Princeton

Small Urban Area Study
Caldwell County, KY

KENTUCKY TRANSPORTATION CABINET

CDM Smith

Final Report
October 2014

Princeton Small Urban Area Study
Caldwell County, Kentucky

Final Report

October 10, 2014

Submitted to:
Kentucky Transportation Cabinet
Division of Planning
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Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADD	Area Development District
ADT	Average Daily Traffic
BG	Block Group
CEDS	Comprehensive Economic Development Strategy
CRF	Critical Rate Factor
CT	Census Tract
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
GPS	Global Positioning System
HCM	Highway Capacity Manual
HIS	Highway Information System
KYTC	Kentucky Transportation Cabinet
LOS	Level of Service
MP	Milepoint
NRHP	National Register of Historic Places
PADD	Pennyrile Area Development District
PDO	Property Damage Only
PIF	Project Identification Form
ROW	Right-of-way
V/C	Volume-to-Capacity Ratio
VPD	vehicles per day

Section 1
Introduction

The Kentucky Transportation Cabinet (KYTC), in partnership with CDM Smith, met in February 2014 to kick off a Small Urban Area planning study for Princeton. The meeting provided an opportunity to discuss the study purpose and history, the scope of work, the preliminary data collected, relevant transportation network issues, and stakeholder coordination efforts. The study examines the state-maintained highway network in Princeton, KY in Caldwell County.

The purpose of this study is to:

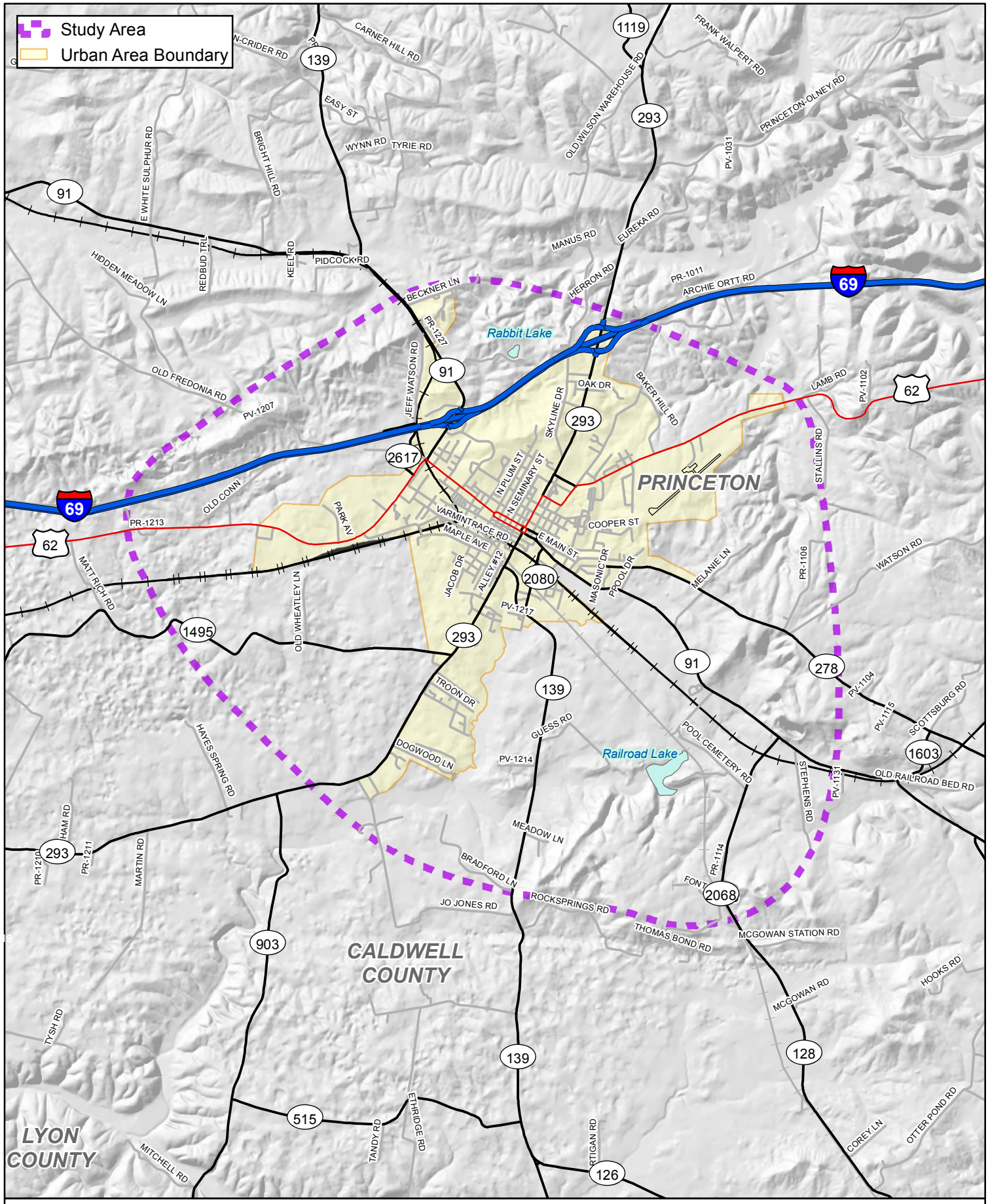
- Identify known issues, concerns, and constraints associated with the urban transportation network;
- Listen to and share information with local officials and other key stakeholders;
- Develop and evaluate improvement concepts based on identified transportation needs, including both short term spot improvements and larger, long term corridor improvements; and
- Prioritize recommended improvement concepts.

A. Study Area

The study area, shown outlined in purple in **Figure 1.1**, covers approximately 25 square miles. It encompasses the entire incorporated area of Princeton, plus a buffer of the surrounding countryside to round out the study area. **Appendix A** contains photographs of the study area.

Princeton, the county seat for Caldwell County, had a 2010 population of approximately 6,300 persons according to the US Census. Located at the junction of US 62 and KY 91, the city is noted for its vibrant, historic downtown business district; the Adsmore Museum; and its annual Black Patch festival. The city serves as a regional commercial and employment hub for surrounding small communities. It is located between the Pennyrile State Resort Park and the Land Between the Lakes Recreation Area in western Kentucky.

View of businesses along Main Street



Princeton Small Urban Area Study
Study Area
Figure 1.1

State-maintained arterial highways within the urban boundary are listed below. **Chapter 2** contains information about existing transportation conditions; **Chapter 3** describes key features of the surrounding community and environment.

- I-69 (formerly the Wendell H. Ford Western Kentucky Parkway) travels east-west on the north side of town. The interstate provides two interchanges for the city. An assessment of this facility falls beyond the scope of this study. A Corridor Master Plan was completed for this portion of I-69 in 2009; findings are available through KYTC's Division of Planning website.
- US 62 generally runs east-west through the city, providing connections to Eddyville and Dawson Springs. US 62 separates into a one-way couplet downtown and is locally designated as Main Street (eastbound) and Market Street (westbound). It provides access to commercial and industrial developments on the west side of town.
- KY 91 generally runs northwest-southeast through the city, providing connections to Fredonia and Hopkinsville. North of I-69, the route provides access to five public schools. Two large quarry operations are located off KY 91, both north and east of town.
- KY 139 connects to I-24 and Cadiz south of town. KY 139 provides a shortcut connection between I-24 and I-69, saving approximately 14 miles of distance compared to following interstate routes the entire way.
- KY 293, locally designated Jefferson Street, runs north-south through the city, providing access to I-24 to the southwest and rural areas to the north.

B. Previous Studies

This Small Urban Area study builds upon previously completed studies in the region to ensure consistency with previous planning efforts. The following studies were consulted in its development:

- The 1999 Comprehensive Plan, *Vision 2020,* completed for the Princeton Planning Commission
- The 2013 *Comprehensive Economic Development Strategies* prepared by the Pennyrile Area Development District (PADD)

In addition, KYTC's *Six Year Highway Plan* and Project Identification Forms (PIF) describe planned transportation projects and unfunded transportation needs, respectively. Two *Six Year Highway Plan* projects are located within Princeton: Item 2-153.00 and 2-193.00. These projects create a new connector route east of downtown, from KY 293 near the interstate to KY 139. **Table 1.1** presents allocated funding in the 2014-2020 *Final Highway Plan*. Planned projects are discussed further in **Chapter 4**.

Table 1.1: Six Year Highway Plan Projects in Princeton

Item	Description	Phase	Year	Amount
2-153.00	New Connector KY 91 to KY 293	ROW	2015	$2.96 million
		Utility	2017	$2.06 million
		Construction	2018	$13.47 million
2-193.00	New Connector KY 139 to KY 91	Design	2014	$9,900

Section 2
Existing Transportation Conditions

The following sections provide a planning-level overview of existing roadway conditions, traffic operations, and roadway safety for state-maintained highways within the Princeton urban area. Generally, I-69 is omitted from this discussion.

A. Roadway Characteristics

The following subsections describe functional classifications, systems designations, geometrics, and truck routing information throughout the urban area.

1. Functional Classification

One of 14 functional classification categories is assigned to each state-maintained road in Kentucky, based on the function that each road provides; roads with higher classifications provide better mobility, while roads with lower classifications provide better land access. Each route is designated as urban or rural and is classified from highest to lowest as follows: Interstate, Other Freeways and Expressways (Principal Arterial), Other Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local. **Figure 2.1** shows the functional classes of state highways in the study area.

2. Systems Designations

Omitting I-69, none of the state routes in the study area are designated as part of the National Highway System, the National Truck Network, the Coal Haul System, Drive Smart Corridors, or Scenic Byways. I-24 and I-69 are the only state or federal designated truck routes in Caldwell County.

3. State Highway System

State-maintained roads in Kentucky are categorized under the State Primary Road System, ranging from the highest order classification to the lowest as follows: State Primary Routes, State Secondary Routes, Rural Secondary Routes, and Supplemental Roads.

- State Primary Routes are those routes which are considered to be long-distance, high-volume intrastate routes that are of statewide significance; these routes link major urban centers within the state and/or serve as major regional corridors.
- State Secondary Routes are regionally significant routes that provide access and mobility over a shorter length, generally serving smaller cities and county seats within a region.
- Supplemental Routes include other state-maintained routes such as frontage roads, cross roads, and local access roads like farm-to-market links.

Table 2.1 summarizes classifications for study routes under the State Primary Road System.

Princeton Small Urban Area Study
Functional Classification
Figure 2.1

Study Area
Urban Area Boundary

Functional Classification
- Interstate
- Rural Local
- Urban Local
- Rural Minor Collector
- Rural Major Collector
- Urban Major Collector
- Rural Minor Arterial
- Urban Minor Arterial

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Table 2.1: State Primary Road System Classifications

Route	Classification
US 62	State Secondary
KY 91	State Secondary
KY 128	Rural Secondary
KY 139	State Secondary
KY 278	Supplemental Roadway
KY 293	State Secondary
KY 1495	Supplemental Roadway
KY 2080	Supplemental Roadway
KY 2617	Supplemental Roadway
KY 3114	Supplemental Roadway

4. Highway Geometrics

Table 2.2 shows a summary of KYTC's Highway Information System (HIS) data for lane and shoulder widths and posted speed limits along study routes. Most above-average lane widths in the downtown area represent segments with on-street parking. Full HIS data for study routes is presented in **Appendix B**.

Table 2.2: HIS Lane, Shoulder, and Speed Data for Study Routes

Route	Section Limits	Cross-Section Geometry	Speed
US 62	MP 3.1-5.931 Study Area Limit to Marion Rd	2-4 lanes at 12 feet 10-foot shoulder	35-55
US 62 Main Street	MP 5.931-6.693 Marion Rd to Plum St	2 lanes at 12-15 feet curb & gutter	25-35
US 62 Main Street	MP 6.693-7.037 Plum St to N Jefferson St	2 lanes at 12-15 feet curb & gutter, one-way	25
US 62-1 Market Street	MP 6.631-6.970 Plum St to N Jefferson St	1-2 lanes at 13-15 feet curb & gutter, one-way	25
US 62 N Jefferson Street	MP 7.037-7.345 Market St to KY 293/McGoodwin	2 lanes at 14 feet curb & gutter	35
US 62 Dawson Road	MP 7.345-9.8 KY 293 to Study Area Limit	2 lanes at 10 feet curb & gutter, 4-foot shoulder	35-55
KY 91 Hopkinsville Street	MP 8.4-11.256 Study Area Limit to Sandlick Rd	2 lanes at 10 feet 8-foot shoulder	45-55
KY 91 Hopkinsville Street	MP 11.256-11.707 Sandlick Rd to Main St	2 lanes at 14 feet curb & gutter	25-35
KY 91 Main Street	MP 11.707-11.849 Washington St to E Court Sq	2 lanes at 12-21 feet curb & gutter, one-way	25
KY 91-1 Market Street	MP 11.707-11.855 Main St to E Court Sq	2 lanes at 11 feet curb & gutter, one-way	25
KY 91 Marion Road	MP 11.849-13.4 US 62 to Study Area Limit	2 lanes at 12-13 feet curb & gutter, 8-foot shoulder	35-55
KY 128	MP 5.0-6.665 Study Area Limit to KY 91	2 lanes at 9 feet 4-foot shoulder	55
KY 139 Cadiz Road	MP 8.3-11.347 Study Area Limit to KY 293	2 lanes at 10 feet 4-foot shoulder	35-55
KY 139 S Jefferson Street	MP 11.347-11.670 KY 293 to Main St	2 lanes at 15 feet 4-foot shoulder	25-35

Table 2.2: HIS Lane, Shoulder, and Speed Data for Study Routes

Route	Section Limits	Cross-Section Geometry	Speed
KY 139-1 W Court Square	MP 11.670-11.702 Main St to Market St	1 lane at 18 feet curb & gutter, one-way	25
KY 278 Sandlick Road	MP 0.0-2.3 Highland Ave to Study Area Limit	2 lanes at 8 feet 3-foot shoulder	35-55
KY 293 S Jefferson Street	MP 3.5-5.884 Study Area Limit to north of Hospital Dr	2 lanes at 9 feet 6-foot shoulder	35-55
KY 293 S Jefferson Street	MP 5.884-6.151 North of Hospital Dr to KY 139	2 lanes at 15 feet curb & gutter	35
KY 293 N Jefferson Street	MP 6.151-7.8 US 62 to Study Area Limit	2 lanes at 9-10 feet curb & gutter, 4-foot shoulder	35-55
KY 1495 Grooms Lane	MP 2.9-5.517 Study Area Limit to KY 293	2 lanes at 8 feet 3-foot shoulder	55
KY 2080 Cadiz Street (Former KY 139)	MP 0.000-0.574 KY 139 to KY 91	2 lanes at 10-11 feet curb & gutter, 2-foot shoulder	35
KY 2617 Old Fredonia Rd	MP 0.000-0.7 US 62 to Study Area Limit	2 lanes at 10 feet 3-foot shoulder	35
KY 3114 E Young Street	MP 0.000-0.204 KY 293 to US 62	2 lanes at 9 feet 3-foot shoulder	25

Analysts also collected HIS data for the horizontal and vertical alignments along study routes. Although this information is less exact than reviewing as-built highway plans, HIS data provides broad categories for alignment elements; categories indicate locations where substandard geometrics could exist.

- Horizontal curve data from HIS designates curves into one of six categories based on the degree of curvature. Data was compared against AASHTO Green Book design standards and the KYTC *Highway Design Manual* for each highway to identify curves that do not meet current standards.

- Vertical curve data from HIS places vertical curves into one of six categories, ranging from Class A (less than 0.5% grade) to Class F (over 8.5% grade). For the purposes of this planning study, any Class E or F segments would be considered substandard (grades over 6.5%). No vertical curves in the study area are classified Class E or F curves. Only one Class D curve is located within the study area limits, located along US 62 at MP 9.676-10.576 (beginning at the eastern limit of the study area).

- Reported lane and shoulder widths from HIS were compared against AASHTO Green Book design standards and the KYTC *Highway Design Manual* for each highway to identify areas where the existing cross-sections do not meet current standards.

Building on this data, analysts conducted a field review of study routes and discussed existing geometric concerns with local officials and stakeholders during February 2014. **Figure 2.2** identifies potential substandard geometric features noted within the study area.

Princeton Small Urban Area Study
Geometric Deficiencies
Figure 2.2

Study Area
Urban Area Boundary

Identified Geometric Deficiencies
- Deficient Horizontal Curve
- Potential Inadequate Sight Distance
- Inadequate Clear Zone
- Tight Turn Radius
- Inadequate Lane or Shoulder Width
- 1 Low Overpass (12'1" clearance)
- 2 Low and Narrow Overpass

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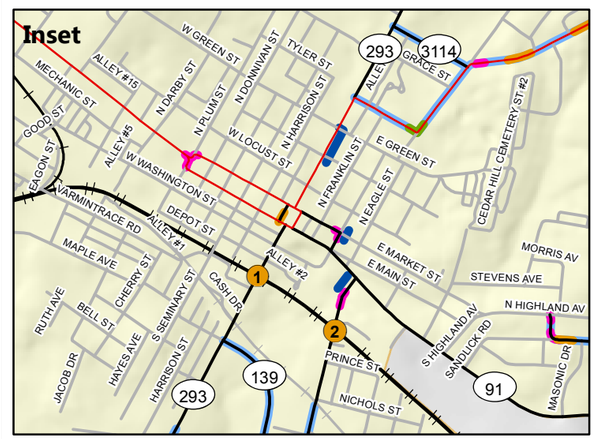

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Noteworthy geometric deficiencies in the study area include the following.

- Two railroad overpasses have limited vertical clearances: 1) the overpass along KY 139 south of Main Street has a vertical clearance of 12-feet 1-inch and 2) the overpass along KY 2080 restricts both vertical and horizontal clearances. The vertical clearance is posted at 12-feet 1-inch. Local law enforcement officials report that large trucks routinely miss warning signage on the KY 139 approach; traffic must be stopped to allow these vehicles to turn around.
- Because these rail overpasses limit clearance for large vehicles travelling beneath them, an alternate truck detour route through local residential streets has been established around downtown. From north to south, the detour follows Green Street west from US 62 (North Jefferson Street), Seminary Street southbound through downtown to cross the rail line at grade, then Legion Street to the KY 293/KY 139 intersection south of town.
- Turn radii at several intersections are not adequate to handle large truck turning movements for trucks traveling the routes.
- Steep ditches channel Eddy Creek alongside the road, separated from the travel way only by a concrete curb. This is most noticeable along US 62 (North Jefferson Street) near the intersection with Green Street. As it was originally designed to carry local traffic, the Green Street drainage structure over this ditch is not ideal for heavy trucks that were observed using the route currently to avoid a series of sharp turns along the designated US 62 truck route (see **Figure 2.3**).

Steep ditch and culvert along N Jefferson St at Green St

- The configuration of the five-leg KY 91 (Hopkinsville Street) intersection with Main Street and Hawthorne Street has a non-standard configuration. According to locals, drivers rely on gestures from other drivers to negotiate the intersection safely.

5. Truck Weight Limits

Kentucky Revised Statutes impose weight limits on the state-maintained highway system. There are three weight classification limits: AAA – 80,000 lbs. maximum gross vehicle weight; AA – 62,000 lbs. maximum gross vehicle weight; and A – 44,000 lbs. maximum gross vehicle weight. For special circumstances, occasional exceptions may be granted for over-dimensional or overweight vehicles by permits issued by the KYTC Division of Motor Carriers. **Figure 2.3** shows the truck weight restrictions on state highways in the study area.

The figure also shows signed local truck routes: a connector along Highland Avenue to reach KY 278 and the Green Street-Seminary Street-Legion Street detour around the low clearance overpass on KY 139 (South Jefferson Street).

Princeton Small Urban Area Study
Vehicle Weight Classification
Figure 2.3

Study Area
Urban Area Boundary

Weight Class
- 44,000 lbs maximum
- 62,000 lbs maximum
- 80,000 lbs maximum
- Locally Designated Truck Detour

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B. Bridges

A dozen culverts and bridges are located along state highways in the study area, as presented in data tables in **Appendix B**. Per federal standards, each bridge is inspected every two years, evaluating its condition and other elements. A sufficiency rating – or numeric score 0-100 that describes the sufficiency of the bridge to remain in service – is calculated at each inspection. According to the KYTC, a bridge structure is eligible for federal replacement funds when it meets two criteria: the bridge has a sufficiency rating below 50.0 and the bridge is considered either structurally deficient or functionally obsolete. Structurally deficient bridges cannot safely carry the weight they were originally designed to carry. Bridges are considered functionally obsolete if they do not meet geometric design standards of today.

According to HIS records, the 2011 sufficiency ratings available for bridges in the study area that KYTC inspects are all over 60.0. Condition ratings for the deck, superstructure, and substructures were all identified as "satisfactory" or better.

C. Existing & Future Traffic Operations

Existing (year 2013) traffic volumes were collected from recent traffic counts conducted by KYTC. At 13,100 vehicles per day, US 62 (Main Street) between KY 91 (Marion Road) and the one-way Main/Market pair downtown has the highest volume within the study area. Daily volumes along US 62 vary from 1,850 vehicles per day (vpd) east of town to 13,100 vpd. Daily volumes along KY 91 vary from 1,280 vpd east of town to 9,960 vpd just south of I-69. The highest truck movements are along KY 139 southeast of town; approximately 21% of the traffic on this section of highway is trucks. **Figure 2.4** presents 2013 daily traffic volumes in the study area.

The statewide travel demand model (May 2014 version) was used to project year 2040 future No Build traffic volumes on major highways throughout the area. The statewide travel demand model is a tool that uses existing traffic patterns, land use, and future population growth estimates to project traffic volumes for a variety of what-if scenarios. In this case, the model uses projections from the state data center to forecast traffic volumes in year 2040 assuming no major changes to the existing highway network. Generally, most highways in the study area are anticipated to experience low to moderate growth in traffic volumes during this period in the No Build scenario.

Level of Service (LOS) is a qualitative measure of highway traffic conditions, as identified in the 2010 *Highway Capacity Manual* (HCM). Individual levels of service characterize conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined and given letter designations from A to F, with LOS A representing free flow conditions and LOS F representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas.

LOS was calculated using Highway Capacity Software HCS 2010 for each of 66 analysis segments within the study area; roadways are segmented for analysis based on sections with similar traffic counts and roadway geometry. All segments operate at LOS D or better today. The LOS analysis was repeated for the 2040 No Build scenario using future volumes forecast by the model. LOS for each segment matches the existing year LOS results. It should be noted that this analysis does not address individual intersections, only highway segments. Additional delay would be anticipated at closely spaced intersections.

Princeton Small Urban Area Study
2013 Segment Level of Service
Figure 2.4

Study Area
Urban Area Boundary

Level of Service
- A
- B
- C
- D
- LOS Undetermined for One-Way Streets (See Discussion in Text)

Signalized Intersection

XXXX — 2013 ADT
XX% — Truck Percentage (Where Available)

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Further, one-way street segments were not included in this LOS analysis as insufficient data is available to analyze operations by HCM standard LOS methodology. To truly represent operations along these developed, one-way corridors, intersection-by-intersection operations would need to be examined with turning movement counts and traffic signal timing plans. The segment-level analysis completed for the majority of the study area indicates that this level of detailed analysis is not critical in the planning phase as existing highways provide adequate capacity. Based on field observations of traffic operations along the one-way pair, the intersections surrounding the courthouse square generally experience some of the highest traffic volumes and associated delay throughout the study area; existing storage lengths are sufficient to hold queues. Except for individual truck turning movements, no notable operational issues were observed beyond the one-way pairs. Stakeholders reported congestion along KY 91 to access the schools during peak hours due to queuing and along KY 139 at the overpass when oversize trucks must be rerouted.

