Bardstown Road Study

# FINAL

# US 31E (Bardstown Rd) Study

Item No. 5-80261.00
Jefferson County, Kentucky

Kentucky Transportation Cabinet

In partnership with:
HMB Professional Engineers, Inc.

December 2025

# US 31E (Bardstown Rd) Study
# Executive Summary

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Item No. 5 -80261.00

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## Background

The Kentucky Transportation Cabinet (KYTC) initiated the US 31E Corridor Study, KYTC Item No. 5-80261.00 to examine transportation needs along the US 31E corridor from the Bullitt County Line (MP 0.000) to KY 1065 (Beulah Church Roa / Seatonville Road) (MP 5.549) including the I-265 (Gene Snyder Freeway) interchange. The extents of the study area are shown in Figure ES-1. A list of prioritized improvement options based on transportation needs, environmental / economic benefits and impact, benefit / cost, safety, public input, and existing / future transportation operations is the outcome of the study.


## Study Objectives

The objective of this study is to identify and develop concepts that might improve safety, reduce congestion, and improve multimodal transportation options along US 31E from the Bullitt County Line to KY 1065 (Beulah Church Road / Seatonville Road) including the I-265 (Gene Snyder Freeway) interchange.

Study goals include the following:

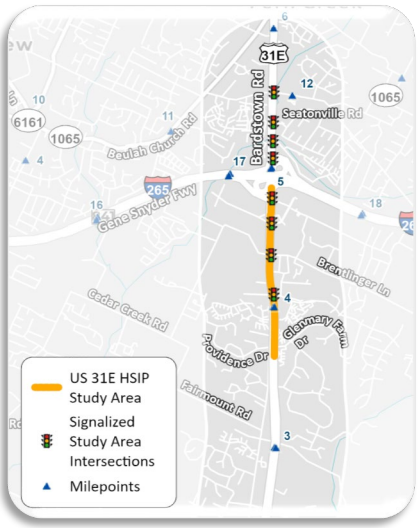
- Provide safety, capacity, access management, transit, and bicycle / pedestrian improvements for all transportation users now and into the future.
- Provide opportunities for engagement with the public to share study information and collect meaningful input to the study process.
- Minimum utility, right-of-way, and environmental impacts.

# Previous Studies, State, and Local Projects

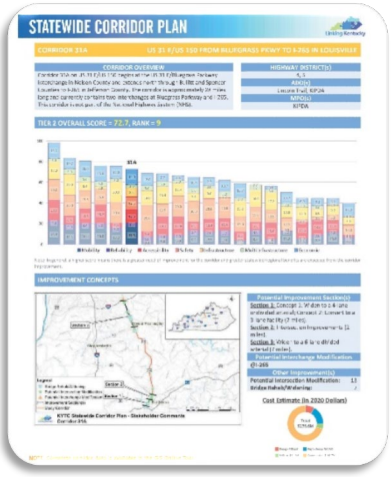
Current and planned studies and projects that may affect the study area include:

## 2024 HSIP Safety Study for US 31E

*Highway Safety Improvement Program (HSIP) projects are federally funded and are intended to use a data-informed process to identify, develop and deliver solutions to prevent fatalities and serious injury crashes on Kentucky's public roads. The highlighted area within the US 31E corridor has recently been evaluated concurrently with emphasis on safety-focused improvements.*




## 2021 Linking Kentucky Statewide Corridor Plan




*The Kentucky Statewide Corridor Plan, or Linking Kentucky, is a planning study of key transportation corridors within the state. This study identifies current and future transportation needs, gathers insight from stakeholders, and prioritizes corridors that have the greatest potential to better link Kentucky's region and improve safety, mobility and accessibility. The US 31E corridor from the Bluegrass Parkway to I-265 is ranked #9 out of 45 corridor segments.*

## KYTC Enacted Highway Plan (2024 – 2030)

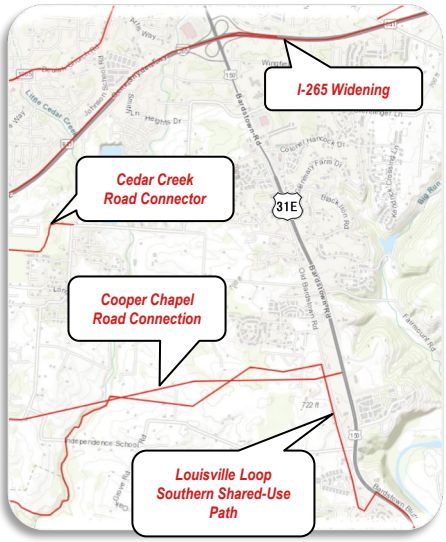
*Relevant projects include:*

- *Item No. 5-554.00: Improve safety and reduce congestion on I-265 from I-65 to US 31E. Funding is listed as $3,250,000 for design in 2025.*
- *Item No. 5-558.00: Improve safety and reduce congestion on I-265 from US 31E to KY 155. Design funds are $3,500,000 for 2026 and $4,000,000 for 2027; Right of way is $2,500,000 in 2028. Utilities is $1,500,000 in 2028.*
- *Item No. 5-80250.00: Design and construction of a realigned Old Bardstown Road to align with the entrance to Walgreens at Hillock with a memorandum of agreement with the Louisville Metro Government. Design funds are $40,000 for 2026. Utilities is $40,000 for 2026. Construction is $400,000 for 2026.*

## KIPDA Connecting Kentuckiana MTP 2050

*There are four projects listed in the Metropolitan Transportation Plan (MTP) that are in the vicinity of the study corridor. These include:*

- *Cooper Chapel Road Phase 3 Connection*
- *Louisville Loop Southern Shared-Use Path*
- *Cedar Creek Road Connector*
- *I-265 improvements including the consideration of widening from four to six lanes*



# Existing Conditions

US 31E is an urban principal arterial north of the I-265 interchange and an urban minor arterial south of the I-265 interchange to the Bullitt County line. It serves as a primary route connecting Louisville to Mt. Washington and further points south. A summary of existing conditions information for the corridor is presented in the following illustration.

## Typical Section

*4 Lanes; 12' Lane; 10' Shoulder*
*16 – 38' Median*

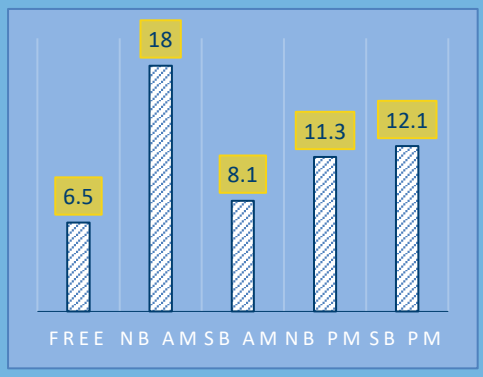
## Traffic & Operations

2024 Traffic: 31,520 – 33,650
2045 Traffic: 35,280 – 42-780

LOS A - D — *Existing overall / mainline level of service and delay is at acceptable level (between LOS A – D)*

LOS E - F — *Most side street approaches at intersections have a high level of delay and failing level of service (LOS E - F)*

## Travel Time (Min)




*Direction of Travel by Period*

## Safety

(Jan. 2018 – Dec. 2023)

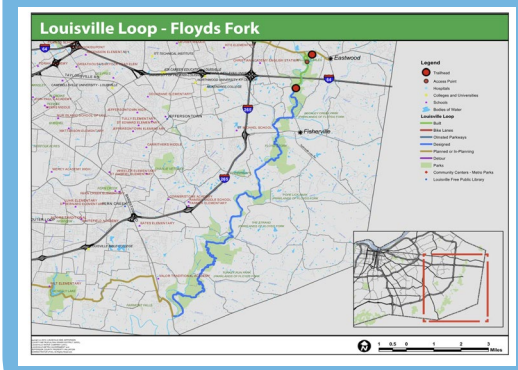
- 9 Killed
- 220 Injury
- 793 Property Damage Only
- 5 Pedestrian Crashes

## Transit

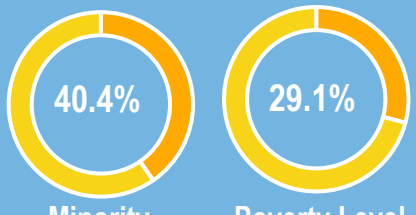
- *TARC operates Route 17; 7 days per week (~6 AM to 11 PM)*
- *Declining route ridership*

| | |
|---|---|
| 2019 | 174,872 |
| 2020 | 66,781 |
| 2023 | 124,732 |

## Bike / Ped




## Environmental Justice

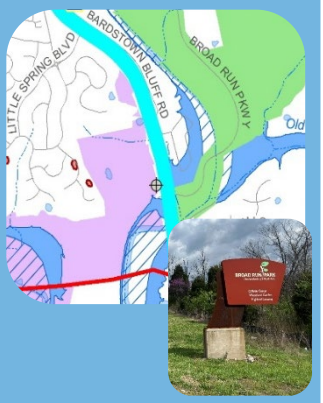



Minority — Poverty Level

*Census Tract 117.08 Block Group 4 is located south of I-265 and west of US 31E. It includes Cedar Heights Mobile Home Park.*

## Environmental Resources

- *Floodway*
- *100 Year Flood Zone*
- *Broad Run Park*
- *Future Fund Property*



# Improvement Concepts

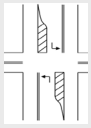
The existing conditions analysis and input from the project team, local elected officials / stakeholders, and the public helped guide the development and evaluation of improvement locations and concepts.

Four project categories were identified to organize the improvement concepts. These include:

- Intersection / Spot Improvement Concepts
- Corridor Improvement Concepts
- Multimodal Improvement Concepts
- Future Policy Considerations

Identifying initial concepts focused on a high-level assessment of the effect on potential crash reductions, potential travel / delay reduction, and cost impacts. The following tables (Tables ES-1 and ES-2) show the types of improvements initially considered.

Table ES -1. Preliminary Concepts for Intersections / Spots

| | | Potential Crash Reduction | Potential Travel / Delay Reduction | Cost Estimate Range |
|---|---|---|---|---|
| Intersections |  **Concept:** Additional / New Turn Lanes | 14 - 26% (All crashes) | 5 - 53% AM<br>29 - 88% PM | LOW - HIGH |
| |  **Concept:** Offset Lefts | 34% (Fatal and Injury Crashes) | N/A | MEDIUM |
| |  **Concept:** Bowtie | Reduces # of conflict points and promotes lower speeds | Fewer signal phases mean less stopping time at main intersection | HIGH |
| |  **Concept:** Access Modifications | Moving traffic to signalized intersection regulates turns | N/A | MEDIUM - HIGH |
| |  **Concept:** Turn Lane Extension | 14 - 26% (All crashes) | Extensions reduce vehicle queues blocking intersections | LOW |
| |  **Concept:** Improve / Add Lighting | 28% (Nighttime injury crashes) | N/A | LOW |

# Improvement Concepts (cont.)

Table ES -2 . Preliminary Concepts for Corridors

| | | Potential Crash Reduction | Potential Travel / Delay Reduction | Cost Estimate Range |
|---|---|---|---|---|
| Corridor |  **Concept:** Pavement Management / Markings | ~13 - 21% (Fatal, Serious, Minor, Possible Injury) | N/A | HIGH |
| |  **Concept:** Cable Median Barrier | 29% (Serious, Minor, Possible Injury) | N/A | MEDIUM |
| |   **Concept:** Speed Feedback Sign | 5 - 22% (All crashes) | N/A | LOW |
| |  **Concept:** Access Management | 25 - 31% (Fatal and Injury) | VARIES | HIGH |
| |  **Concept:** Widen to Six Lanes | 15% (All crashes) | Less than 10% reduction in arterial total delay | HIGH |
| |  **Concept:** RCUT | 22 - 63% (Fatal and Injury) | Up to 40% reduction in travel time | HIGH |

Additional concepts were developed to address needs in transit, pedestrian, and bicycle modes of transportation. Concepts developed include:

- Enhanced Transit Service – Standardize bus stop locations, upgrade higher usage stops, provide faster bus running times.
- Shared Use Path – Explore modifications on Old Bardstown Road to connect between high traffic areas and Broad Run Park.
- Sidewalk Connectivity – Extend / construct new segments of sidewalk for continuity of pedestrian network. A recent HSIP study of the area for sidewalks gaps produced a prioritized list of segments. US 31E segments within the study area were considered a lower priority.
- Pedestrian Interchange Connectivity – Explore feasibility of constructing a pedestrian path in median with concrete barrier separators and connect to all crossings at existing signalized intersections.

Other concepts discussed but not deemed feasible at this time include major interchange reconstruction, express lane, hard shoulder running, and limiting left turns at cross streets and Old Bardstown Road.

# Public Involvement

During the study, multiple outreach and collaborative meetings were held.

### Project Team Meetings

*The Project Team consisted of:*

- *KYTC District 5*
- *KYTC Central Office*
- *KIPDA*
- *Consultant Team*

*Project Team Meeting No.1:*
*Presentation and Discussion of Existing Conditions*

*Project Team Meeting No. 2:*
*Presentation and Discussion of Improvement Concepts*

*Project Team Meeting No. 3:*
*Presentation and Discussion of Revised Improvement Concepts*

*Prioritization Meeting:*
*Discussion of Prioritization*

### Local Elected Official / Stakeholder Meetings

*Two meetings were held to inform local elected officials and stakeholders of the study and solicit input on transportation needs and improvement concepts.*

*Representatives included:*

- *Louisville Metro*
- *Bike Louisville*
- *State and Local Elected Officials*
- *Cedar Creek Baptist Church*
- *Fern Creek Fire and EMS*
- *Louisville Metro Police Department*
- *Jefferson County Public Schools*

### Public Meetings

*Two open-house events were held to inform attendees about the study and provide an opportunity to collect feedback on improvement concepts.*

*Top Issues Identified:*
*1. Congestion; 2. Safety; 3. Access to Properties*

*Top Intersections Identified for Improvement:*

- *Cedar Creek Rd / Brentlinger Ln*
- *KY 2053 (Thixton Ln)*
- *Hillock Dr / Colonel Hancock Dr*

*Top Segment Identified for Improvement:*
*I-265 WB Off Ramp to I-265 EB Off Ramp*

### Online Surveys

*Interactive online surveys were published concurrently with the public meetings to inform and collect feedback on the study for interested people not able to attend the public meeting.*

*Top Issues Identified:*
*1. Congestion; 2. Safety; 3. Access to Properties*

*Top Intersections Identified for Improvement:*

- *Cedar Creek Rd / Brentlinger Ln*
- *Hillock Dr / Colonel Hancock Dr*
- *I-265 EB Off Ramp*

*Top Segments Identified for Improvement:*
*Southpoint Blvd to Brentlinger Ln*

Bardstown Road Study
Public Survey #1

# Conclusions

The US 31E Study resulted in a range of conceptual improvements for future implementation. Improvement concepts primarily focused on areas with safety, traffic operations, and multimodal (bicycle / pedestrian) needs. Significant congestion and delay at the intersections impact the overall roadway capacity – consideration may be given to improving intersections as noted prior to larger-scale investments such as full corridor widening. The recommended priorities are based on identification of needs, technical analysis, public input, and KYTC District 5 staff prioritization. The following tables (Tables ES-3 and ES-4) present the identified projects based on high, medium, and low priority.

An additional recommendation proposes a separate study for the US 31E / I-265 interchange to evaluate the full impacts of the interchange in conjunction with the larger-scale transportation network beyond the corridor.

The next phase in the project development process for any of the recommendations would be Preliminary Engineering. If federal funds are used or permits required, additional environmental analysis will be required to satisfy the National Environmental Policy Act (NEPA).

KYTC continues to implement the 2024 HSIP Safety Study recommendations. No additional funding currently exists for any of the recommendations made in this study. Any identified projects, that are not funded through HSIP, would need to be integrated into the KIPDA Metropolitan Transportation Plan (MTP) and the KYTC Strategic Highway Investment Formula for Tomorrow (SHIFT) process as a first step in pursuit of funding. KYTC, KIPDA, and Louisville Metro could potentially collaborate on funding and implementation of some projects.

# Conclusions (cont.)

Table ES-3. Intersection / Spot Priority Improvement List

| Concept ID | Location | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) | Priority |
|---|---|---|---|---|---|---|
| **SPOT** | | | | | | |
| **A** | KY 660 (Waterford Rd) | Turn Lanes | $437,000 | 2:1 | 60 | LOW |
| **B** | Little Spring Blvd | RCUT | $1,290,000 | 13:1 | 57 | LOW |
| **C** | KY 2053 (Thixton Ln) | Turn Lanes | $459,000 | 54:1 | 84 | HIGH |
| **D** | Fairmount Rd | RCUT | $2,336,000 | 7:1 | 57 | MEDIUM |
| **E** | Long Home Rd | Offset Lefts | $627,000 | 6:1 | 57 | LOW |
| **F** | Long Home Rd | RCUT | $2,123,000 | 11:1 | 57 | MEDIUM |
| **G** | Providence Dr / Glenmary Farm Dr | RCUT | $2,463,000 | 9:1 | 57 | MEDIUM |
| **H** | Hillock Dr / Colonel Hancock Dr | Offset Lefts | $451,000 | 21:1 | 66 | MEDIUM |
| **I** | Hillock Dr / Colonel Hancock Dr | RCUT | $6,560,000 | 52:1 | 57 | MEDIUM |
| **J** | Cedar Creek Rd / Brentlinger Ln | Turn Lanes | $1,144,000 | 145:1 | 83 | HIGH |
| **K** | Bartley Dr | Realign Intersection | $3,500,000 | N/A | 64 | HIGH |
| **L** | I-265 WB Off Ramp | Expand Storage | $704,000 | 10:1 | N/A | LOW |
| **M** | Cedar Springs Blvd / Brookridge Village Blvd | Turn Lanes | $2,264,000 | 12:1 | 78 | MEDIUM |
| **N** | Cedar Look Dr | Turn Lanes / Offset Lefts | $1,726,000 | 81:1 | 60 - 67 | HIGH |
| **O** | KY 1065 (Beulah Church / Seatonville Rd) | Bowtie | $6,200,000 | 7:1 | 39 | LOW |
| **P** | KY 1065 (Beulah Church / Seatonville Rd) | Turn Lanes / Offset Lefts | $1,975,000 | 15:1 | 60 - 65 | HIGH |
| **Q** | Hillock Dr / Colonel Hancock Dr to Southpointe Blvd | Add NB Lane | $6,150,000 | 4:1 | 70 | HIGH |
| **R** | Southpointe Blvd to I-265 EB On Ramp | Add NB Lane | $7,050,000 | 2:1 | 70 | HIGH |

# Conclusions (cont.)

Table ES-4. Corridor and Multimodal Priority Improvement List

| Concept ID | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) | Priority |
|---|---|---|---|---|---|
| **CORRIDOR** | | | | | |
| **A** | Old Bardstown Rd Management (modify pavement markings and STOP signs) | $100,000 | N/A | N/A | LOW |
| **B** | Jefferson / Bullitt County Line to I-265 EB On-Ramp – Widen from 4 to 6 Lanes | $88,000,000 | 5:1 | 70 | LOW |
| **B-1** | Jefferson / Bullitt County Line to Cooper Chapel Extension – Widen from 4 to 6 Lanes | $47,200,000 | 1:1 | | LOW |
| **B-2** | Cooper Chapel Extension to Hillock Dr / Colonel Hancock Dr – Widen from 4 to 6 Lanes | $27,500,000 | 1:1 | | MEDIUM |
| **B-3** | Hillock Dr / Colonel Hancock Dr to I-265 EB On Ramp – Add NB Lane | $13,200,000 | 3:1 | | HIGH |
| **C** | Combination Added NB Lane (B-3) and RCUTs | $19,600,000 | 30:1 | 57 | MEDIUM |
| **MULTIMODAL** | | | | | |
| **A** | Enhance Transit | $730,000 | N/A | 53 | N/A |
| **B** | Sidewalk Connectivity | $2,060,000 | N/A | 69 | N/A |
| **C** | Pedestrian Interchange Connectivity | $1,410,000 | N/A | 54 | N/A |
| **OTHER** | | | | | |
| **A** | Speed Feedback Signs | $40,000 | 249:1 | 55 | N/A |
| **B** | Cable Median Barrier | $660,000 | 3:1 | 61 | N/A |
| **C** | Lighting | $960,000 | 25:1 | 74 | N/A |

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# Chapter 1 – Introduction

The Kentucky Transportation Cabinet (KYTC) initiated the US 31E (Bardstown Road) Study, KYTC Item No. 5-80261.00, to examine transportation needs along the US 31E corridor from the Bullitt County Line (MP 0.000) to KY 1065 (Beulah Church Road / Seatonville Road) (MP 5.549) including the I-265 (Gene Snyder Freeway) interchange. A list of prioritized improvement options based on transportation needs, environmental / economic benefits and impact, benefit / cost, safety, public input, and existing / future transportation operations is the outcome of the study.

The project team consists of KYTC District 5, KYTC Central Office, the Kentuckiana Regional Planning and Development Agency (KIPDA), and the HMB Consultant team (HMB, Qk4, Kaskaskia Engineering Group, LLC, and Lochmueller Group).

## 1.1 Study Area

The study area encompasses US 31E (Bardstown Road) from the Bullitt County Line (MP 0.000) to KY 1065 (Beulah Church Road / Seatonville Road) (MP 5.549). Additional emphasis is placed on major intersections along this portion of US 31E including the following:

- North Bardstown Road*
- KY 660 (Waterford Road)
- Oakland Hills Trail
- Hidden Valley Farm Road / Broad Run Parkway
- Little Spring Boulevard
- KY 2053 (Thixton Lane)
- Glenmary Village Boulevard
- Fairmount Road
- Long Home Road
- Providence Drive / Glenmary Farm Drive
- Broadwood Drive / Captain Place
- Hillock Drive / Colonel Hancock Drive
- Ichabod Drive / Circle K
- Kohl's Entrance
- Cedar Creek Road / Brentlinger Lane
- Southpointe Boulevard
- I-265 EB Off Ramp
- I-265 WB Off Ramp
- Cedar Springs Boulevard / Brookridge Village Boulevard
- Cedar Look Drive
- KY 1065 (Beulah Church Road / Seatonville Road)

*This intersection is in Bullitt County and excluded from improvement concept development and analysis but included in traffic model to provide a logical terminus.

