provide space for vehicles to turnaround and avoid backing into roundabout. Property acquisition and / or driveway realignment should be considered.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 100,000 |
| ROW: | $ 90,000 |
| Utilities: | $ 300,000 |
| Construction: | $ 600,000 |
| Total: | $ 1,090,000 |

**Project Priority:** High

# PROBLEM

## Project Background:

Narrow two lane corridor that serves the County School complex to avoid congestion at the US 127B and US 150 intersection to the west of the KY 34 intersection with US 150.

KY 34 ADT = 5,650 (2011) / 3,800 (2040)
LOS = D (2011) / C (2040)
v/c ratio = 0.28 (2011) / 0.21 (2040)

## Project Issues:

- ***SAFETY***
- Narrow lanes (a portion of corridor has 10-foot lanes)
- Numerous Karst features identified within the area
- Some bank erosion identified by site review
- Located within an area that may have minority, low-income, and disabled populations


# SOLUTION

## Project Type:

Road Widening

## Project Solution:

Widen to three lanes and re-align access to US 150 (KY 52).

## Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 205,000 |
| ROW: | $ 325,000 |
| Utilities: | $ 400,000 |
| Construction: | $ 2,070,000 |
| Total: | $ 3,000,000 |

## Project Priority:

Medium

# PROBLEM

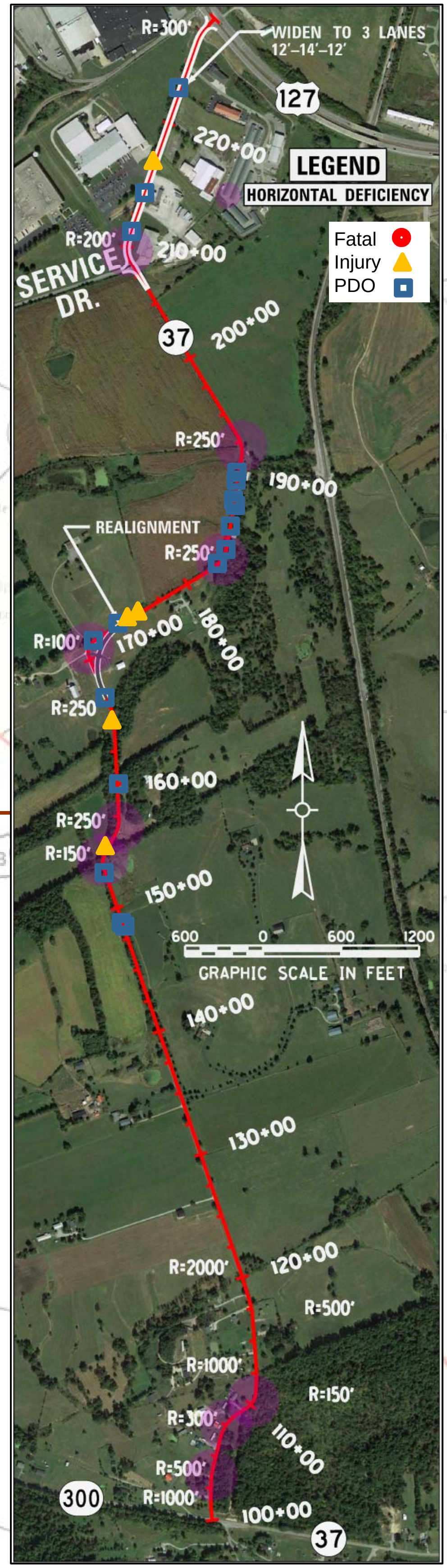
## Project Background:

Narrow winding road that is primarily used by passenger cars but heavy commercial traffic does exist for businesses.

KY 37 ADT = 860 (2012) / 1,100 (2040)

## Project Issues:

- ***SAFETY***
- CCRF = 1.07 and 2.37
- Majority of crashes are single vehicle and opposite direction sideswipes
- 52% (12 out of 23) crashes may be due to roadway geometrics (sharp curves, sight distance, and slick pavement). Remainder of crashes are attributed to human error.
- Narrow roadway for commercial traffic
- Located within an area that may have minority, low-income, and disabled populations




# SOLUTION

## Project Type:

Corridor Safety Improvements

## Project Solution:

High-friction pavement applications;
Re-align sharp / blind curve; widen portion of corridor adjacent to US 127B; and
Roadway re-alignment at identified horizontal deficient spots.

## Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 175,000 |
| ROW: | $ 155,000 |
| Utilities: | $ 200,000 |
| Construction: | $ 1,680,000 |
| Total: | $ 2,210,000 |

**Project Priority:** Low

# US 127 Corridor: Lisa Ave (MP 3.652) to US 127B (MP 3.442)

**Project #LT-H**

## *PROBLEM*

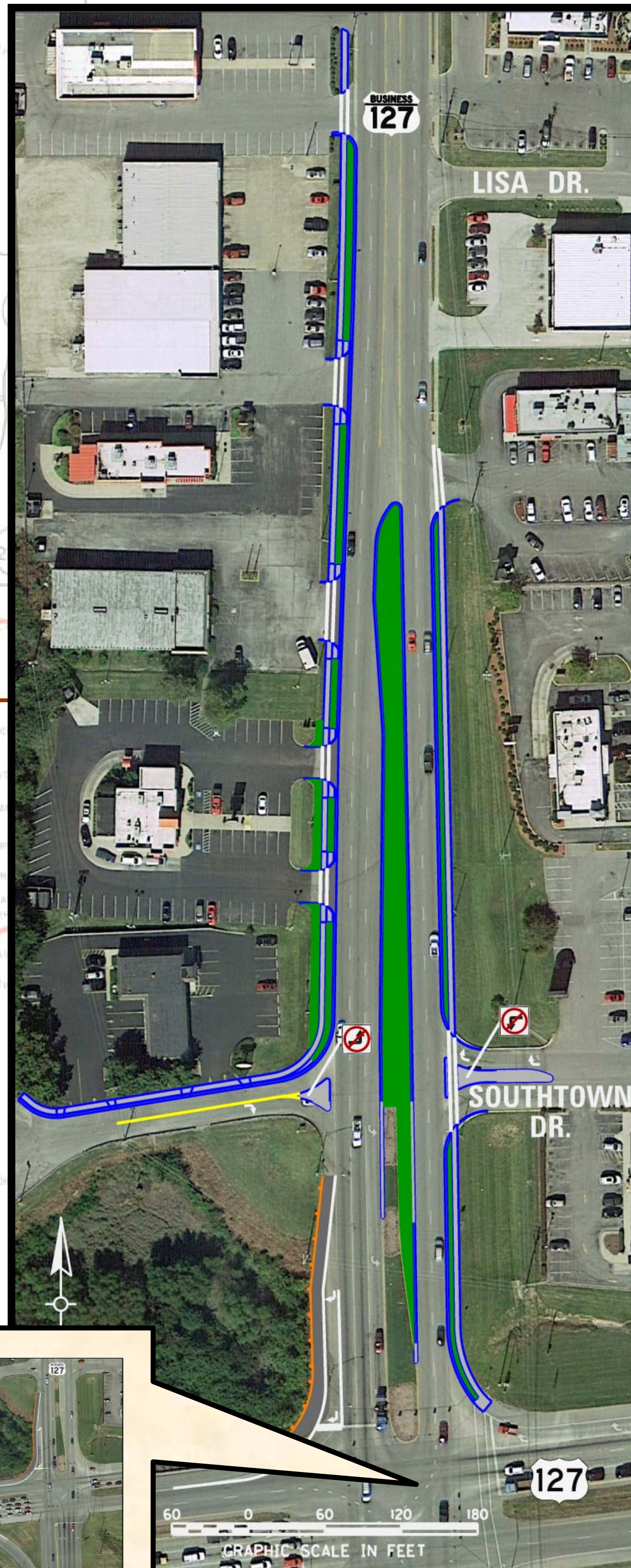
### Project Background:

Highly congested area with multiple access points. Pedestrian connectivity is limited and in some places there are no facilities available.

US 127 ADT = 22,300 (2012) / 20,600 (2040)

### Project Issues:

- ***SAFETY***
- CCRF = 2.44 (north of US 127/US 127B int.)
- Majority of crashes are angle collisions
- Access / numerous conflict points
- Lack of sidewalks
- Visibility for pedestrians




## *SOLUTION*

### Project Type:

Corridor Improvement

### Project Solution:

Install SB right turn lane and increase channelized section of the EB right turn lane onto US 127 at US 127 and US 127B intersection.

Eliminate full access and implement right-in and right-out (RIRO) access for shopping center and restaurants. Qwick Kurb delineators should be installed as a median separator.

Sidewalks and crossings may be installed in conjunction with this project.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 40,000 |
| Utilities: | $ 50,000 |
| Construction: | $ 350,000 |
| Total: | $ 440,000 |