As an alternative to the LOS methodology, daily traffic volumes were also compared to the road's theoretical capacity. A volume-to-capacity (V/C) ratio represents the number of vehicles using the road in a specific time period (i.e. design hour volume) compared to the number of vehicles the road was designed to be able to handle during that period. The target V/C ratio is 0.9 for rural areas and 1.0 for urban areas. A V/C ratio greater than this indicates the road is congested, i.e. operating above its design capacity. Analysis shows that the V/C ratio for each analysis segment is well below the 0.9 guideline. **Table 2.3** presents 2013 average daily traffic volumes, LOS, and the V/C ratio for each analysis segment during the peak hour in the peak direction. Detailed tables are presented in **Appendix C**.

Table 2.4 presents year 2040 average daily traffic volumes, LOS, and the V/C ratio; the differences between the 2013 and 2040 No Build operating conditions (LOS and the V/C ratio) are minimal for each of the studied highway links.

Table 2.3: Year 2013 Traffic and Operations Data by Segment

Route	Section Limits	ADT	LOS	V/C
US 62	MP 3.1-5.931 Study Area Limit to Marion Rd	4,100-8,800	C-D	0.18-0.38
US 62 Main Street	MP 5.931-6.693 Marion Rd to Plum St	13,100	D	0.47
US 62 Main Street	MP 6.693-7.037 Plum St to N Jefferson St	5,400	N/A[1]	N/A[1]
US 62-1 Market Street	MP 6.631-6.970 Plum St to N Jefferson St	5,700	N/A[1]	N/A[1]
US 62 N Jefferson Street	MP 7.037-7.345 Market St to KY 293/McGoodwin	4,100	B	0.16
US 62 Dawson Road	MP 7.345-9.8 KY 293 to Study Area Limit	500-3,100	A-B	0.06-0.27
KY 91 Hopkinsville Street	MP 8.4-11.256 Study Area Limit to Sandlick Rd	1,300-3,800	B-C	0.16-0.32
KY 91 Hopkinsville Street	MP 11.256-11.707 Sandlick Rd to Main St	3,800-4,700	B	0.16-0.19
KY 91 Main Street	MP 11.707-11.849 Washington St to E Court Sq	3,200	N/A[1]	N/A[1]
KY 91-1 Market Street	MP 11.707-11.855 Main St to E Court Sq	3,500	N/A[1]	N/A[1]

Table 2.3: Year 2013 Traffic and Operations Data by Segment

Route	Section Limits	ADT	LOS	V/C
KY 91 Marion Road	MP 11.849-13.4 US 62 to Study Area Limit	4,500-10,000	C-D	0.30-0.43
KY 128	MP 5.0-6.665 Study Area Limit to KY 91	300-500	A	0.04-0.07
KY 139 Cadiz Road	MP 8.3-11.347 Study Area Limit to KY 293	2,000-2,500	B-C	0.25-0.29
KY 139 S Jefferson Street	MP 11.347-11.670 KY 293 to Main St	6,000	C	0.40
KY 139-1 W Court Square	MP 11.670-11.702 Main St to Market St	2,900	N/A[1]	N/A[1]
KY 278 Sandlick Road	MP 0.0-2.3 Highland Ave to Study Area Limit	300-600	A	0.03-0.06
KY 293 S Jefferson Street	MP 3.5-5.884 Study Area Limit to north of Hospital Dr	1,800-3,700	B-C	0.18-0.24
KY 293 S Jefferson Street	MP 5.884-6.151 North of Hospital Dr to KY 139	3,700	B	0.14
KY 293 N Jefferson Street	MP 6.151-7.8 US 62 to Study Area Limit	1,900-2,900	B-C	0.17-0.22
KY 1495 Grooms Lane	MP 2.9-5.517 Study Area Limit to KY 293	300	A	0.03
KY 2080 Cadiz Street	MP 0.000-0.574 KY 139 to KY 91	1,000-2,000	A-B	0.15-0.26
KY 2617 Old Fredonia Rd	MP 0.000-0.7 US 62 to Study Area Limit	800-1,700	A-B	0.07-0.16
KY 3114 E Young Street	MP 0.000-0.204 KY 293 to US 62	1,600	A	0.15

[1] Operations not analyzed for one-way segments as insufficient data available for standard analysis; see conceptual discussion on page 13.

Table 2.4: Year 2040 No Build Traffic and Operations Data by Segment

Route	Section Limits	ADT	LOS	V/C
US 62	MP 3.1-5.931 Study Area Limit to Marion Rd	4,200-9,300	C-D	0.19-0.40
US 62 Main Street	MP 5.931-6.693 Marion Rd to Plum St	13,900	D	0.50
US 62 Main Street	MP 6.693-7.037 Plum St to N Jefferson St	6,300	N/A[1]	N/A[1]
US 62-1 Market Street	MP 6.631-6.970 Plum St to N Jefferson St	6,800	N/A[1]	N/A[1]
US 62 N Jefferson Street	MP 7.037-7.345 Market St to KY 293/McGoodwin	6,200	B	0.24
US 62 Dawson Road	MP 7.345-9.8 KY 293 to Study Area Limit	1,400-6,300	A-C	0.16-0.36
KY 91 Hopkinsville Street	MP 8.4-11.256 Study Area Limit to Sandlick Rd	2,000-3,900	B-C	0.22-0.32
KY 91 Hopkinsville Street	MP 11.256-11.707 Sandlick Rd to Main St	4,200-5,000	B	0.17-0.20
KY 91 Main Street	MP 11.707-11.849 Washington St to E Court Sq	5,700	N/A[1]	N/A[1]

Table 2.4: Year 2040 No Build Traffic and Operations Data by Segment

Route	Section Limits	ADT	LOS	V/C
KY 91-1 Market Street	MP 11.707-11.855 Main St to E Court Sq	4,500	N/A[1]	N/A[1]
KY 91 Marion Road	MP 11.849-13.4 US 62 to Study Area Limit	5,400-8,300	C	0.32-0.38
KY 128	MP 5.0-6.665 Study Area Limit to KY 91	450	A	0.06
KY 139 Cadiz Road	MP 8.3-11.347 Study Area Limit to KY 293	1,900-2,400	B-C	0.24-0.29
KY 139 S Jefferson Street	MP 11.347-11.670 KY 293 to Main St	6,600	C	0.40
KY 139-1 W Court Square	MP 11.670-11.702 Main St to Market St	4,000	N/A[1]	N/A[1]
KY 278 Sandlick Road	MP 0.0-2.3 Highland Ave to Study Area Limit	450	A	0.04-0.05
KY 293 S Jefferson Street	MP 3.5-5.884 Study Area Limit to north of Hospital Dr	2,500	B-C	0.17-0.22
KY 293 S Jefferson Street	MP 5.884-6.151 North of Hospital Dr to KY 139	3,800	B	0.14
KY 293 N Jefferson Street	MP 6.151-7.8 US 62 to Study Area Limit	4,700	C	0.28
KY 1495 Grooms Lane	MP 2.9-5.517 Study Area Limit to KY 293	300	A	0.03
KY 2080 Cadiz Street	MP 0.000-0.574 KY 139 to KY 91	1,300	B	0.19
KY 2617 Old Fredonia Rd	MP 0.000-0.7 US 62 to Study Area Limit	600-1,400	A	0.06-0.13
KY 3114 E Young Street	MP 0.000-0.204 KY 293 to US 62	2,300	B	0.19

[1] Operations not analyzed for one-way segments as insufficient data available for standard analysis; see conceptual discussion on page 13.

D. Roadway Safety

To quantify safety concerns, a crash analysis was performed for the study area. Crash records were collected from KYTC for a 6-year period (January 1, 2008 through December 31, 2013). Crashes were geospatially referenced and compared to statewide data to identify locations experiencing above-average crash rates. The methodology used is defined in the KYTC research report *Analysis of Traffic Crash Data in Kentucky* (Kentucky Transportation Center, 2013).

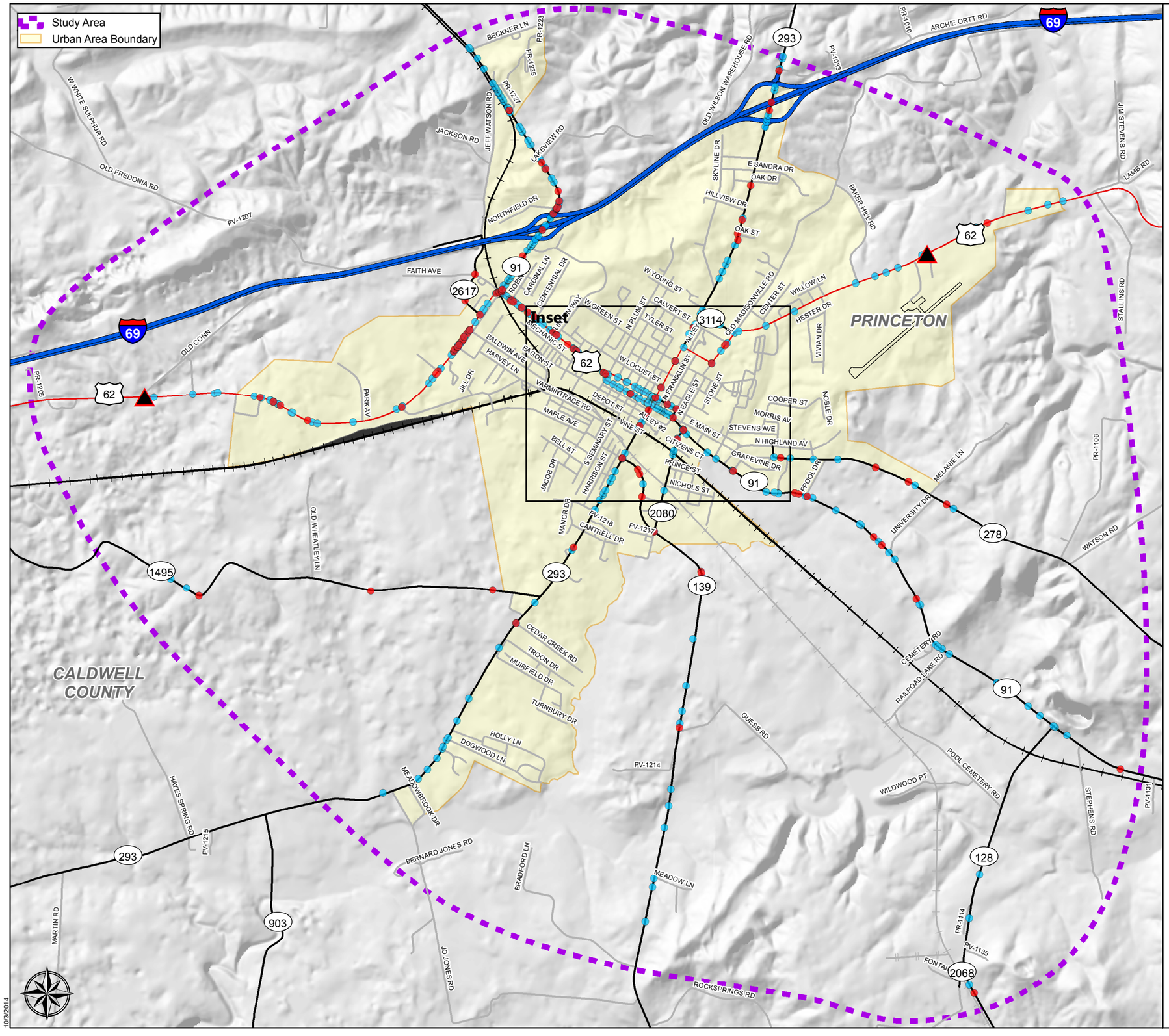
Over the analysis period, there were 678 reported crashes within the study area, which includes over 27 miles of state-maintained highways. Of these, two crashes resulted in fatalities and 133 resulted in injuries. It should be noted that crashes along I-69 were not tabulated for this analysis. **Figure 2.5** presents the locations of reported fatality, injury, and property-damage-only (PDO) crashes.

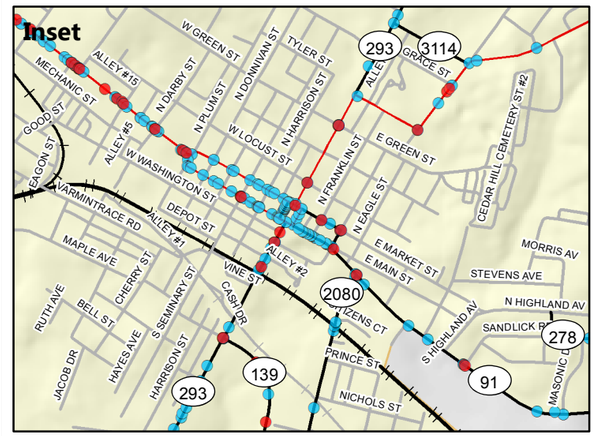
Princeton Small Urban Area Study
Vehicle Crash Locations
Figure 2.5

Vehicle Crash Location

- Fatal Crash
- Injury Crash
- PDO Crash

NOTE: Based on reported crashes Jan 1, 2008-Dec 31, 2013





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1. Segment Analysis

As defined in the methodology report, segments vary in length and are divided along roadways where geometry or traffic volumes change. For each section, analysts looked at the number and severity of crashes to determine the critical rate factor (CRF). The CRF is one measure of the safety of a road, expressed as a ratio of the crash rate at the location compared to the average crash rate for roadways of the same functional classification throughout the state. CRF also takes into account traffic volume, area type (rural/urban), and the number of lanes. If the CRF is 1.00 or greater, it may indicate that crashes are happening due to circumstances that cannot be attributed to random occurrence.

Segment results are shown graphically in **Figure 2.6**. **Table 2.5** summarizes the results of the crash analysis for segments along state-maintained highways in Princeton that have a CRF greater than 1.0. The highest CRF segment is along the one-way portion of US 62 (Main Street), which exhibits a CRF of 1.95.

Table 2.5: High CRF Crash Segments

Road	Location Description	CRF	Total Crashes
US 62	W Main St - MP 5.931 (Marion Rd) to MP 6.664 (one-way section)	1.06	96
US 62	W Main St - MP 6.664 (one-way split) to MP 6.987 (E Court Square) E Court Square - MP 6.987 (Main St) to MP 7.019 (Market St) Market St - MP 7.019 (E Court Sq) to MP 7.037 (N Jefferson St)	1.95	48
US 62	N Jefferson St - MP 7.037 (W Market St) to 7.345 (McGoodwin Ave)	1.34	23
KY 91	Hawthorne St - MP 11.707 (Main St) to MP 11.750 (Market St) E Market St - MP 11.750 (Hawthorne St) to MP 11.849 (E Court Sq)	1.20	10
KY 91-1	E Main St - MP 11.707 (Hawthorne St) to MP 11.855 (E Court Sq)	1.75	16
KY 128	KY 128 - MP 5.000-5.213 (at Rock Springs Rd)	1.30	3
KY 139	S Jefferson St - MP 11.347 (E Legion Dr) to MP 11.670 (Main St)	1.41	32
KY 278	Sandlick Rd - MP 0.000 (N Highland Ave) to MP 0.990 (University Dr)	1.07	10

2. Spot Analysis

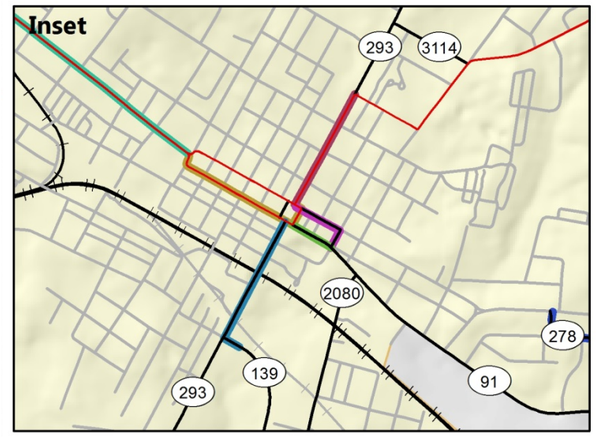
Analysts also conducted a spot crash analysis along the study route. Spots were defined by observing crash data to identify 0.10 mile sections where crashes were concentrated. Crashes were again geospatially referenced and compared to statewide data to identify spot locations experiencing above average crash rates. The methodology is also defined in the KYTC research report *Analysis of Traffic Crash Data in Kentucky*.

Within the study area, 18 spots were found to have a CRF greater than 1.00, as shown in **Figure 2.7**. (In the figure, the tabulated data on the right corresponds to downtown crashes shown in the inset map; data for crashes outside the downtown area are shown in call-out boxes on the larger map.) **Table 2.6** presents summary information about each of the high crash spots identified.

Princeton Small Urban Area Study
Vehicle Crash Analysis
Figure 2.6

High Crash Segments

Based on reported crashes during 2008-2013



Study Area
Urban Area Boundary

US 62 MP 7.037-7.345
North Jefferson Street
23 crashes (4 injury)
CRF = 1.34

US 62 MP 5.931-6.664
West Main Street
95 crashes (17 injury)
CRF = 1.06

US 62 MP 6.664-7.037
W Main St & E Court Sq
48 crashes (2 injury)
CRF = 1.95

KY 91 MP 11.707-11.849
Hawthorne & E Market Streets
10 crashes (3 injury)
CRF = 1.20

KY 139 MP 11.347-11.670
South Jefferson Street
32 crashes (6 injury)
CRF = 1.41

KY 91-1 MP 11.707-11.855
East Main Street
16 crashes
CRF = 1.75

KY 278 MP 0.000-0.990
Sandlick Road
10 crashes (3 injury)
CRF = 1.07

KY 128 MP 5.000-5.213
3 crashes (1 injury)
CRF = 1.30

Inset

PRINCETON

CALDWELL COUNTY

US 62 MP 5.931-6.664
US 62 MP 6.664-7.037
US 62 MP 7.037-7.345
KY 91 MP 11.707-11.849
KY 91 MP 11.707-11.855
US 139 MP 11.347-11.700
US 278 MP 0.000-0.990
US 128 MP 5.000-5.213

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Princeton Small Urban Area Study
Vehicle Crash Analysis
Figure 2.7

High Crash Spots
Spots are defined as 0.10 miles in length
(MP denotes centerpoint)
Based on reported crashes during 2008-2013

Statistics for non-downtown crashes
shown in map and callout boxes at left

Statistics for downtown crashes
shown in inset and table below

Study Area
Urban Area Boundary

KY 91 at MP 13.057
14 crashes (3 injury)
CRF = 1.20

KY 91 at MP 11.899
16 crashes (1 injury)
CRF = 1.10

KY 91 at MP 12.472
16 crashes (7 injury)
CRF = 1.38

US 62 at MP 5.953
28 crashes (5 injury)
CRF = 1.98

US 62 at MP 7.310
16 crashes (2 injury)
CRF = 3.83

US 62 at MP 5.660
19 crashes (7 injury)
CRF = 1.42

US 62 at MP 5.535
30 crashes (9 injury)
CRF = 2.25

US 62 at MP 6.270
23 crashes (4 injury)
CRF = 1.29

KY 278 at MP 1.350
3 crashes (2 injury)
CRF = 1.19

KY 278 at MP 0.108
5 crashes (1 injury)
CRF = 1.99

PRINCETON

CALDWELL COUNTY

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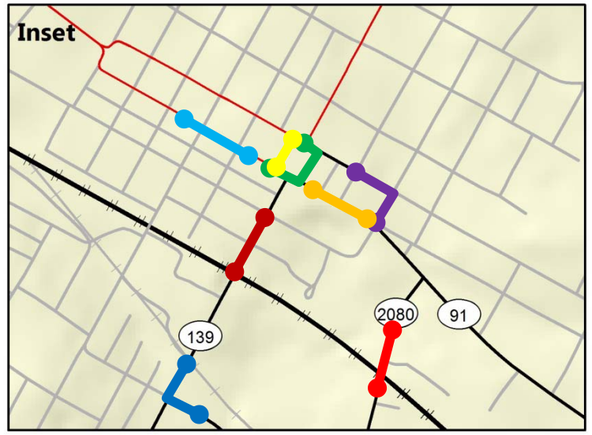

ID	Route	MP	Crashes	Injury	CRF
	US 62	6.874	24	1	2.52
	US 62	6.992	18	0	2.04
	KY 91	11.757	10	3	1.49
	KY 91-1	11.757	15	0	2.10
	KY 139	11.353	15	4	1.98
	KY 139	11.574	24	4	2.46
	KY 139-1	11.686	15	0	2.38
	KY 2080	0.474	5	1	1.01

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KENTUCKY TRANSPORTATION CABINET

1/9/2014

Table 2.6: High CRF Crash Spots

Route	Center MP	Total Crashes	Injury Crashes	CRF
US 62	5.535	30	9	2.25
US 62	5.660	19	7	1.42
US 62 Main St	5.953	28	5	1.98
US 62 Main St	6.270	23	4	1.29
US 62 Main St	6.874	24	1	2.52
US 62 Main St/E Court Sq	6.992	18	0	2.04
US 62 N Jefferson St	7.310	16	2	3.83
KY 91 Hawthorne St/Market St	11.757	10	3	1.49
KY 91-1 Main St	11.757	15	0	2.10
KY 91 Marion Rd	11.899	16	1	1.10
KY 91 Marion Rd	12.472	16	7	1.38
KY 91 Marion Rd	13.057	14	3	1.20
KY 139 Legion Dr/S Jefferson St	11.353	15	4	1.98
KY 139 S Jefferson St	11.574	24	4	2.46
KY 139-1 W Court Square	11.686	15	0	2.38
KY 278 Sandlick Rd	0.108	5	1	1.99
KY 278 Sandlick Rd	1.350	3	2	1.19
KY 2080 Cadiz St	0.474	5	1	1.01

For the three highest CRF spots, analysts requested detailed crash reports to better understand crash causation trends.

- The highest CRF spot in the area occurs along US 62 (N Jefferson Street) at center MP 7.310, between Green Street and McGoodwin Avenue. Within this spot, 15 of the 16 reported crashes occurred at the intersection with Green Street, which is stop-controlled for the two Green Street approaches. Review of the detailed crash reports indicated that the majority of crashes are related to drivers failing to pay attention on Green Street, pulling out in front of traffic traveling along US 62. There were no observed directional, time-of-day, or weather-related trends within the data. Commercial trucks were only involved in one of the reported crashes, which involved a car backing into another car to make room for a turning truck.
- The second highest CRF spot in the area occurs along US 62 (Main Street) at center MP 6.874, at the intersections with Seminary Street (2-way stop-controlled for minor Seminary Street approaches) and Harrison Street (signalized). On-street parallel parking spaces are located on both sides of Main Street east of Seminary Street. Within this spot, 10 of the 24 crashes were located at the intersection with Seminary Street and 7 of 24 were located at the intersection with Harrison Street. Crashes were caused by a variety of factors:
    - 4 crashes were caused by drivers failing to yield the right-of-way at a stop sign or red light.
    - 3 crashes were related to drivers entering/exiting parking spaces.