The full extent of the study area is included as **Figure 1**.

**Figure 1. Study Area**

## 1.2 Study Purpose and Goals

The purpose of this study is to improve safety, reduce congestion, and improve multimodal transportation options along US 31E from the Bullitt County Line to KY 1065 (Beulah Church Road / Seatonville Road) including the I-265 (Gene Snyder Freeway) interchange.

Study goals include the following:

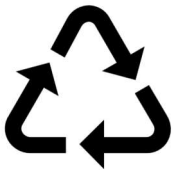
- ***Provide necessary safety, capacity, access management, transit, and bicycle / pedestrian improvements for all users now and into the future.***
- ***Provide opportunities for engagement with the public to share study information and collect meaningful input to the study process.***
- ***Have minimal utility, right-of-way, and environmental impacts.***

## 1.3 Study Process

The process of this study is described in detail in the following nine chapters. Additional resource / reference materials are included in the appendices.

**Chapter 1 – Introduction**
The first chapter provides background introductory information about the study and provides the framework for the remainder of the report.

**Chapter 2 – Existing Transportation Conditions**
The second chapter encompasses existing information including geometrics, speeds, existing traffic volumes and operations, safety analysis, bicycle and pedestrian accommodations, transit operations, and existing intelligent transportation systems (ITS) infrastructure.



**Chapter 3 – Environmental Overview**
This chapter is devoted to a summary of the natural, human, and socioeconomic resources within the study area.

**Chapter 4 – Initial Community Outreach**
This chapter is devoted to a summary of initial outreach efforts which includes coordination with local elected officials / stakeholders, community surveys, and public meetings. Existing study information is presented with input requested on issues / needs for the corridor.

**Chapter 5 – Future Year (2045) Traffic Forecast and Operations**
The process of determining traffic volumes for the future year of analysis (2045) is presented in this chapter along with the resulting operations analysis.

**Chapter 6 – Improvement Concepts**
Chapter seven presents the process by which intersections / spot locations / corridor-wide improvement concepts were identified.

**Chapter 7 – Continued Community Outreach**
This chapter is devoted to a summary of outreach efforts to present and discuss draft improvement concepts. It includes coordination with local elected officials / stakeholders, community surveys, and public meetings.

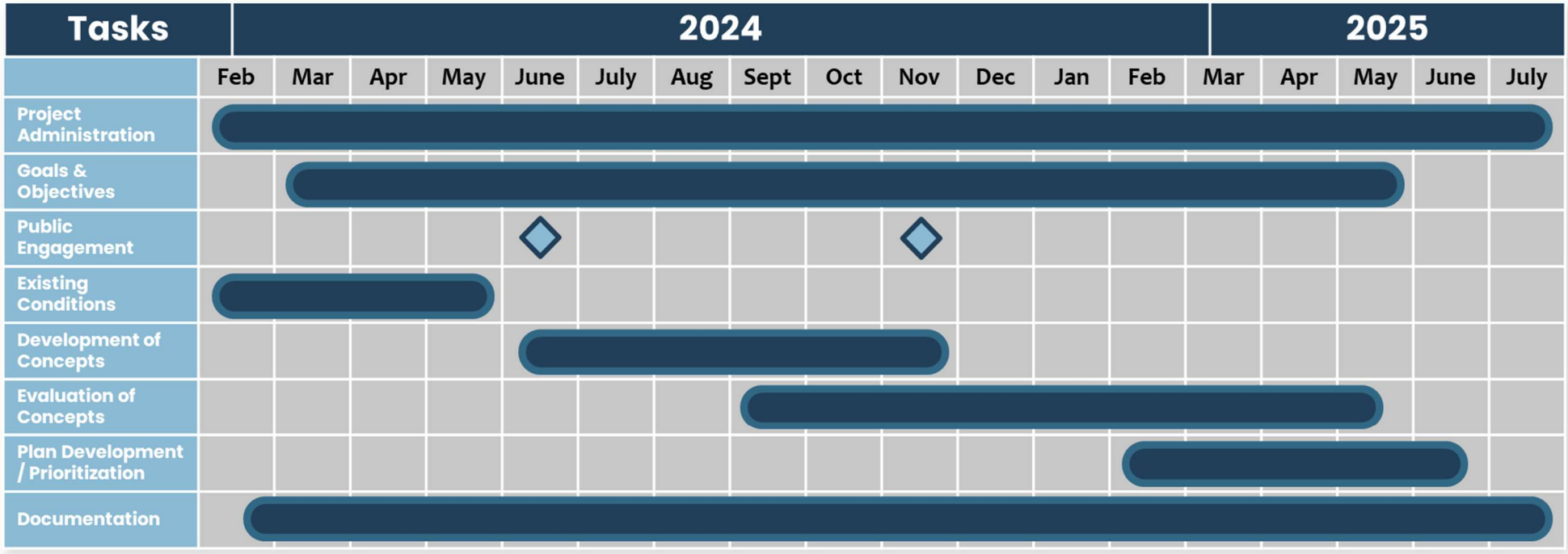
**Chapter 8 – Improvement Concept Refinement**
In this chapter, the focus is on the evaluation and refinement of improvement concepts. This includes preparing more detailed information such as cost estimates and return on investment. Using this information individual project sheets are developed.

**Chapter 9 – Study Outcomes**
The final chapter presents the outcomes of the study as a prioritized list of locations and improvement concepts.

## 1.4 Study Schedule

The study began in February 2024 and concluded in July 2025. The following illustration (**Figure 2**) shows the timeline of events throughout the study.

**Figure 2. Study Schedule**



## 1.5 Previous Studies, State and Local Plan Projects

Current and planned projects and studies that may affect the study area were identified. These documents include:

- Linking Kentucky Statewide Corridor Plan[1]
- I-265 Programming Study[1]
- KIPDA Interchanges Study[2]
- HSIP Safety Study for US 31E
- KYTC Enacted Highway Plan (2024 – 2030)[3]
- KYTC Identified SHIFT Projects
- KIPDA Connecting Kentuckiana Metropolitan Transportation Plan (MTP) 2050[4]
- Move Louisville[5]

**Corridor Plan and Studies**

The need for improvements to US 31E has been noted in several previous planning studies. The Linking Kentucky Statewide Corridor Plan (September 2021) is intended to develop investment strategies for statewide and regional corridors through 2045. In the plan, US 31E (from the Bluegrass Parkway to I-265) was ranked nine (9) out of forty-five (45) corridor segments based on scoring criteria. **Figure 3** displays the project information from the plan for reference.

The I-265 Programming Study (2015) identified priority segments of I-265 for improvements as well as system improvements. The segment of I-265 between I-65 and Bardstown Road was ranked three (3) out of five (5) for widening priority. Improvement to the I-265 / US 31E interchange was ranked two (2) out of seven (7) for reconstruction within that segment.

The KIPDA Interchanges Study (June 2005) included the I-265 / US 31E interchange for evaluation. Traffic volumes and analysis in 2004 identified queue lengths on ramps that exceeded capacity. Several improvements recommended in the study have since been completed. These include adding capacity to the I-265 EB Off Ramp with two left and two right turn lanes and separating the US 31E SB lane to I-265 WB On Ramp from US 31E SB through lanes.

**HSIP Safety Study for US 31E**

The KYTC Traffic Safety Branch administers the federally-funded Highway Safety Improvement Program (HSIP). Item No. 5-9047.00 is an HSIP improvement project along US 31E from I-265 EB Off Ramp to Hillock Drive. This project was initiated prior to the US 31E Study. Traffic volumes, crash analysis, traffic operations model, and improvement concepts information were provided to assist with the US 31E Study. Evaluation and design of improvement concepts for the HSIP project have been on-going throughout this study. At the time of this report, the following are the proposed improvements and implementation schedule.

Proposed Improvements

- Construction of a right turn lane at Ichabod Drive
- Construction of a right turn lane at Bartley Drive

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[1] KYTC Planning Studies & Reports available at https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx

[2] KIPDA Planning Studies & Reports available at Archived Studies – KIPDA Transportation

[3] KYTC Projects listed in the current 2024-2030 Enacted Highway Plan: https://transportation.ky.gov/Program-Management/Pages/default.aspx. Online map available at https://maps.kytc.ky.gov/activehighwayplan/

[4] KIPDA Metropolitan Transportation Plan available at https://www.kipda.org/transportation/core-products/metropolitan-transportation-plan/

[5] Louisville Loop information available at https://louisvilleky.gov/government/louisville-loop

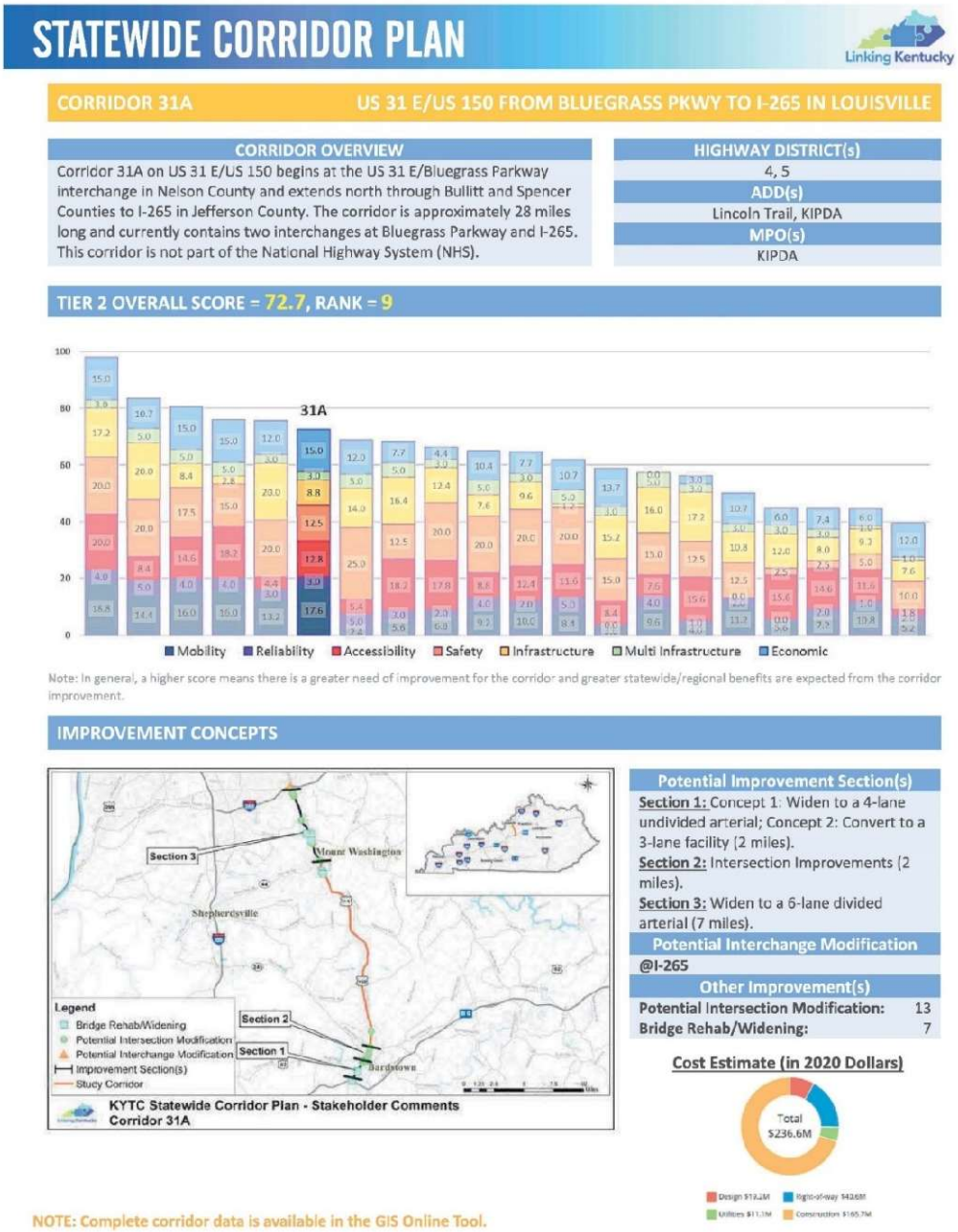
- Installation of a raised median from Kohl's Entrance to Hillock Drive
- Construction of a right turn free-flow lane (separate from the main flow that allows right turning traffic to move freely regardless of mainline traffic signaling) from the I-265 EB Off Ramp to US 31E

Project Timeline

- Final Design Summer 2025
- Construction 2026

For purposes of development and evaluation of improvement concepts for the US 31E Study, the proposed improvements identified from the HSIP project were considered committed projects. All traffic operation analysis in this study included these improvements.

**Figure 3. Linking Kentucky Statewide Corridor Plan – US 31E Segment Information**



### KYTC Identified and Highway Plan Projects

Identified projects are transportation projects that have been identified as a need and have been entered in the Continuous Highway Analysis Framework (CHAF) database. The database provides a means to track and analyze projects as well as a way to sponsor, score, and rank projects as part of the Strategic Highway Investment Formula for Tomorrow (SHIFT) prioritization process. Many projects originally CHAFs are in KIPDA's MTP.

The KYTC Enacted Highway Plan projects are those that have been prioritized through SHIFT and have been included in Kentucky's Highway Plan. The enacted plan at the time of this study is *FY 2024 – 2030* It includes three relevant projects:

- Item No. 5-554.00: Improve safety and reduce congestion on I-265 from I-65 to US 31E. Funding is listed as $3,250,000 for design in 2025.
- Item No. 5-558.00: Improve safety and reduce congestion on I-265 from US 31E to KY 155. Design funds are $3,500,000 for 2026 and $4,000,000 for 2027; Right of way is $2,500,000 in 2028. Utilities are $1,500,000 in 2028.
- Item No. 5-80250.00: Design and construction of a realigned Old Bardstown Road to align with the entrance to Walgreens at Hillock with a memorandum of agreement with the Louisville Metro Government. Design funds are $40,000 for 2026. Utilities is $40,000 for 2026. Construction is $400,000 for 2026.

Other KYTC District 5 projects identified in operations and maintenance budgets include:

- Traffic Signal Upgrade: This is a $1.2 million investment with committed funds. New traffic signal controllers were deployed during the week of October 8, 2024 with new optimized signal timing plans implemented. Communication / radar detection is still pending.
- Resurfacing: Resurfacing of US 31E from MP 0.000 to MP 4.000 was let in January 2025 with completion by June 30, 2025.

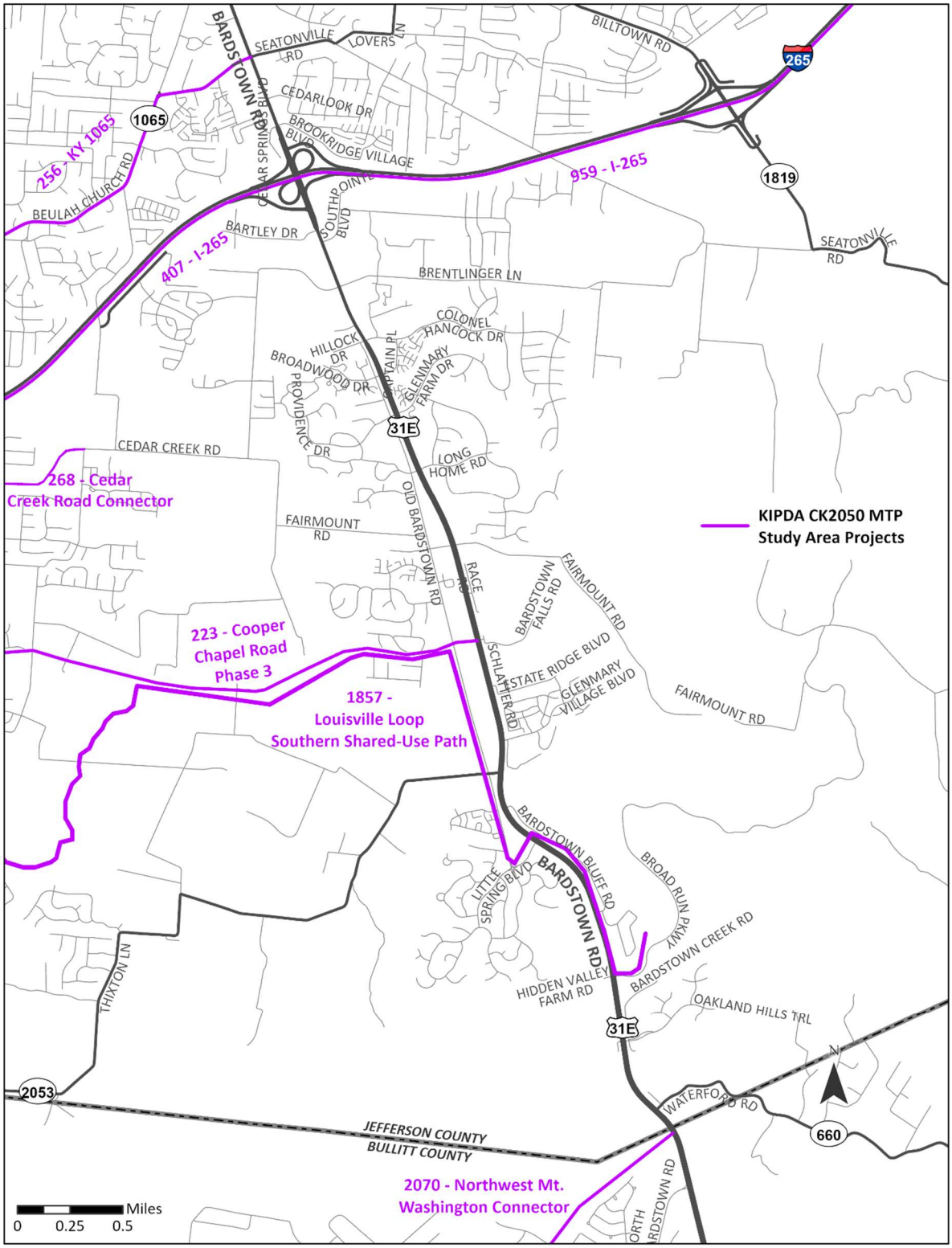
### KIPDA Connecting Kentuckiana 2050 Metropolitan Transportation Plan (MTP) Projects

The Connecting Kentuckiana 2050 (CK2050) MTP is a comprehensive policy document projecting the transportation needs and outlining the vision and priorities for the region for the next 20 years. Projects identified in the CK2050 MTP that are in the vicinity / may influence development of improvement concepts include:

- Item No. 5-404.01 (KIPDA ID 223): Cooper Chapel Road Phase 3 – Extend and construct a 2-lane roadway with a continuous center turn lane from KY 864 (Beulah Church Road) to US 31E (Bardstown Road) at Bardstown Falls Road. Open year listed is 2025.
- Item No. 5-8710.00 (KIPDA ID 2070): Northwest Mt. Washington Connector – New route northwest of Mt. Washington from US 31E to KY 2706. Open year listed is 2032.
- Item No. 5-554.00 (KIPDA ID 407): I-265 – Project will evaluate widening to the inside from 4 to 6 lanes. Open year listed is 2028.
- Item No. 5-558.00 (KIPDA ID 959): I-265 – Project will evaluate widening to the inside from 4 to 6 lanes. Open year listed is 2029.
- KIPDA ID 256: KY 1065 – Project will evaluate 3-lane widening or other lower impact solutions and consider accommodations for bicyclists and pedestrians. Open year listed is 2035.
- KIPDA ID 268: Cedar Creek Road Connector –New 2-lane east-west connector from KY 864 (Beulah Church Road) to Cedar Creek Road with pedestrian accommodations. Open year listed is 2040.

**Figure 4** depicts the location of the identified CK2050 MTP projects.

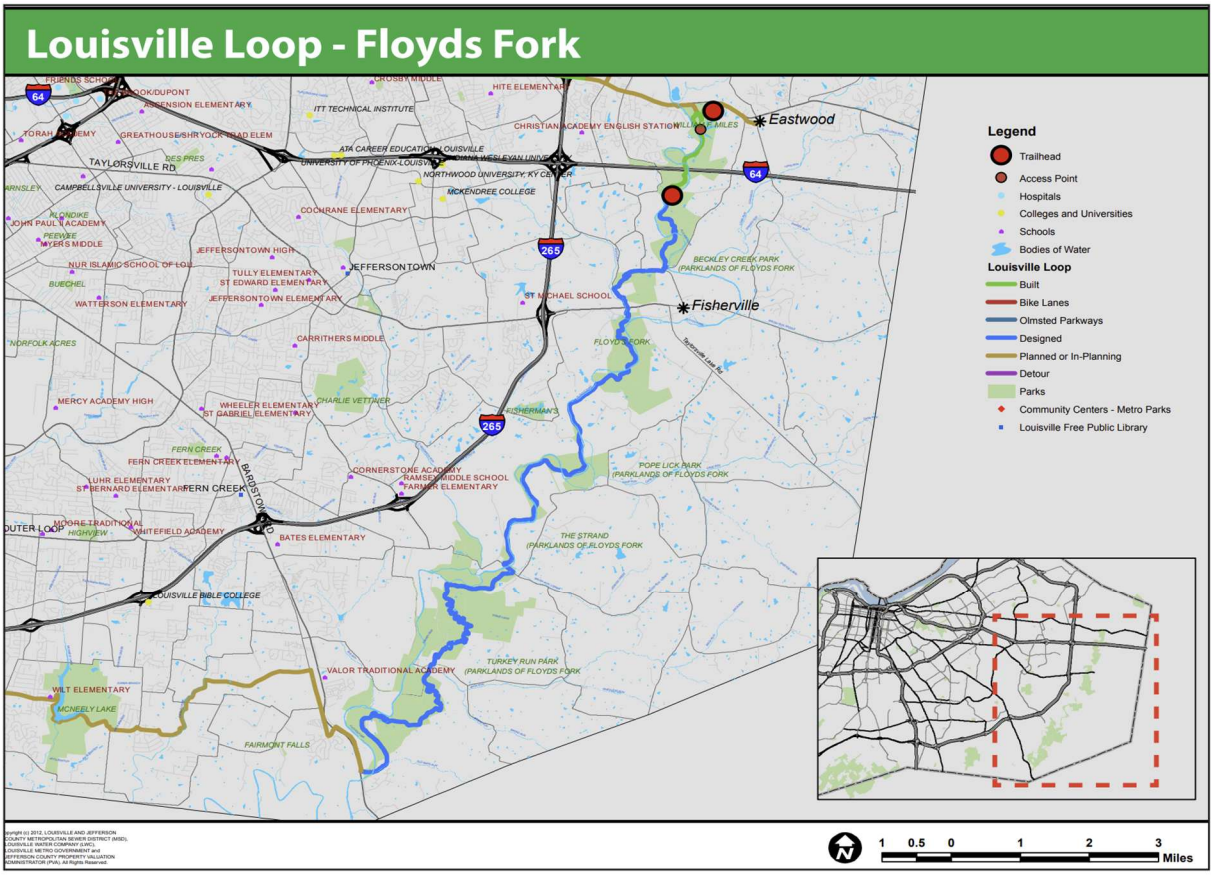
**Figure 4. CK2050 MTP Projects**



**Louisville Loop Master Plan**

The Louisville Loop Master Plan (2013) was created to provide a resource for the entire system of an estimated 100-mile loop path around Louisville / Jefferson County composed of a network of shared-use paths, soft surface trails, on-road bike lanes, stream corridors, Olmsted parkways, greenways and transit routes. Depicted in this document (and included as **Figure 5** for reference), a segment of the Louisville Loop is planned to connect to Broad Run Park, crossing US 31E in the park vicinity.