### Project Priority:

High

**Danville SUA**

# New Rail Crossing

**Project #LT-I**

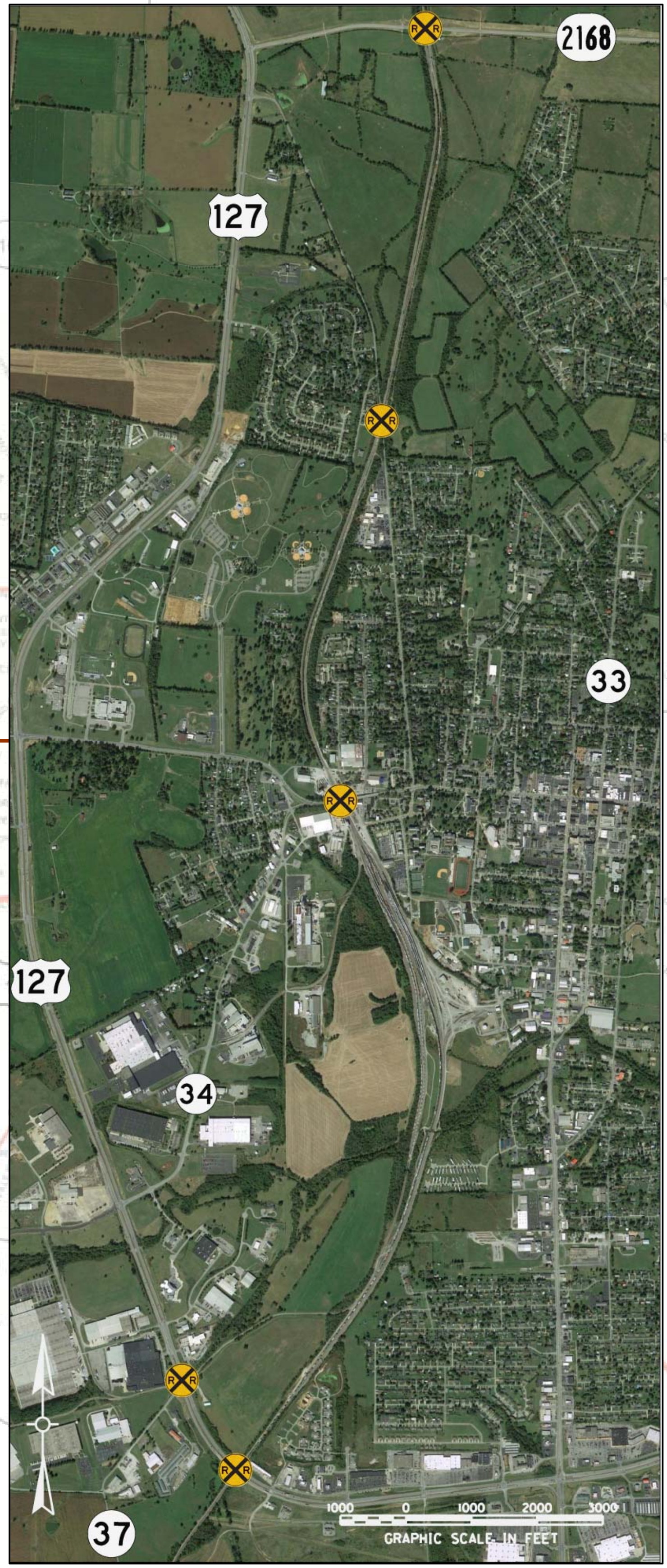
## PROBLEM

### Project Background:

The City of Danville is geographically divided by the rail line which travels through the center of the city. Currently less than 5 crossing locations (at-grade and overpass / underpass) exist. As a result these crossings are highly congested and would benefit for an additional crossing.

### Project Issues:

- ***CONGESTION***
- Limited number of rail crossings
- All traffic from west of Danville must cross rail to travel east.




## SOLUTION

### Project Type:

Planning Study

### Project Solution:

Study additional feasible rail crossing locations in the City of Danville in an attempt to reduce congestion while traveling east / west through the City.

### Project Cost Estimate (2014 Dollars):

Study Only: $250,000

### Project Priority:

Low

Danville SUA

# KY 52 (US 150) / Admiral Stadium (MP 14.031 to 14.114)

**Project #LT-J**

## PROBLEM

### Project Background:

Special event generator; left turns into the complex shut down northbound flow on KY 52.

KY 52 (US 150) ADT = 8,260 (2011) / 6,100 (2040)

*Northwest bound approach to stadium entrance*

### Project Issues:

- ***CONGESTION***
- ***SAFETY***
- Flooding
- Congestion during special events
- Left turns into stadium
- Public comment (survey and Stakeholder Meeting)

*View from east corner of stadium entrance*

## SOLUTION

### Project Type:

Lane Markings and Drainage Improvements

### Project Solution:

Refresh lane markings with retro-reflective paint for clear lane assignments.

Provide 12-foot ditch along roadway on west side to improve drainage.

### Project Cost Estimate (2014 Dollars):

| | |
|---|---|
| Design: | $ 50,000 |
| ROW: | $ 75,000 |
| Utilities: | $ 200,000 |
| Construction: | $ 330,000 |
| Total: | $ 655,000 |

**Project Priority:** High

## 5.2 Project Prioritization

At this time, additional funding is not available for any future project development for any of the identified projects. To assist with future project steps (such as listing Long-Term projects in the Six Year Plan), projects were prioritized within each category (Local, Short-Term, and Long-Term).