- 4 crashes were caused by drivers along Main Street switching lanes to pass a slower moving vehicle without checking to see if the other lane was occupied.

Overall, the predominant crash types were angle collisions and same direction sideswipes. There were no observed directional, time-of-day, or weather-related trends within the data. Commercial trucks were not involved in any of the reported crashes.

- The third highest CRF spot in the area occurs along KY 139 (S Jefferson Street) at center MP 11.574, at the intersection with Washington Street (4-way stop-controlled). Within this spot, 15 of 24 reported crashes occurred at the Washington Street intersection. Review of the detailed crash reports indicated that the majority of crashes are related to drivers failing to pay attention at the stop signs, pulling out in front of oncoming traffic from other approaches. Two crashes involved collisions with trucks: one scraping its roof on the overpass and one knocking over a mailbox trying to turn around in an adjacent parking lot. There were no observed directional, time-of-day, or weather-related trends within the data.

It should be noted that turn lanes were added along KY 91 at the school entrance within the past 3-4 years. It is assumed that this improvement will reduce crash rates in the future; for now, this spot has a CRF of 1.20 based on 2008-2013 crashes.

E. Adequacy Rating Section

KYTC assigns adequacy ratings for state-maintained arterials and major collector routes. The composite rating is based on the condition, safety, and service component scores of the route, as described below:

- The Condition Index covers the condition of the roadway's pavement.
- The Safety Index is evaluated based on lane width, shoulder width, median widths, alignment, and critical crash rate factors.
- The Service Index considers the route's V/C ratio and access control.

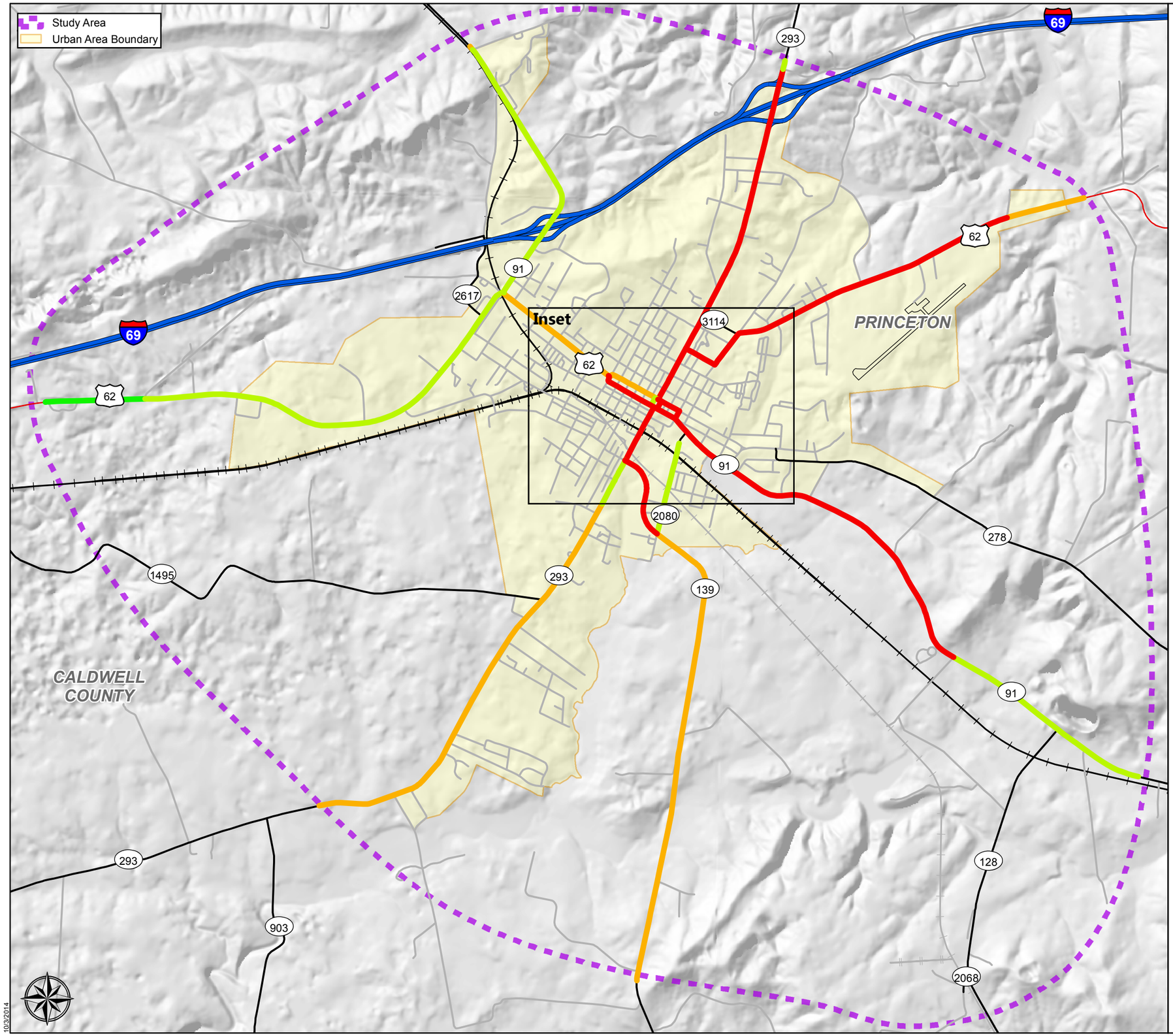
Composite adequacy ratings, shown for the study area in **Figure 2.8**, are assigned based on a 100-point scale. Composite ratings in the study area range from 100 to 60. The lowest adequacy rates are assigned to US 62 through and east of downtown, KY 91 east of downtown, KY 139 south of downtown, and KY 293 between US 62 and I-69. In light of the generally low traffic volumes, the condition and safety indices tend to control the ratings.

KYTC also equates the composite ratings to a statewide percentile; for example, a highway segment in the 60th percentile based on adequacy rating means that 60% of evaluated highways statewide have a lower adequacy rating. Percentile ratings in the study area range from 100 (equivalent to other routes statewide in the best overall condition) to 18.78 (lowest 19% of routes statewide).

Four segments fall in the lowest 30th percentile statewide:

- KY 91 (Hawthorne Street & Market Street) at MP 11.707-11.849, with a Composite Adequacy Rating of 60.0, is in the 19th percentile.
- KY 139 (Legion Street) between KY 2080 and KY 293 (S Jefferson St) at MP 10.871-11.347 with a Composite Adequacy Rating of 63.6, is in the 24th percentile.

Princeton Small Urban Area Study
Adequacy Rating
Figure 2.8



Adequacy Rating
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100

NOTE: KYTC rates state highways on a 100 point scale. The composite adequacy rating is based on each highway's pavement condition, geometrics, safety factor, and traffic operations.

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- US 62 (Main Street) from the one-way section to KY 139 at South Jefferson Street (MP 6.664-7.345), with a Composite Adequacy Rating of 66.0, is in the 28th percentile.
- KY 91-1 (Market Street) from KY 139 through the end of the one-way section (MP 11.707-11.855), with a Composite Adequacy Rating of 66.0, is in the 28th percentile.

F. Other Transportation Modes

Within downtown Princeton, sidewalks are provided along Market and Main Streets and at prominent local cross streets. Sidewalks continue to the west along either side of US 62 (Main Street) between downtown and KY 91 (Marion Road) and along the east side of KY 91 (Marion Road) from US 62 (Main Street) to Linton Way just south of the I-69 interchange. Sidewalks also exist along both sides of South Jefferson Street (KY 139/KY 293), along both sides KY 91 (Hopkinsville Street) east of downtown, along the one or both sides of North Jefferson Street (US 62/KY 293) to Skyline Drive. Conversations with local officials indicated that there is local interest in promoting community walkability.

Sidewalks along Main St. downtown

The multi-state Trail of Tears National Historic Trail passes through Princeton along KY 91.

There are no dedicated bicycle facilities in the area although social media venues indicate cyclists do travel along area highways and the local street network. The most common recreational road routes tend to be located south and west of the city, making use of portions of KY 1495, KY 293, and other rural routes beyond the city limits. Princeton's location between the Pennyrile State Resort and Land Between the Lakes Recreational Area make the area attractive for recreational bike rides.

View along US 62 (North Jefferson Street) towards downtown

Transit services for the region are provided by Pennyrile Allied Community Services. This agency provides demand-response transportation services for Medicaid recipients, persons over 60 years of age, and other county residents upon request. There is no fixed route transit service provided within the study area.

In addition, the Princeton-Caldwell County Airport is a small, publicly owned regional airport. It is located along US 62 (Dawson Road) near the eastern urban boundary.

Princeton's location at the junction of the Illinois Central and L&N rail lines contributed to its development in the late 1800s. Today, the Paducah & Louisville Railroad runs east-west through town, the only Class II railroad in the state. A railyard is located west of town near the industrial park.

Section 3
Environmental Overview

The following sections provide an overview of the existing human and natural environment, based on planning-level information from readily available sources. Any transportation improvement projects should be developed to minimize impacts to the environment, particularly sensitive resources such as schools, parks, and homes adjacent to the corridor. The following sections describe population trends, community resources, aquatic and terrestrial resources, air quality, noise, hazardous materials, and geotechnical concerns.

A. Socioeconomic and Community Resources

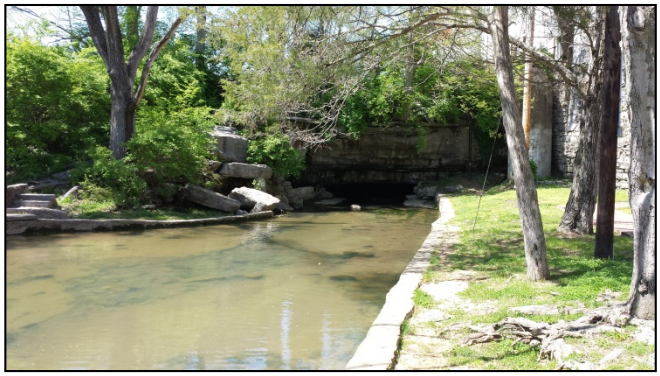
A number of community resources exist, shown in **Figure 3.1**. **Figure 3.2** presents land use maps prepared for the 1999 *Comprehensive Plan*.

The majority of civic offices (i.e., courthouse, fire department, police station) are located within the one-way Main/Market couplet downtown. The downtown area is also home to a vibrant business community housed within the Downtown Princeton Commercial Historic District, which is listed on the National Register of Historic Places (NRHP). Six other NRHP listed properties are found near downtown: the Adsmore Museum (304 N Jefferson Street), the Champion-Shepherdson House (115 E Main Street), the Confederate Soldier Monument at the Courthouse, the Knott House (302 Nichols Street), the L. B. Overby House (317 S Jefferson Street), and the William S. Powell House (501 Washington Street).

Adsmore Museum

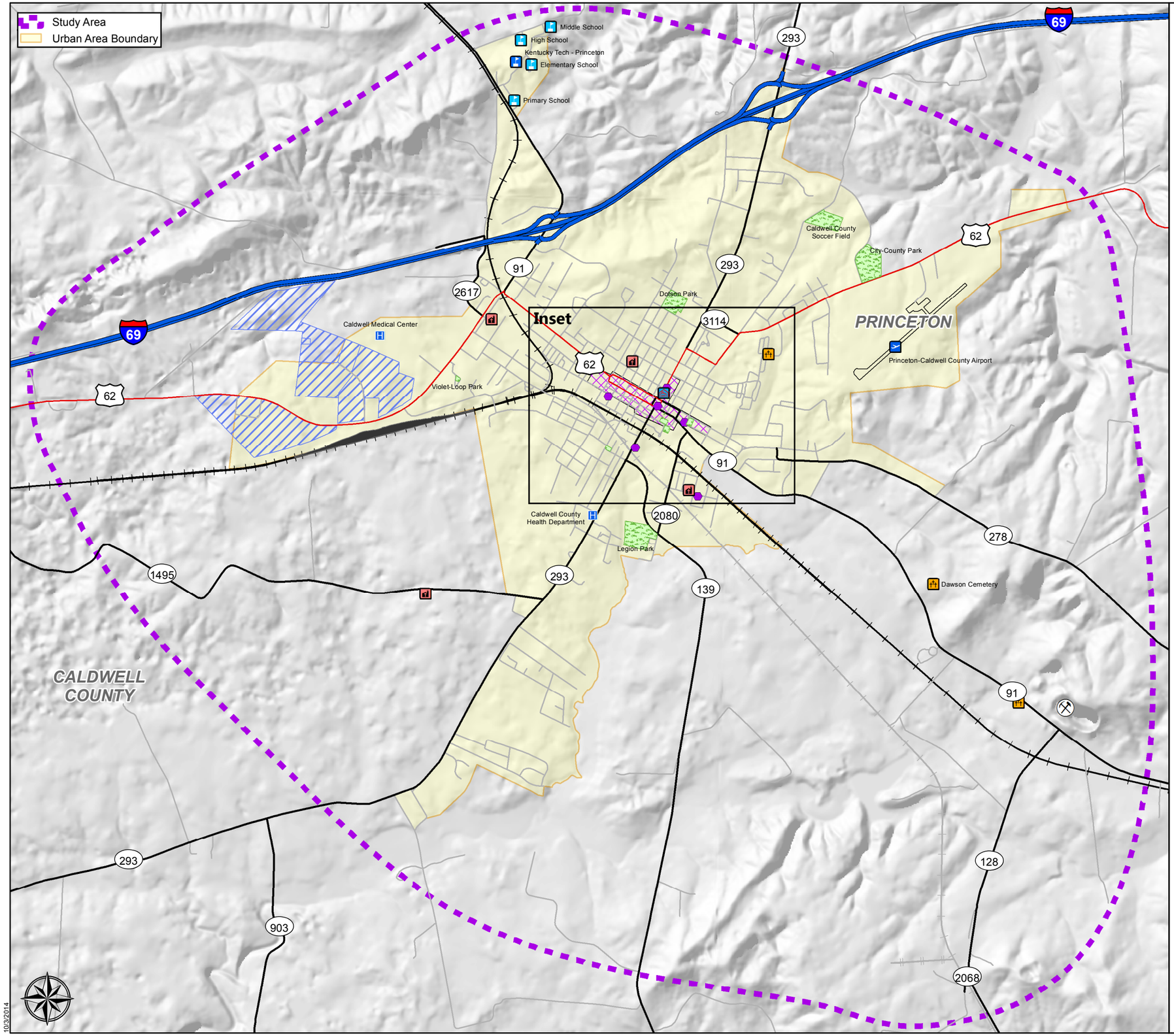
Princeton is also home to an impressive network of local parks, including the following:

- Project Park, which provides playground equipment outside the Frank P. Giannini Senior Citizen's Center downtown
- Trail of Tears Park, which provides commemorative green space along the multi-state national historic trail
- Big Springs Park, which is the natural spring where the city was founded and a certified historic site along the Trail of Tears National Historic Trail



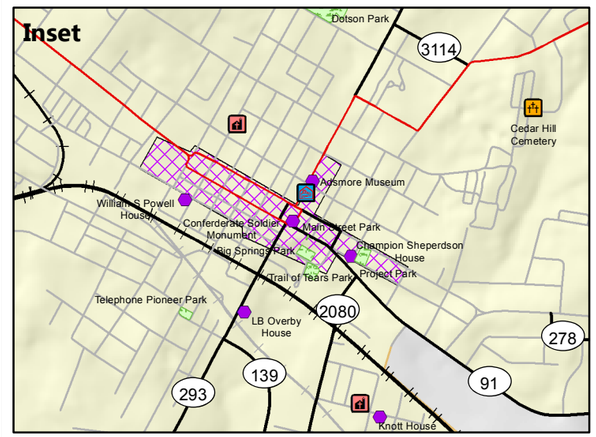
Big Springs Park

Princeton Small Urban Area Study
Community Resources
Figure 3.1



Legend

- Community Resources
- Airport
- Cemetery
- Church
- Hospital
- Quarry
- Primary Schools
- Secondary Schools
- Police/Fire Departments
- National Register Sites
- National Register District
- Parks
- Princeton Industrial Park
- Railroad Yard



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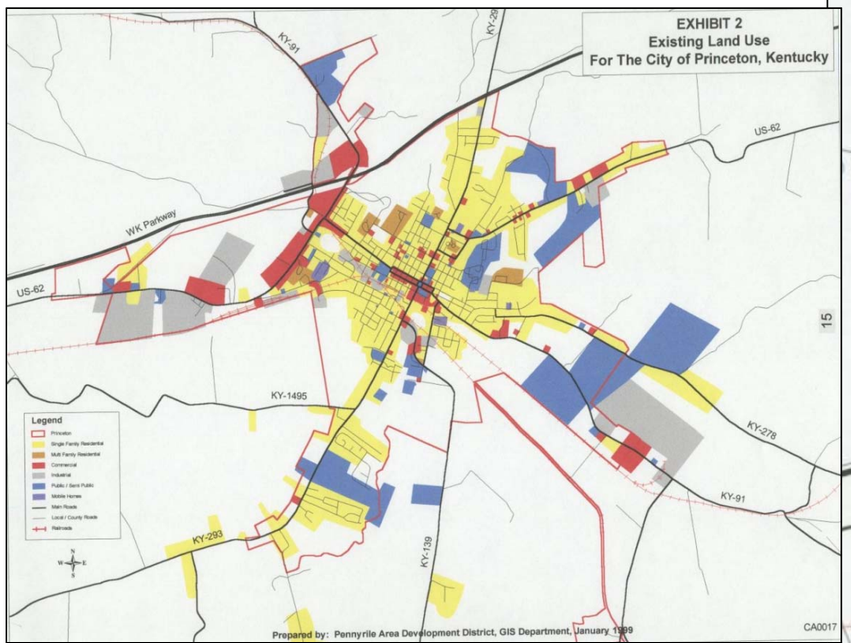

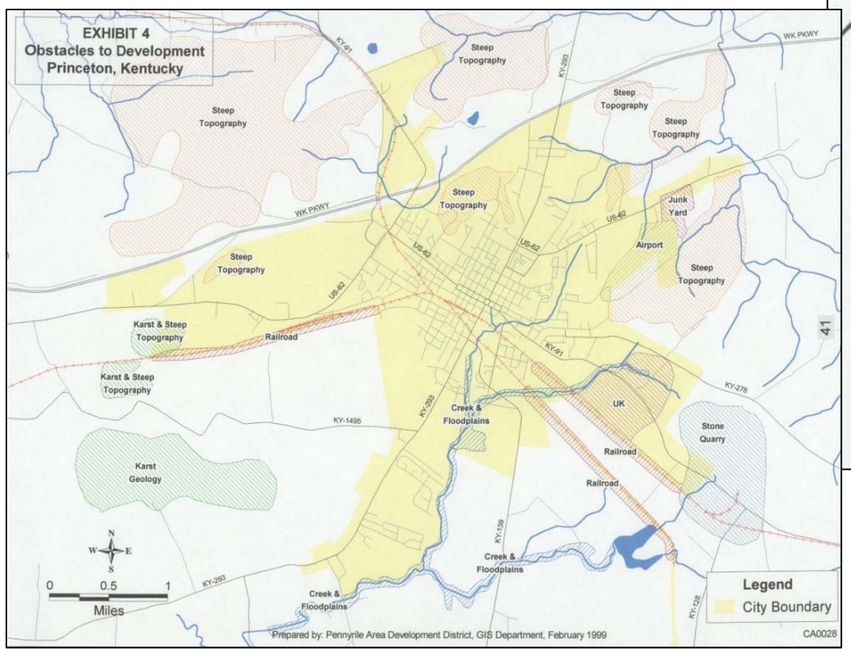

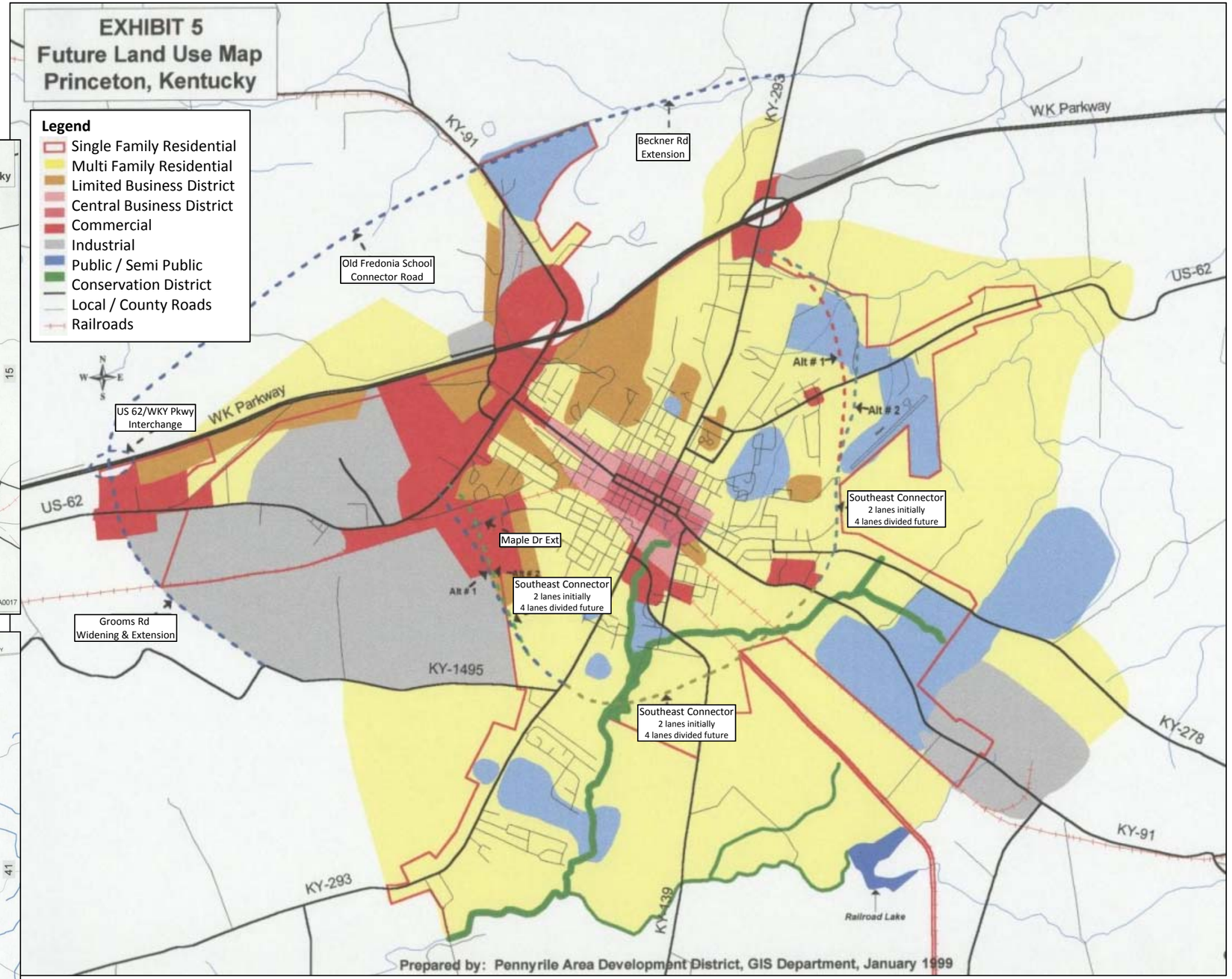

Figure 3.2: Land Use Maps from 1999 Comprehensive Plan

- Main Street Park, a landscaped pocket park between Main Street and Big Springs Park
- Telephone Pioneer Park, a green space with picnic tables along Legion Street
- Dotson Park, which includes playground equipment, a picnic shelter, a basketball court, and open field space on the north side of town
- Legion Park, a recreational complex with ball fields, located off KY 139
- City-County Park, which provides tennis courts, ball fields, and a swimming pool off US 62 (Dawson Road)
- Caldwell County Soccer Field, a collection of soccer fields located off Old Madisonville Road north of town
- Violet-Loop Park, a playground associated with the Hyacinth Village public housing development

Public parks and historic properties listed on or eligible for the NRHP are protected by Section 4(f) of the US Department of Transportation Act.