**Figure 5. Louisville Loop Floyds Fork Section**



# Chapter 2 – Existing Transportation Conditions

In this chapter, the existing transportation conditions are presented. This includes information on the following:

- Roadway Facility and Geometrics
- Vehicular Speeds
- Existing Traffic Volumes and Operations
- Safety Analysis
- Bicycle and Pedestrian Accommodations
- Transit Systems
- Intelligent Transportation Systems (ITS)

Data for this chapter was collected from KYTC's Highway Information System (HIS) database, KYTC Traffic Count Reporting System, and KIPDA GIS Mapping. Field reviews were performed for additional data collection and verification.

## 2.1 Roadway Facility and Geometrics

**Functional Class**

Functional classification is the process of grouping streets and highways by character of travel service and access to adjacent land uses. According to the HIS database, US 31E is classified as an Urban Principal Arterial north of the I-265 interchange and as an Urban Minor Arterial south of the I-265 interchange to the Bullitt County line. Principal Arterials are roadways that provide a high level of mobility for substantial statewide travel and / or serve major activity centers and the longest trip demands within urban areas. Minor Arterials are roadways that serve trips of moderate length to smaller geographic areas and at a slightly lower level of traffic mobility than Principal Arterials.

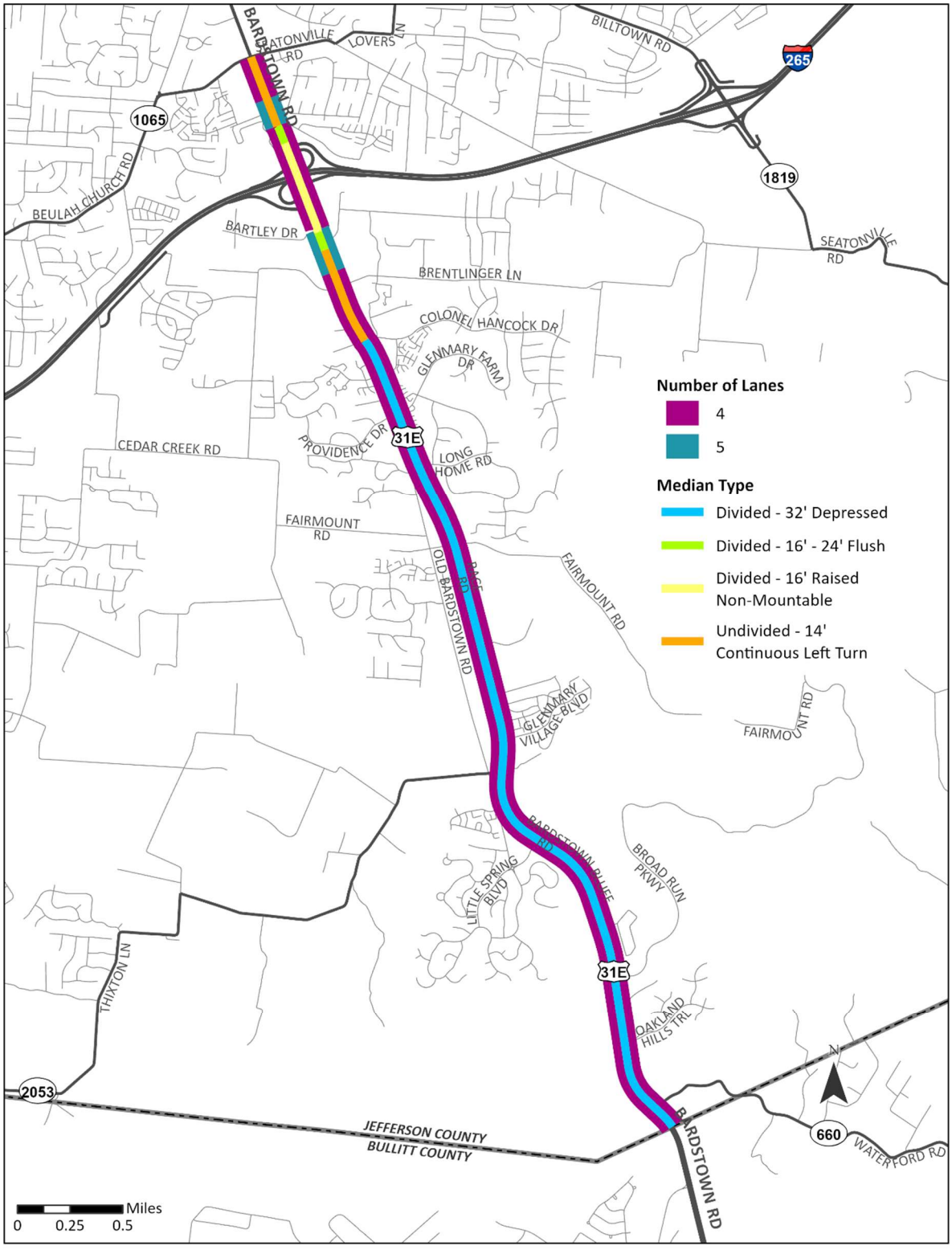
**Typical Section**

Elements that comprise the typical section include the number of lanes, lane width, shoulder width, and median type and width.

- Number of lanes: Primarily four lanes (two per direction) with turn lanes and additional lanes near the I-265 interchange for access.
- Lane width: Twelve-foot lanes entirety of US 31E in the study area.
- Shoulder width: Majority of the corridor has ten-foot shoulders on either side except for two-foot shoulders near the I-265 interchange. The inside shoulder width varies with a maximum of six-foot in the areas with a depressed median.
- Median: Majority of the corridor has a thirty-two-foot depressed median (38-foot if including inside shoulder width). This changes to a fourteen-foot continuous left turn lane north and south of the I-265 interchange and a sixteen-foot raised non-mountable median near the I-265 interchange.

**Figure 6** displays the limits of these typical section elements.

**Figure 6. Roadway Characteristics**



### Horizontal and Vertical Curves

Information for horizontal and vertical curves was extracted from the KYTC HIS database. The A to F letters shown represent a grading scale to allow for easy assessment of a roadway's curves. The designation of "A" represents little to no curvature. The designation of "F" represents significant curvature of the roadway. Curves graded at D or lower typically would benefit from improvements. All horizontal curves within the study area are between grades of A and C.

All vertical curves within the study area have a grade between A and C indicating that all are 4.4% or less. This meets the criteria given in the KYTC Highway Design Guidance Manual for 45-55 mph urban arterials in rolling terrain.

### Structures

Four bridges and four culverts are found on US 31E in the study area:

- Bullitt / Jefferson County Line (MP 5.400) – 27-foot 2 span concrete culvert
- Floyds Fork Bridge Northbound (MP 0.640) – 403-foot 4 span prestressed concrete continuous stringer / multi-beam or girder
- Floyds Fork Bridge Southbound (MP 0.640) – 403-foot 4 span prestressed concrete continuous stringer / multi-beam or girder
- I-265 NB Over Bardstown Road (MP 17.300) – 174-foot single span steel stringer / multi-beam or girder
- I-265 SB Over Bardstown Road (MP 17.280) – 174-foot single span street stringer / multi-beam or Girder
- Bardstown Road Over Tributary to Cedar Creek (MP 5.220) – 25-foot 2 span concrete culvert
- Bardstown Road Over Cedar Creek (MP 5.440) – 37-foot span concrete culvert
- Seatonville Road Over Cedar Creek (MP 11880) – 25-foot 2 span concrete culvert

Of these bridges, the National Bridge Inventory (NBI) inspections listed all in fair condition.

### Freight Network

Through the Surface Transportation Assistance Act of 1982 (STAA), Kentucky established a network of highways on which commercial vehicles with increased dimensions may operate. These STAA vehicles include semi-trucks with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. Freight designations are defined as follows:

- Kentucky Highway Freight Network (KHFN) – a network of state approved routes for truck travel.
- National Truck Network (NTN) – a network of approved state highways and interstate for commercial truck drivers in the United States.
- Weight Class – designates truck weight limits for travel on Kentucky's state-maintained highway system.

US 31E is a Tier 3 on the KHFN, NTN State Designated Truck Route with an 80,000-pound weight class.

### Access Control

US 31E has a dense level of development north of Broadwood Drive / Captain Place primarily consisting of commercial / retail use. South of Broadwood Drive / Captain Place to the Bullitt County line is a mix of residential and commercial / retail use. Access to US 31E is partially controlled from the county line to Hillock Drive / Colonel Hancock Drive, by permit from Hillock Drive / Colonel Hancock Drive to Bartley Drive, and fully controlled from Bartley Drive north through the I-265 interchange.

## 2.2 Vehicular Speeds

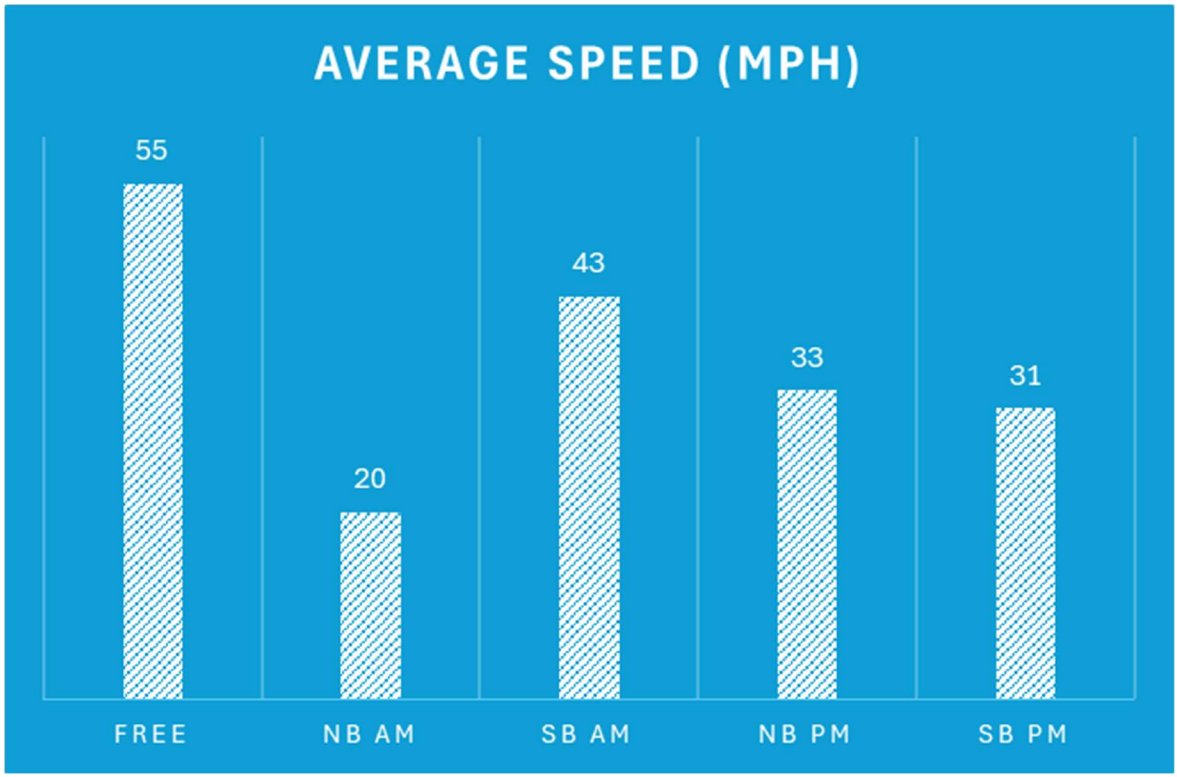
The speed limit is 55 mph from the Bullitt / Jefferson County line (MP 0.000) to Providence Drive / Glenmary Farm Drive (MP 3.676). North of Providence Drive / Glenmary Farm Drive to Beulah Church Road / Seatonville Road the speed limit is 45 mph.

Travel time data was collected to determine speeds during the peak hours as well as for use in calibration of the traffic operations model. The collected data shows reduced travel speeds during both peak periods compared to calculated optimum free flow speeds. **Figure 7** displays average speed and travel time data for both peak periods. **Figure 8** shows the speed distribution for both peak periods.

Additional travel time data was provided by KYTC using HERE Technologies' GPS-based data. The latest data set is for the year 2023. The average 85$^{th}$ Percentile Speed is 52 mph during the AM peak period and 49 mph during PM peak period. The 85$^{th}$ percentile speed is a statistical measure used in traffic engineering to determine the speed at or below which 85% of vehicles travel on a given road segment. It historically has been used to help in setting speed limits.

Vehicular speeds over the posted speed limit have also been documented in crash records. Specifically noted were motorcycles travelling at 95 mph and 120 mph recorded by LIDAR by Mt. Washington Police and Bullitt County Sheriff's Deputy. These were recorded just north of the Bullitt / Jefferson County line.

**Figure 7. Average Speed and Travel Time**



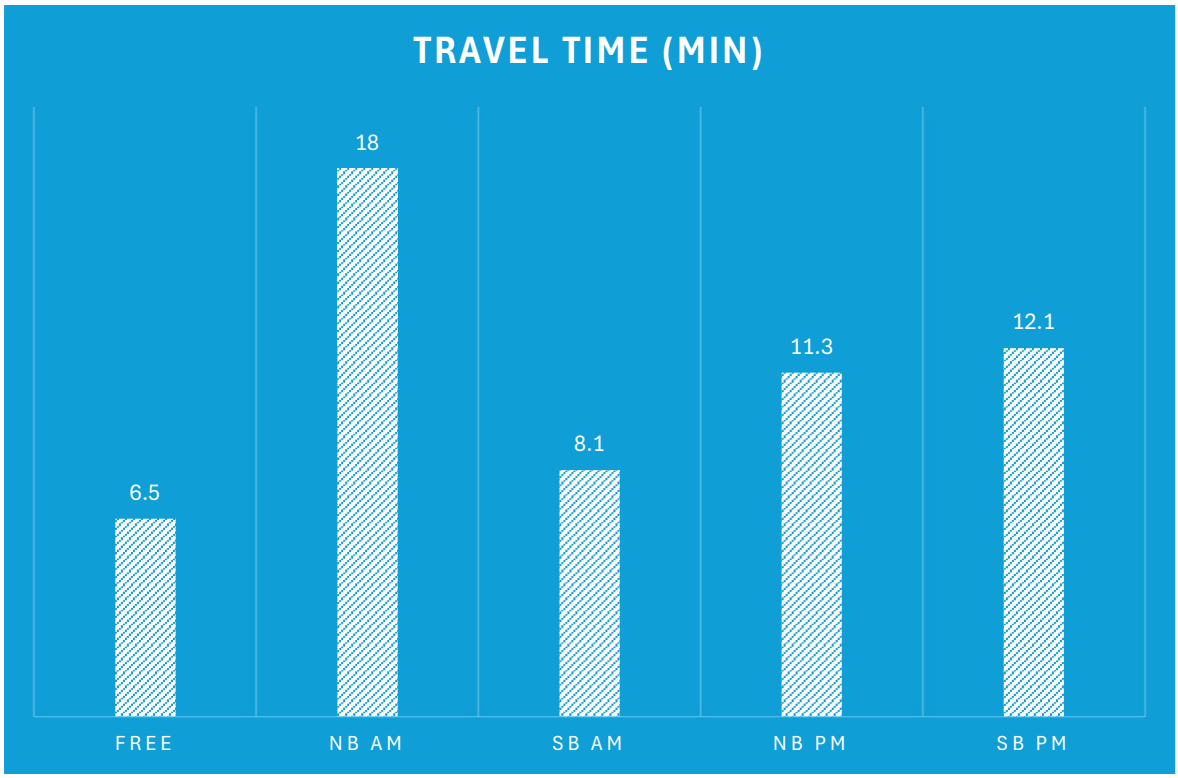
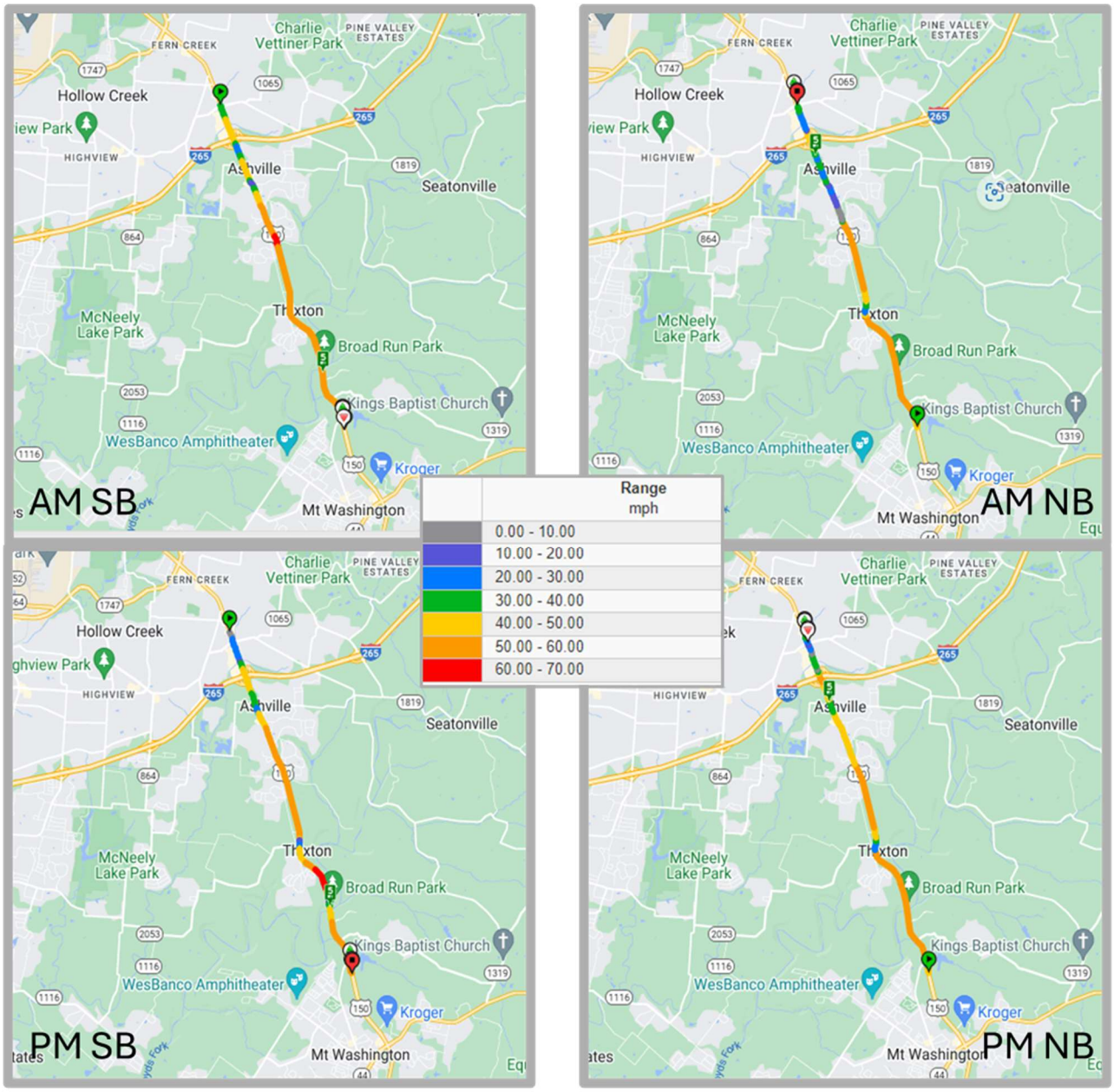



**Figure 8. Speed Distribution**



## 2.3 Existing Traffic Volumes and Operations

Existing year (2024) Annual Average Daily Traffic (AADT) volumes for US 31E and peak hour turning movement volumes for the identified study area intersections are based on multiple sources:

- Hourly traffic counts provided by KYTC
- 2022 Turning Movement Counts for HSIP Safety Study
- 2024 Turning Movement Counts collected for this study

The following table (**Table 1**) displays base year (2024) segment volumes.