As agreed by the PDT, projects were not given an individual rank score; rather they were assigned a low, medium, or high priority categorization. The assignment within these categories is based in part on the feedback received at the second LO/S meeting and discussion with the PDT. The scoring compiled for the Local projects was used directly as provided by the stakeholders, as the KYTC has no financial commitment to these projects.

The following table (**Table 12**) displays the final project prioritization for all projects. The final project priority categories are also included on the project sheets shown on the previous pages.

**Table 12: Project Recommendation and Prioritization**

| Project Type | Project ID | Project Description | Cost Estimate* (2014 Dollars) | Priority |
|---|---|---|---|---|
| Local | L-C | Add sidewalk along north side of Baughman Ave | $395,000 | High |
| | L-D | Gose Pike / Baughman Ave: NB left turn lane and new signage | $280,000 | High |
| | L-A | 10-foot multi-use path on north side of US 150 | $174,000 | Medium |
| | L-E | Crosswalk and sidewalk connectivity throughout Wal-Mart shopping area | $530,000 | Medium |
| | L-F | New lighting FAQ and procedure to gain KYTC approval for install | Not Applicable | Medium |
| | L-H | KY 34 / Seminole Trail: Re-align Barbee Way and re-stripe for defined turn lanes on KY 34 | $400,000 | Medium |
| | L-B | 2nd St / E. Walnut St: Extend curb lines on corners | $90,000 | Low |
| | L-G | Bicycle Master Plan; map / brochure development | Study Only: $150,000 | Low |
| Short-Term | ST-B | KY 34 / KY 2168 & KY 34 / KY 2168: Truck route signage | $3,000 | High |
| | ST-A | KY 2168 / US 127: Signal warrant analysis | Not Applicable | Medium |
| | ST-C | US 127 / Maple Ave: Re-stripe and re-align WB approach | $52,000 | Medium |
| | ST-D | US 127 (S 4th St) / Fackler St: Stop bars on side streets | $1,500 | Low |
| | ST-E | US 127 (S 3rd St) / Fackler St: Stop bars on side streets | $1,500 | Low |
| | ST-F | US 127B / KY 37: Review / revise traffic signal timing, phasing and signage | Not Applicable | Low |
| | ST-G | US 127B / Smoky Way: Signal warrant analysis and access management for Fireside Dr | $27,000 | Low |
| | ST-H | US 150B / Gose Pike: Signal operation to coordinate with the Daniel Dr traffic signal | Not Applicable | Low |
| Long-Term | LT-E | US 150 / E. Walnut St: Re-align intersection with a roundabout | $1,090,000 | High |
| | LT-H | US 127 Corridor: Turn lanes, access management, and median delineators | $440,000 | High |
| | LT-J | KY 52 / Admiral Stadium: Lane markings and 12-foot ditch for drainage | $655,000 | High |
| | LT-A | US 150 Corridor: Median, turn lanes, and signal warrant analysis | $685,000 | Medium |
| | LT-B | US 127 / Argyll Dr: Upgrade drainage and clear ditch line | $345,000 | Medium |
| | LT-C | KY 2324 Corridor: Turn lanes at KY 33 intersection and bicycle lanes along corridor | $104,000 | Medium |
| | LT-F | KY 34 Corridor: Widen and re-align access to US 150 (KY 52) | $3,000,000 | Medium |
| | LT-D | KY 34 Corridor: Median, limit turns, realign KY 2324 intersection, and improve sidewalks | $149,000 | Low |
| | LT-G | KY 37 Corridor: High friction pavement applications, re-align curves and add pavement | $2,210,000 | Low |
| | LT-I | Study additional feasible rail crossing locations in the City of Danville | Study Only: $250,000 | Low |

*Includes Design, Right-of-Way, Utilities, and Construction Costs as applicable

The City of Danville and / or Boyle County will be responsible for further project development for Local projects. Short-Term and Long-Term projects are candidates for inclusion in one or more programming and planning documents to include: unscheduled needs list, Transportation Improvement Programs, District Transportation Plan, and / or the KYTC's Six Year Highway Plan. More discussion among project participants and sponsors is needed, especially with regard to project funding and timing in order to advance one or more of these identified projects.

# 6.0 CONTACTS / ADDITIONAL INFORMATION

Written requests for additional information should be sent to:

John Moore, Director
KYTC Division of Planning
200 Mero Street
Frankfort, Kentucky 40622

Additional information regarding this Small Urban Area Study for Danville can also be obtained from the KYTC District 7 Project Manager, Bret Blair, at (859) 246-2355 or via email at Bret.Blair@ky.gov.