Other community resources in the study area include:

- Five public schools are located off KY 91 north of I-69, including Caldwell County Primary School, Caldwell County Elementary School, Caldwell County Middle School, Caldwell County High School, and the Caldwell County Area Technology Center (vocational school).
- A large industrial park is located along US 62 west of town. The largest employer in the area is Bremner, Inc. which manufactures cookies and crackers and employs over 600 workers.

View west along US 62 at Industrial Park

- The Princeton-Caldwell County Airport is a regional airport located off US 62 east of town.
- A large quarry operation is located along KY 91 southeast of town, near the intersection with KY 128. Although truck counts were not performed at this location, the quarry reportedly generates an estimated 100 truck trips per day. A second large quarry is located along KY 91 north of town, although it falls beyond the study area boundary.

- Caldwell Medical Center is located off US 62 just east of the industrial park. It is a 25-bed critical access medical center and serves the surrounding rural communities as well as the city itself.

A number of churches and cemeteries are located throughout the study area as well (see **Figure 3.1.**).

Underground water and sewer lines follow most of the existing highways and local routes within the urban boundary, as shown in **Figure 3.5** on page 33. Water tanks, pump stations, and other utilities infrastructure are also identified. Because of its topography and access to existing infrastructure, the undeveloped area roughly bounded by the rail line, KY 1495, and the urban boundary has been identified as some of the most developable open space in the city.

1. Demographics

PADD assembled an overview of select socioeconomic characteristics to determine a "first look" identification of potential environmental justice populations; the report is presented as **Appendix D** and summarized in this section. Census data was assembled for two Census tracts (CT) and ten block groups (BG) that comprise the tracts containing the study area and for Caldwell County, Kentucky, and the US. It should be noted that the tracts cover a much larger area than the urban limits of Princeton or the study area.

The demographic data collected, summarized in **Table 3.1**, shows that several block groups in the study area may require further evaluation if projects advance for additional project development phases. Seven of the ten block groups are above the state threshold in at least two of the four areas of interest. One block group (CT 920200 BG 5) is above the state thresholds in all four categories of interest. **Figure 3.3** shows the geographic limits of tracts and block groups.

- Two block groups exhibit a higher minority percentage than the state threshold (12.2%): CT 920200 BG 4 (30.2%) and CT 920200 BG 5 (23.7%).
- Six block groups exhibit a higher low-income percentage than the state threshold (17.7%): in CT 920200, BG 5 (29.2%), BG 3 (25.6%), and BG 2 (21.1%); in CT 920300, BG 4 (25.6%), BG 1 (23.3%), and BG 2 (18.7%).
- Nine of the ten block groups exhibit a higher elderly percentage than the state threshold (13.3%).
- Six block groups exhibit a higher percentage of persons with disabilities than the state threshold (16.3%): CT 920300 BG 2 (36.0%), CT 920200 BG 2 (34.6%), CT 920300 BG 4 (30.6%), 920300 BG 1 (22.2%), CT 920200 BG 4 (19.1%), and CT 920200 BG 5 (18.1%).

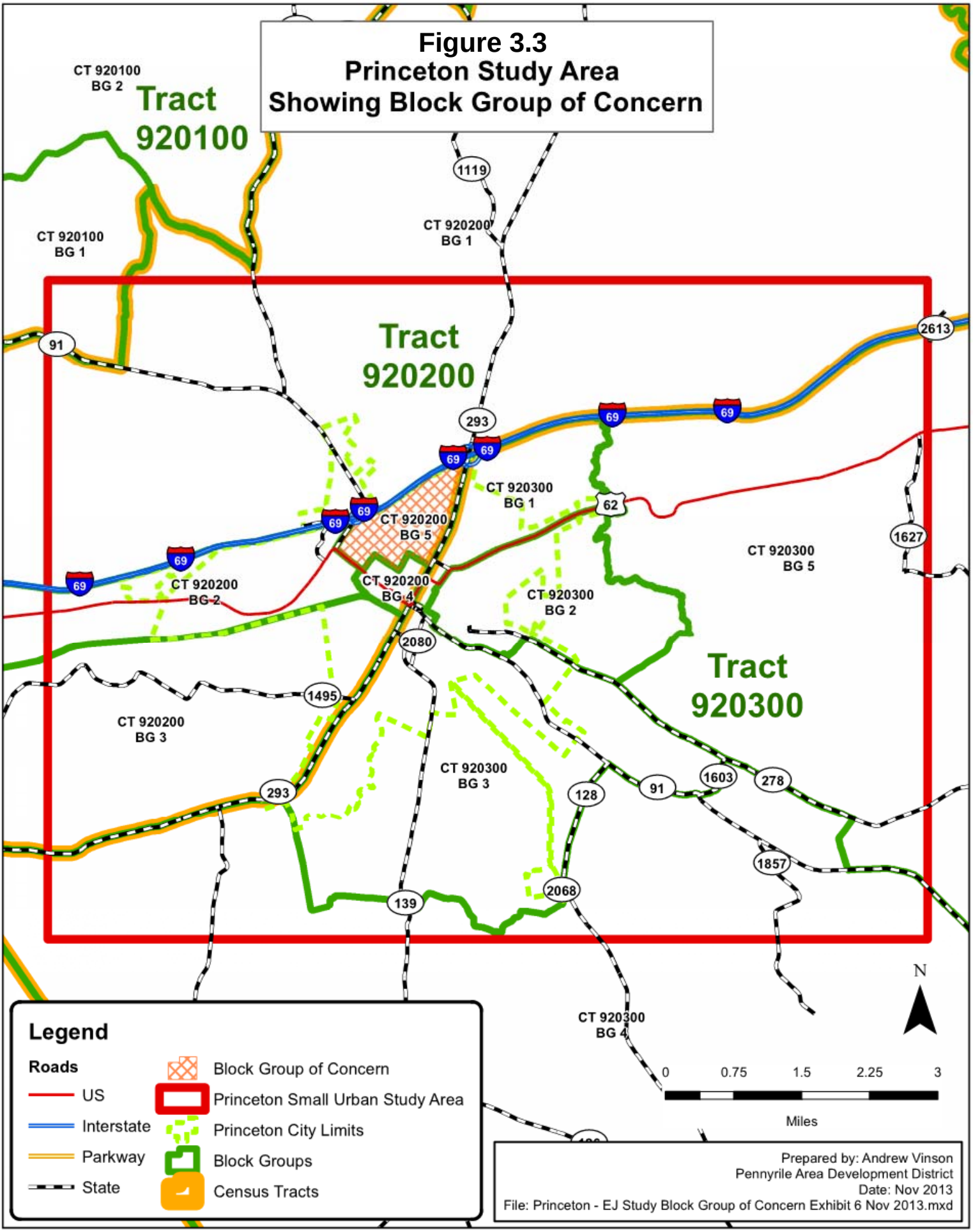
Figure 3.3
Princeton Study Area
Showing Block Group of Concern
Tract 920100
Tract 920200
Tract 920300
CT 920100 BG 2
CT 920100 BG 1
CT 920200 BG 1
CT 920200 BG 5
CT 920200 BG 2
CT 920200 BG 4
CT 920200 BG 3
CT 920300 BG 1
CT 920300 BG 5
CT 920300 BG 2
CT 920300 BG 3
CT 920300 BG 4
1119
91
293
69
62
2613
1627
2080
1495
128
1603
278
1857
2068
139
N
0 0.75 1.5 2.25 3
Miles
Legend
Roads
US
Interstate
Parkway
State
Block Group of Concern
Princeton Small Urban Study Area
Princeton City Limits
Block Groups
Census Tracts
Prepared by: Andrew Vinson
Pennyrile Area Development District
Date: Nov 2013
File: Princeton - EJ Study Block Group of Concern Exhibit 6 Nov 2013.mxd

Table 3.1: Demographic Summary Data for Selected Geographies

Geography	Minority Population[1]	Population over Age 65[2]	Population Below Poverty Level[3]	Disabled Population[4]
United States	27.6%	13.0%	13.8%	11.7%
Kentucky	12.2%	13.3%	17.7%	16.3%
Caldwell County	7.2%	17.8%	18.6%	11.7%
Princeton	12.2%	18.9%	20.5%	N/A
Tract 920200	11.9%	17.1%	19.7%	17.4%
BG 1	2.7%	13.1%	11.9%	4.1%
BG 2	8.0%	22.1%	21.1%	34.6%
BG 3	6.3%	18.0%	25.6%	10.9%
BG 4	30.2%	16.3%	12.7%	19.1%
BG 5	23.7%	19.2%	29.3%	18.1%
Tract 920300	5.1%	18.4%	17.8%	20.8%
BG 1	11.1%	19.0%	23.3%	22.2%
BG 2	5.7%	14.4%	18.7%	36.0%
BG 3	4.1%	22.0%	7.8%	10.5%
BG 4	4.7%	16.7%	25.6%	30.6%
BG 5	1.7%	19.2%	17.0%	0.0%

[1] Table P5 from 2010 Census SF1
[2] Table P12 from 2010 Census SF1
[3] Table S1701 from 2006-2010 ACS estimates
[4] Table P42 from Census 2010 SF3

B. Aquatic & Terrestrial Resources

The study area is primarily a developed urban area. Scattered agricultural fields and large tracts of forested land surround the built-up portions of town, which potentially provide habitat for common terrestrial species.

The US Fish & Wildlife Service website indicates two known threatened, endangered, or candidate species may occur within the study area: Gray bat (*Myotis grisescens,* Endangered) and Indiana bat (*Myotis sodalist,* Endangered). There are no known critical habitats or wildlife refuges in the vicinity.

Figure 3.4 shows water resources within the study area, which lies within two watersheds: the Tradewater to the north and the Lower Cumberland to the south. Major streams in the area include Eddy Creek and Goose Creek. There are several natural springs in the area and numerous water wells. **Figure 3.4** also presents wetlands and floodplains based on GIS records; additional field survey and agency coordination will be necessary for any future project development phases.

Big Eddy Creek alongside KY 2080

Princeton Small Urban Area Study
Water Resources
Figure 3.4

Study Area
Urban Area Boundary

Hydraulics
- Water Wells
- Springs
- National Hydrology Dataset Waterways
- National Hydrology Dataset Waterbody

FEMA Q3 Flood Data
- Flood Zone A 1% annual chance of flooding

National Wetland Inventory Data
- NWI Wetlands

Inset

PRINCETON

CALDWELL COUNTY

Rabbit Lake
Eddy Creek
Big Spring Branch
Goose Creek
Railroad Lake
Wiley Creek

0 1,000 2,000 4,000 Feet

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C. Air Quality & Noise

The study area is identified in US Environmental Protection Agency records as in attainment for all criteria pollutants.

The study area includes a number of noise-sensitive receptors, some of which were identified earlier in this chapter. Noise-sensitive land use categories, defined by FHWA, include residential areas, cemeteries, hospitals, parks, religious institutions, playgrounds, and schools. As specific projects are identified for further development, additional impact studies will be necessary.

D. Hazardous Materials

GIS data from the US Environmental Protection Agency include a number of permitted facilities and monitored sites throughout the area. These are shown in **Figure 3.5**. As specific projects are identified for further development, additional contamination studies may be necessary.

E. Geotechnical Overview

The KYTC Division of Geotechnical Engineering completed a preliminary geotechnical assessment of the study area which is provided as **Appendix E** and summarized herein.

The study area is located in the Mississippian Plateau or Pennyrile Physiographic Region. The area is known for its rolling terrain, red clay soils, and karst features (e.g. sinkholes and caves). Faults to the north mark the beginning of the western Kentucky fluorspar-barite-lead district. Commercial mining operations exist within the study area. A figure illustrating these features is located in **Appendix E**.

Foundations for bridges in the study area are generally rock bearing. Smaller structures are commonly founded on soil or bedrock. Soils in the area are generally suitable for embankment construction, which can typically be constructed to a height of 60 feet with 2H:1V sideslopes. Soil cuts in the native soil have been historically problematic. Rock cuts can be problematic due to the karst nature of the bedrock. California Bearing Ratios are generally low; chemical modification of the subgrade or use of rock for roadbed is common. Site specific geotechnical investigations are critical in the region for design due to the karst potential and likelihood of encountering problematic soils.

A collection of previously completed geotechnical studies within the area can be accessed through the KYTC Division of Structural Design website.

Princeton Small Urban Area Study
Program Sites and Utilities
Figure 3.5

Study Area
Urban Area Boundary

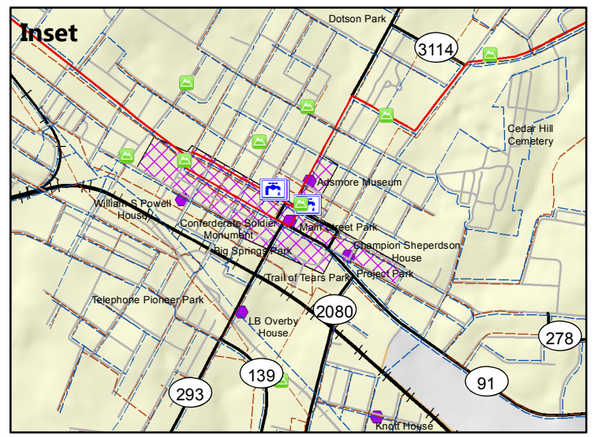
Middle School
High School
Kentucky Tech - Princeton
Elementary School
Primary School
Caldwell County Soccer Field
City-County Park
Dotson Park
Caldwell Medical Center
Violet-Leap Park
Princeton-Caldwell County Airport
Caldwell County Health Department
Legion Park
Dawson Cemetery
PRINCETON
CALDWELL COUNTY
Inset
69
62
91
293
2617
3114
2080
278
139
1495
903
128
2068

EPA Program Sites

- EPA Registered Facility

Water and Sewer Utilities

- Water Purchase Source
- Water Pump Station
- Water Tank
- Proposed Water Project
- Water Line
- Sewage Lift Station
- Sewer Line
- Proposed Sewer Line



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Section 4

Previously Identified Project Concepts

The purpose of this Small Urban Area Study is to identify and examine transportation issues related to safety and traffic operations in the city of Princeton and its surrounding area. Per the KYTC, "the study will focus on short-term improvements that can be quickly and effectively implemented at both an individual intersection level and at a corridor-wide level. The study will produce a list of short term recommendations which the KYTC, the City of Princeton, Caldwell County, and/or private developers can take for further project development and implementation. The study will also seek to address long term concerns by examining future transportation needs and determining options for future improvement projects."

To accomplish this, analysts completed a review of available planning documents to identify potential transportation improvement projects that have been previously suggested. The following subsections discuss this effort; **Figure 4.1** presents a summary map with each of these projects included.

A. KYTC Six Year Highway Plan

Two projects within Princeton are included in the current KYTC *Six Year Highway Plan.* This plan represents KYTC's committed priorities during 2014-2020. Projects with construction funding designated within the *Six Year Highway Plan* are assumed to be implemented within the next six years.

- A new Connector from KY 293 (just south of the I-69 interchange) to KY 91 east of town is presented as Project R in **Figure 4.1**. This new connector is Item Number 2-153.00 in the *Six Year Plan* and has designated construction funding in year 2018. KYTC is currently in the preliminary design/environmental phase of the project development process and anticipates advancing to final design in 2015.

- A continuation of the new Connector 2-153.00 above, Project Q in **Figure 4.1**extends the new highway from KY 91 to KY 139 south of town. The southern component of the new connector is Item Number 2-193.00 in the *Six Year Plan* and has some funding for its design phase. This project can enter the preliminary design/environmental phase of the project development process once the southern tie-in of 2-153.00 is determined.

B. KYTC Project Identification Forms

As part of its long range transportation planning process, KYTC maintains PIFs for potential improvement projects nominated by KYTC district offices, Area Development District planners, local elected officials, a rural transportation committee, FHWA, or members of the public. A PIF is a concise summary document that includes pertinent information about a highway where an unscheduled need has been identified.

Princeton Small Urban Area Study
Previously Identified Projects
Figure 4.1

ID	Source	ID	Description
A	PIF	02 017 B0062 1.00	Widen Route
B	PIF	02 017 B0062 2.00	Intersection Improvements
C	PIF	02 017 B0062 3.00	Realign Curve
D	PIF	02 017 B0062 4.00	Add Sidewalk
E	PIF	02 017 D0091 4.00	Widen Route
F	PIF	02 017 D0139 3.00	Intersection Improvements
G	PIF	02 017 D1495 1.00	Widen/New Route
H	PIF	02 017 D2080 1.00	Reconstruct Rail Underpass
I	Comp	#7 in Exhibit 6	New Route
J	PIF	02 017 C0000 1.00	New Route
K	PIF	02 017 C0000 2.00	New Route
L	Comp	#12 in Exhibit 6	Unspecified Improvement
M	Comp	#15 in Exhibit 6	New Route
N	Comp	#16 in Exhibit 6	Redesignate Truck Route
O	Comp	#17 in Exhibit 6	Reconstruct to State Route
P	Comp	#21 in Exhibit 6	New Route/Interchange
Q	6YP	Item # 2-193.00	New Route
R	6YP	Item # 2-153.00	New Route
S	CEDS	n/a	Reconstruct/widen KY 91 Christian Co to Fredonia
T	CEDS	n/a	Reconstruct Intersection
U	CEDS	n/a	Reconstruct/widen KY 139 Cadiz to Princeton

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Thirteen PIF forms present projects that are located within the urban limits of Princeton:

- PIF 02 017 B0062 1.00 (Project A in **Figure 4.1**) is a minor widening project along US 62, proposed to address traffic congestion. The PIF states that the highway section has a high average daily traffic volume with two 12-foot lanes, there is strip commercial development along the route, and traffic flow is blocked by left turning vehicles. The project was classified as a low priority for the district and region as of 2007. It should be noted that a center turn lane was added along the western portion of Project A within the last 10-15 years.

- PIF 02 017 B0062 2.00 (Project B in **Figure 4.1**) is an intersection reconstruction project, proposed to address a substandard turning radius along US 62 (North Jefferson Street) at East Green Street. The PIF notes that the issue contributes to congestion and safety concerns at this location. The project was classified as a high local priority as of 2013.

- PIF 02 017 B0062 3.00 (Project C in **Figure 4.1**) is a spot improvement project to address substandard geometrics at a curve on US 62 at the intersection with KY 3114 (Young Street). The PIF states that eastbound trucks cannot navigate the curve without getting into the on-coming traffic lane. A utility pole just behind the curbline further complicates the turning movement for eastbound vehicles. The project was classified as a medium to low priority for the district and region as of 2007.

- PIF 02 017 B0062 4.00 (Project D in **Figure 4.1**) is a proposed project to add sidewalks along US 62 to improve pedestrian safety in a developed commercial area.

- PIF 02 017 D0091 4.00 (Project E in **Figure 4.1**) is a reconstruction project, proposed to provide better traffic flow and reduce congestion along KY 91 from I-69 to KY 139. This route is the primary access facility for Caldwell County schools. Turn lanes were added along KY 91 within the past 3-4 years to serve the school entrance. The PIF project was classified as a high priority locally and regionally as of 2013. It should be noted that KYTC is in the process of revising this form to create two separate PIFs.[1]

- PIF 02 017 D0139 3.00 (Project F in **Figure 4.1**) is a widening project, proposed to relieve congestion at the intersection of KY 293 and KY 139. Currently, the east approach is signed as KY 139; the south approach is signed as KY 293; the west approach is signed as the KY 139 and KY 293 truck route through downtown; and the north approach is signed as KY 139 and KY 293. The intersection is currently signalized with a single travel lane per direction per approach. The PIF project was classified as a high priority locally as of 2011.

Signage at KY 139/KY 293

- PIF 02 017 D1495 1.00 (Project G in **Figure 4.1**) includes the reconstruction and extension of KY 1495 (Grooms Lane), proposed to reduce traffic congestion downtown and provide a new truck route. The project was classified as a high priority locally and regionally as of 2013.

[1] This PIF has been changed to inactive status, replaced by PIF 02 017 D0091 4.60 and PIF 02 017 D0091 4.30.

- PIF 02 017 D2080 1.00 (Project H in **Figure 4.1**) is a spot improvement project to reconstruct and widen the railroad underpass on KY 2080, proposed to improve safety and truck access. The PIF states that the clearance (posted at 12 feet 1 inch) prohibits most standard semi-truck box trailers. The project was classified as a low priority for the district and region as of 2007.

Narrow railroad underpass on KY 2080, facing north

- PIF 02 017 C0000 1.00 (Project J in **Figure 4.1**) is one of four sections of a new Connector route around the south side of the city. This section would construct a new route from US 62 west of town to KY 293.

- PIF 02 017 C000 1.11 and PIF 02 017 C000 2.00 (Project K in **Figure 4.1**) describe one of four sections of a new Connector route around the south side of the city. This section would construct a new route from KY 293 to KY 139. PIF 02 017 C000 2.00 was classified as a high priority locally and regionally as of 2013.

- PIF 02 017 C000 3.00 (Project Q in **Figure 4.1**) is one of four sections of a new Connector route around the south side of the city. This section, also included as Item Number 2-193.00 in the *Six Year Plan*, would construct a new route from KY 139 to KY 91.

- PIF 02 017 C000 4.00 (Project R in **Figure 4.1**) is one of four sections of a new Connector route around the south side of the city. This section, also included as Item Number 2-153.00 in the *Six Year Plan*, would construct a new route from KY 91 to KY 293 just south of the I-69 interchange.

C. 1999 Comprehensive Plan

Vision 2020, the comprehensive plan for the city prepared in 1999, identifies 21 transportation improvement projects within the urban area. Several of these improvements overlap with potential projects described above, including the new connector route south of town from US 62 west of town to KY 293 just south of the I-69 interchange. Projects in the Comprehensive Plan that have not been described previously are listed below. It should be noted that the city is beginning the process to update its Comprehensive Plan; the findings of this small urban area study will feed into the update.