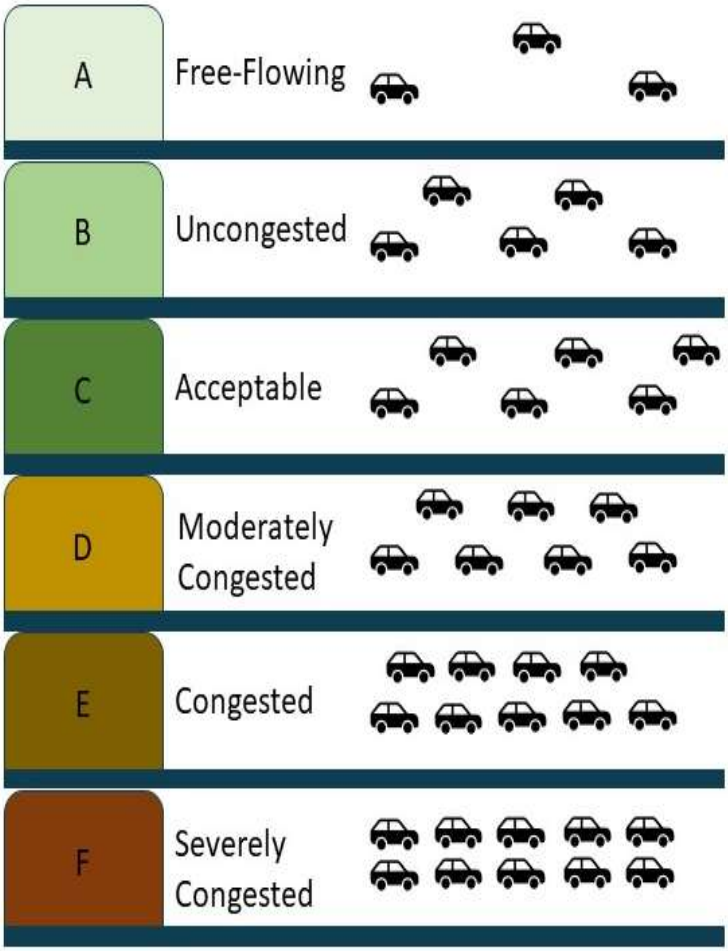
**Table 1. Base Year (2024) Segment Volumes**

| Beginning Description | Ending Description | 2024 AADT |
|---|---|---|
| Bullitt Co. Line (MP 0.000) | KY 2053 (MP 1.946) | 31,520 |
| KY 2053 (MP 1.946) | Fairmount Rd (MP 3.039) | 33,650 |
| Fairmount Rd (MP 3.039) | I-265 (MP 4.771) | 33,390 |
| I-265 (MP 4.771) | KY 1065 (MP 5.549) | 31,910 |

All volumes (including intersection turning movement counts) are included as part of **Appendix A**.

A level of service (LOS) analysis was performed to assess traffic operations for the corridor and intersections using *Synchro 12* based on the *HCM 7th Edition.* LOS is a qualitative measure of determining the operational characteristics of a roadway facility. It is used to define the quality of traffic operations based on measures such as vehicle speed, travel time, comfort and convenience, maneuverability, congestion, and delay. There are six levels of service for each type of facility. The levels are designated by letters, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Acceptable operations for roadways in urban areas are LOS D or better. **Figure 9** presents a graphical depiction of LOS for reference.

**Figure 9. Level of Service (LOS) Designations**




In addition to providing the range of traffic flow according to letter grade, another reported performance measure is seconds of delay. These are provided to illustrate the range in operation within each letter category. Finally, queue lengths are recorded to compare to existing available storage lengths. This allows a comparison to determine if existing turn lane lengths are adequate to capture queues without backing up into travel lanes.

**Table 2** and **Table 3** illustrate the results of the traffic operations analysis (LOS, delay, and queue length) by intersection.

Additional operational data was collected to calibrate the Synchro traffic analysis model. This included travel time runs conducted during during peak hours (AM and PM) in May 2024 and queue lengths at the intersections.

**Table 2. AM Existing (2024) Intersection Operations**

| 2024 Existing - AM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Intersections** | **Milepoint** | **Traffic Control** | **LOS (Average Delay, sec)** | | | | |
| | | | **Overall** | **Northbound** | **Southbound** | **Eastbound** | **Westbound** |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | **B (13.4)** | A (8.6) | A (7.3) | C (26.6) | A (0.0) |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | A (0.0) | B (14.3) | N/A | E (40.5) |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | A (0.0) | B (14.5) | A (0.0) | D (26.0) |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **A (0.4)** | A (0.0) | A (0.0) | A (0.0) | D (50.1) |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | A (0.0) | A (0.0) | C (16.9) | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **B (11.2)** | A (6.4) | B (10.1) | E (68.5) | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | B (13.3) | B (13.3) | N/A | C (21.4) |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | B (10.6) | B (13.2) | C (18.4) | C (15.4) |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | A (0.0) | B (13.7) | E (41.1) | D (31.8) |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **B (13.3)** | B (12.3) | A (0.9) | F (88.9) | E (74.6) |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | B (10.2) | C (15.7) | F (64.9) | E (45.0) |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **C (20.8)** | B (17.4) | A (2.2) | F (111.9) | E (61.6) |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | B (11.2) | C (20.3) | E (47.9) | F (62.1) |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | A (0.0) | C (21.3) | N/A | C (23.0) |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **C (20.3)** | A (5.6) | A (2.7) | F (107.7) | E (68.5) |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (3.1)** | A (1.6) | A (2.5) | N/A | D (49.8) |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **C (21.4)** | A (0.3) | A (0.4) | E (78.0) | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **B (17.1)** | A (0.7) | A (0.2) | N/A | E (79.1) |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **B (13.5)** | A (7.7) | A (0.8) | F (87.1) | F (101.1) |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **A (7.6)** | A (3.5) | A (0.4) | F (81.1) | F (90.4) |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **C (27.8)** | B (16.4) | A (4.8) | F (80.8) | F (100.4) |
| **Note: For TWSC (Two-Way Stop Controlled) intersections, the LOS and delay shown for the mainline US 31E northbound and southbound approaches is for the left turning movement only since the through movement experiences no delay.** | | | | | | | |

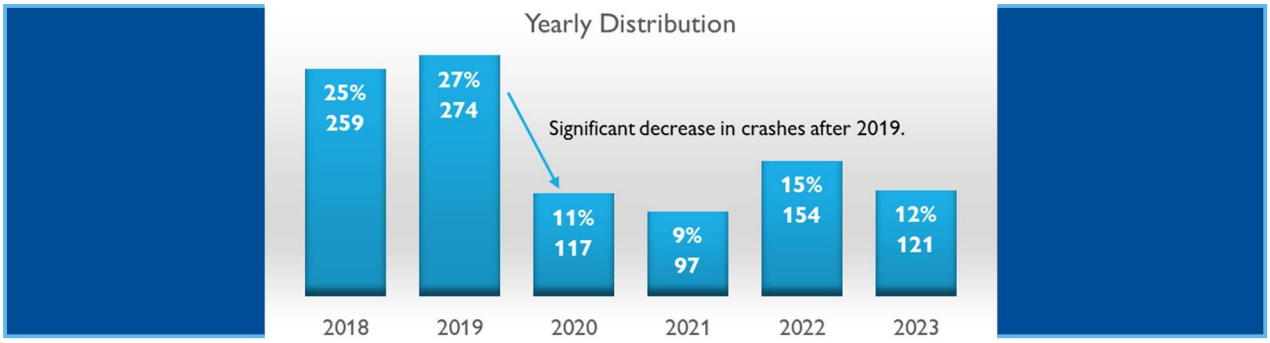
**Table 3. PM Existing (2024) Intersection Operations**

| 2024 Existing - PM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Intersections** | **Milepoint** | **Traffic Control** | **LOS (Average Delay, sec)** | | | | |
| | | | **Overall** | **Northbound** | **Southbound** | **Eastbound** | **Westbound** |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | **C (32.2)** | A (5.2) | D (38.8) | E (61.0) | A (0.0) |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | A (0.0) | B (13.3) | N/A | D (31.2) |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | A (0.0) | B (12.2) | A (0.0) | D (33.4) |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **A (3.1)** | A (0.0) | A (0.0) | A (0.0) | E (79.4) |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | D (25.8) | A (0.0) | F (102.6) | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **D (42.9)** | B (14.7) | C (28.2) | F (242.4) | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | A (0.0) | B (12.3) | N/A | C (22.9) |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | C (20.6) | B (11.8) | F (266.5) | F (101.0) |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | A (0.0) | B (12.6) | F (528.5) | F (50.9) |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **B (12.6)** | B (11.1) | A (4.8) | F (125.9) | F (97.7) |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | C (22.5) | B (14.1) | F (328.7) | F (130.6) |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **C (22.9)** | A (2.8) | A (3.4) | F (400.3) | F (97.1) |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | D (27.3) | C (15.7) | F (679.1) | E (46.3) |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | A (0.0) | C (16.2) | N/A | F (52.3) |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **C (25.8)** | A (1.7) | A (6.0) | F (110.5) | F (174.3) |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (4.9)** | A (0.2) | A (4.3) | N/A | F (116.9) |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **D (49.6)** | A (0.5) | C (32.1) | F (103.9) | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **C (23.9)** | B (17.7) | A (0.5) | N/A | E (59.7) |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **C (31.0)** | B (14.4) | D (36.6) | E (74.8) | F (86.6) |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **D (45.7)** | B (18.0) | A (3.2) | E (67.0) | F (609.7) |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **E (60.7)** | B (10.2) | F (83.7) | E (71.7) | F (139.0) |
| **Note: For TWSC (Two-Way Stop Controlled) intersections, the LOS and delay shown for the mainline US 31E northbound and southbound approaches is for the left turning movement only since the through movement experiences no delay.** | | | | | | | |

## 2.4 Safety Analysis

As part of this study, historical crash data was analyzed to identify locations along US 31E in the study area that could be considered high crash locations. Historical crash records were extracted from the Kentucky State Police's (KSP) *Collision Database* for a six-year period (January 1, 2018 – December 31, 2023). Typically, five years of crash data is used to identify trends. An additional year was collected for this study due to a noticeable decrease in the number of crashes per year between 2019 and 2020 (see **Figure 10**). The analysis period includes the COVID pandemic which may be a factor in the change in crash distribution. A crash heat map is included as **Figure 11** to visually represent the frequency of crashes along the corridor for this period.

**Figure 10. Yearly Distribution of Crashes**




Other trends in crash locations, severity and manner of collision were examined with summaries shown in **Figure 12** and **Figure 13**. Additional information on crash trends is included in **Appendix B**. Crash severities are classified based on the Modal Minimum Uniform Crash Criteria (MMUCC), 4th Edition.

- K – Fatal Injury: indicates a person was killed as a result of the collision and died within 30 days of the collision.
- A – Suspected Serious Injury: any non-fatal injury which prevents the person from walking, driving, or normally continuing the activities he / she could perform prior to the collision and does require medical attention. Includes severe lacerations, broken limbs, skull fracture, internal injuries, unconsciousness when leaving the scene, or inability to leave scene without assistance.
- B – Suspected Minor Injury: evident to observers at the collision scene such as minor lacerations, bruises, and abrasions.
- C – Possible Injury: claim of injury and / or pain that is not evident to the eye. Includes momentary unconsciousness, limping, nausea, and hysteria.
- O – No Apparent Injury: property damage only.

Statistical analysis was performed based on methods that compare existing crash rates with crash rates of similar types of facilities. Excess Expected Crashes (EEC) is a statistical model to calculate crash distributions based on AASHTO Highway Safety Manual (HSM) procedures. This method allows for the ability to estimate the frequency of crashes based on differences in roadway characteristics such as geometry, lane/shoulder/median configurations, AADT, length, functional classification, and traffic control. A positive EEC value indicates more crashes are occurring than expected in a segment. A negative EEC value indicates fewer crashes are occurring than expected in a segment. Once established, EEC values can be categorized by Level of Service of Safety (LOSS). LOSS ranges from LOSS 1 to LOSS 4. LOSS 1 indicates substantially better safety performance and a low potential for crash reduction. LOSS 4 indicates a substantially worse than expected safety performance and a high potential for crash reduction. Displayed on **Figure 14** are LOSS 3 and 4 segments and intersections which is indicative of areas for good potential for crash reduction.

**Figure 11. Heat Map – All Crashes**

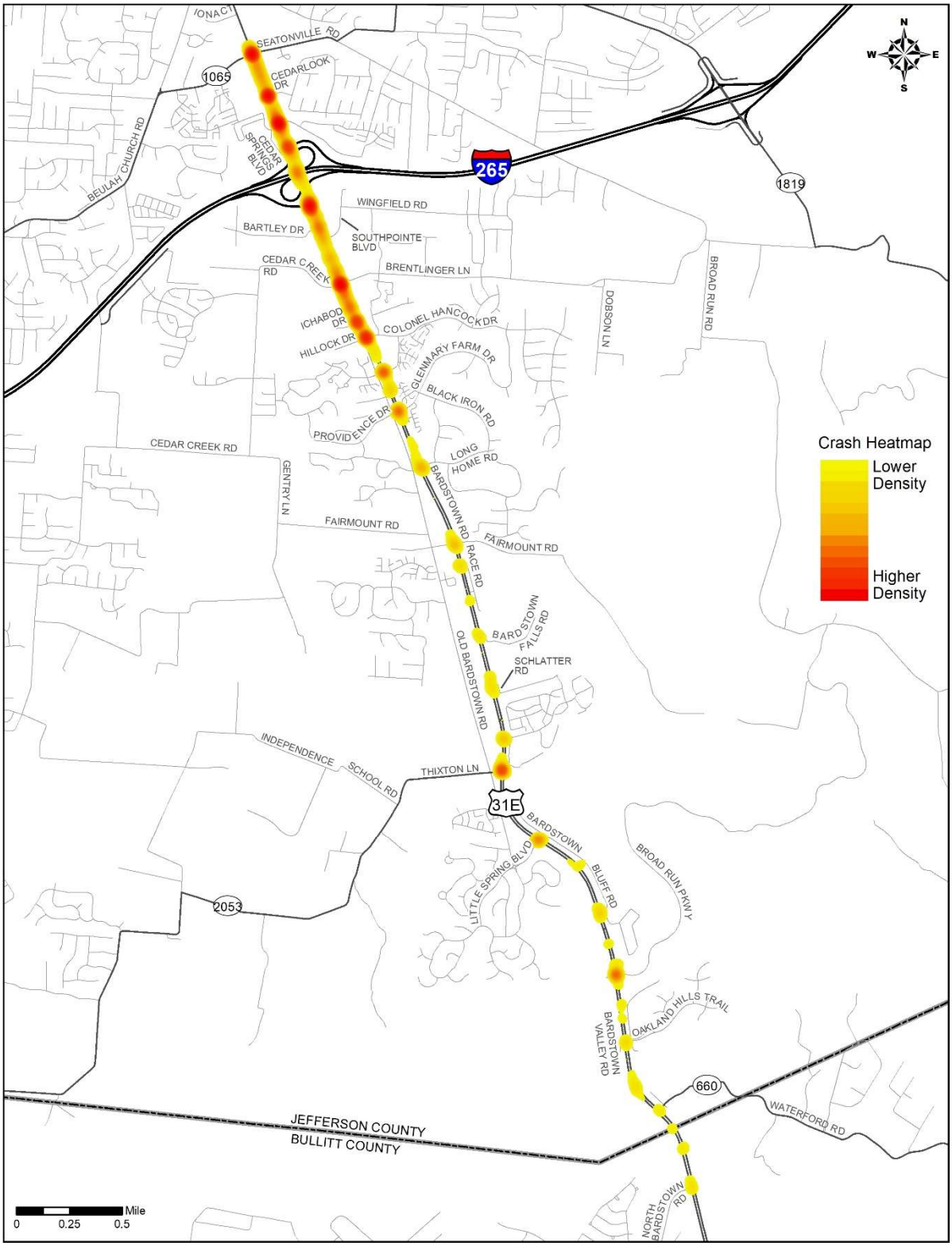


**Figure 12. Manner of Collision for KAB Collisions**

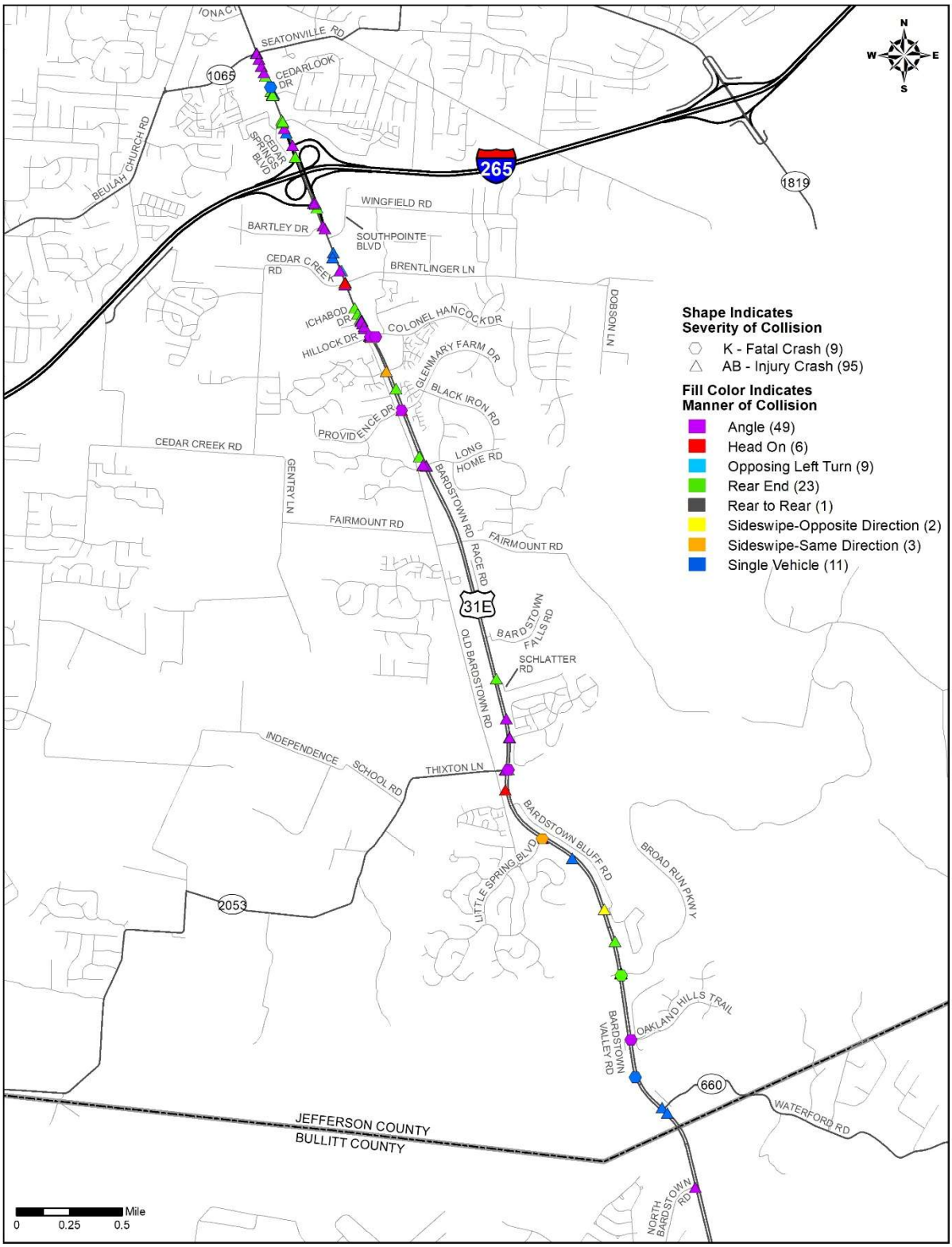


**Figure 13. Manner of Collision for CO Collisions**

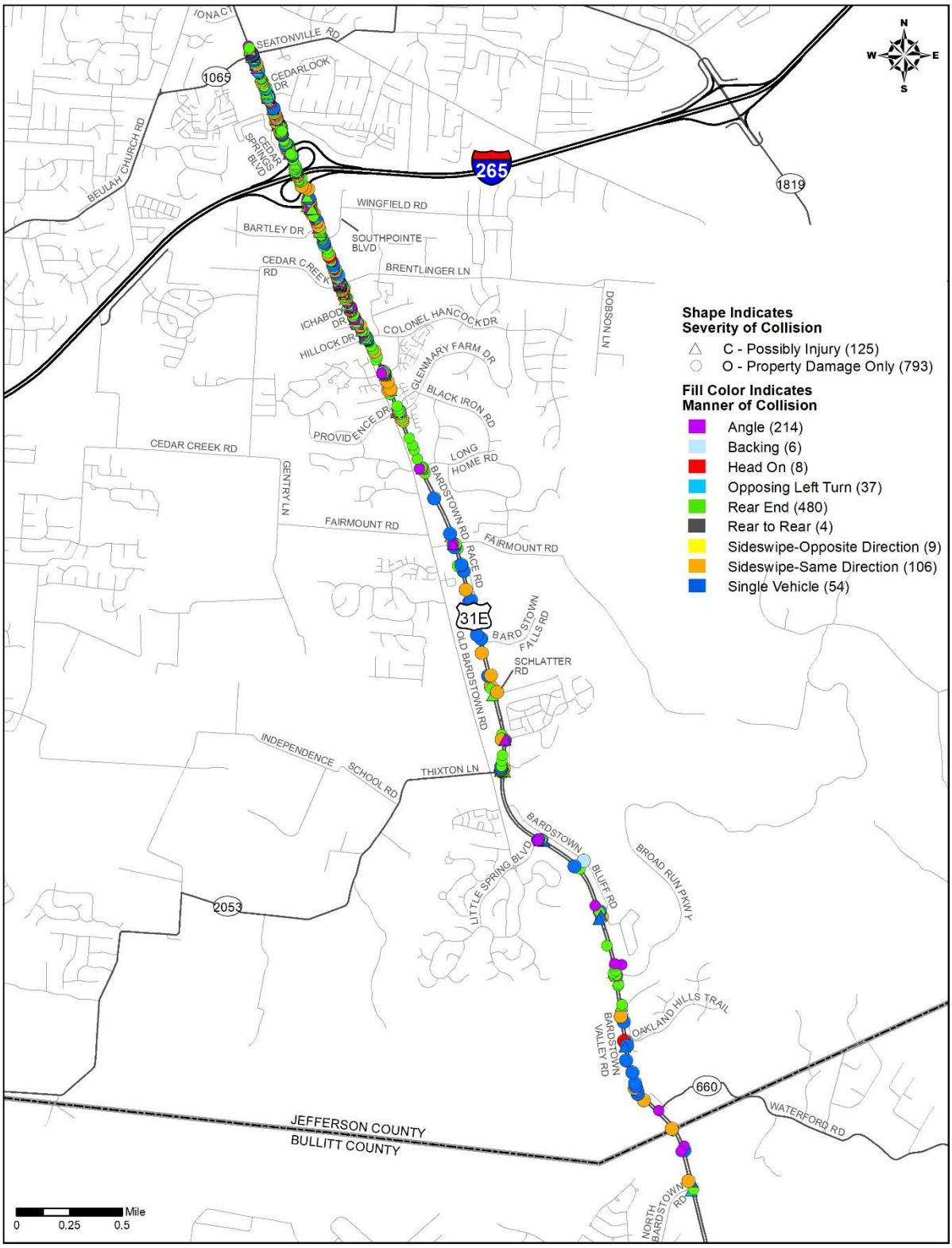
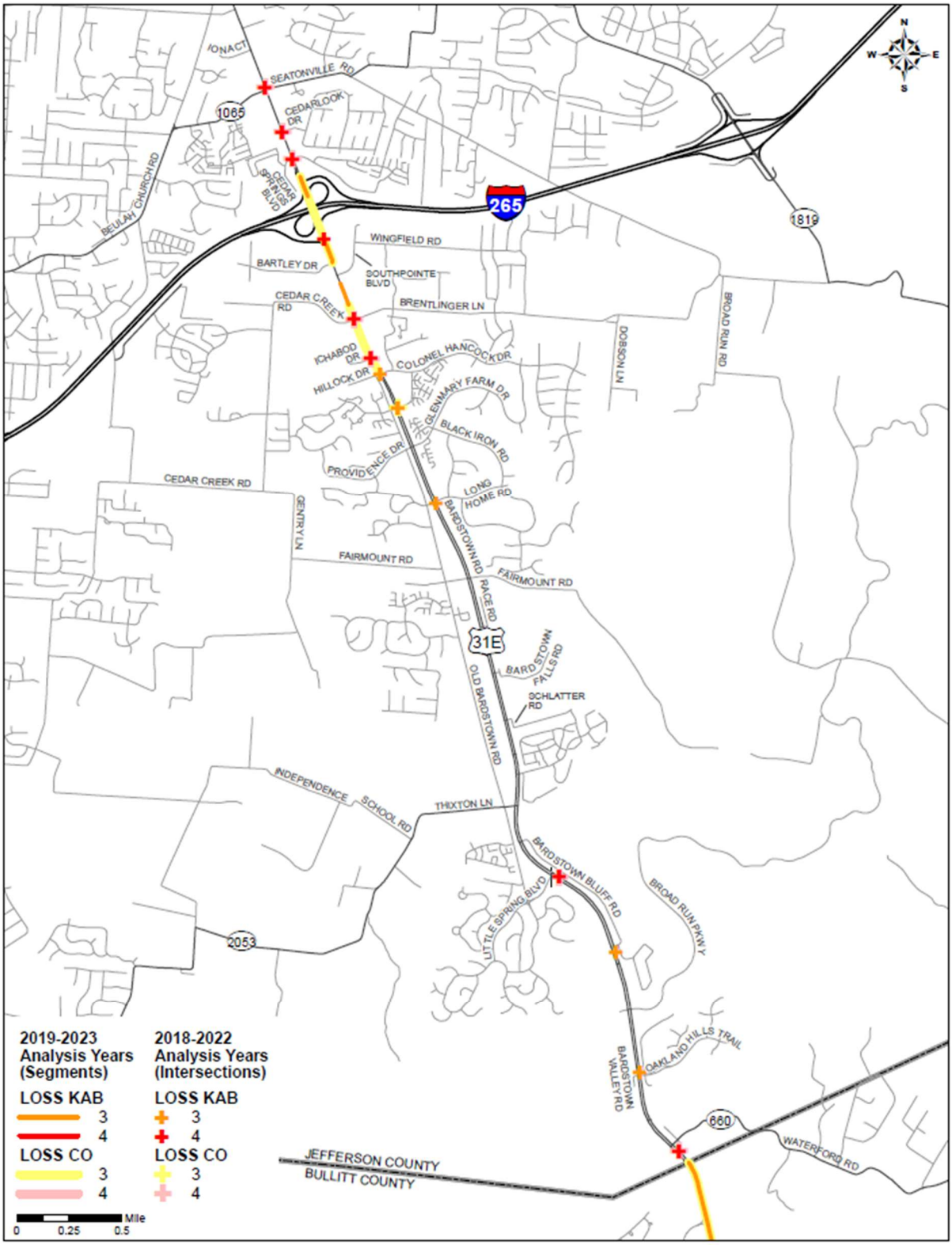


**Figure 14. Level of Service of Safety**



## 2.5 Bicycle and Pedestrian Accommodations

KYTC adopted a Complete Streets Policy in September 2022. A complete street is a street, road, or highway that is safe and accommodating for all expected users. The intent of the Policy is to promote the inclusion of Complete Streets design and multimodal access in all transportation activities at the local, regional, and statewide levels, and to develop a comprehensive, integrated and connected transportation network focused on the safety of all users.

Strava is a social network application for exercise that records activities and allows the user to share them with friends and followers. Data from Strava is available which shows a record of a user's activity for either biking or walking and displayed as a heat map. **Figure 15** is a heat map of user activity showing where people actively walk as recorded through the Strava app. **Figure 16** shows user activity where people actively bike as recorded through the Strava app. A lighter color indicates more activity.

**Figure 15. Strava Pedestrian Data**

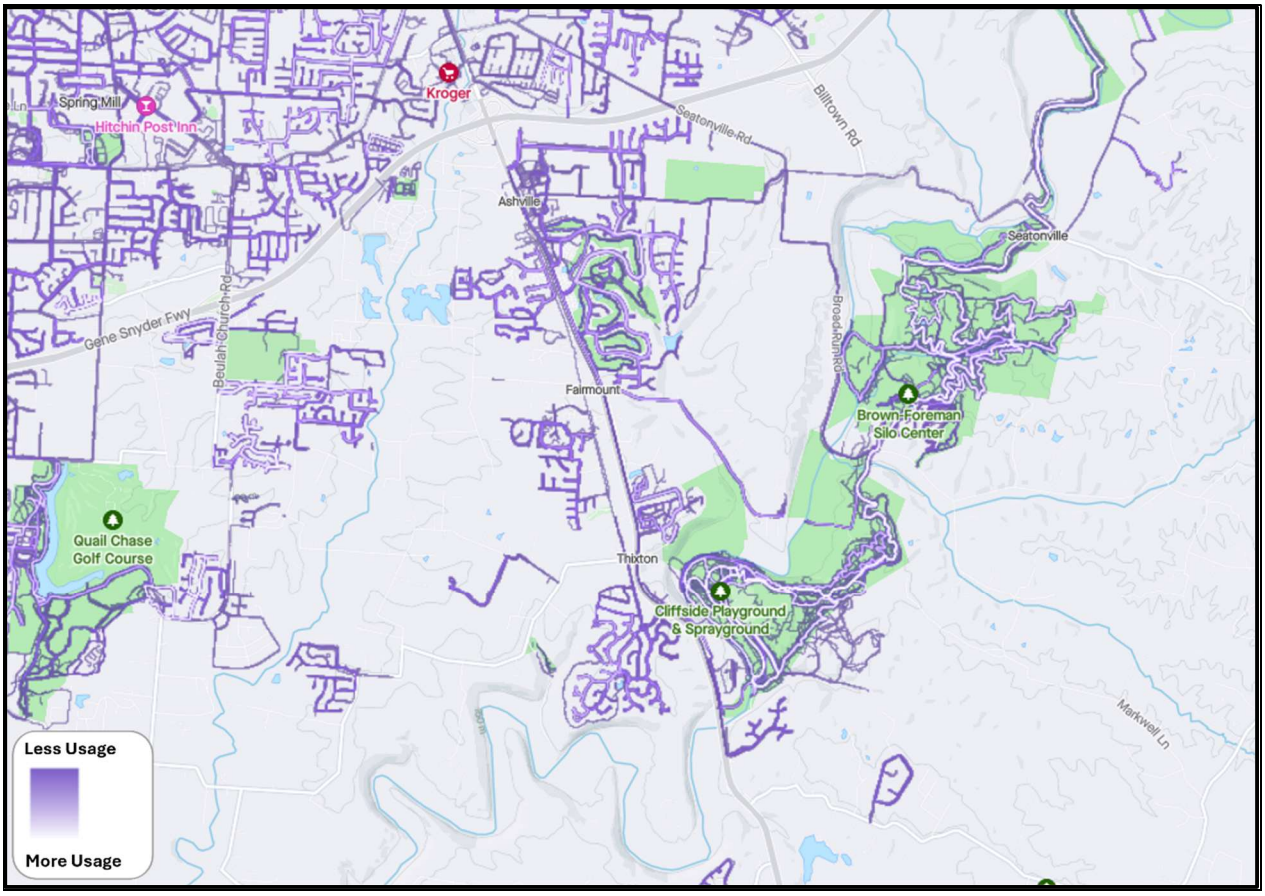
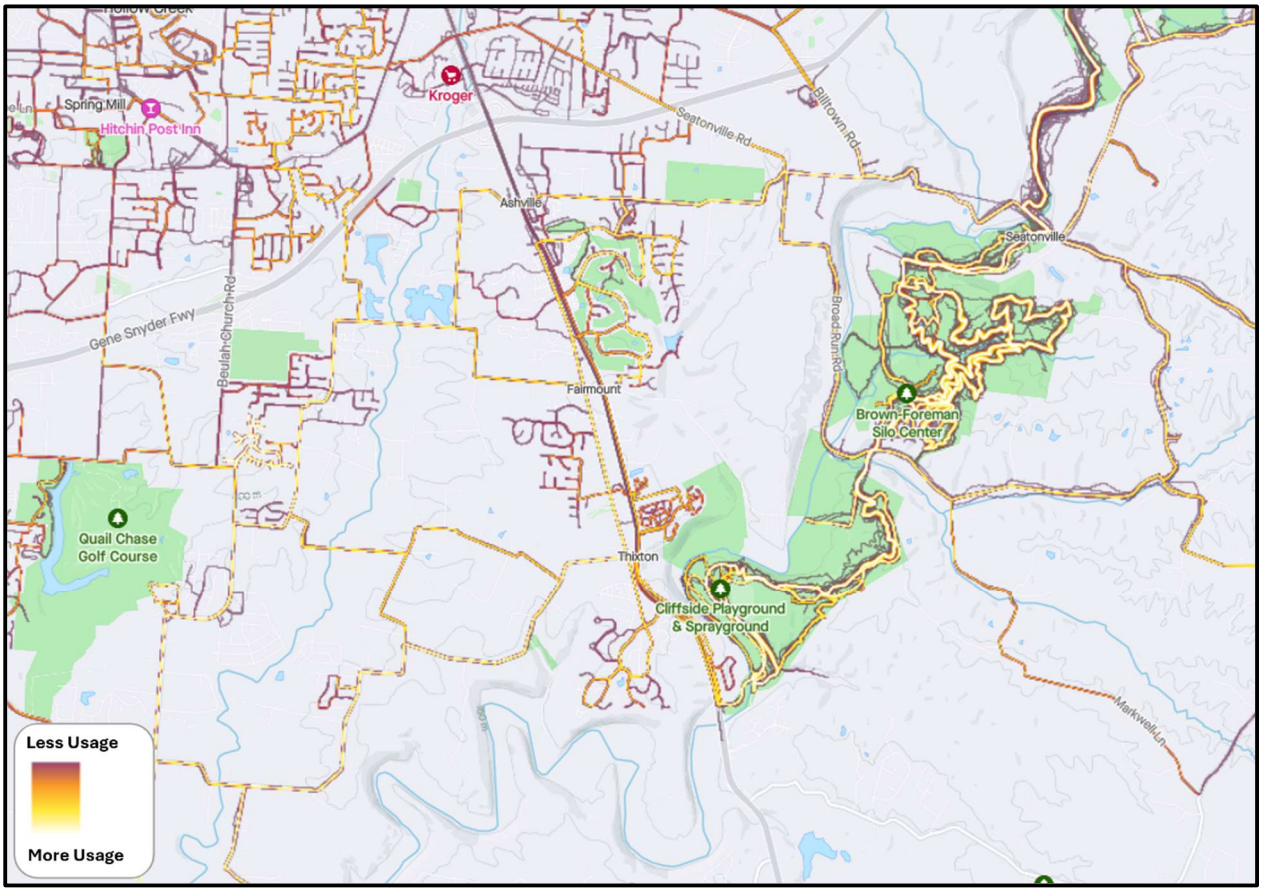
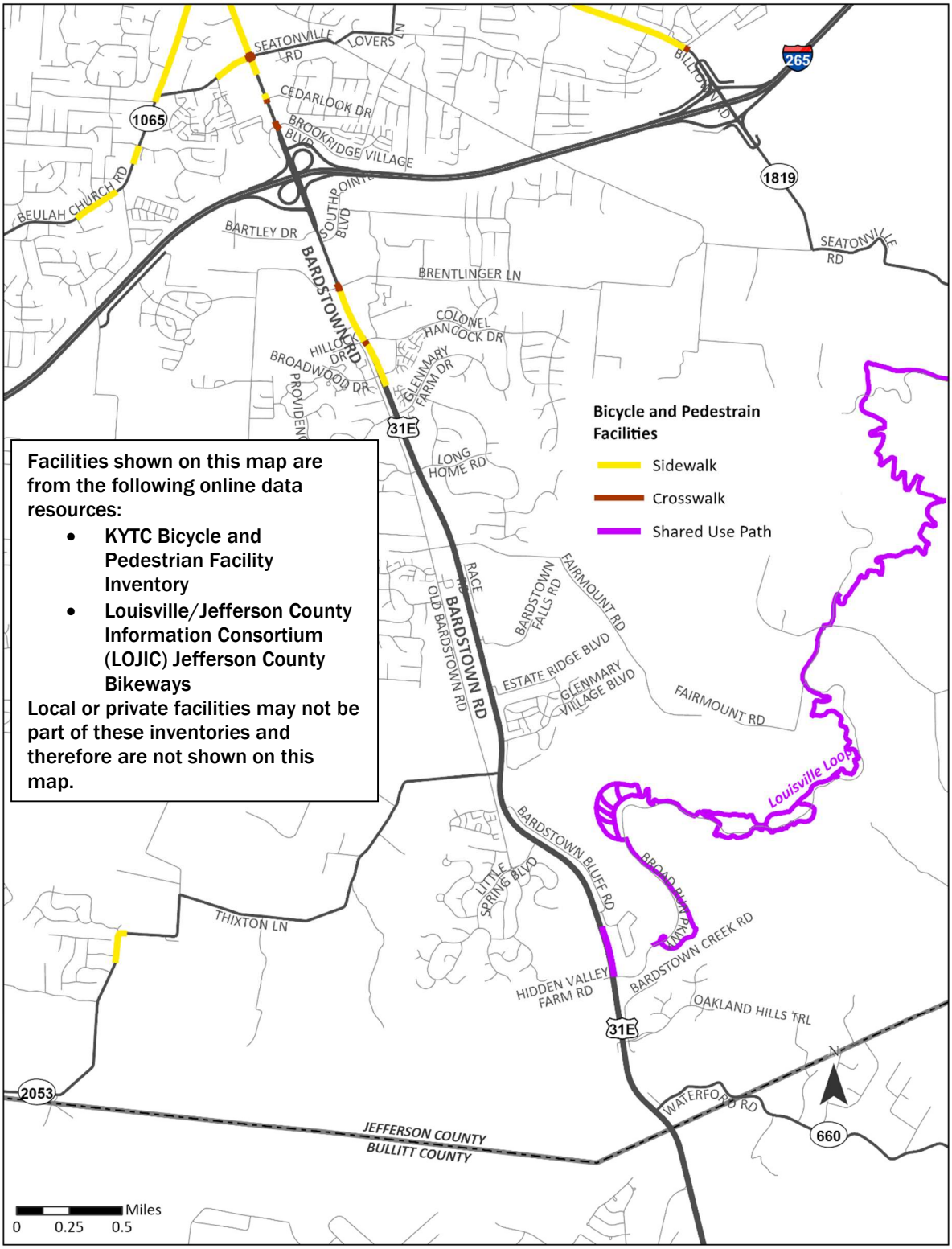


**Figure 16. Strava Bicycle Data**




Residential neighborhoods and Broad Run Park / Floyds Fork recreational areas show more pedestrian and bicycle activity where there are sidewalks and / or bike accommodations. A map of the study area depicting existing facilities is included as **Figure 17**. Along the US 31E corridor, there are only three segments of sidewalk or shared use path. Opportunities to expand the network / provide connectivity will be explored as part of this study.

**Figure 17. Existing Bicycle and Pedestrian Accommodations**



# 2.6 Transit

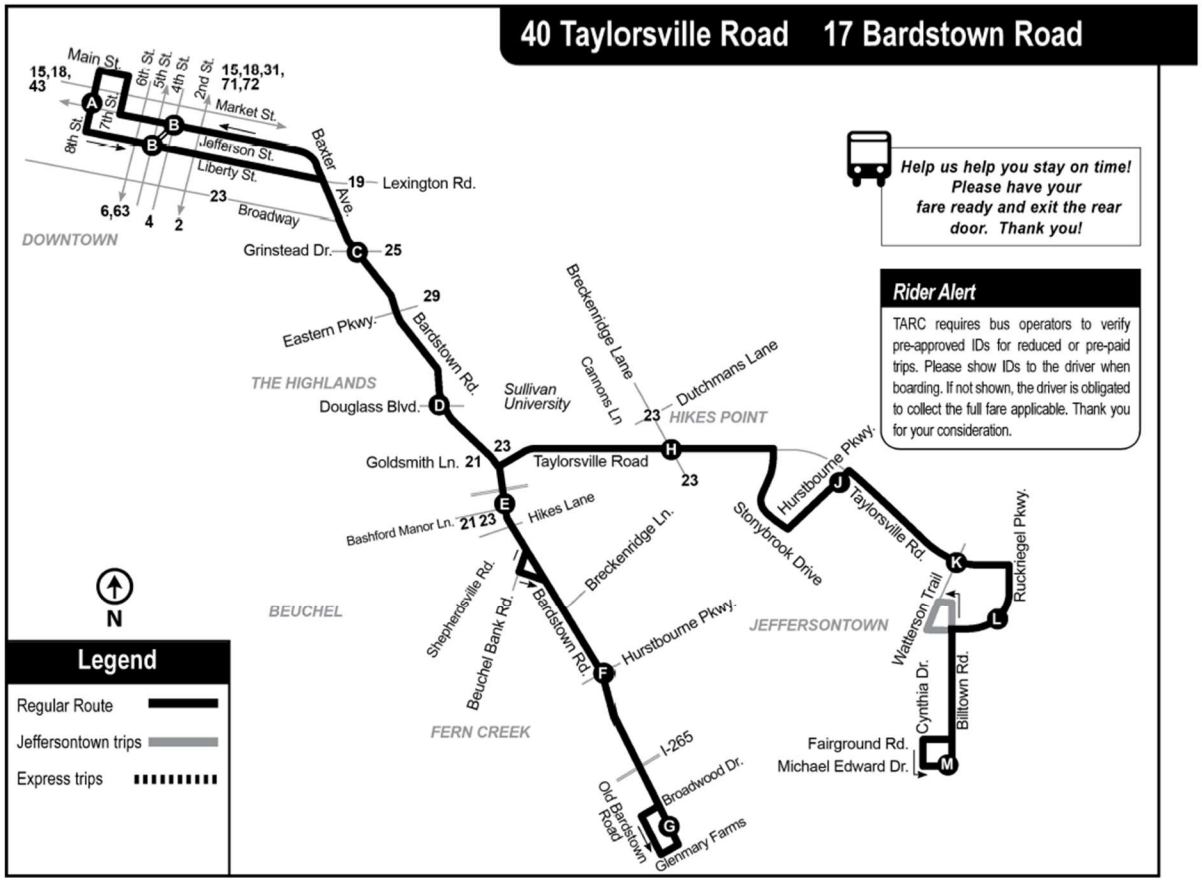
**Service Provider**

The Transit Authority of River City (TARC), the transit service provider in the Louisville region operates one fixed transit service route in the project's study area. Route 17, Bardstown Road, operates in the study area and provides a crosstown fixed route service connecting downtown Louisville to the Bardstown Road corridor, and southward to the Fern Creek area. The route starts in downtown Louisville at 8th Street and Main Street and heads south and east terminating at Old Bardstown Road and Providence Drive south of the Gene Snyder Freeway (I-265).

**Route Map**

A route map is included as **Figure 18**, depicting the route starting in downtown Louisville and traveling east and south along Bardstown Road, terminating past I-265 in the Glenmary Farm area. The 17 Express, which formerly connected downtown and the south part of the study area with express service was discontinued by TARC in August 2023. Note that only the far end of the route just north of the line depicting I-265 south to Glenmary Farms is within the project's study area. This covers a fraction of the entire route.

**Figure 18. Route Map**




**Operations**

The route operates seven days per week from 5:47 AM to 11:19 PM, Monday through Friday for a service span of approcximately 18.5 hours. Weekday headways are generally 30 minutes during the peaks, tapering off to near hourly service midday. There are 18 eastbound (outbound) and 20 westbound (inbound) trips weekdays.

On weekends and holidays, the service starts at 6:01 AM and runs until 10:29 PM, an almost 16.5 hour service span. Headways for these days of service are 60 minutes for the first few AM trips,

then increasing to 90 minutes thereafter through the evening and termination of service. There are 11 trips each for both eastbound and westbound for weekend and holidays.

On time performance (OTP), or how closely bus arrivals at a given stop or time point matches the schedule was provided by TARC. Generally, on time performance is influenced by the traffic the bus operates in, the boarding and aligthing of passengers at stops, and the weather. OTP generally ranges by day, time of the run, and by stop points along the route as well. OTP according to TARC is as low as 46.2% near the south end of the route, to a high of 68.8% in the downtown portion. TARC's OTP goal for all routes is 80%.

### Ridership

According to TARC's Comprehensive Operations Analysis (COA), completed in May 2021, ridership on the route peaked in 2019 with 174,872 yearly riders. Like many routes in the system, ridership plummeted in 2020 due to the COVID pandemic, resulting in a 62% decrease in annual riders, falling to 66,781. The ridership has struggled to return to pre-pandemic levels. Most recent ridership levels are 124,732 trips annually observed in 2023, which is an increase over pandemic levels but still 50,000 fewer trips when compared to 2019's pre pandemic peak.

Overall, ridership at the stop level tends to be fairly modest in the study area. Data provided by TARC from August 2023 to January 2024 from sampled on-board observations typically depicts less than three stop level activities (boardings/alightings) for most of the bus stops in the study area during the observed runs/trips. The only exception to that is for a Saturday service trip observation at Bardstown Road and Brookridge Village which had 13 activities observed. These trips are likely assocaited with shopping at the nearby Walmart supercenter and perhaps the adjacent shopping center anchored by a Kroger.