1. Previously Completed Projects in Comp Plan

- Adding turn lanes at "Druthers Corner," that is, the intersection of US 62 with KY 91 (Marion Road). This improvement has been completed, including signalizing the intersection and adding turn lanes for all three approaches. This is shown as Project T in **Figure 4.1**.

- Widening US 62 west of town to provide a three lane cross section, which has been completed.

- Widening KY 91 (Marion Road) to provide a three lane cross section between US 62 and I-69, which has been completed.

2. Additional Concepts Identified in Comp Plan

- A dedicated travel lane from the Southeastern Connector to access I-69 (Project L in **Figure 4.1**). As Project R has advanced through the project development process, the initial alignment shown in the 1999 Comprehensive Plan has shifted south, reducing the importance of Project L as originally shown.

- Rerouting of the US 62 truck route from McGoodwin Avenue to East Green Street (Project N in **Figure 4.1**). This would also include replacement of a small drainage structure, intersection improvements, elimination of on-street parking, and signalization of the US 62 (North Jefferson Street) intersection with Green Street. This has been identified as a high priority project for implementation prior to 2019.

- Creation of a new connector route west of town between Old Fredonia Road and US 62 west of town (Project P in **Figure 4.1**), including a new interchange along I-69. This has been identified as a medium priority project.

- Creation of a new state urban collector route north and east of the downtown area (Project O in **Figure 4.1**). The Comprehensive Plan identifies this route as generally following Linton Way east from KY 91 (Marion Road), West Green Street, East Green Street, North Eagle Street, and KY 2080 (Cadiz Street) to KY 139 (Legion Street). This also includes reconstruction of the KY 2080 railroad overpass (Project H) and realignment of the KY 91 intersections with KY 2080 and Eagle Street. This project was identified as a low priority for implementation.

- Creation of a new connector route north of town between Old Fredonia Road and KY 91 near the schools (Project I in **Figure 4.1**). This project has been identified as a low priority for implementation.

- Creation of a new connector route north of town between KY 293 and KY 91 near the schools (Project M in **Figure 4.1**). Identified as the Beckner Road Extension in the Comprehensive Plan, this project was identified as a low priority for implementation.

The Comprehensive Plan identifies its priorities for the proposed network of new connector routes around the city, beginning with the highest priority: Eastern Connector (R), east portion of Southern Connector (Q), Southern Connector (J), west portion of Southern Connector (K), West Connector with interchange (P), Grooms Lane Extension (G), Beckner Road Extension (M), and then the Old Fredonia Road School Connector (I).

D. 2013 Comprehensive Economic Development Strategy

In 2013, PADD updated their *Comprehensive Economic Development Strategy* (CEDS), which describes planning and coordination efforts to guide economic development for the nine county Pennyrile Region. "The analysis addresses the local and state economy, the opportunities and threats posed by external trends and market forces, and the availability of partners and resources for economic development. The community's vision and goals, together with the appraisal of the region's competitive advantage, set the strategic direction for the action plan" (CEDS, page 4).

One transportation goal is established in the CEDS: to promote efficient and economical movement of people and goods into and throughout the PADD area by linking population centers with accessible transportation facilities. Several objectives support this goal, divided between modes. Four transportation projects identified in the CEDS fall within the urban limits of Princeton:

- Construct a bypass around the city of Princeton from US 62 (west) to US 62 (east), which is shown as Projects R, Q, and K, with G or J in **Figure 4.1** and is addressed in the previous subsections.
- Major widening and reconstruction of KY 91 from Christian County to Fredonia in Caldwell County, which is shown as Project S in **Figure 4.1**.
- Total reconstruction of the US 62 and KY 91 intersection in Princeton, which is shown as Project T in **Figure 4.1**. This "Druthers Corner" intersection has been reconstructed within the last 10-15 years.
- Major widening and reconstruction of KY 139 from Cadiz to Princeton, which is shown as Project U in **Figure 4.1**.

The CEDS recognizes that not all of the goals, objectives, and needs discussed in the document can be implemented in a short time span. The implementation chapter discusses the ADD's intention to regularly coordinate with KYTC and local governments to identify transportation needs and submit potential projects for inclusion in the *Six Year Plan*. The CEDS plan does not prioritize these proposed projects for implementation.

Section 5
Initial Team & Stakeholder Coordination

In February 2014, the project team met to discuss the existing transportation network and study area needs. A separate meeting was held with local officials and stakeholders to understand the local perspectives on these issues. The following subsections summarize these meetings; summaries of each are included in **Appendix F**.

A. Project Team Meeting #1

Staff from the KYTC Central Office, KYTC District 2 Office, PADD, and consultant firm met at the Princeton Tourist Center on February 4, 2014. The purpose of the meeting was to review the existing conditions data, discuss previously proposed projects, and prepare for the local officials/stakeholders meeting later that morning. Lettered projects in the following and subsequent sections may be referenced in **Figure 4.1** on page 35. Key discussion items included:

- A portion of Highland Avenue is currently signed as KY 278 and also has an "End of State Maintenance" sign.
- FHWA is reviewing the environmental document for the Eastern Connector (Project R); the preferred alternative should move into design later in 2014. The next link to the south (Project Q) can begin design once the southern tie-in for Project R is decided.
- The utility pole at the US 62 curve near KY 3114 (Project C) is an issue for eastbound truck traffic.
- Adding turn lanes at the school a few years ago helped relieve traffic issues but there may still be a local desire to see Project E implemented.
- Projects J, K, and G are important to locals. The land roughly bounded by US 62, Project J, and Project G represents some of the most developable land in the city; these projects would help support economic development. For reference, **Figure 3.2** on page 26 contains relevant land use mapping from the city's comprehensive plan.
- The Northern Connector (Projects P, I, and M) is a lower priority need with the Eastern Connector (Projects R and Q) moving forward now.
- A project has been in the *Six Year Highway Plan* to improve KY 139 at Rock Springs Hill, which lies within the limits of Project U but beyond the study area boundary. PIF 02 017 D0139 2.10 covers this location, including reconstruction of approximately 0.6 miles of highway to address substandard curves.

B. Local Officials/Stakeholders Meeting #1

The project team reached out to a number of local government representatives and other community groups early in the planning process. The following organizations were invited to participate as key stakeholders in the Small Urban Area Planning Study:

- Caldwell County Judge Executive
- Mayor of Princeton
- Princeton Finance Officer
- Princeton Chief of Police
- Princeton Fire Chief
- Caldwell County Sheriff
- Caldwell County Road Supervisor
- Rogers Group (Quarry)
- Lake Barkley Partnership for Economic Development
- Princeton-Caldwell Chamber of Commerce
- Caldwell County Board of Education
- Princeton Street Superintendent
- Chairman of the Princeton Planning Commission

The project team met with key stakeholders and local officials on February 4, 2014 following the first project team meeting. In addition to members of the project team, 13 local government representatives and stakeholders attended the meeting. During the meeting, the project team presented a series of maps depicting existing traffic volumes, vehicle crashes, truck routes/restrictions, adequacy ratings, geometric deficiencies, previous projects, and community/environmental resources.

Several participants identified their main concerns with the existing transportation network:

- Tight turns along the truck route cause problems for large vehicles, especially downtown. The Eastern Connector (Projects R and Q) will help alleviate the majority of this issue by removing non-essential trips from the downtown network.
- The low overpass on KY 139 is an issue; GPS devices route large trucks through this area. Even though most trucks don't physically hit the bridge, they have to back up traffic until they can get turned around.
- There is a sight distance issue along US 62, just east of the intersection with KY 3114 (Young Street).
- Walkability is a major emphasis for aging community members.

The group also provided a local perspective on previously identified projects (shown in **Figure 4.1** on page 35).

- Project A (widening US 62 from KY 91 Marion Road to Plum Street) was suggested a long time ago and is not warmly supported by the community.
- Project B (intersection improvements along US 62 at McGoodwin Avenue/North Jefferson Street) is needed, particularly along the ditch line at Green Street.
- The group was divided regarding the importance of Project D (adding sidewalks along US 62).

- Despite the recent addition of turn lanes to service the schools, KY 91 still backs up during peak school hours. Widening the route (Project E) would still be beneficial.

- Project F (intersection improvements at KY 139/293) is not as high a priority as it once was because of the Southeast Connector (Projects R and Q).

- Projects J and G (connections from KY 293 to US 62 southwest of town) would serve a similar purpose. The group questioned whether Project J was feasible with the terrain and proximity of the rail yard.

- Project H (reconstructing the railroad overpass on KY 2080) is not as high a priority as it once was because of the Southeast Connector.

- The Northside Connector (Projects P, I, and M) is not as high a priority as it once was because of the Southeast Connector. The proposed new interchange would not meet spacing requirements after the designation of the parkway as I-69.

- Project L (dedicated lanes from the Southeast Connector to I-69) is unnecessary based on current designs for Project R.

- The community sees Project Q (Southeast Connector between KY 139 and KY 91) as having primary importance; KY 139 serves as a short-cut between I-69 and I-24. Project K (the next link in the Southeast Connector between KY 139 and KY 293) is also seen as a valuable project but less critical than Project Q.

- Project O (a new arterial connection roughly following Linton Way, Green Street, Eagle Street, and KY 2080) is not as high a priority as it once was because of the Southeast Connector.

- The "Druther's Corner" intersection of US 62/KY 91 (Project T) has recently been reconstructed.

- Generally, Project U (widening KY 139 to Cadiz) is a lower priority than the Southeast Connector but still would be beneficial overall. The group discussed whether improving the curve at Rock Springs Hill would address the problem or if the larger widening project would add further value.

Finally, different attendees identified potential new projects to consider, including bicycle and pedestrian mobility improvements, conversion of one-way streets downtown to two-way streets, and improving the five-leg intersection at KY 91/Main Street/Hawthorne Street.

The project team agreed to consider this input, to develop some preliminary project concepts, and to meet with the group again in Summer 2014 to seek local input on study findings.

Section 6
Development of Proposed Improvement Concepts

The purpose of this Small Urban Area Study is to identify and examine transportation issues related to safety and traffic operations in the City and its surrounding area. The study focuses on short term improvements that can be quickly and effectively implemented at both an individual intersection level and at a corridor-wide level. The study will also seek to address long term concerns by examining the future transportation needs and determining options for future improvement projects.

For these reasons, a range of concepts were developed based on the existing conditions analysis (i.e., traffic, crash, and environmental overview), previous projects identified, and input received from the project team and stakeholders/local officials. Study recommendations are presented in **Chapter 8**; this chapter provides an overview of each improvement concept considered.

Improvement concepts were discussed at the second project team meeting in March 2014; the meeting summary is included in **Appendix F**.

A. Project Specific Goals

Each improvement concept described herein was developed to support one or more transportation needs in the study area, while also being consistent with additional goals for the area. Two project-level general purposes were identified, based on existing conditions analyses presented in **Chapter 2**: 1) to improve safety and 2) to improve traffic operations.

In addition, a number of additional project-level goals were identified:

- Reduce pass-through truck traffic downtown
- Accommodate local truck trips (i.e., deliveries to downtown businesses) within the street network
- Enhance pedestrian connections, particularly downtown
- Enhance bicycle mobility, particularly to local and regional recreational destinations
- Enhance tourism and economic development opportunities within the City
- Minimize impacts to residents, businesses, and the environment

B. Corridor-level Improvement Concepts

During Spring 2014, five corridor-level improvement concepts were identified. Due to the size and complexity, each can generally be considered a long term improvement concept although one of the components of the Southeast Connector is already under development. Specific information for each concept is presented on the relevant project sheet in **Appendix G**; a brief overview of each improvement concept is presented below. Each of these corridor-level potential improvements comes from previously defined projects envisioned for Princeton's future transportation system (i.e., the *Six*

Year Highway Plan, PIF forms, the city's Comprehensive Plan, or regional CEDS plan). Potential corridor-level projects are shown in shades of red in **Figure 6.1**.

Southeast Connector (Projects KQR)

The Southeast Connector would create a new 3.7-mile long, two lane highway link from KY 293 (North Jefferson Street) to KY 293 (South Jefferson Street). The project would create an alternate link to route non-local truck trips away from geometric restrictions downtown and to divert cut-through regional trips currently passing through Princeton.

The easternmost portion, Project R, has designated funding in the *Six Year Highway Plan* through construction (Item No. 2-153.00). At the time of this study, an Environmental Assessment has been prepared to evaluate potential impacts of the project on the human and natural environment. The next portion to the south, Project Q, has designated design funding in the *Six Year Highway Plan* (Item No. 2-193.00). Together, Q and R would enable the new connector to serve local and regional trips, which currently must pass through downtown Princeton.

The southernmost portion, Project K, when combined with Projects Q and R already in the *Six Year Highway Plan*, creates an eastern connection around the city. It provides new intersections with US 62 (Dawson Road), KY 278 (Sandlick Road), KY 91 (Hopkinsville Road), KY 139 (Cadiz Road), and KY 293 (South Jefferson Street), providing an alternate route for regional trips to access I-69 without traveling through downtown Princeton.

Southern KY 293 to US 62 Connection (Project G or J)

The land on the west side of town south of the rail line has been identified as some of Princeton's most developable area. The 1999 *Comprehensive Plan* identifies the area for future industrial land use. The Plan notes, "The city has targeted this area for a substantial portion of its future growth due to planned transportation infrastructure improvements, access to the city's sewer treatment plant, access to the main waterline along KY 293, as well as the relatively flat topography of the area that is more conducive to urban development. The western side of the city was also identified as the major future industrial and commercial districts because of its access to [I-69] and the current market forces that indicated a commercial and industrial growth trend on the west side of the city."

Two potential new highway links have been identified between KY 293 (South Jefferson Street) and US 62 to support economic development for this area:

- Project J would create a new connection near the eastern boundary of the rail yard.
- Grooms Lane Extension (Project G) would provide a longer, southern connection generally following a portion of existing KY 1495 (Grooms Lane).

The eastern end of both links generally aligns with the proposed Southeast Connector (Project KQR); Project G would also align at its western end with the proposed Northside Connector (Project MIP). While Project J is feasible to construct, it would likely result in more implementation challenges than Project G, such as business relocations and coordination with the Paducah & Louisville Railroad due to proximity to their yard. As both connections would serve a similar function, only one of these two concepts should be pursued.

Princeton Small Urban Area Study
Improvement Concept Map
Figure 6.1

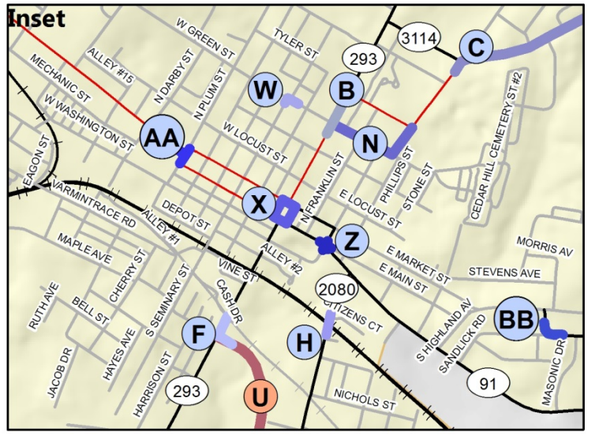
Corridor-Level Improvement Concepts:

- New Southeast Connector (Projects K, Q, R)
- New Southern KY 293 to US 62 Connection (Project G or J)
- New Northside Connector with Interchange (Projects M, I, P)
- Widen KY 91 (Projects E, S)
- Widen KY 139 (Project U)

Spot-Level Improvement Concepts:

- Five-Leg Intersection Improvements (Project Z)
- Truck Route Improvements (Projects F, W, B, N, C)
- Operational Improvements at Courthouse (Project X)
- US 62/Plum Street Intersection Improvements (Project AA)
- KY 278 Curve Realignment (Project BB)
- KY 2080 Rail Overpass Reconstruction (Project H)
- Add sidewalks along US 62 (Project D)

Note: Improvement concepts shown represent planning-level concepts and not actual alignments



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Northside Connector with Interchange (Projects MIP)

This proposed project, identified in the 1999 *Comprehensive Plan*, would create a new, 4.9-mile long, two lane highway link from KY 293 north of town to US 62 west of town. The concept includes a new interchange with I-69, approximately 2.5 miles west of the existing KY 91 interchange. The project would improve access to Caldwell County schools, which are currently accessible only via KY 91. KY 91 (Marion Road) reportedly experiences severe congestion during peak school traffic hours, despite turn lanes which were added in the past few years. This project is divided into three segments in the Comp Plan:

- Project M, KY 293 to KY 91
- Project I, KY 91 to Old Fredonia Road
- Project P, Old Fredonia Road to US 62, including a new interchange with I-69

Widen KY 91 (Projects ES)

Proposed in the 2013 CEDS study, Project S includes the regional widening of KY 91 from the Christian County line to Fredonia to "promote the efficient and economical movement of people and goods into and through the Pennyrile Area Development District by linking population centers with accessible transportation centers." A PIF form exists for the portion of the route in north Princeton, which would improve traffic operations for motorists accessing Caldwell County schools. For planning purposes, this project is broken into three segments in this study, the majority of which lie beyond the study area:

- Project S1, widening from the Christian County line (MP 0.0) to the proposed Southeast Connector (approximate MP 10.7)
- Project E, widening from I-69 ramps (MP 12.235) to KY 139 Farmersville Road (MP 13.905)
- Project S2, widening from KY 139 (MP13.905) to Fredonia (approximate MP 23.3)

KY 91 today provides two 10-12 foot wide travel lanes with minimal paved shoulders.

Widen KY 139 (Project U)

Proposed in the 2013 CEDS study, Project U includes the regional widening of KY 139 from Cadiz to Princeton. It should be noted that the majority of the 12.8-mile project lies beyond the study area for this study. KY 139 currently provides two 10-12 foot wide travel lanes with minimal paved shoulders.

1. Recommended Cross-Sections

For cost-estimating purposes, typical section templates were developed for each of the corridor-level improvement concepts. This includes three different sections:

- For new connector routes including Projects KQR, MIP, J, and G, the recommended cross-section includes two 12-foot travel lanes with 10-foot shoulders (8-foot paved), and 8-foot ditches (shown in **Figure 6.2**).
- For regional reconstruction/widening projects like Projects S and U, two 11-foot lanes, 8-foot shoulders (4-foot paved), and 8-foot ditches are recommended (shown in **Figure 6.3**).
- For the KY 91 improvement at the schools (Project E), the recommended cross-section includes two 12-foot travel lanes, a 14-foot center turn lane, 8-foot shoulders (4-foot paved), and 8-foot ditches (shown in **Figure 6.4**).

Figure 6.2: Typical Section for New Connector Routes

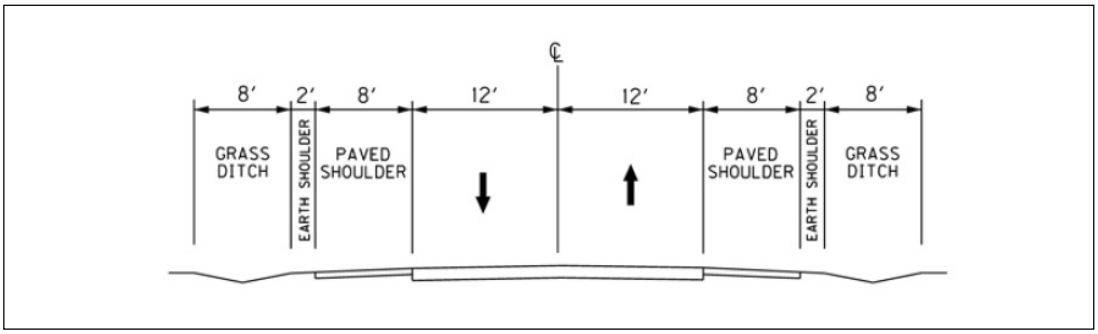


Figure 6.3: Typical Section for Regional Reconstruction/Widening

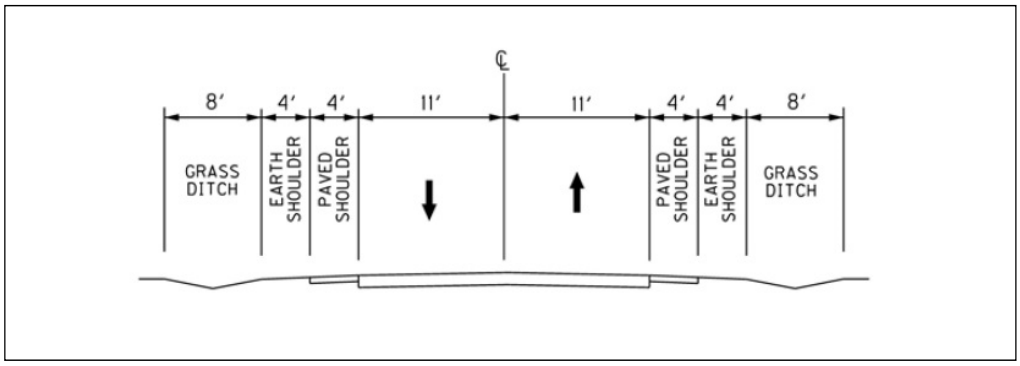
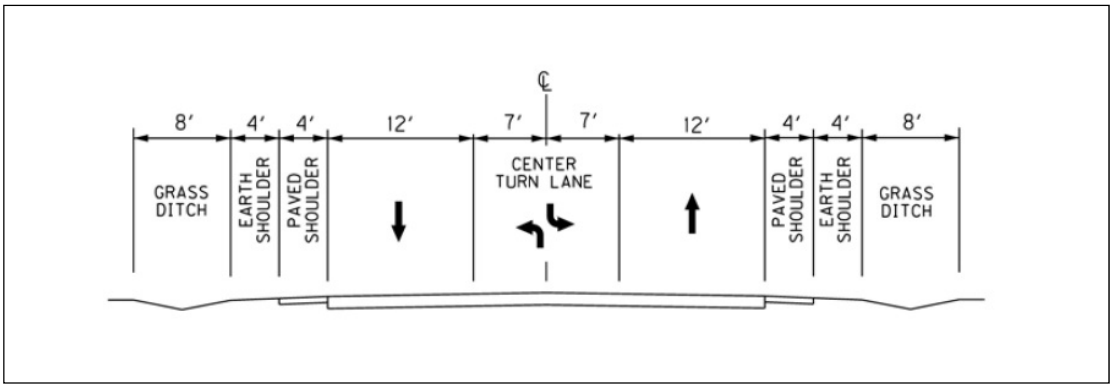


Figure 6.4: Typical Section for School Improvement



2. Future Build Traffic Volumes

As with the 2040 No Build traffic forecast described in **Section 2.C**, KYTC's statewide travel demand model was used to project future traffic volumes along the five new corridor-level improvement concepts. Assuming all five concepts are constructed with a single Southern KY 293 to US 62 Connection (J or G), the following bullets outline the 2040 Build forecast volumes for new corridors:

- The Southeast Connector (Project KQR) could be expected to carry 2,000 to 5,000 vehicles per day, with the heavier volumes on the northern portion. For reference, the Environmental

Assessment for Project R forecast an estimated 1,000 to 3,000 vehicles per day if just the northernmost KY 293 to KY 91 portion were constructed.