### Typical Stops and Amenities

TARC has a Transit Design Standards Manual†† that contains among other things, policy and guidance to place bus stops in the safest location as possible at the intersection or mid-block given the adjacent land use, the local streets, the potential stop location(s), and the volumes of passenger activities at each stop. Bus stop design criteria is also part of the manual as well, and this includes the types and placement of amenities at the stops. Typically, the more passenger activity, the more amenities that are included and vice versa. Criteria, according to the manual cited above which dictates what stops get what amenities include:

- Number of daily boardings and transfers at stop
- Mobility needs
- Stop potential
- Long wait times in between a scheduled stop (headway is 30 minutes or more)
- Isolated development or unfavorable landscape/ environmental conditions
- TARC bus operator or passenger recommendations

Amenities usually include a pad, a shelter, a bench, a trash can, and landscaping, or some combination thereof. Field observations of stops in both directions reveal that the stops in study area vary by type, location and what amenities they have. Some are just a TARC stop sign and pole, while others have a pad, a bench and a trash can. No stops were observed to have a shelter. Representative pictures along the corridor that depict some of the typical stop situations in the study area are included in **Appendix C**.

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†† https://www.ridetarc.org/wp-content/uploads/2022/07/Transit-Design-Standards-Manual.pdf

**Future Plans**

TARC revealed that there were no plans to make upgrades to stops or other infrastructure in the study area. This is largely due to low passenger volumes. As far as service goes, TARC is currently examining all its routes and may make decisions in the future to cut service as it is currently facing a substantial funding obstacle in FY 2025.

MOVE Louisville had made recommendations to use a portion of US 31E for a crosstown express route, but that was never implemented, and likely will not be in the short term given the current funding situation.

**APPENDIX C** includes the following supplemental transit information:

- Photos
- Data tables depicting the stop activity data from observations as provided by TARC

## 2.7 Intelligent Transportation Systems

According to Kentucky Transportation Cabinet (KYTC), the only Intelligent Transportation Systems (ITS) related improvement(s) is upgrading the detection at the signalized intersections on US 31E between the Bullitt/Jefferson County line and I-265. The Transportation System Management and Operations (TSMO) program is still identifying funding and expects completion in FY 2024/2025. Details include:

- Upgrading 24 controllers to 2070s
- Deploying 24 wireless communication routers
- Installing 27 quad-view cameras
- Installing radar detection at 27 signalized intersections

Beyond the ITS improvements, a KYTC Highway Safety Improvement Program (HSIP) project (MP 3.028 – 5.561) has recommended several improvements along the corridor. Those improvements include:

- Wavetronix detection within the project limits
- Signal design / signal rebuilds coordinated with KYTC Central Office traffic
- Signing review and potential removal of some panel signs and upgrades to others in the area

There appear to be no other planned or committed ITS / TSMO projects beyond those discussed above.

# Chapter 3 – Environmental Overview

An Environmental Overview was conducted to identify resources and potential issues for consideration during the development of improvement concepts. Natural and human environmental resources were identified from a literature/database review. Study area environmental resources are summarized in the following sections (and on **Figure 19**) with supplemental mapping and resources included in **Appendix D**.

## 3.1 Natural Environment

**Streams and Wetlands**

The Kentucky Division of Water (KDOW) Water Maps portal was reviewed. Water resources intersect the study area. From north to south, named streams include Cedar Creek, Floyds Fork, and Old Mans Run. Several unnamed tributaries also intersect US 31E. According to the Louisville Metropolitan Sewer District (MSD), Floyds Fork is the least environmentally compromised watershed in the county. It is also the largest watershed in the county, running for 30 miles and draining approximately 122 square miles.

The National Wetlands Inventory map shows wetlands and ponds are adjacent to the study corridor. According to KDOW online mapping, no special use waters or source water protection areas were identified.

Impacts to jurisdictional waters of the U.S. require permit coordination with the U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), and/or Kentucky Division of Water (KDOW), depending on the scale of the water resource and potential disturbance.

**Floodplains**

The Federal Emergency Management Agency (FEMA) Flood Map Service Center was reviewed to identify floodplains in the study area. The 100-year floodplain intersects the study corridor at Cedar Creek, Floyds Fork, and Old Mans Run. Any future project should consult with the local floodplain coordinator for any transportation improvements that cross the 100-year floodplain. A floodplain permit may also be required.

**Critical and Endangered Species**

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation database of federally protected species—listed as endangered or threatened under the Endangered Species Act—was reviewed. Species listing status are shown in **Table 4**, including candidate species as they could potentially be listed prior to construction of any future projects.

**Figure 19. Environmental Features**

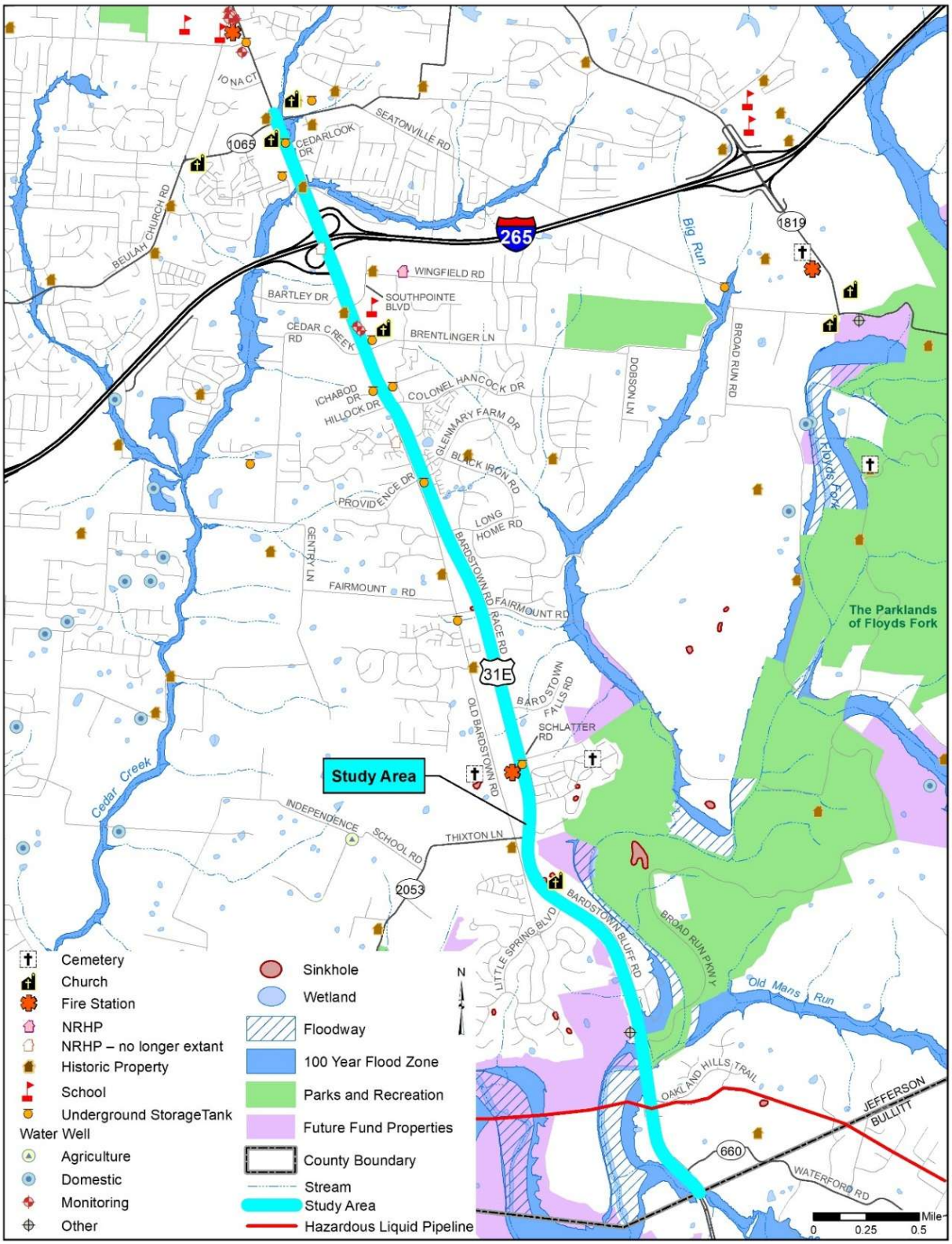


**Table 4. Listed Threatened / Endangered Species**

| Group | Name | Scientific Name | Status |
|---|---|---|---|
| **Mammals** | Gray Bat | Myotis grisescens | Endangered |
| **Mammals** | Indiana Bat | Myotis sodalist | Endangered |
| **Mammals** | Northern Long-eared Bat | Myotis septentrionalis | Endangered |
| **Mammals** | Tricolored Bat | Perimyotis subflavus | Proposed Endangered |
| **Clams** | Clubshell | Pleurobema clava | Endangered |
| **Clams** | Fanshell | Cyprogenia stegaria | Endangered |
| **Clams** | Orangefoot Pimpleback | Plethobasus cooperianus | Endangered |
| **Clams** | Pink Mucket | Lampsillis abrupta | Endangered |
| **Clams** | Rabbitsfoot | Quadrula cylindrica cylindrica | Threatened |
| **Clams** | Ring Pink | Obovaria retusa | Endangered |
| **Clams** | Salamander Mussel | Simpsonaias ambigua | Proposed Endangered |
| **Insects** | Monarch Butterfly | Danaus plexippus | Candidate |
| **Plants** | Kentucky Glade Cress | Leavenworthia exigua laciniata | Threatened |
| **Birds** | Whooping Crane | Grus americana | Experimental Population, Non-essential candidate |

While the whooping crane is listed as an endangered species, its status is Experimental Population, Non-Essential in Kentucky, meaning it is not essential for the continued existence of the species. In accordance with 50 CFR 17, since the study area is not in a National Wildlife Refuge or National Park, the crane is treated as a species proposed for listing. Species proposed for listing are not protected by the "take" prohibitions of Section 9 of the Endangered Species Act of 1973 (ESA). There is no designated critical habitat within the study area. A habitat assessment should be completed in the early stages of project development for future project(s) to assess potential project impact to threatened and endangered species. Projects that occur within an area of known bat habitat would require project-specific evaluation to assess appropriate minimization/mitigation measures. For other federally listed species, specific ecological surveys may be required for projects that have the potential to impact habitat. Coordination with the USFWS Kentucky Field Office would be necessary to determine the need for future project-specific surveys.

**Geology**

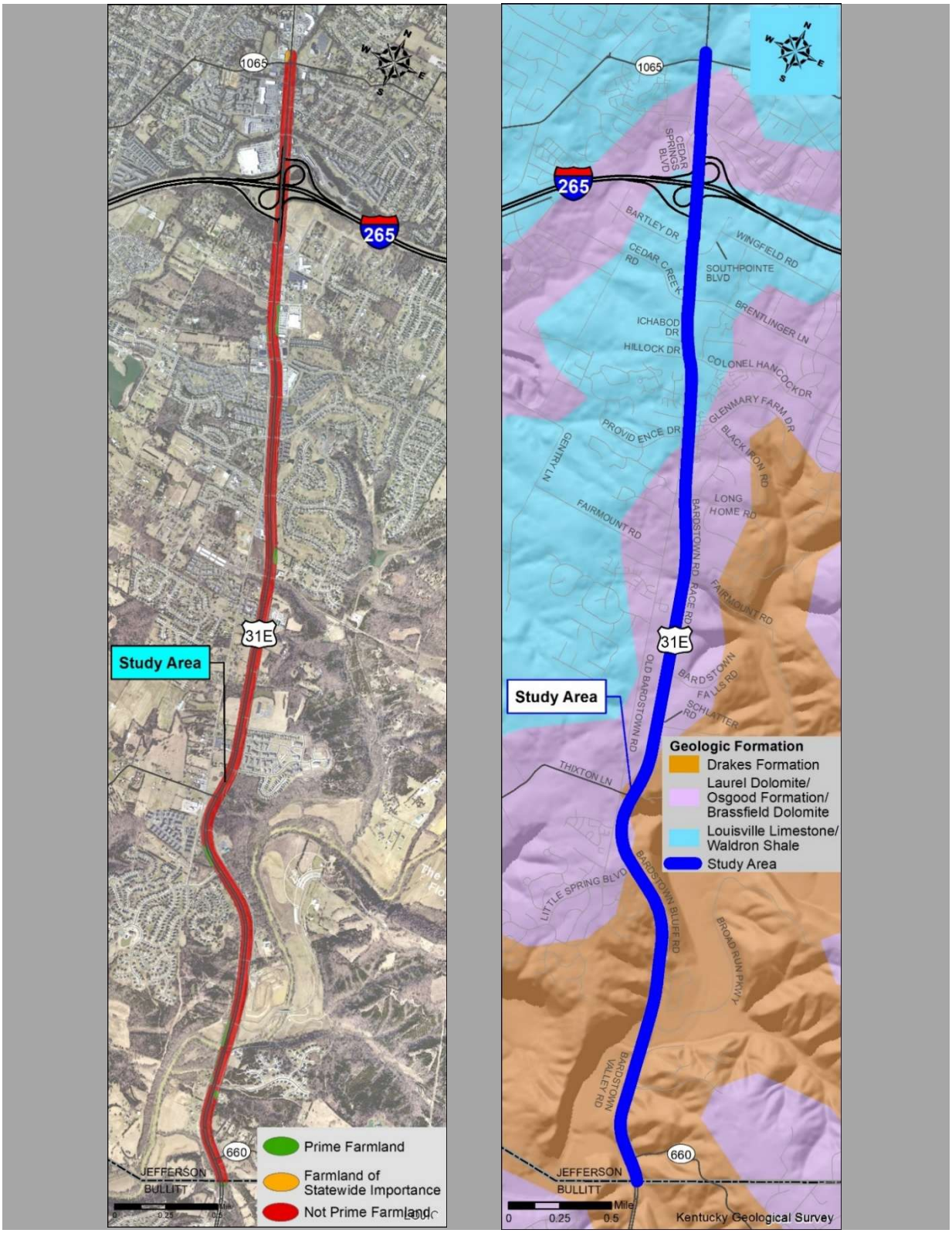
The project area is in the Outer Bluegrass Physiographic Region, which is typically characterized by low to moderate relief soils that range from thick over limestone to thin over shale.

The northern portion of the study corridor is in the Jefferson County Limestone Belt Physiographic Region. The limestone bedrock combined with the gentle topography and multiple creeks has historically made this region ideal for agriculture. However, review of the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey shows nearly all the land within the study corridor is not classified as prime farmland. NRCS farmland soil classifications are shown in **Figure 20**.

The southern portion of the study corridor is in the Jefferson County Floyds Fork Physiographic Region, which is characterized by many creeks and the oldest exposed bedrock in the county. According to the Kentucky Geological Survey (KGS), most of the corridor either overlays Waldron Shale and Louisville Limestone and has intense karst potential or overlays Laurel Dolomite, Osgood Formation, and Brassfield Dolomite and is karst prone. From about KY 2053 south to the county

line, it overlays Drakes Formation and has no karst potential. Some sinkholes are mapped near the Floyds Fork area. Geological formations are included in **Figure 20**.

**Figure 20. NRCS Farmland Soils and Geological Formations**



## 3.2 Human Environment

The human environment includes people and the resources they define: land use, community features, cultural historic resources, pollution (hazardous materials, air quality, noise), etc. Each could potentially be impacted by any future projects and are identified in the following sections for consideration during the project development process.

### Land Use

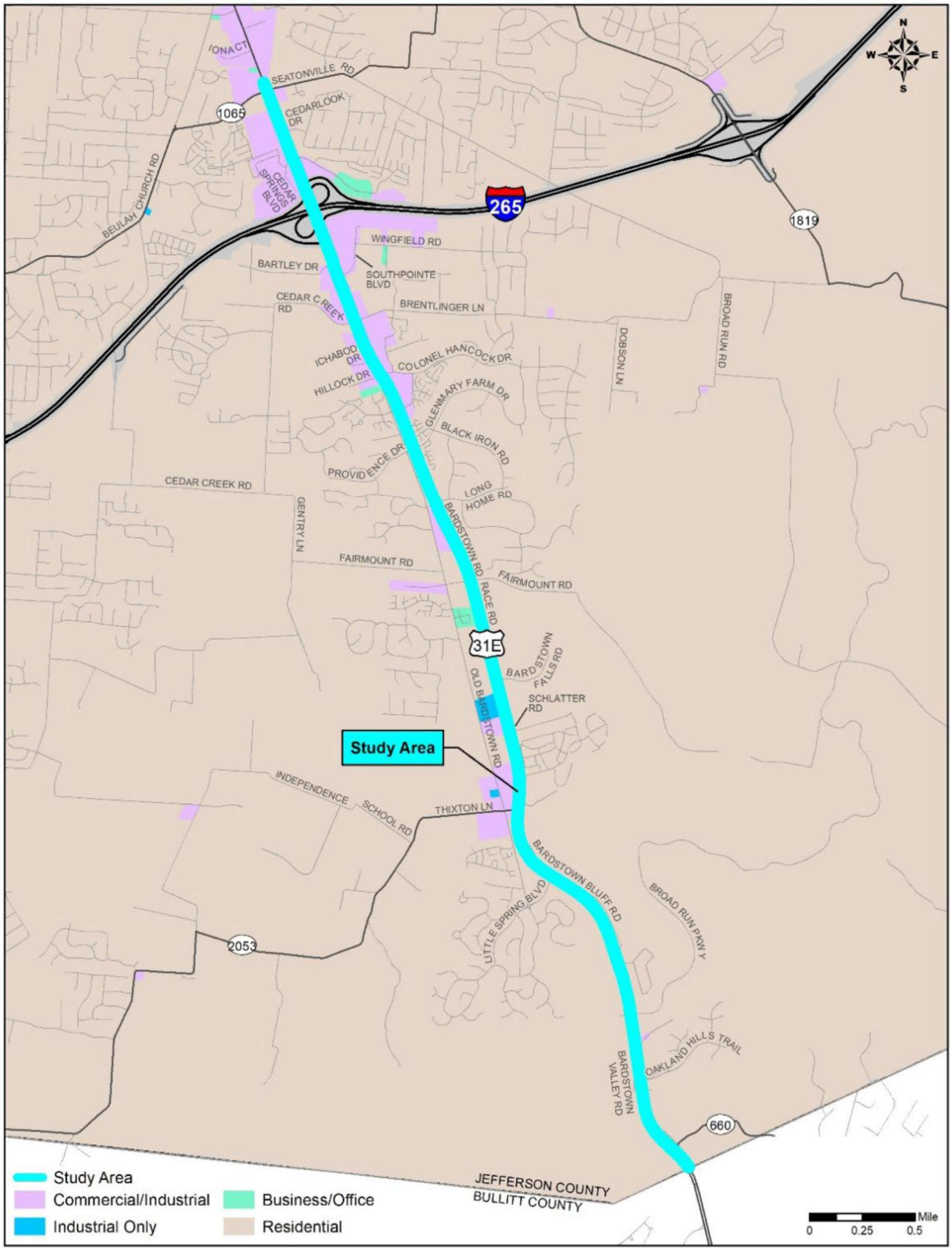
The study area is predominantly characterized by residential land use, with commercial properties concentrated along the northern section adjacent to US 31E. Additionally, there are a few scattered commercial areas in the southern section. A small section of the study area also includes business and industrial properties. Zoning data from the Louisville/Jefferson County Information Consortium (LOJIC) is mapped in **Figure 21**.

### Community Features

Several community features are located along US 31E or are directly accessed by this route. These include:

- Residences – Ten residential subdivisions
- Services – Restaurants, shopping centers, department stores, grocery stores, and banking. Most are concentrated near the I-265 interchange.
- Schools – Bates Elementary School is located along US 31E, south of I-265 and east of US 31E.
- Churches and Cemeteries – Fairmount Cemetery is located in the south end of the study area off Old Bardstown Road. There are four churches along US 31E (Fern Creek Christian Church, Beulah Presbyterian Church, Fern Creek United Methodist Church, and Cedar Creek Baptist Church).
- Historic Resources – Twelve historic resources were mapped in the viewshed of the study area. Formal coordination for any future projects is recommended to confirm listing status with the Kentucky Heritage Council (KHC) State Historic Preservation Office. Two National Register of Historic Places (NRHP) sites were identified but have been previously relocated. There is an historical maker for the Cedar Creek Baptist Church east of US 31E approximately 0.1 miles north of Brentlinger Lane.
- Conservation – Near the US 31E / Broad Run Parkway / Hidden Valley Farm Road intersection, parcels on both sides of US 31E are protected for conservation uses, owned by the Future Land Trust.
- Recreational – The entrance to Broad Run Park intersects with US 31E in the southern portion of the corridor.