- If Connector J were constructed but not G, it could be expected to carry 5,000 vehicles per day. If Connector G were constructed without J, it could be expected to carry 2,400 vehicles per day.
- The Northside Connector (Project MIP with an I-69 interchange) could be expected to carry 500 to 2,500 vehicles per day, with the lowest volumes in the vicinity of the new interchange.
- Widening KY 91 (Projects E and S) could be expected to increase the KY 91 traffic volumes an estimated 300 to 500 vehicles per day compared to the 2040 No Build scenario.
- Widening KY 139 (Project U) could be expected to increase KY 139 traffic volumes an estimated 500 vehicles per day compared to the 2040 No Build scenario.

Based on the magnitude of anticipated traffic volume increases, existing infrastructure and proposed two lane connections would provide adequate capacity for acceptable traffic operations.

C. Spot-level Improvement Concepts

Seven smaller, spot-level improvement concepts were also identified to address existing safety or traffic operational needs. Generally, these improvements are confined to a single deficient curve or intersection and could be implemented more rapidly than the larger scale corridors described previously. Concepts in this section include both short and long term projects, discussed further in **Chapter 8**. Specific information for each concept is presented on the relevant project sheet in **Appendix G**; a brief overview of each improvement concept is presented below. **Figure 6.1** shows the spot-level improvement concepts developed alongside the corridor-level projects.

Five-Leg Intersection Improvements (Project Z)

The existing intersection of KY 91 with East Main Street and East Washington Street has five approaches, shown in **Figure 6.5**:

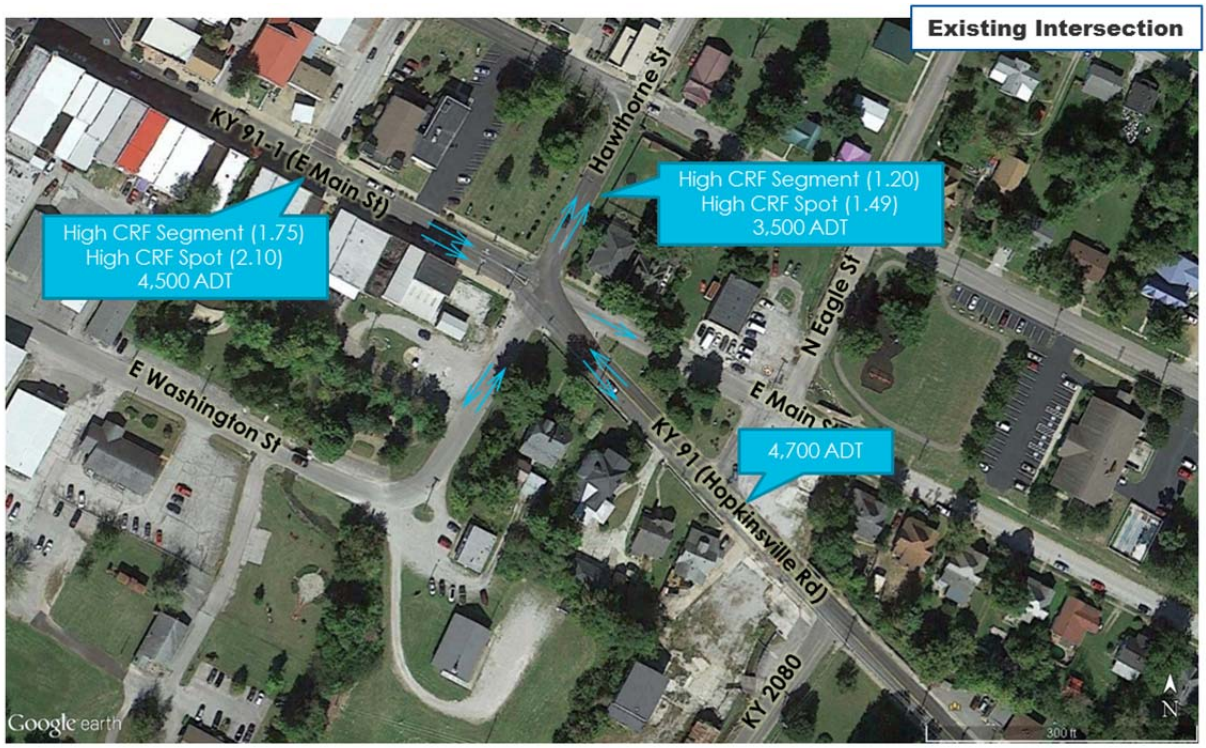
Existing five-leg intersection, facing east

- To the south, East Washington Street has two lanes, serves two way traffic, and is stop controlled.
- To the southeast, KY 91 (Hopkinsville Street) has two lanes, serves two way traffic, and is a free-flow movement.
- To the east, the local portion of East Main Street has two lanes and serves eastbound traffic. A midblock "Do Not Enter" sign is posted for westbound traffic, located approximately 150 feet east of the intersection. There is no additional stop or yield signage at this approach to the five-leg intersection.

- To the north, KY 91 (Hawthorne Street) has two lanes and serves one way traffic (away from the five-leg intersection).

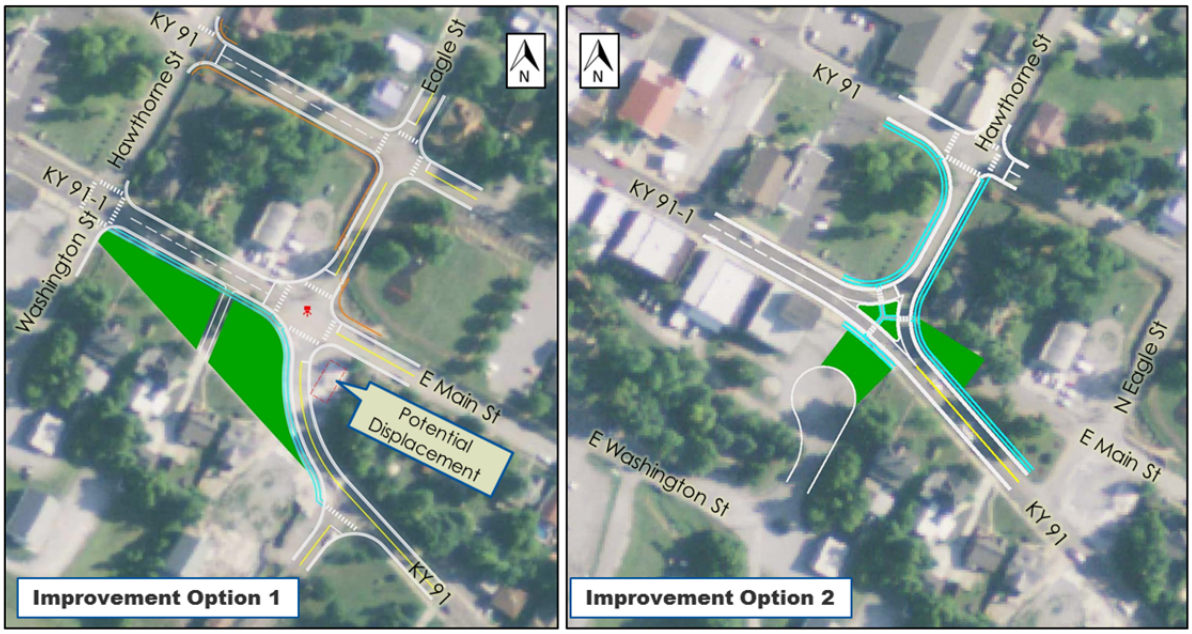
- To the west, KY 91-1 (East Main Street) has two lanes and serves one way traffic (towards the five-leg intersection). The left lane is yield controlled while the right lane is a free-flow movement. According to feedback from local stakeholders, trucks making local deliveries will sometimes park in the right lane of this approach, further complicating traffic movements.

Figure 6.5: Existing Layout of Five-Leg Intersection



Two of the five approaches are high crash spots. For Project Z, two conceptual improvement options were developed to simplify traffic operations and improve safety at this intersection. Conceptual designs for each are shown in **Figure 6.6**.

Figure 6.6: Conceptual Improvement Options at Five-Leg Intersection



- Option 1 would realign KY 91 (Hopkinsville Street) to tie into East Main Street at Eagle Street, one block to the east. The existing five-leg intersection becomes a standard four-leg intersection. The KY 91/Eagle Street intersection would be configured as a standard four-leg intersection and should be evaluated during design to determine if traffic volumes warrant signalization.

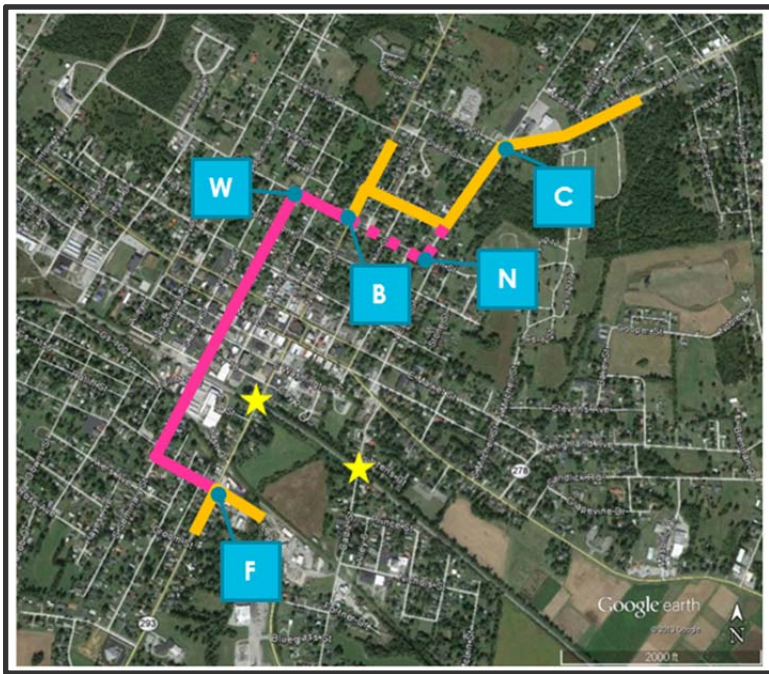
- Option 2 would eliminate the southern Washington Street and eastern Main Street local approaches, terminating each before reaching the intersection. Access to properties along these local streets would be retained via adjacent streets. A raised median island would be added to the intersection to help channelize traffic and the KY 91 (Hawthorne Street) approach would be reduced to a single lane.

Truck Route Improvements (Projects FWBNC)

Although the proposed Southeast Connector Project will help divert through truck trips away from downtown, some trucks will still have to access downtown destinations and will still be limited by geometric restrictions in the existing network. This series of spot improvements is intended to address these restrictions through small-scale improvements to facilitate truck movements through downtown.

Today, the low overpass on KY 139 and tight turn radii downtown limit truck movements. A local truck detour has been established along Legion Street, Seminary Street, and Green Street for heavy trucks. **Figure 6.7** shows the existing truck routing and location of each proposed improvement project within this set.

Figure 6.7: Truck Routing & Proposed Spot Improvements



Orange lines note the state-owned portions of the designated truck route approaching the local detour; pink lines are signed detours along local streets to avoid the low clearance overpasses (marked with yellow stars).

Blue callout boxes note the location of the five proposed component projects along the truck route.

Five component elements are included in the proposed truck route improvement concept:

- Project F would add turn lanes at any or all approaches at the KY 139/KY 293/South Jefferson Street/Legion Drive intersection. Traffic counts should be conducted to determine where such lanes are warranted.
- Project W would realign the Seminary Street/Green Street intersection to provide a 25 mph through movement along the local truck detour. The culvert just south of the intersection would likely have to be replaced. Minor realignment of the other two approaches at this intersection would also be included.

Truck turning left at Green/Seminary intersection, following existing truck route

- Project B would improve the US 62/KY 293/North Jefferson Street/Green Street intersection by adding turn lanes at any or all approaches, improving the turn radius in the northern quadrant, and replacing the drainage structure immediately east of the intersection. Traffic counts should be conducted to determine whether signalization and/or turn lanes are

warranted. It should be noted that this location is the highest crash spot identified within the study area (CRF 3.83).

- Project N would redesignate US 62 to follow Green Street and Old Madisonville Road, reducing the number of turns required along the truck route. It also eliminates the tight turn for southbound trucks at McGoodwin Avenue.

Truck turning right onto McGoodwin Avenue, following existing truck route

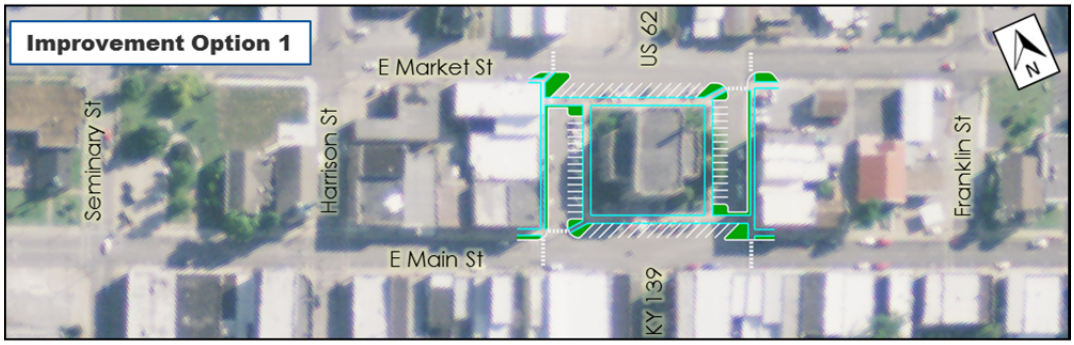
- Project C would include a minor realignment of US 62 to address substandard horizontal and vertical curves north of the intersection with Young Street (KY 3114). A utility pole at the Young Street intersection is reportedly a problem for eastbound trucks as it is located near the curbline. Relocation of the pole would require coordination with local utility companies.

Operational Improvements at Courthouse (Project X)

Currently, one-way pairs downtown create a counter-clockwise traffic loop around the courthouse. Lane widths, closely spaced intersections, and on-street parking lead to elevated crash rates for portions of all four highway segments surrounding the courthouse. For Project X, two conceptual improvement options were developed to simplify traffic operations and improve safety at this location, shown in **Figures 6.8** and **6.9**.

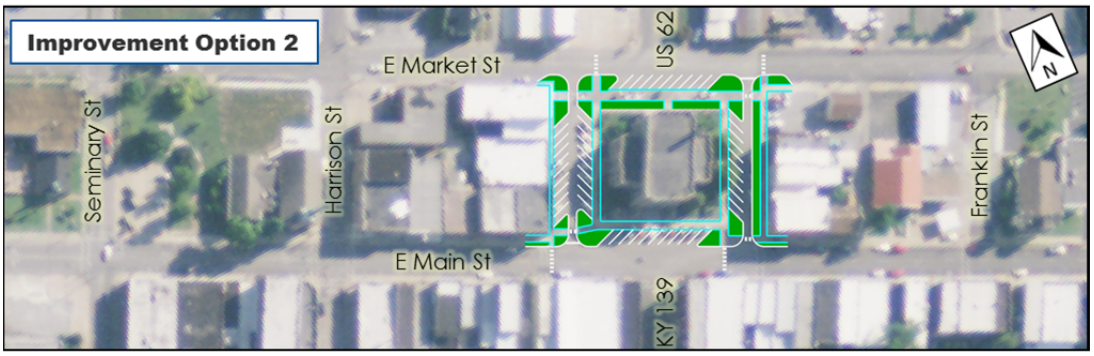
- Option 1 would close the eastern and western side streets to through traffic, making traffic divert to the next cross-streets: Franklin Street to the east or Seminary Street to the west.

Figure 6.8: Conceptual Improvement Options at Courthouse, Option 1



- Option 2 would retain existing traffic flow patterns but incorporate sidewalks and curb extensions to better define traffic movements.

Figure 6.9: Conceptual Improvement Options at Courthouse, Option 2



US 62/Plum Street Intersection Improvements (Project AA)

Today, three intersections lie in close proximity near the western end of the one-way street segments downtown. Plum Street runs north-south across US 62 (Main Street) as it splits into a one-way pair, creating a wide open paved area with few visual cues to channelize movements. The location lies within a high crash segment (CRF 1.06). As proposed, Project AA would add raised median islands and stop signs to clarify traffic movements in the vicinity of Plum Street.

KY 278 Curve Realignment (Project BB)

Within Princeton, KY 278 (Sandlick Road) approaches Highland Avenue with a deficient horizontal curve and limited stopping sight distance. The location lies within a high crash segment (CRF 1.07) and high crash spot (CRF 1.99). Project BB would improve the alignment at this location to improve safety.

KY 2080 Rail Overpass Reconstruction (Project H)

The aging railroad overpass on KY 2080 provides substandard horizontal and vertical clearances. Project H, identified in a PIF, proposes reconstruction of the overpass. Alternatively, the city may choose to terminate KY 2080 with a cul-de-sac at either end when the structural condition deteriorates to an unsafe level. The Southeast Connector project would provide an alternate north-south link around town, further reducing the traffic volume using KY 2080.

Add Sidewalks along US 62 (Project D)

Proposed in a PIF, Project D includes the addition of sidewalks along US 62 from MP 3.644 to MP 5.310 to improve multi-modal access. This location is near the industrial park and Walmart shopping center.

D. Comparison of Costs

Based on the conceptual improvements described above, **Table 6.1** presents planning-level cost estimates for each of the corridor and spot improvements. Costs are presented in millions of 2014 dollars.

Table 6.1: Planning-Level Cost Estimates (Millions)

Improvement	Design	ROW	Utility	Construction	Total
Southeast Connector (KQR)	$1.1 M	$7.0 M	$5.0 M	$18.9 M	**$32.0 M**
KY 293 to US 62 Connection (G)	$1.0 M	$3.0 M	$0.9 M	$9.6 M	**$14.5 M**
KY 293 to US 62 Connection (J)	$0.6 M	$1.8 M	$0.8 M	$6.0 M	**$9.2 M**
Northside Connector (MIP)	$3.0 M	$5.5 M	$3.0 M	$29.7 M	**$41.2 M**
Widen KY 91 (ES)	$2.4 M	$7.5 M	$7.8 M	$24.4 M	**$42.1 M**
Widen KY 139 (U)	$1.5 M	$5.0 M	$0.5 M	$15.3 M	**$22.3 M**
Five-Leg Intersection Improvements (Z)					
Option 1	$0.2 M	$0.2 M	$0.5 M	$1.6 M	**$2.5 M**
Option 2	$0.1 M	$0.2 M	$0.5 M	$0.7 M	**$1.5 M**
Truck Route Improvements					
All Combined	$0.5 M	$1.8 M	$3.4 M	$4.8 M	**$10.6 M**
F	$0.1 M	$0.5 M	$0.6 M	$0.7 M	**$1.9 M**
W	$0.1 M	$0.2 M	$0.6 M	$0.7 M	**$1.6 M**
B	$0.1 M	$0.3 M	$0.6 M	$1.1 M	**$2.1 M**
N	$0.1 M	<$0.1 M	$0.6 M	$0.9 M	**$1.7 M**
C	$0.1 M	$0.8 M	$1.0 M	$1.4 M	**$3.3 M**
Operations at Courthouse (X)					
Option 1	$0.1 M	$0.2 M	<$0.1 M	$1.0 M	**$1.3 M**
Option 2	$0.1 M	$0.2 M	<$0.1 M	$1.0 M	**$1.3 M**
US 62/Plum Street Intersection Improvements (AA)	$0.1 M	$0.4 M	$0.3 M	$0.4 M	**$1.2 M**
KY 278 Curve Realignment (BB)	$0.1 M	$0.2 M	$0.2 M	$0.4 M	**$0.9 M**
KY 2080 Overpass Reconstruction (H)	$0.5 M	$0.8 M	$0.4 M	$4.5 M	**$6.2 M**
US 62 Sidewalks (D)	$0.2 M	$0.5 M	$0.5 M	$1.0 M	**$2.2 M**

E. Other Improvement Concepts

Beyond the infrastructure improvements identified previously, local officials and project team members identified a range of other improvement concepts that the city could elect to pursue. Additional details are provided in **Appendix G**.

- Coordinate with KYTC to update recommended GPS routing patterns through Princeton, particularly to encourage truck traffic to follow the signed detour route.
- Conduct a walkability audit, which is a hands-on evaluation to identify concerns related to existing pedestrian safety, access, comfort, and convenience.
- Consider system-wide and/or project-specific application of access management principles.
- Conduct an in-depth examination of the Main Street/Market Street corridor to clearly define the long term vision for the downtown area, which presents unique opportunities to create a

safe, multi-modal environment for motorists, pedestrians, and cyclists while supporting a vibrant downtown business community.

- Coordinate with KYTC's Bicycle/Pedestrian Coordinator to create a City Bike/Ped Plan, including general concepts for implementation. Initial coordination to kick off this effort began in Spring 2014.

Section 7
Final Coordination

Following the development of these improvement concepts, the project team met with stakeholders and local officials. During the meeting, long term and short term improvement concepts were presented and attendees were asked to provide feedback regarding their concerns and priorities.

A. Local Officials/Stakeholders Meeting #2

The second local officials/stakeholders meeting for the study was held on July 15, 2014 at the Tourist Center in Princeton. The purpose of the meeting was to present the improvement concepts described in **Chapter 6** and to solicit feedback on the project definitions and local priorities.

In addition to members of the project team, 11 local government representatives and stakeholders attended the meeting. During the meeting, the project team presented the study purpose/goals, a map depicting the long term and short term recommended projects, and draft project sheets. Participants were asked to complete an informal survey to help the project team understand their perspective on the prioritization of projects. A summary of the meeting is included in **Appendix F**.

During the meeting, the group discussed long term improvement projects: the Southeast Connector (Project KQR), a Southern KY 293 to US 62 Connection (Project J or G), the Northside Connector (Project MIP) with an interchange on I-69, widening KY 91 (Projects S and E), widening KY 139 (Project U), the KY 2080 rail overpass reconstruction (Project H), and adding sidewalks along US 62 at the industrial park (Project D). Key comments included:

- The city would likely only pursue one connection between KY 293 and US 62, not both. Each has advantages and disadvantages. Project J would carry more traffic and be more useful for area residents trying to cut through to Walmart. However, J has more constructability issues, particularly related to the proximity of the rail yard and existing businesses. Project G would align with the outer loop (i.e., the Southeast Connector and Northside Connector) envisioned for the city. However, G seems less likely to foster commercial development as it is further from town and primarily agricultural.