**Figure 21. Land Use**



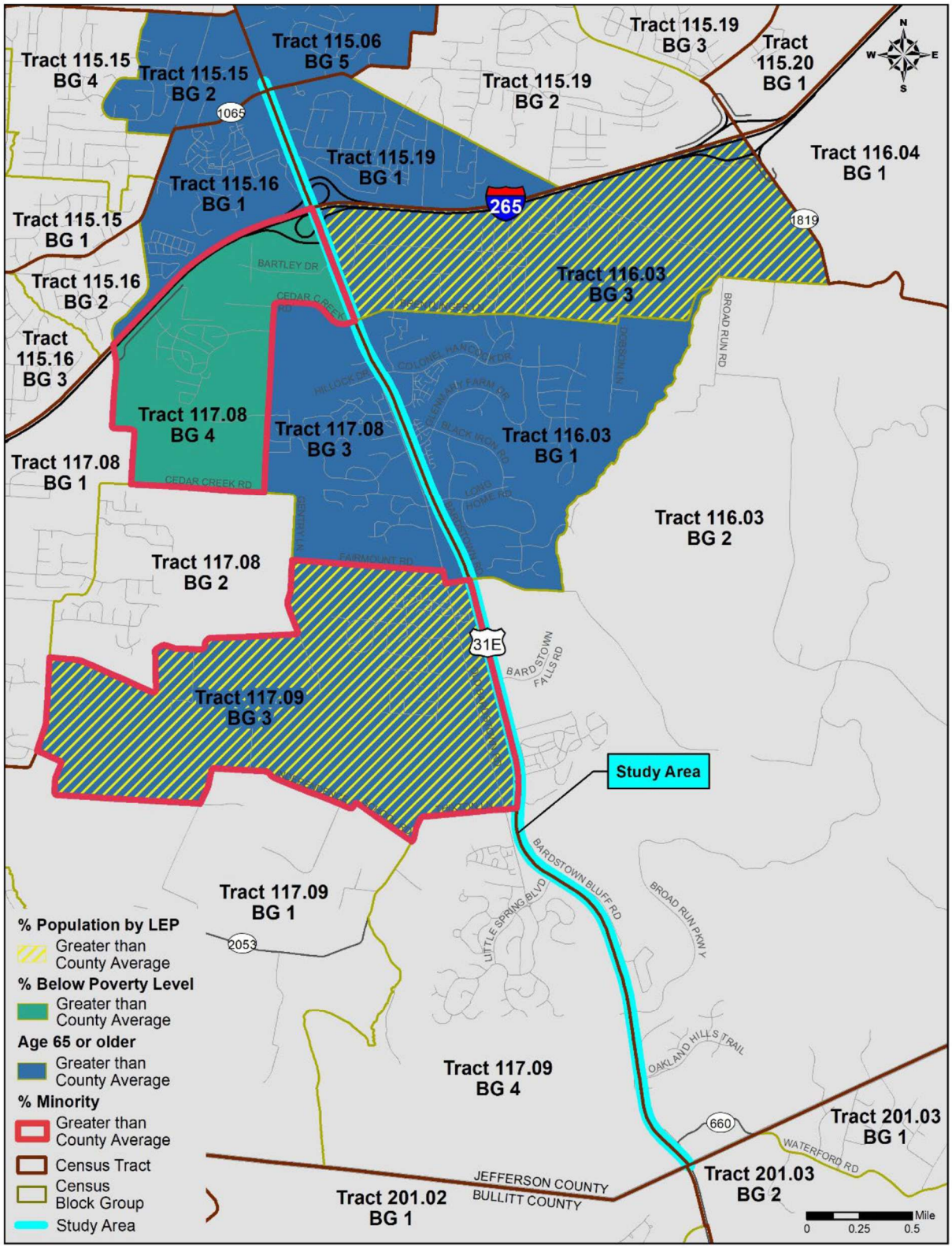
## 3.3 Socioeconomic Study

A socioeconomic study was completed to identify areas statistically likely to contain elevated concentrations of minority, elderly, low-income, limited English proficiency (LEP), and / or disabled populations. Statistics are reported from 2021 American Community Survey 5-year estimates. There are eleven block groups that are adjacent to US 31E in the study area. Four of the five demographic categories reviewed have one or more geographic areas exceed the county threshold, as highlighted in **Figure 22**. In the study area, the following are characteristics to consider during future phases of project development.

- Census Tract 116.03 Block Group 3 – Bounded by I-265 to the north and US 31E to the west, includes both a higher population of persons aged 65 and over and LEP population concentrations above the reference threshold of Jefferson County.
- Census Tract 117.08 Block Group 4 – Bounded by I-265 to the north and US 31E to the east, includes both minority and individuals below poverty population concentrations that exceed the percentage for the referenced threshold of Jefferson County.
- Census Tract 117.09 Block Group 3 – West of US 31E in the south-central study area, minority population that substantially exceeds the referenced threshold of Jefferson County. There are also both aged 65 and LEP population concentrations above Jefferson County.

The complete socioeconomic study is included as an appendix to the Environmental Overview.

**Figure 22. Socioeconomic Populations Exceeding County Thresholds**



# Chapter 4 – Initial Community Outreach

Multiple outreach and collaborative meetings were held throughout the study. These include:

- Project Team Meetings: Three meetings were held with the Project Team which consisted of KYTC District 5 and Central Office, KIPDA, and the consultant team. These meetings were conducted to discuss study progress and next steps. Summaries of the meetings are provided in **Appendix E**.
- Local Elected Officials / Stakeholder Meetings: Two meetings were held to inform local elected officials and stakeholders (fire / EMS / police / schools / churches / tourism / parks) of the study and solicit input on transportation needs and improvement concepts. These meetings were held immediately before the public meetings.
- Public Meetings: Two open house style meetings were held to inform attendees about the study and provide an opportunity to collect feedback on improvement concepts.
- Community Survey: Interactive online surveys were published concurrently with the public meetings to inform and collect feedback on the study for interested people not able to attend the public meetings.

The first outreach effort for the study included a meeting with the Local Elected Officials / Stakeholders, a Public Meeting, and an online survey.

## 4.1 Local Elected Officials / Stakeholders Meeting No. 1

The meeting with the Local Elected Officials / Stakeholders was held on the same day as the Public Meeting at the Bates Elementary School library. A virtual option was available for those that could not attend in person. Representatives included:

- Louisville Metro
- Bike Louisville
- State and local elected officials
- Cedar Creek Baptist Church
- Fern Creek Fire and EMS
- Louisville Metro Police Department

For a full list of attendees – refer to the meeting minutes included in **Appendix E**.

Existing collected data was presented. Attendees provided input on the collected data and were able to ask questions about the study. Information obtained from the meeting is summarized below. Additional information can be found in the meeting minutes.

- Attendees stressed the need for improvements to the US 31E corridor to relieve congestion and address safety.
- Attendees expressed concern over continued development along US 31E. Of particular note were additional apartment complexes along Cedar Creek Road. This is just one example of increased traffic in the area that may add to congestion on US 31E.
- Though the focus of this study is operations along US 31E, attendees encouraged the project team to consider the impacts of the area transportation network.
- Fire and EMS response is an issue along the corridor with increased response times (up to 40 minutes from fire station to north side of the corridor) due to congestion.
- Peak hours of congestion have been expanding, particularly in the PM, and may last from 3:30 to 6:30 PM.

- Fire and EMS have observed more speed-related crashes in the south end of the study area (closer to the county line). Street racing is a noted issue at night. In the northern part of the corridor, red light running is an issue.
- Multiple attendees expressed their desire to see more emphasis on addressing motor vehicle congestion and safety rather than investment in pedestrian / bicycle infrastructure. They were not in favor of shared-use or lane adjacent facilities along US 31E.

## 4.2 Public Meeting No.1

This public meeting was the first opportunity for residents and users of the corridor to provide input on the study. It was held at the Bates Elementary School Cafeteria on June 25, 2024, from 5:30 – 7:30 PM (EST). The meeting format was open house style with handouts, displays, a looping video and interactive stations. A total of 126 individuals signed-in (excluding project team members). Outreach efforts included:

- KYTC District 5 website
- KYTC District 5 social media
- Newspapers (Louisville Courier Journal and Bullitt County Pioneer News)
- Variable message signs stationed along US 31E corridor
- Flyers distributed to target areas for outreach to traditionally underrepresented populations. This included distribution to the Cedar Heights Mobile Home Park and the Cedar Creek Baptist Church

Meeting materials and surveys were provided in both English and Spanish. **Appendix F** contains a complete summary of information.

Input from the interactive stations includes the following:

1. Attendees were given a sticker sheet with different criteria to identify top priorities of issues along the corridor. The top three priorities identified (in order) are congestion / travel time, safety, and access to properties.

2. In consideration of tradeoffs – the following is the majority response:
   - Improvements should have major benefits but may come with larger impacts.
   - Improvements should have faster travel times but this may limit access to adjacent locations.
   - Improvements should use the available capacity for motor vehicles only.
   - Improvements should consider new innovative designs.

3. A mapping exercise allowed participants to place stickers to identify locations where they would like to see improvement concepts. The following (**Figure 23** and **Figure 24**) shows a compilation of responses grouped by intersection and segment.

**Figure 23. Public Meeting No. 1 – Intersection Improvement Input**

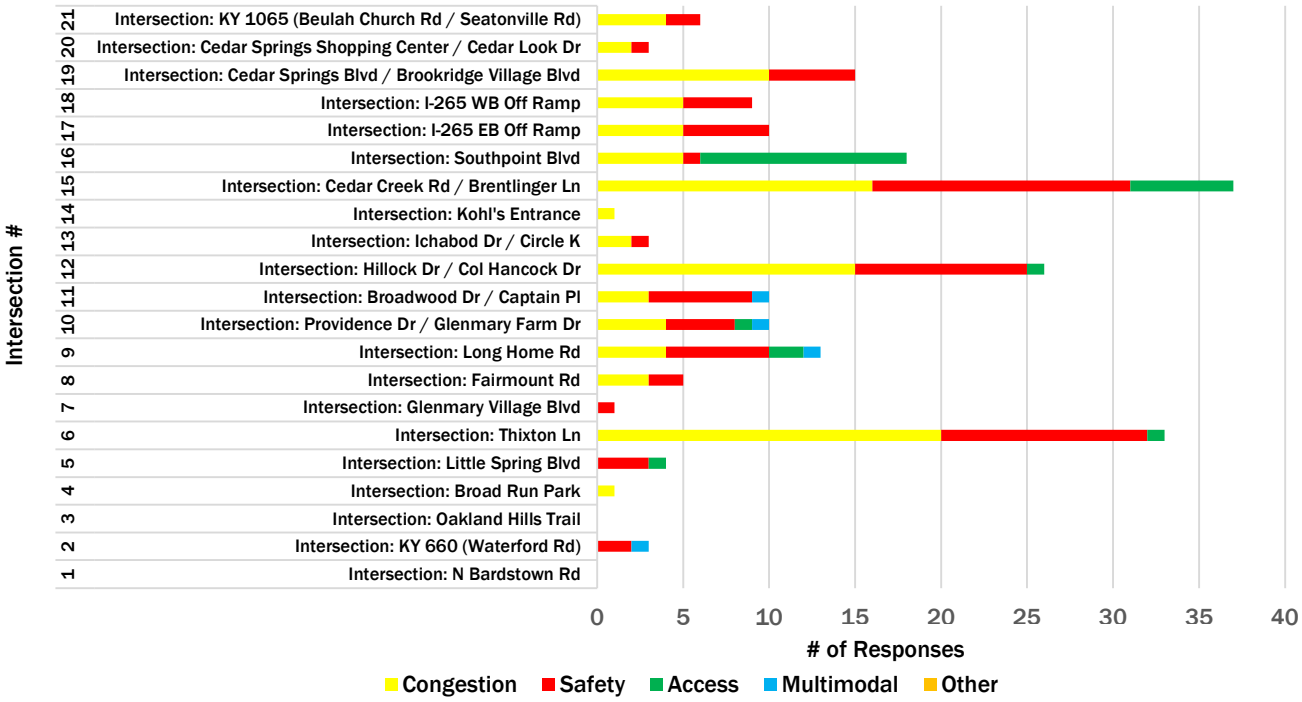



**Figure 24. Public Meeting No. 1 – Road Segment Improvement Input**

## 4.3 Online Survey No. 1

Similar information presented at the public meeting was published as a StoryMap and accessible through the KYTC District 5 website. A link to an online survey was distributed at the public meeting, through flyers, and through social media. The survey opened on June 11, 2024, and closed on July 9, 2024, with a total of 444 responses.

Similar questions were presented in the survey to correlate with the input from the public meeting. The following highlights key survey questions and responses.

1. Attendees were given a list of different criteria to identify top priorities of issues along the corridor. The top three priorities identified (in order) are congestion / travel time, safety, and access to properties.

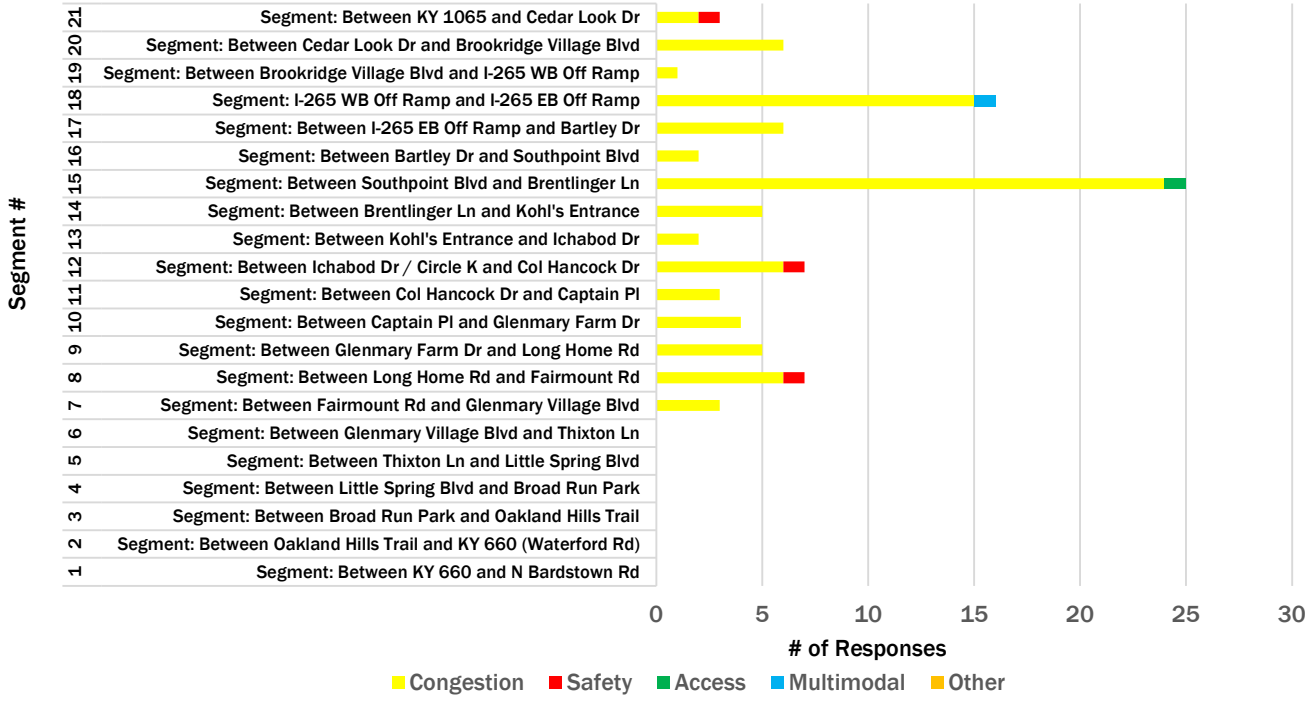
2. In consideration of tradeoffs – the following is the majority response:
   - Improvements should have major benefits but may come with larger impacts.
   - Improvements should have a balanced mix of access to businesses and community facilities versus faster travel times.
   - Improvements should use the available capacity for motor vehicles only.
   - Improvements should consider new innovative designs.

3. Respondents were asked to click or tap on the map to place a marker for their highest priority for improvement along the corridor. The following (**Figure 25** and

4. **Figure 26**) shows a compilation of responses grouped by intersection and segment.

**Figure 25. Online Survey No. 1 – Intersection Improvement Input**

**Figure 26. Online Survey No. 1 – Road Segment Improvement Input**



# Chapter 5 – Future Year (2045) Traffic Forecast and Operations

For evaluation of future traffic operations along US 31E and the major intersections, traffic volumes were forecasted for the future year of 2045. A separate Traffic Forecast Report (April 2024) was prepared to document the forecast process and segment and intersection volumes. This is included in **Appendix A.**

### Traffic Counts

New peak hour turning movement counts were collected for intersections beginning with North Bardstown Road up to (and including (Fairmount Road). Turning movement count data from the HSIP Safety Study was used and adjusted to balance with the collected counts. Annual Average Daily Traffic (AADT) volumes from nearby KYTC count stations were also used to develop future year volumes.

### Growth Rates and 2045 Traffic Volumes

The determination of growth rates to apply to existing volumes is based on multiple sources:

- Historical traffic growth analysis (KYTC Traffic Count Reporting System) – Trendlines showed growth from Thixton Lane south to Bullitt County Line (1.3%). Projected trendlines for the rest of the study area range from -2.6 to -4.0%.
- Population trends and projections (Kentucky State Data Center) – The population of Jefferson County has increased by 5.7% between 2010 and 2020 compared to 3.8% during the same time period for Kentucky. Population forecasts show an increase in population for Jefferson County of 7.1% between 2020 and 2050 compared to a 6.2% increase for Kentucky.
- KIPDA Travel Demand Model (TDM) – Projects noted in the previous studies and identified and identified / planned projects were presented at the beginning of this report (Chapter 1). This information was reviewed to determine which transportation improvement projects would result in changes in capacity and / or traffic flow.

The growth rates applied are based on KIPDA TDM output and shown in **Table 5**. Segments are grouped together where appropriate to assist with balancing efforts. For evaluating purposes, growth rates were determined for a 4-lane and 6-lane scenario. When evaluating improvement concepts the 6-lane scenario encompasses potential additional growth in traffic volumes resulting from added capacity.

**Table 5. Growth Rates KIPDA TDM**

| From | To | Proposed Growth Rate (4 Lane) | Proposed Growth Rate (6 Lane) |
|---|---|---|---|
| Bullitt County Line | KY 660 | 1.7% | 1.9% |
| KY 660 | Broad Run Parkway | | |
| Broad Run Parkway | Thixton Lane | | |
| Thixton Lane | Cooper Chapel Road | 1.1% | 1.7% |
| Cooper Chapel Road | Fairmount Road | | |
| Fairmount Road | Glenmary Farm Drive | 0.7% | 1.5% |
| Glenmary Farm Drive | Colonel Hancock Drive | | |
| Colonel Hancock Drive | Cedar Creek Road / Brentlinger Lane | | |
| Cedar Creek Road / Brentlinger Lane | I-265 EB Ramp | | |
| I-265 EB Ramp | I-265 WB Ramp | 0.5% | 0.8% |
| I-265 WB Ramp | Beulah Church Road / Seatonville Road (KY 1065) | | |

Figure 27 and Figure **28** display the resulting future volumes for the 4-lane and 6-lane scenarios. These include:

- AADT = Annual Average Daily Traffic – The average number of vehicles that pass a specific point on a roadway each day, calculated over an entire year.
- DHV = Design Hourly Volume – The traffic volume used for roadway design, usually representing the 30$^{th}$ highest hourly volume of the year.
- AADTT = Annual Average Daily Truck Traffic – The average number of trucks (not all vehicles) passing a point on a roadway per day over a full year.
- DHVT = Design Hourly Volume of Trucks – The truck-only equivalent of DHV. It represents the expected truck traffic volume during the design hour.

**No Build 2045 Traffic Operations**

To evaluate intersection operations, Synchro 12 was used (similar to the existing operations analysis of 2024). Traffic operations are presented in **Table 6** and **Table 7** for the AM and PM peak periods. Corridor operations were evaluated using Vissim. More details on the model development and operations analysis are provided in the next chapter.