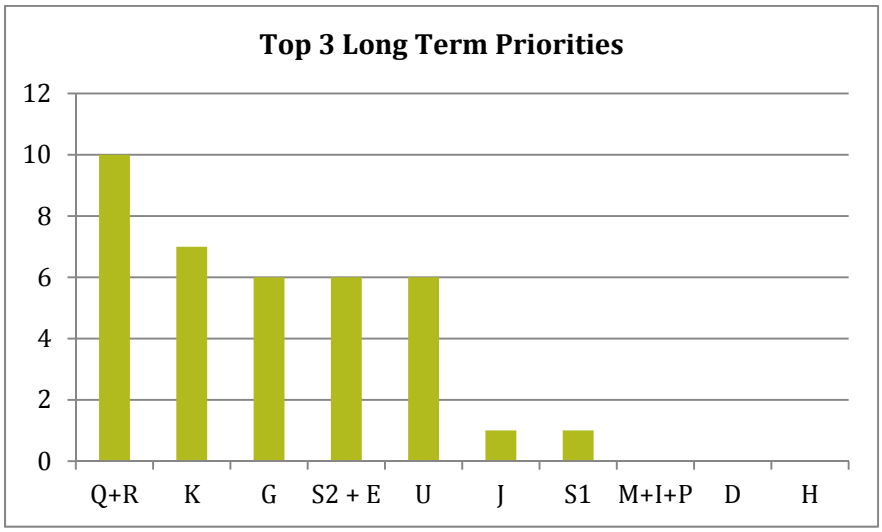
- The S and E components of the KY 91 widening project are functionally different. Project E, which falls inside the city limits near the schools, is a more local project. Project S2, which widens the route north of the city to Fredonia, is a high priority for the county as it serves the quarry trucks. The route's narrow lanes, small shoulders, and steep ditches are a concern for truck traffic, resulting in 5-6 overturned trucks each year. Pavement condition also deteriorates quickly due to the heavy truck traffic.

- Widening KY 139 south of town is a high priority for the county in light of its high crash rates. The route is a cut-through for interstate traffic and carries large farm equipment. The road's narrow lanes, small shoulders, and steep ditches are a concern for truck traffic, resulting in overturned vehicles. The curve at Rock Spring Hill is a particular concern; this project (Item No. 02-141.00) has been in the *Six Year Highway Plan* for several cycles with SP funds.

- In light of high gas prices, people are walking more, particularly along US 62 to access commercial sites (e.g. Walmart) and jobs in the industrial park every day. They walk along the shoulders today, but Project D would provide a safer connection.

One of the survey questions asked which three long term projects are the most important for the City. Of the 11 questionnaires returned, the Southeast Connector was the most frequently selected priority. **Figure 7.1** illustrates the survey results for this question.

Figure 7.1: What are the top three long term projects that are most important for the city?

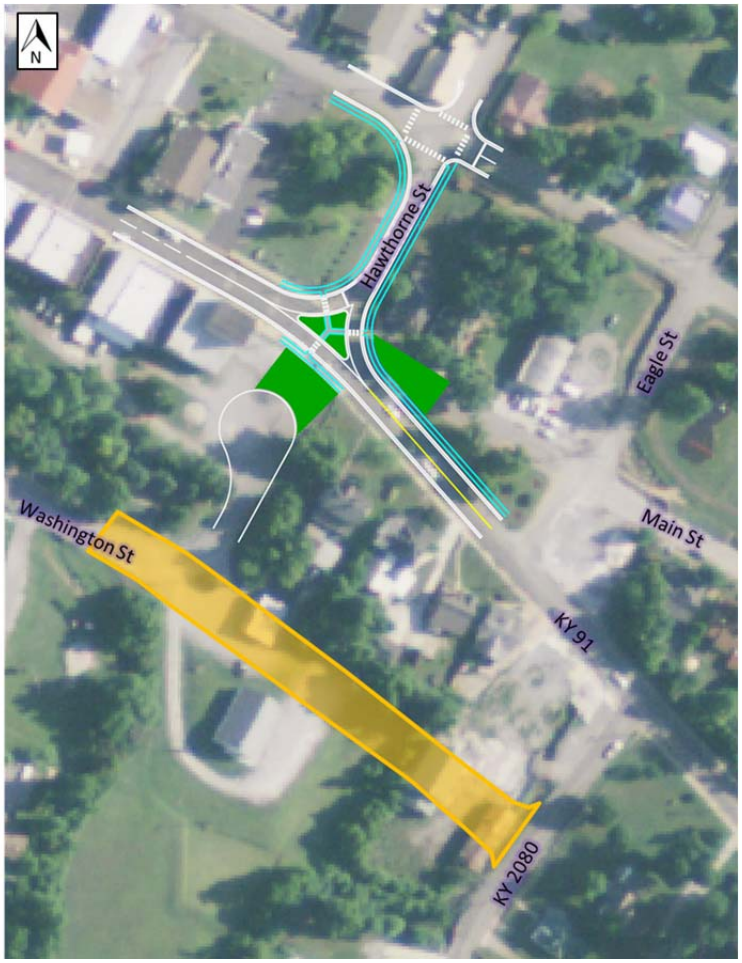


Key
Q+R: Southeast Connector (north)
K: Southeast Connector (south)
G: Southern KY 293 to US 62 Connection
S2+E: Widen KY 91 (north)
U: Widen KY 139
J: Southern KY 293 to US 62 Connection
S1: Widen KY 91 (south)
M+I+P: Northside Connector
D: US 62 Sidewalks
H: KY 2080 Rail Overpass

During the meeting, the group also discussed short term improvement projects: the five-leg intersection on KY 91 (Project Z), the truck route (Projects F, W, B, N, and/or C), traffic flow around the courthouse square (Project X), the US 62/Plum Street intersection (Project AA), and the curve on KY 278 (Project BB). Key comments included:

- For Project Z, Option 2 could be modified to extend Washington Street to KY 2080 rather than terminating it at a cul-de-sac. This is shown conceptually in **Figure 7.2**.

Figure 7.2: Conceptual Sketch of Proposed Washington Street Extension



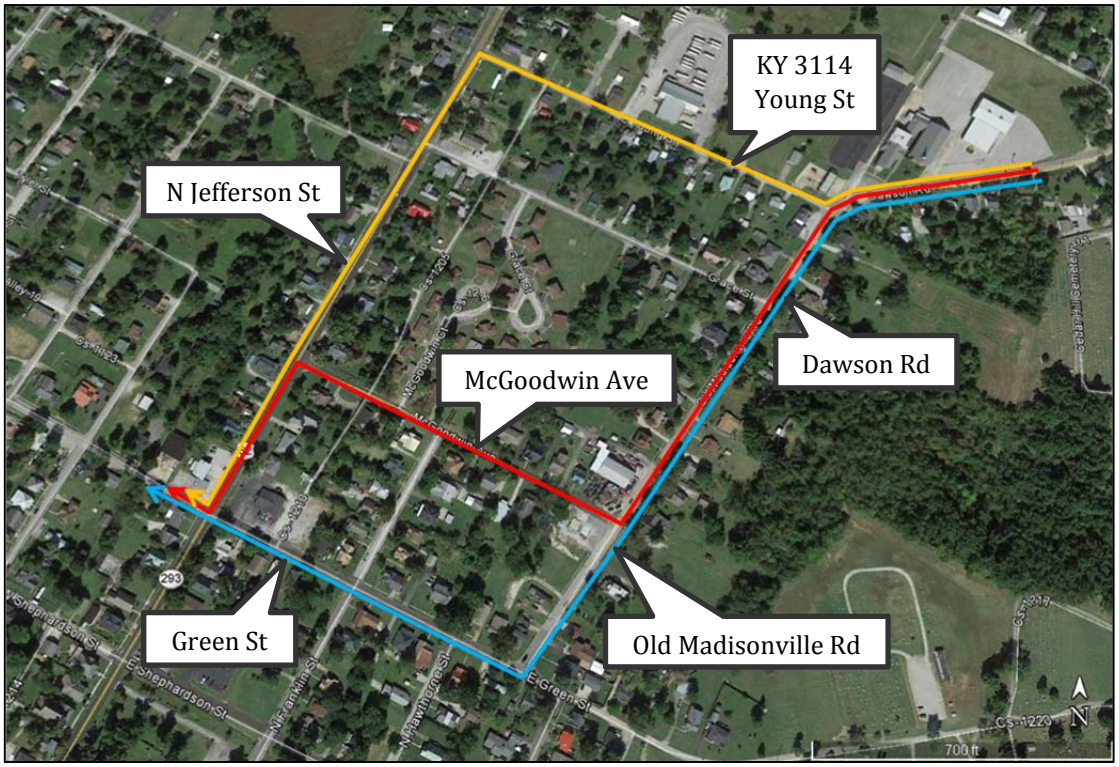
- A third option was suggested for Project Z, which would create a new one-way link for northbound KY 91 traffic from Hopkinsville Street to Market Street at the current Hawthorne Street intersection. However, this configuration would create a new five-leg intersection at Market Street and Hawthorne Street, shifting the existing safety concern to a new location. Therefore, this option is not recommended for further consideration.

- As an alternative to Project N, it was suggested that the truck route should be signed to follow KY 3114 (Young Street) from US 62 (Dawson Road) to US 62/KY 293 (North Jefferson Street). The current US 62 connection is signed along McGoodwin Avenue; Project N includes shifting the connection one block south to Green Street. The advantage to following Green Street is that one set of sharp curves would be eliminated from the route.

  As shown in red in **Figure 7.3**, westbound trucks today must follow a shallow curve north of Young Street, make a tight right turn onto McGoodwin Avenue, make a left turn onto North Jefferson Street, then a tight right turn onto West Green Street to access the local truck detour. With the implementation of Project N (shown in blue in **Figure 7.3**), westbound trucks would follow a shallow curve north of Young Street, then make a right turn onto Green Street, which would continue straight across North Jefferson Street to access the local portion of the truck route. The blue route eliminates two turns compared to the red route. The Young Street

routing suggested at the meeting is shown in yellow in **Figure 7.3**. Westbound trucks would follow a shallow curve onto Young Street, make a left turn onto North Jefferson, then make a tight right turn onto West Green Street to access the local truck route. The yellow route eliminates one turn compared to the red route.

Figure 7.3: Truck Routing Options Considered between Dawson Road and North Jefferson Street

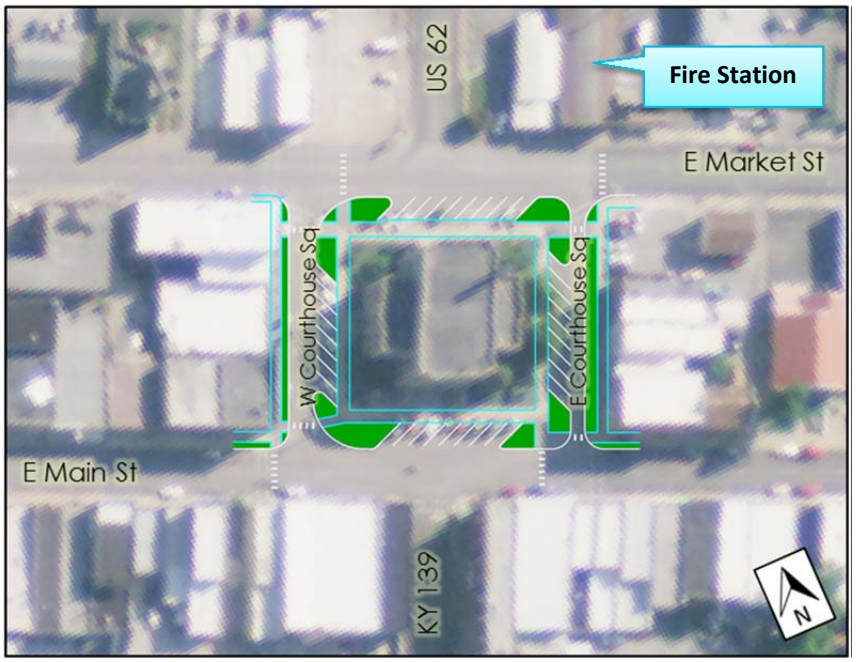


The benefit to the proposed Young Street routing is that KY 3114 is already a state highway. However, this path would require at least one building demolition to improve the curve at Dawson Road/Young Street. In addition, a short hill just east of the North Jefferson Street/Young Street intersection would make this route challenging for trucks, likely requiring additional improvements to the segment.

The proposed Young Street routing is not discussed further in this report as it does not appear to offer benefits over the Project N (Green Street) routing already proposed.

- The fire department strongly objected to Project X Option 1 as it would increase their response times for destinations to the south and east. Project X Option 2 was seen as potentially beneficial, but would require some modifications to be sure fire trucks could navigate the turn out of their garage onto Market Street and from Market Street onto West Courthouse Square. A revised Option 2A is shown in **Figure 7.4**.

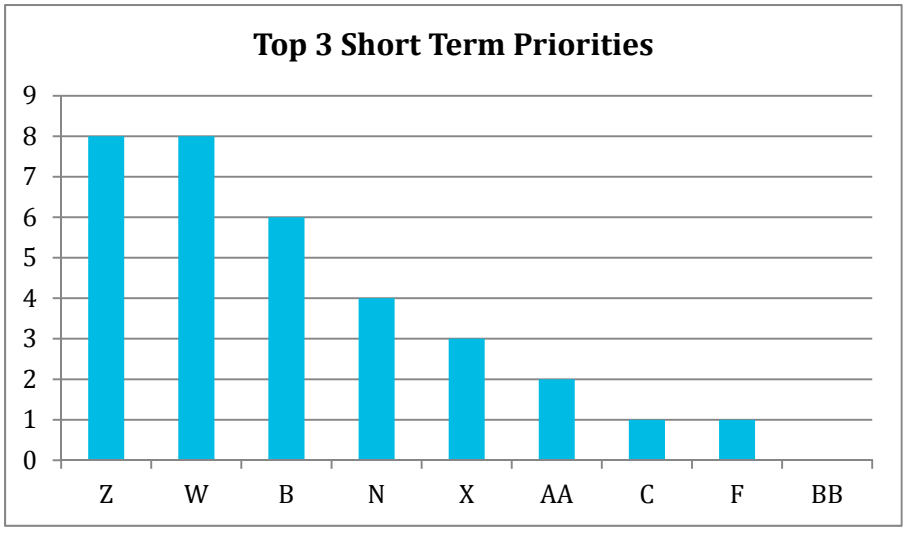
Figure 7.4: Project X Option 2A



- The raised curb in Project AA would likely meet opposition from the adjacent property owner. Overall, designs would have to be careful to accommodate large truck turning movements, which are a problem today.

One of the survey questions asked which three short term projects are the most important for the City. Of the 11 questionnaires returned, the five-leg intersection and Green Street/Seminary Street curve along the local truck route were the most frequently selected priorities. **Figure 7.5** illustrates the survey results for this question.

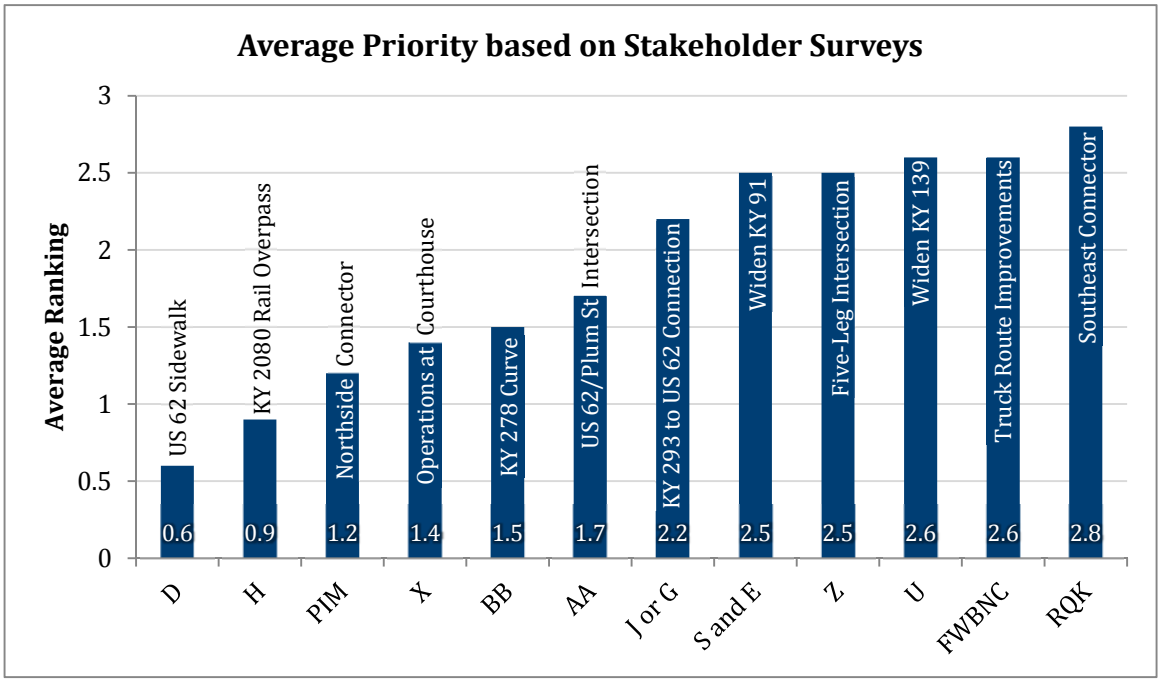
Figure 7.5: What are the top three short term projects that are most important for the city?



Key
Z: Five-Leg Intersection Improvement
W: Truck Route: Green at Seminary
B: Truck Route: Green at Jefferson
N: Truck Route: Routing east of Jefferson
X: Operations at Courthouse
AA: US 62/Plum St. Intersection Improvements
C: Truck Route: Curve at Young St
F: Truck Route: Jefferson at Legion
BB: KY 278 Curve Realignment

Another question on the informal survey asked participants to rank each of the improvement concepts as Not Needed or a High, Medium, or Low priority based on each project's relative importance. Converting each of these options to a numeric value, **Figure 7.6** presents the average results for each improvement concept based on stakeholder survey responses, where a higher average ranking indicates a higher priority.

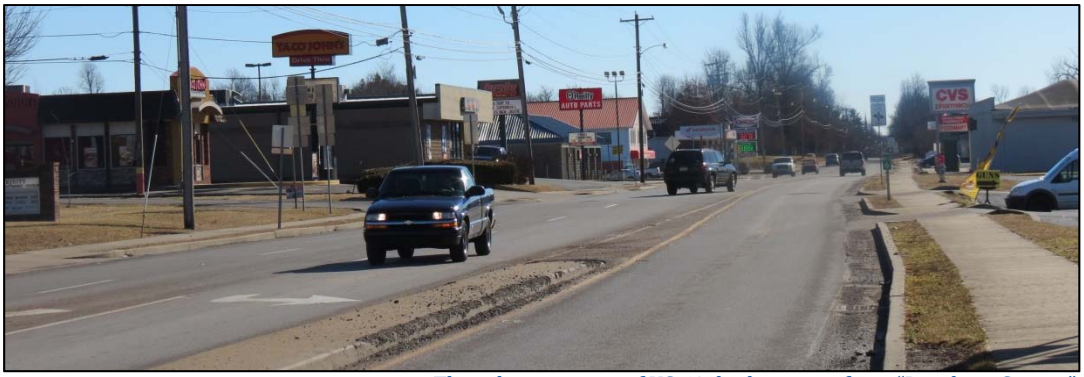
Figure 7.6: Ranked Relative Importance of Projects



Numeric equivalent for ranking: Not Needed = 0; Low = 1; Medium = 2; High = 3

At the second stakeholder meeting, three additional improvement concepts were identified by local stakeholders:

- Upgrade and/or add ADA-compliant sidewalks on the west side of North Jefferson Street to the hilltop. A wheelchair-bound community member currently uses this portion of the highway and must travel in the busy roadway to reach destinations near Young Street.
- Improve the curve and hill along KY 293 at Princeton Olney Road (MP 9.135). It should be noted that this location falls outside the study area boundary for this study.
- Add a center turn lane along US 62 (Main Street) between KY 91 (Marion Street) and Plum Street to help relieve traffic congestion. It should be noted that a third lane was added through the commercial portion of this segment as part of the US 62/KY 91 "Druthers Corner" intersection improvement project 10-15 years ago. East of the commercial section, US 62 provides access to a number of older, well-maintained residences lining both sides of the street. This concept is not recommended for additional study.



Three lane portion of US 62, looking east from "Druthers Corner"

B. Project Team Meeting #3

The project team met for a third and final meeting on July 15, 2014 in Princeton, following the local officials/stakeholders meeting earlier in the day. The purpose of the meeting was to review input received from stakeholders regarding potential prioritization and to concur on the final recommendations for the study, which are presented in the following chapter. A copy of the meeting summary is included in **Appendix F**.

Section 8
Conclusions & Recommendations

This chapter provides recommendations for transportation improvements within Princeton as part of this Small Urban Area Study. Recommendations are built upon technical analyses, stakeholder input, and engineering judgment. Project sheets describing each proposed improvement concept are located in **Appendix G**.

A. Long Term Improvement Concepts

Shown in **Figure 8.1**, long term improvement projects identified as a result of this study include the Southeast Connector, a Southern KY 293 to US 62 connection, the Northside Connector with an interchange on I-69, widening of KY 91, and widening of KY 139, the KY 2080 rail overpass reconstruction, and adding sidewalks along US 62 at the industrial park and along KY 293 north of town. **Table 8.1** summarizes the prioritized recommendations for each long term improvement concept. Additional information about each project is provided in the following paragraphs.

Table 8.1: Prioritized Recommendations for Long Term Improvement Concepts

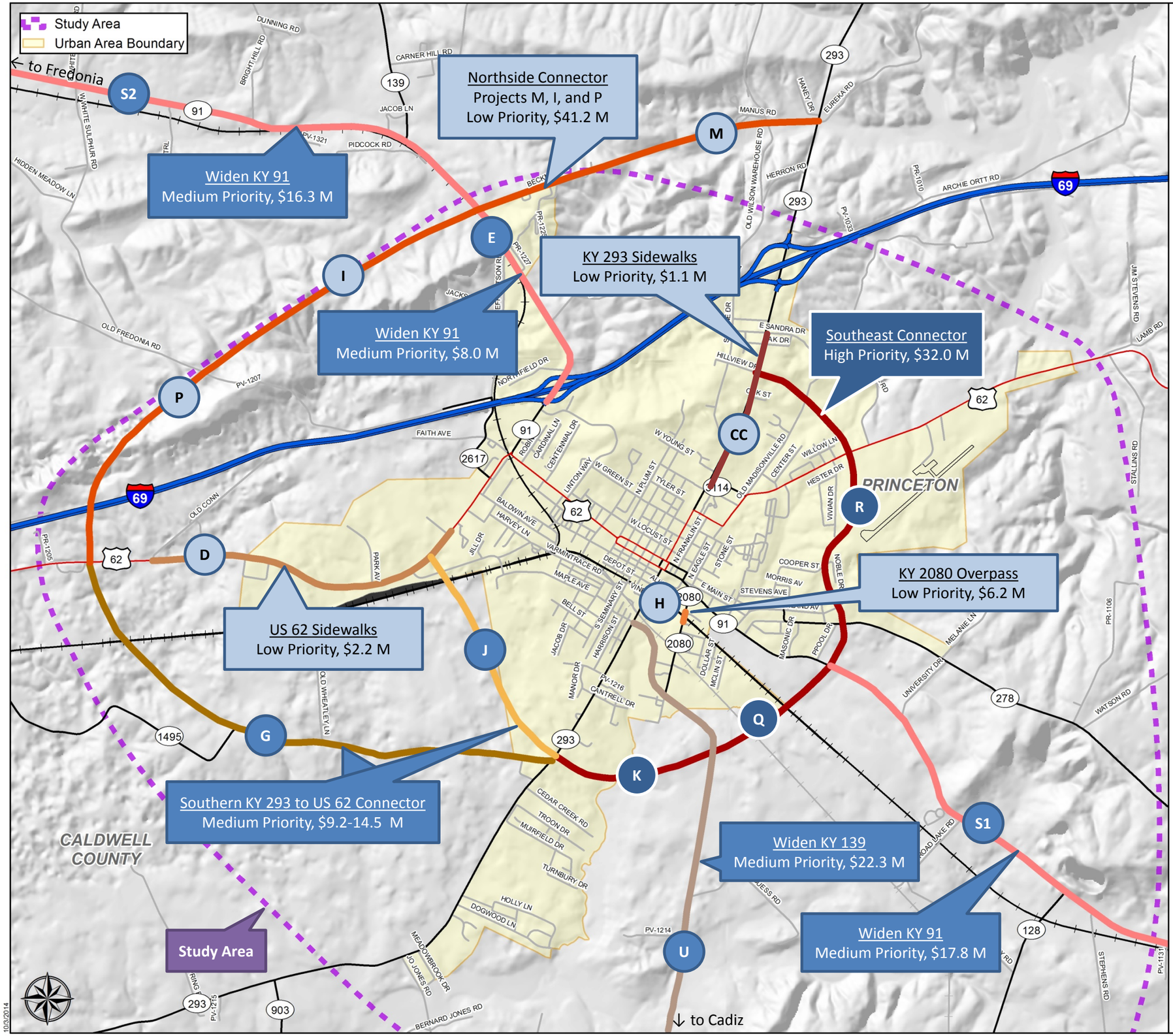
Priority	Project(s)	Description
High	KQR	Southeast Connector: new highway link from KY 293 (N Jefferson St) to KY 293 (S Jefferson Street)
Medium	J or G	Southern KY 293 (S Jefferson St) to US 62 connection to support economic development
Medium	S and E	Widening KY 91 from the Caldwell/Christian county line to Fredonia
Medium	U	Widening KY 139 from Princeton to Cadiz
Low	MIP	Northside Connector: new highway link from KY 293 to US 62, including a new interchange with I-69
Low	H	Reconstruction of the KY 2080 railroad overpass
Low	D	Addition of sidewalks along US 62
Low	CC	Addition of sidewalks along KY 293 (suggested by stakeholder at July 2014 meeting)

Southeast Connector (Projects KQR)

The Southeast Connector is recommended as a high priority project as a result of this study. This project would create a new two-lane highway link east and south of downtown Princeton. This project is recommended for further consideration for the following reasons:

- Together, Projects R and Q provide an alternate route for truck traffic that currently uses KY 139 as a cut-through connection between I-24 and I-69.
- Projects R and Q also provide a route for trucks south of Princeton to reach I-69 without negotiating low clearance overpasses or residential neighborhoods.

Princeton Small Urban Area Study
Long Term Recommendations Map
Figure 8.1



High Priority Projects

Southeast Connector, 3.7 miles new alignment
- Project R (KY 293 to KY 91)
- Project Q (KY 91 to KY 139)
- Project K (KY 139 to KY 293)

Medium Priority Projects

Southern KY 293 to US 62 Connection
- Project J (1.8 miles new alignment) or
- Project G (3.0 miles new alignment)

Widen KY 91, 21.8 total miles
- Project E (I-69 ramps to KY 139)
- Project S2 (KY 139 to Fredonia)
- Project S1 (Southeast Connector to county line)

Widen KY 139, 12.8 total miles
- Project U (KY 293 to Cadiz)

Low Priority Projects

Northside Connector, 4.9 miles new alignment
- Project M (KY 293 to KY 91)
- Project I (KY 91 to Old Fredonia Road)
- Project P (Old Fredonia Road to US 62)

KY 2080 Rail Overpass Reconstruction, 0.10 miles
- Project H

Add sidewalks along US 62, 1.67 miles
- Project D

Add/upgrade ADA sidewalks along KY 293, 0.7 miles
- Project CC

Inset descriptions under each project heading above are also listed in priority order within each project. For example, Project R is the highest priority component of the Southeast Connector Project.

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- The Southeast Connector was identified as the most important long-term project for the Princeton area by the local stakeholders.

The three projects that comprise the Southeast Connector are ranked in the following order of importance:

- **Project R**, from KY 293 (N Jefferson St) to KY 91 (Hopkinsville St), is Item No. 2-153.00 in the 2014 *Six Year Highway Plan*. This portion of the route has designated funding through construction in 2018; preliminary design work is ongoing. Therefore, it is recommended that this portion of the route should continue to move forward first of the three segments that comprise the Southeast Connector Project.
- **Project Q**, from KY 91 (Hopkinsville St) to KY 139 (Cadiz Rd), is Item No 2-193.00 in the 2014 *Six Year Highway Plan* and has some design funding designated. This section of the roadway is considered equally important as Project R.
- **Project K,** from KY 139 (Cadiz Rd) to KY 293 (S Jefferson St), does not have designated funding. It is the lowest priority of the three sections of the Southeast Connector, but does continue the "Outer Loop" concept described in the city's 1999 *Comprehensive Plan*.

Southern KY 293 to US 62 Connection (Project J or G)

The Southern KY 293 to US 62 Connection is recommended as a medium priority as the result of this study. Two options were considered for a new link between KY 293 (S Jefferson St) and US 62: 1) **Project J** near the urban boundary and 2) **Project G** that generally follows KY 1495 (Grooms Lane) before cutting north on new alignment to connect to US 62. This project is recommended for further consideration for the following reasons:

- The 1999 *Comprehensive Plan* recommends this area of Princeton for industrial development.
- Project J or G would provide the infrastructure necessary to open up this area southwest of town for potential development.
- Local stakeholders supported this project as important for local economic development in the Princeton area, and also confirmed that only one of these two corridors should be pursued, although local preferences were divided between the two. Either should be considered a medium priority.

Each of the two potential corridors offer different benefits and challenges; however, both corridors are recommended for additional evaluation as part of any future project development phases:

- Project J is shorter and would likely carry higher traffic volumes as it provides a more direct connection from residential areas to commercial destinations west of town. Some local stakeholders preferred Project J as they felt that it would be more likely to spur development since it is nearer to town. However, the proximity of the rail yard makes constructability in this area more challenging.
- Project G is located in a more rural setting with fewer constructability challenges and better fits the "Outer Loop" concept illustrated in the 1999 *Comprehensive Plan*. However, it is anticipated to carry lower traffic volumes and could be slower to develop.

Widen KY 91 (Projects ES)

Overall, the KY 91 Widening project is recommended as a medium priority but it can be separated into three functionally distinct segments, listed in order of importance:

- **Project E** includes widening KY 91 (Marion Road) to three lanes from I-69 to KY 139 (Farmersville Road) to improve traffic flow associated with the five county schools located along this portion of the highway. Originally defined as PIF 02 017 D0091 4.00, KYTC is in the process of redefining this as two separate projects with separate PIF forms. Although turn lanes were added to serve the school driveways within the last 3-4 years, Project E is still seen as a local priority. The recommended cross-section for this location includes two 12-foot travel lanes, a 14-foot center turn lane, 8-foot shoulders (4-foot paved), and 8-foot ditches.

- **Project S2** includes widening KY 91 from KY 139 (Farmersville Road) to Fredonia, a total distance of about 9.4 miles. Although the entirety of this segment falls outside the boundary of the study area for this study, the project is seen as a high priority for the county in light of perceived crash trends associated with narrow lanes, small shoulders, and steep ditches. Martin Marietta quarry trucks frequent this route. Based on Kentucky State Police records, 49 crashes occurred in this segment during 2011-2013, including 17 injury collisions and no fatalities.

- **Project S1**, widening KY 91 from the Caldwell/Christian county line to the south side of Princeton, is the lowest priority of the three sections of this project. Project S1 is approximately 10.7 miles long. Rogers Group quarry trucks frequent this route. Based on Kentucky State Police records, 42 crashes occurred in this segment during 2011-2013, including 14 injury collisions and no fatalities.

Widen KY 139 (Project U)

Widening KY 139 from Princeton to Cadiz (**Project U**) was identified as a medium priority for this study as the majority of the 12.8-mile project falls outside the boundary of the study area. However, stakeholders indicated that it is a priority for the county; narrow lanes, small shoulders, and steep ditches lead to reportedly elevated crash rates, exacerbated by heavy truck traffic that uses the route as a shortcut between I-69 and I-24. Based on Kentucky State Police records, 51 crashes occurred in this segment during 2011-2013, including 17 injury collisions and no fatalities. Item No. 02-141.00 in the *Six Year Highway Plan,* improving the curves at Rock Spring Hill (Caldwell County MP 7.573-8.173), falls within the limits of Project U but beyond the study area boundary.

Northside Connector with Interchange (Projects MIP)

A low priority for implementation, the Northside Connector (**Projects P**, **I**, and **M**) is consistent with the long-term "Outer Loop" concept described in the city's 1999 *Comprehensive Plan*. As envisioned, the project includes a third Princeton interchange along I-69, located approximately 2.5 miles west of the existing KY 91 interchange. Although it is beyond the scope of this study, the feasibility of justifying an additional interchange at this location should be investigated as this project is advanced for additional project development phases.

KY 2080 Rail Overpass Reconstruction (Project H)

As the aging railroad overpass deteriorates, the structure should be reconstructed (**Project H**). With the implementation of the Southeast Connector, KY 2080 will carry lower traffic volumes, making this link in the transportation network less critical. The overpass reconstruction is recommended as a long

term low priority and should be coordinated with the Paducah & Louisville Railway as the condition necessitates action.

Add Sidewalks along US 62 (Project D)

In light of pedestrians currently walking along US 62 west of town, **Project D** is recommended to construct sidewalks or a multi-use path alongside the highway. This project is recommended as a long term low priority but should be considered as the City Bike/Ped Plan is developed.

Add Sidewalks along KY 293 (Project CC)

In light of pedestrians currently traveling along KY 293 north of town, a project was suggested at the second local officials/stakeholder meeting to upgrade and to extend the sidewalk network further north along KY 293 (N Jefferson Street). **Project CC** has been added to address this suggestion, which is recommended as a long term low priority but should be considered as the City Bike/Ped Plan is developed.

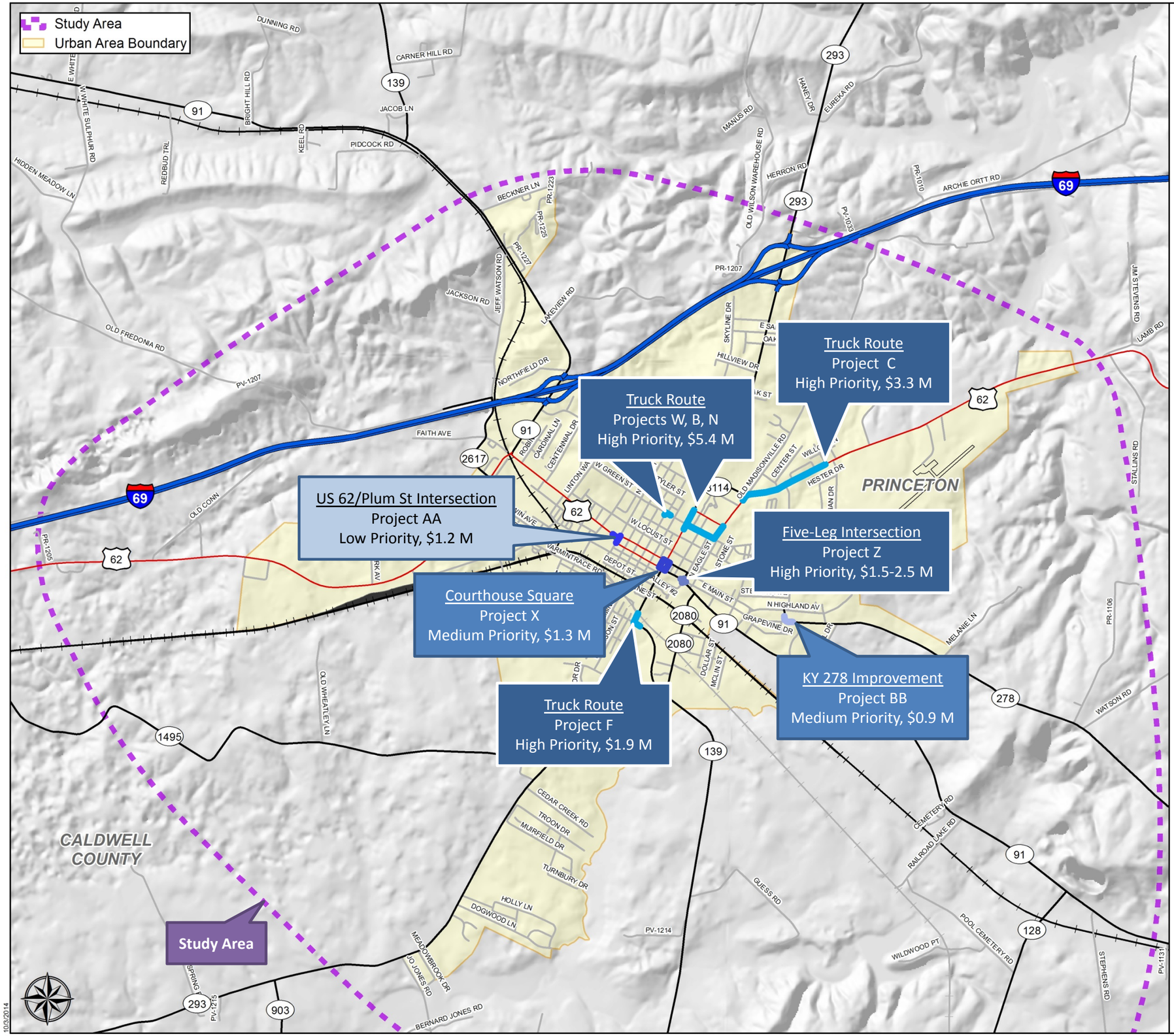
Review of existing conditions shows there would be fewer utility impacts to extend the sidewalk on the east side of the street instead of the west side, as originally suggested. Planning-level cost estimates were developed to (1) add ADA-compliant ramps to the existing sidewalks at cross streets between Grace Street and Skyline Drive and (2) construct a new ADA-accessible sidewalk along the east side of KY 293 from Skyline Drive to Sandra Drive. This results in estimated costs of $100,000 for design, $200,000 each for right-of-way acquisition and utility work, and $600,000 for construction, a total of $1.1 million in 2014 dollars.

B. Short Term Improvement Concepts

Short term improvement projects identified as a result of this study include the five-leg intersection on KY 91, the truck route, traffic flow around the courthouse square, the US 62/Plum Street intersection, and the curve on KY 278. **Table 8.2** summarizes the prioritized recommendations for each short term improvement concept. Additional information about each project is provided in the following paragraphs. **Figure 8.2** shows the individual project locations graphically.

Table 8.2: Prioritized Recommendations for Short Term Improvement Concepts

Priority	Project(s)	Description
High	Z	Improve five-leg intersection on KY 91
High	F, W, B, N, and/or C	Truck Route: intersection improvements to facilitate truck movements along the state-maintained and local portions of the designated truck route
Medium	X	Improve traffic flow at Courthouse Square
Medium	BB	Improve vertical curve on KY 278 (Sandlick Road)
Low	AA	Improve intersection at US 62/Plum Street



Princeton Small Urban Area Study
Short Term Recommendations Map
Figure 8.2

High Priority Projects

Five-Leg Intersection Improvements
- Project Z (Option 1 or 2)

Truck Route Improvements
- Project W (Green St/Seminary St Curve)
- Project B (Green St/N Jefferson St Intersection)
- Project N (Green St Rerouting)
- Project F (S Jefferson St/Legion St Intersection)
- Project C (0.55 miles of realignment north of KY 3114)

Medium Priority Projects

Operational Improvements at Courthouse
- Project X (Option 2A)

KY 278 Curve Realignment, 0.10 miles
- Project BB

Low Priority Projects

US 62/Plum Street Intersection Improvements
- Project AA

Inset descriptions under each project heading above are also listed in priority order within each project. For example, Project W is the highest priority component of the Truck Route Improvements.

0 1,000 2,000 4,000 Feet

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10/3/2014

Five-Leg Intersection Improvements (Project Z)

Identified as a high priority, two improvement concepts were considered for **Project Z** to address elevated crash rates at the five-leg intersection at KY 91. Option 1 would realign KY 91 to tie into East Main Street at Eagle Street (one block to the east); Option 2 would eliminate the southern Washington Street and eastern Main Street approaches at the existing intersection location and add raised medians to help channelize flow. Both options are recommended for additional evaluation as part of future project development phases. Based on stakeholder input at the July 2014 meeting, a local project to extend East Washington Street to KY 2080 (Cadiz St) could be considered simultaneously if Option 2 is selected for implementation.

Truck Route Improvements (Projects FWBNC)

Another high priority for implementation is a series of spot improvements along the designated truck route, which follows both state and local routes. While the Southeast Connector will remove pass-through truck traffic from the downtown network, some trucks will still need to access local destinations downtown. Five distinct components are included in this concept:

- **Project W**, improving the curve at Green Street/Seminary Street, was identified as the highest priority within the truck route improvements based on stakeholder surveys. This turn lies along the local portion of the truck route and would involve reconfiguration of the intersection to increase the design speed of the through movement. A box culvert drainage structure runs beneath Seminary Street just south of Green Street.

Existing Green St/Seminary St intersection, facing south

- **Project B**, intersection improvements at US 62/KY 293 (North Jefferson Street) and Green Street, was also identified as a high priority based on stakeholder surveys. This location has the highest crash rate of all the high-CRF spots identified in the study area. Proposed improvements include adding turn lanes, improving radii, reconstructing drainage structures, and potentially signalizing the intersection.

- **Project N**, which includes rerouting the US 62 truck route from McGoodwin Avenue to East Green Street, is recommended for implementation simultaneously with Project B. This rerouting would reduce the number of turns required for trucks accessing the local portion of the truck route.

- **Project C**, originally defined as PIF 02 017 B0062 3.00, was proposed to realign 0.1 miles of US 62 at the KY 3114 (Young Street) intersection as trucks have trouble negotiating the horizontal curve in close proximity to a utility pole. The project limits have been expanded for this study to include 0.55 total miles of mainline US 62 to correct two additional vertical

curves that restrict sight distance. Project C is one of two lower priority components within the proposed truck route improvement project.

- The other lower priority location is **Project F**, which proposes to add turn lanes at one or more of the approaches to the KY 293/KY 139 (South Jefferson Street) intersection with Legion Street.

Operational Improvements at Courthouse (Project X)

A medium priority, **Project X** includes providing curb extensions and sidewalks around the courthouse square to better channelize traffic flow. Based on the crash analysis, 3.5 of the 4 sides of the courthouse square exhibit high crash rates. As part of Project X, reconfiguration of on-street parking should also be examined. It is essential that this project be coordinated with the local fire department, which is located just north of the East Market Street/East Courthouse Square intersection.

KY 278 Curve Realignment (Project BB)

Identified as a medium priority, **Project BB** would improve the deficient vertical curve along KY 278 (Sandlick Road). This link carries low traffic volumes, which would be further reduced once the Southeast Connector link is implemented. At that time, the westernmost portion of KY 278 could be rerouted along the new highway link to provide an improved connection to KY 91.

US 62/Plum Street Intersection Improvements (Project AA)

Project AA proposes to improve the US 62 intersection with Plum Street to clarify traffic movements. July 2014 coordination with stakeholders indicated that this improvement is a low priority and implementation of access management principles would not be supported by the adjacent business owner.

C. Cost Estimates by Priority

Table 8.3 on the following page presents cost estimates for each improvement concept, grouped by recommended priority level.

Table 8.3: Planning-Level Cost Estimates (Millions) by Priority

[1]	Improvement [2]	Design	ROW	Utility	Construction	Total
	Recommended High Priority Projects					
	Five-Leg Int. Improvements (Z)					
ST	Option 1	$0.2 M	$0.2 M	$0.5 M	$1.6 M	**$2.5 M**
	Option 2 [3,4]	$0.1 M	$0.2 M	$0.5 M	$0.7 M	**$1.5 M**
	Truck Route Improvements					
	All Combined	$0.5 M	$1.8 M	$3.4 M	$4.8 M	**$10.6 M**
	W	$0.1 M	$0.2 M	$0.6 M	$0.7 M	**$1.6 M**
ST	B	$0.1 M	$0.3 M	$0.6 M	$1.1 M	**$2.1 M**
	N	$0.1 M	<$0.1 M	$0.6 M	$0.9 M	**$1.7 M**
	F	$0.1 M	$0.5 M	$0.6 M	$0.7 M	**$1.9 M**
	C	$0.1 M	$0.8 M	$1.0 M	$1.4 M	**$3.3 M**
LT	Southeast Connector (KQR)	$1.1 M	$7.0 M	$5.0 M	$18.9 M	**$32.0 M**
	Recommended Medium Priority Projects					
ST	Operations at Courthouse (X)					
	Option 2A	$0.1 M	$0.2 M	<$0.1 M	$1.0 M	**$1.3 M**
ST	KY 278 Curve Realignment (BB)	$0.1 M	$0.2 M	$0.2 M	$0.4 M	**$0.9 M**
	KY 293 to US 62 Connection [4]					
LT	J	$0.6 M	$1.8 M	$0.8 M	$6.0 M	**$9.2 M**
	G	$1.0 M	$3.0 M	$0.9 M	$9.6 M	**$14.5 M**
	Widen KY 91					
	All Combined	$2.4 M	$7.5 M	$7.8 M	$24.4 M	**$42.1 M**
LT	E	$0.4 M	$1.5 M	$1.8 M	$4.3 M	**$8.0 M**
	S2	$0.9 M	$3.0 M	$3.0 M	$9.4 M	**$16.3 M**
	S1	$1.1 M	$3.0 M	$3.0 M	$10.7 M	**$17.8 M**
LT	Widen KY 139 (U)	$1.5 M	$5.0 M	$0.5 M	$15.3 M	**$22.3 M**
	Recommended Low Priority Projects					
ST	US 62/Plum Street Intersection Improvements (AA)	$0.1 M	$0.4 M	$0.3 M	$0.4 M	**$1.2 M**
LT	Northside Connector (MIP)	$3.0 M	$5.5 M	$3.0 M	$29.7 M	**$41.2 M**
LT	KY 2080 Overpass Reconstruction (H)	$0.5 M	$0.8 M	$0.4 M	$4.5 M	**$6.2 M**
LT	US 62 Sidewalks (D)	$0.2 M	$0.5 M	$0.5 M	$1.0 M	**$2.2 M**
LT	KY 293 Sidewalks (CC) [5]	$0.1 M	$0.2 M	$0.2 M	$0.6 M	**$1.1 M**

[1] Note: LT = Long Term and ST = Short Term
[2] Note: Within each improvement concept, component projects are listed in order of importance, with highest priority components on top.
[3] Note: costs for suggested local project to extend East Washington Street to KY 2080 not included in cost estimates
[4] Note: Both options recommended for further consideration as part of future project development phases
[5] Note: As concept was introduced at second local official/stakeholder meeting, it was not presented alongside other concepts in Chapter 6.