**Figure 27. Segment Forecasts – 4-Lane Future Year (2045)**

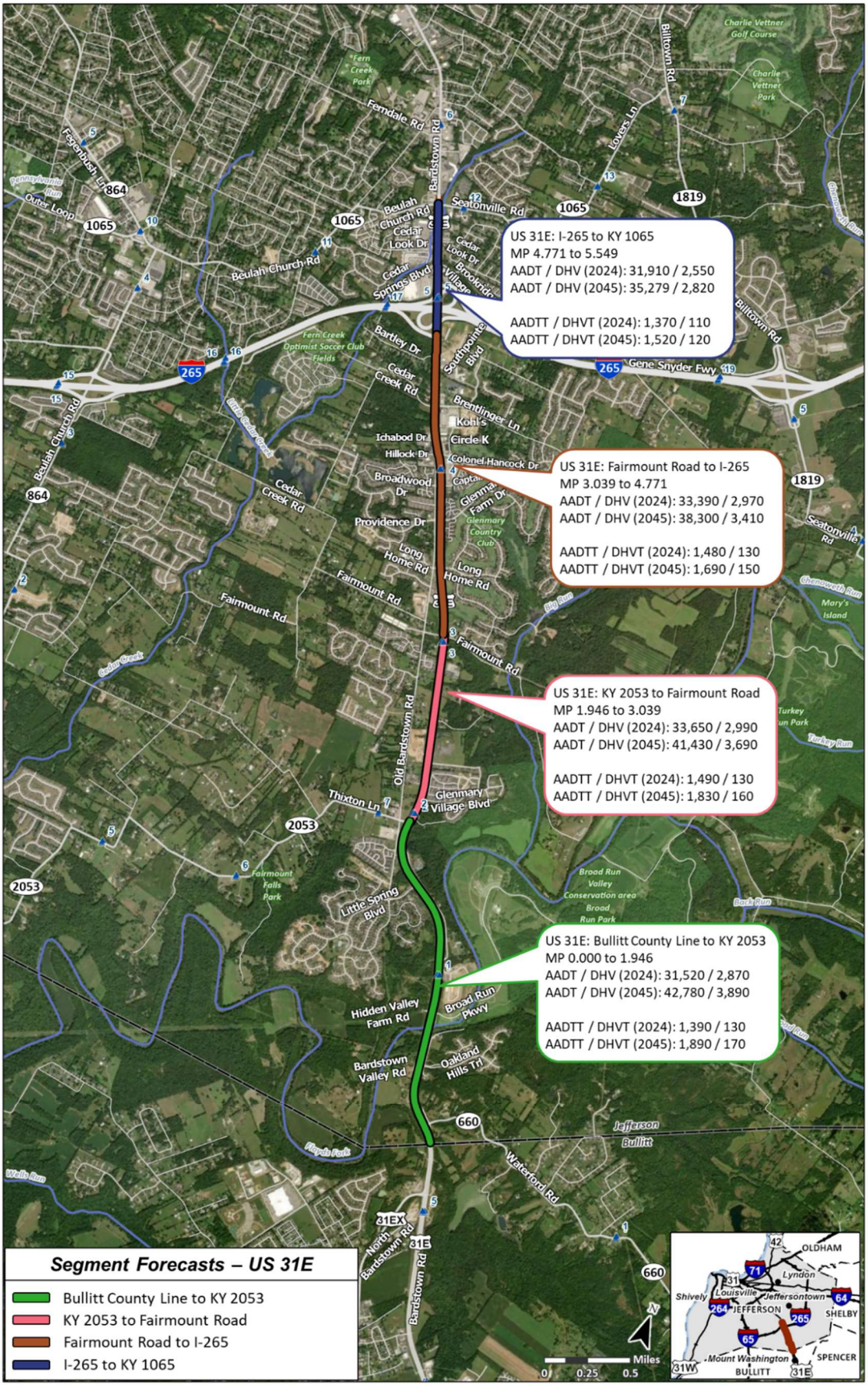


**Figure 28. Segment Forecasts – 6-Lane Future Year (2045)**

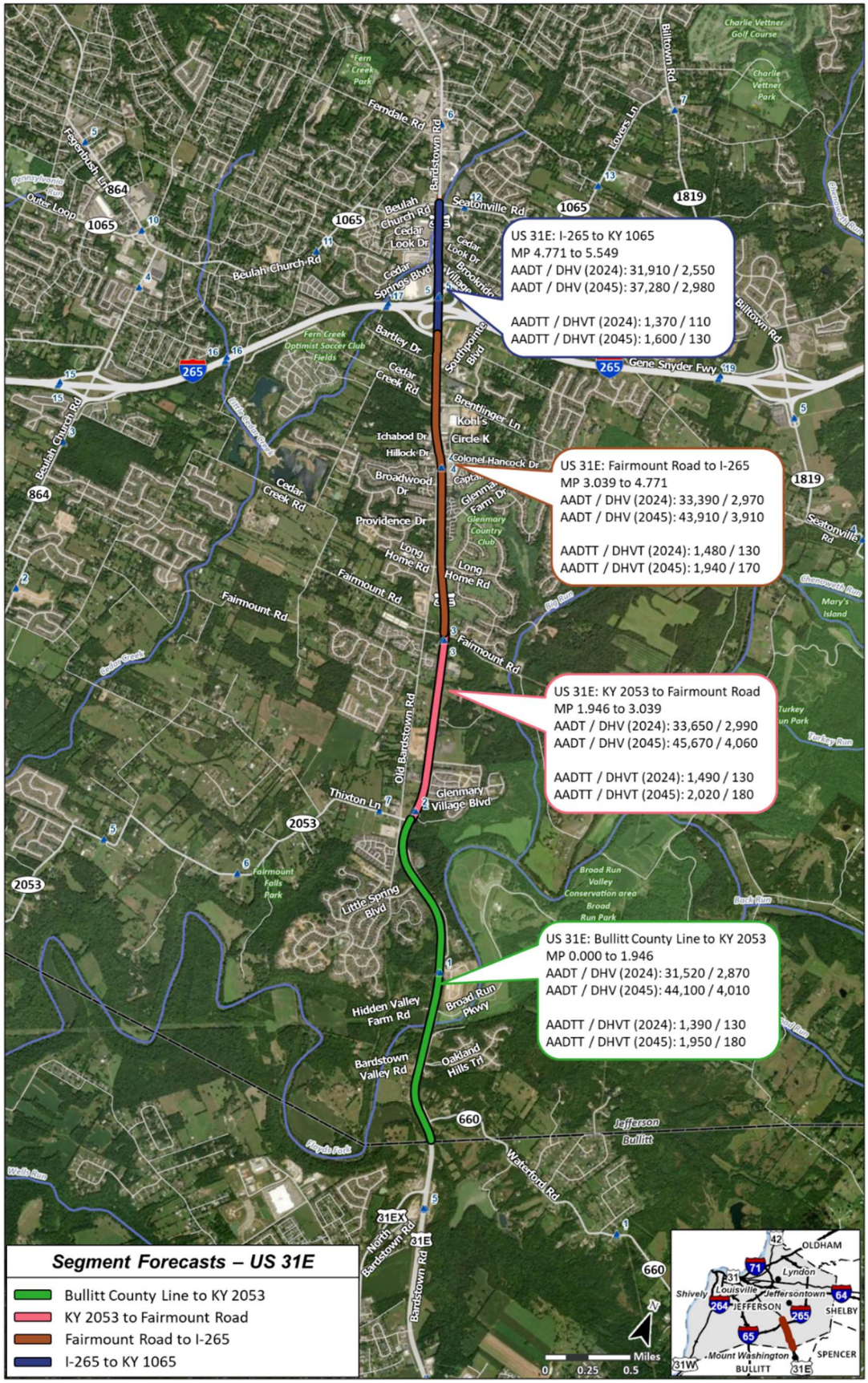


**Table 6. AM Future Year (2045) No-Build Intersection Operations**

| 2045 No Build (Four Lanes) - AM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | |
|---|---|---|---|---|---|---|---|
| Intersections | Milepoint | Traffic Control | LOS (Average Delay, sec) | | | | |
| | | | Overall | NB* | SB* | EB | WB |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | **C (22.2)** | B (19.3) | B (15.1) | C (32.3) | D (46.6) |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | A (0.0) | C (19.1) | N/A | F (54.8) |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | B (10.9) | C (19.4) | D (33.2) | D (30.1) |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **A (8.7)** | A (8.9) | A (5.5) | E (65.1) | E (64.9) |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | B (11.1) | A (0.0) | C (18.5) | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **B (17.2)** | B (11.1) | B (14.9) | F (87.0) | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | A (0.0) | C (16.3) | N/A | C (20.5) |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | B (12.1) | C (16.2) | D (32.2) | E (46.9) |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | B (11.1) | C (17.3) | E (47.1) | D (31.1) |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **C (20.7)** | C (20.7) | A (1.3) | F (125.6) | F (93.6) |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | B (11.3) | C (21.0) | F (140.0) | F (50.9) |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **E (70.7)** | A (6.7) | A (2.4) | F (758.3) | F (107.3) |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | A (0.0) | A (0.0) | C (17.3) | E (37.2) |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | A (0.0) | D (34.4) | N/A | D (25.3) |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **F (122.1)** | F (166.4) | A (6.8) | F (240.4) | F (100.2) |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (7.6)** | A (4.4) | A (6.3) | N/A | F (88.8) |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **C (30.0)** | B (12.9) | B (11.0) | F (103.1) | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **C (21.5)** | B (12.8) | A (0.2) | N/A | E (66.9) |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **E (65.0)** | F (94.5) | B (19.3) | E (75.8) | F (82.7) |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **A (8.3)** | A (5.8) | A (0.6) | E (71.5) | F (80.1) |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **D (44.3)** | B (17.8) | E (65.0) | E (67.4) | F (85.4) |
| *For TWSC (Two-Way Stop-Controlled) intersections, LOS and delay shown for the mainline US 31E northbound and southbound approaches are for the left turning movement only since the through movement experiences no delay. | | | | | | | |

**Table 7. PM Future Year (2045) No-Build Intersection Operations**

| 2045 No Build (Four Lanes) - PM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Intersections** | **Milepoint** | **Traffic Control** | **LOS (Average Delay, sec)** | | | | |
| | | | **Overall** | **NB*** | **SB*** | **EB** | **WB** |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | **B (18.7)** | B (12.8) | B (16.9) | C (32.4) | D (44.4) |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | A (0.0) | C (18.1) | N/A | E (43.1) |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | E (39.0) | B (14.9) | F (204.0) | F (68.0) |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **C (31.0)** | A (8.3) | C (31.6) | F (128.4) | F (181.2) |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | F (62.4) | A (0.0) | F (265.7) | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **F (128.6)** | C (31.7) | F (142.2) | F (364.8) | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | A (0.0) | C (15.2) | N/A | D (25.6) |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | D (33.2) | B (13.7) | F (486.8) | F (67.9) |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | D (32.3) | C (15.1) | F (571.8) | F (52.5) |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **C (24.4)** | B (10.7) | B (14.5) | F (285.7) | F (105.4) |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | D (34.5) | C (17.5) | F (480.4) | F (155.9) |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **F (155.5)** | A (6.2) | B (13.8) | F (3488.3) | F (187.6) |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | A (0.0) | A (0.0) | F (109.4) | D (26.4) |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | A (0.0) | C (23) | N/A | C (22.5) |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **D (41.3)** | B (10.5) | A (2.2) | F (360.0) | F (135.4) |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (8.5)** | A (0.2) | A (9.0) | N/A | F (120.7) |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **E (57.2)** | C (22.7) | D (40.5) | F (124.4) | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **C (28.2)** | C (24) | A (0.6) | N/A | E (66.4) |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **C (24)** | B (11.7) | C (20.5) | F (87.1) | F (95.6) |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **F (131.9)** | A (3.4) | A (1.5) | F (94.0) | F (2494.4) |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **E (58.6)** | B (14.5) | D (51.9) | F (88.3) | F (209.3) |

*For TWSC (Two-Way Stop-Controlled) intersections, LOS and delay shown for the mainline US 31E northbound and southbound approaches are for the left turning movement only since the through movement experiences no delay.

# Chapter 6 – Improvement Concepts

This chapter summarizes the process by which potentially beneficial improvements are identified, along with the development of improvement concepts for the identified locations. The existing conditions analysis and input from the project team / local elected officials / stakeholders / public helped guide the development and evaluation of improvement locations and concepts.

Four project categories were identified to organize the development improvements. These include:

- Intersection / Spot Improvement Concepts
- Corridor Improvement Concepts
- Multimodal Improvement Concepts
- Future Policy Considerations

Throughout this study, the HSIP Safety Study improvements have been concurrently evaluated and refined. The identified modifications are taken into account with all improvement concept evaluation and considered committed improvements.

## 6.1 Identification of Intersection / Spot Improvement Concepts

Considerations for identifying improvement concepts for individual intersections / spots include:

- Traffic Operations – Are there ways to reduce delay / improve Level of Service through capacity modifications?
- Intersection Control Evaluation (ICE) – Are there alternative intersection concepts that should be considered to improve mobility and safety?
- Crash Data – Which intersections have the highest number / potential for exposure of crashes and what are the severity and crash types? What countermeasures can be considered to reduce the potential for crashes based on this information?

The following sections provide additional detail of these considerations.

**Traffic Operations**

At the intersection level, modifications were evaluated using Synchro to reduce delay / improve level of service. Modifications to increase capacity such as additional turn lanes and extended storage were evaluated along with changes in access. An iterative process was applied, with modifications tested individually (i.e. adding a turn lane to one approach) and combined as needed to achieve optimal improvement levels (i.e. adding turn lanes to multiple approaches).

Signal timing and phasing along the corridor was updated in October 2024. This timing was used to analyze each intersection and adjusted as needed to account for modifications to intersection capacity. Given the complexity of the signal system and corridor timing preferences, major changes in signal timing, such as corridor-wide cycle length or progression parameters, were not evaluated in this induvial intersection-level analysis. However, for corridor-wide improvement options, the full signal network was evaluated and adjusted as needed.

In some cases, turn lane and access modifications alone could not reduce the delay to result in a level of service better than LOS F. Larger-scale modifications to the system are considered in the corridor improvement section to evaluate potential concepts to further reduce delay / improve safety where spot improvements alone are not able to fully address issues. **Table 8** lists the improvement modifications determined to provide the optimum reduction in delays. **Table 9** and **Table 10** display the resulting 2045 AM and PM delay and LOS.

**Table 8. Intersection Modifications Based on 2045 Peak Hour Traffic Operations Analysis**

| Intersections | Milepoint | Traffic Control | Improvements |
|---|---|---|---|
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | No Improvements Considered Due to Outside Study Area - Analysis for Information Purpose Only |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | Add WB Right Turn Lane |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | Restrict Left Turns Out |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | Increase WB Storage |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | Restrict Left Turns Out; Potentially Channelize Right Turn |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | Add WB Right Turn Lane; Add Second NB Left Turn Lane; Potentially Channelize Right Turn |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | No Improvements Considered - Delay and LOS are at Acceptable Levels |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | Restrict Left Turns Out; Potentially Channelize EB Right Turn |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | Restrict Left Turns Out |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | Add EB Left Turn Lane; Separate Thru and Right Movement |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | Restrict Left Turns Out |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | Add Dual EB Left Turn Lanes; Add WB Thru Lane; Increase WB Storage; Increase SB Left Storage |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | No Improvements Considered - Access Modifications Proposed as part of HSIP Project |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | No Improvements Considered - Access Modifications Proposed as part of HSIP Project |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | Add Second EB Left Turn Lane; Add EB Right Turn Lane; Increase EB Storage; Add NB Thru Lane; Increase NB Left Storage |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | No Improvements Considered - Modifications Proposed as part of HSIP Project |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | Increase EB Exit Ramp Storage |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | Increase WB Exit Ramp Storage |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | Add Second NB Left Turn Lane |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | Add EB Left Turn Lane and EB Right Turn Lane; Add WB Left Turn Lane and SB Right Turn Lane |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | Add WB Right Turn Lane; Add SB Right Turn Lane; Add NB Right Turn Lane |

**Table 9. AM Future Year (2045) Build Intersection Operations**

| 2045 Build (Four Lanes) - AM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intersections | Milepoint | Traffic Control | LOS (Average Delay, sec) | | | | | | | | | |
| | | | Overall | Improvement | NB* | Improvement | SB* | Improvement | EB | Improvement | WB | Improvement |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 - (-0.299) | Signal | **C (22.2)** | **0%** | B (19.3) | **0%** | B (15.1) | **0%** | C (32.3) | **0%** | D (46.6) | **0%** |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | C (19.1) | **0%** | N/A | N/A | D (30.0) | **45%** |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | **N/A** | B (10.9) | **0%** | C (19.4) | **0%** | A (7.7) | **77%** | C (19.2) | **36%** |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **A (8.7)** | **0%** | A (8.9) | **0%** | A (5.5) | **0%** | E (65.1) | **0%** | E (64.9) | **0%** |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | **N/A** | B (11.1) | **0%** | A (0.0) | **0%** | B (12.2) | **34%** | N/A | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **C (21.3)** | **-24%** | B (19.2) | **-73%** | B (13.2) | **11%** | F (82.7) | **5%** | N/A | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | C (16.3) | **0%** | N/A | N/A | C (20.5) | **0%** |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | **N/A** | B (12.1) | **0%** | C (16.2) | **0%** | B (12.4) | **61%** | C (16.3) | **65%** |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | **N/A** | B (11.1) | **0%** | C (17.3) | **0%** | B (12.5) | **73%** | A (7.3) | **77%** |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **B (19.7)** | **5%** | B (19.4) | **6%** | A (1.3) | **0%** | F (119.4) | **5%** | F (95.7) | **-2%** |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | **N/A** | B (11.3) | **0%** | C (21.0) | **0%** | B (14) | **90%** | C (18.8) | **63%** |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **C (21.9)** | **69%** | A (6.7) | **0%** | A (2.4) | **0%** | F (170.2) | **78%** | F (107.5) | **0%** |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | A (0.0) | **0%** | C (17.3) | **0%** | E (37.2) | **0%** |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | D (34.4) | **0%** | N/A | N/A | D (25.3) | **0%** |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **C (24.3)** | **80%** | A (9.1) | **95%** | A (2.8) | **59%** | F (113.2) | **53%** | F (93.9) | **6%** |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (7.6)** | **0%** | A (4.4) | **0%** | A (6.3) | **0%** | N/A | N/A | F (88.8) | **0%** |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **C (30.0)** | **0%** | B (12.9) | **0%** | B (11.0) | **0%** | F (103.1) | **0%** | N/A | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **C (21.5)** | **0%** | B (12.8) | **0%** | A (0.2) | **0%** | N/A | N/A | E (66.9) | **0%** |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **E (63.3)** | **3%** | F (93.4) | **1%** | B (16.1) | **17%** | E (78.1) | **-3%** | F (82.7) | **0%** |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **A (8.5)** | **-2%** | A (5.8) | **0%** | A (0.5) | **17%** | F (81.6) | **-14%** | E (72.0) | **10%** |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **C (32.0)** | **28%** | A (5.0) | **72%** | D (50.5) | **22%** | E (64.8) | **4%** | E (75.3) | **12%** |

*For TWSC (Two-Way Stop-Controlled) intersections, LOS and delay shown for the mainline US 31E northbound and southbound approaches are for the left turning movement only since the through movement experiences no delay.

**Table 10. PM Future Year (2045) Build Intersection Operations**

| 2045 Spot Improvements Build (Four Lanes) - PM Peak<br>Level of Service and Average Intersection Delay by Approach | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intersections | Milepoint | Traffic Control | LOS (Average Delay, sec) | | | | | | | | | |
| | | | Overall | Improvement | NB* | Improvement | SB* | Improvement | EB | Improvement | WB | Improvement |
| 1 - US 31E @ N. Bardstown Rd (US 31EX) | 5.099 (-0.299) | Signal | **B (18.7)** | **0%** | B (12.8) | **0%** | B (16.9) | **0%** | C (32.4) | **0%** | D (44.4) | **0%** |
| 2 - US 31E @ KY 660 (Waterford Rd) | 0.111 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | C (18.1) | **0%** | N/A | N/A | D (30.8) | **29%** |
| 3 - US 31E @ Oakland Hills Trl / Bardstown Valley Rd | 0.479 | TWSC | **N/A** | **N/A** | E (39.0) | **0%** | B (14.9) | **0%** | D (30.2) | **85%** | B (14.8) | **78%** |
| 4 - US 31E @ Hidden Valley Farm Rd / Broad Run Pkwy | 0.792 | Signal | **C (31.0)** | **0%** | A (8.3) | **0%** | C (31.6) | **0%** | F (128.4) | **0%** | F (181.2) | **0%** |
| 5 - US 31E @ Little Spring Blvd | 1.563 | TWSC | **N/A** | **N/A** | F (62.4) | **0%** | A (0.0) | **0%** | F (67.4) | **75%** | N/A | N/A |
| 6 - US 31E @ KY 2053 (Thixton Ln) | 1.946 | Signal | **E (58.5)** | **55%** | C (25.1) | **21%** | E (63.6) | **55%** | F (138.1) | **62%** | N/A | N/A |
| 7 - US 31E @ Glenmary Village Blvd | 2.095 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | C (15.2) | **0%** | N/A | N/A | D (25.6) | **0%** |
| 8 - US 31E @ Fairmount Rd | 3.039 | TWSC | **N/A** | **N/A** | D (33.2) | **0%** | B (13.7) | **0%** | F (147.5) | **70%** | B (14.1) | **79%** |
| 9 - US 31E @ Long Home Rd | 3.432 | TWSC | **N/A** | **N/A** | D (32.3) | **0%** | C (15.1) | **0%** | E (35.9) | **94%** | A (7.5) | **86%** |
| 10 - US 31E @ Providence Dr / Glenmary Farm Dr | 3.714 | Signal | **C (21.8)** | **11%** | B (10.7) | **0%** | B (14.5) | **0%** | F (213.6) | **25%** | F (105.8) | **0%** |
| 11 - US 31E @ Broadwood Dr / Captain Pl | 3.910 | TWSC | **N/A** | **N/A** | D (34.5) | **0%** | C (17.5) | **0%** | D (33.2) | **93%** | C (18.5) | **88%** |
| 12 - US 31E @ Hillock Dr / Colonel Hancock Dr | 4.089 | Signal | **C (25.9)** | **83%** | A (6.2) | **0%** | B (13.8) | **0%** | F (108.5) | **97%** | F (183.4) | **2%** |
| 13 - US 31E @ Ichabod Dr / Circle K | 4.174 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | A (0.0) | **0%** | F (109.4) | **0%** | D (26.4) | **0%** |
| 14 - US 31E @ Kohl's Entrance | 4.255 | TWSC | **N/A** | **N/A** | A (0.0) | **0%** | C (23.0) | **0%** | N/A | N/A | C (22.5) | **0%** |
| 15 - US 31E @ Cedar Creek Rd / Brentlinger Ln | 4.369 | Signal | **C (26.1)** | **37%** | A (9.0) | **14%** | A (2.2) | **0%** | F (167.3) | **54%** | F (135.4) | **0%** |
| 16 - US 31E @ Southpointe Blvd | 4.593 | Signal | **A (8.5)** | **0%** | A (0.2) | **0%** | A (9.0) | **0%** | N/A | N/A | F (120.7) | **0%** |
| 17 - US 31E @ I-265 EB Off Ramp | 4.771 | Signal | **E (57.2)** | **0%** | C (22.7) | **0%** | D (40.5) | **0%** | F (124.4) | **0%** | N/A | N/A |
| 18 - US 31E @ I-265 WB Off Ramp | 5.072 | Signal | **C (28.2)** | **0%** | C (24.0) | **0%** | A (0.6) | **0%** | N/A | N/A | E (66.4) | **0%** |
| 19 - US 31E @ Cedar Springs Blvd / Brookridge Village Blvd | 5.191 | Signal | **C (20.7)** | **14%** | B (10.8) | **8%** | B (12.9) | **37%** | F (92.2) | **-6%** | F (95.6) | **0%** |
| 20 - US 31E @ Cedar Look Dr | 5.333 | Signal | **B (15.3)** | **88%** | A (3.4) | **0%** | A (1.7) | **-13%** | F (90.9) | **3%** | E (66.0) | **97%** |
| 21 - US 31E @ KY 1065 (Beulah Church Rd / Seatonville Rd) | 5.549 | Signal | **D (39.0)** | **33%** | A (9.3) | **36%** | D (40.1) | **23%** | F (87.7) | **1%** | F (98.0) | **53%** |

*For TWSC (Two-Way Stop-Controlled) intersections, LOS and delay shown for the mainline US 31E northbound and southbound approaches are for the left turning movement only since the through movement experiences no delay.

### Intersection Control Evaluation

Intersection Control Evaluation (ICE) is a data-driven, performance-based framework used to screen intersection alternatives and identify an optimal solution. The benefits of using ICE include:

- Implementation of solutions that are safer, more balanced for all users, and more cost-effective
- Consistent documentation to support transparent decision making
- Increased awareness of innovative solutions
- Objective performance metrics for decision making

There are two stages of ICE. Stage 1 is a screening process used to shortlist possible alternatives that merit further consideration and analysis because they meet organizational goals, project needs and are practical. Stage 2 is the intersection selection stage where alternatives are evaluated in more detail and objectively compared to other alternatives. Generally, Stage 1 is used during the conceptual planning phase and Stage 2 during design. For the purposes of this study, only Stage 1 was completed for identified intersections.

Stage 1 includes the application of multiple spreadsheet tools:

- Capacity Analysis for Planning of Junctions (CAP-X)
- SSI Score Calculator Tool

KYTC has developed a spreadsheet to summarize findings from the spreadsheet tools and other intersection information.

The ICE process was implemented by KYTC after the initiation of this study. As a result, the scope of work did not include application of the ICE process to all intersections. Intersections for application of ICE were selected to represent a cross-section throughout the corridor. Additional consideration for selection was given to intersections that may be candidates for application of innovate intersections such as reduced conflict U-Turn (RCUT), roundabouts, quadrant roadways, and bowties. The selected intersections include:

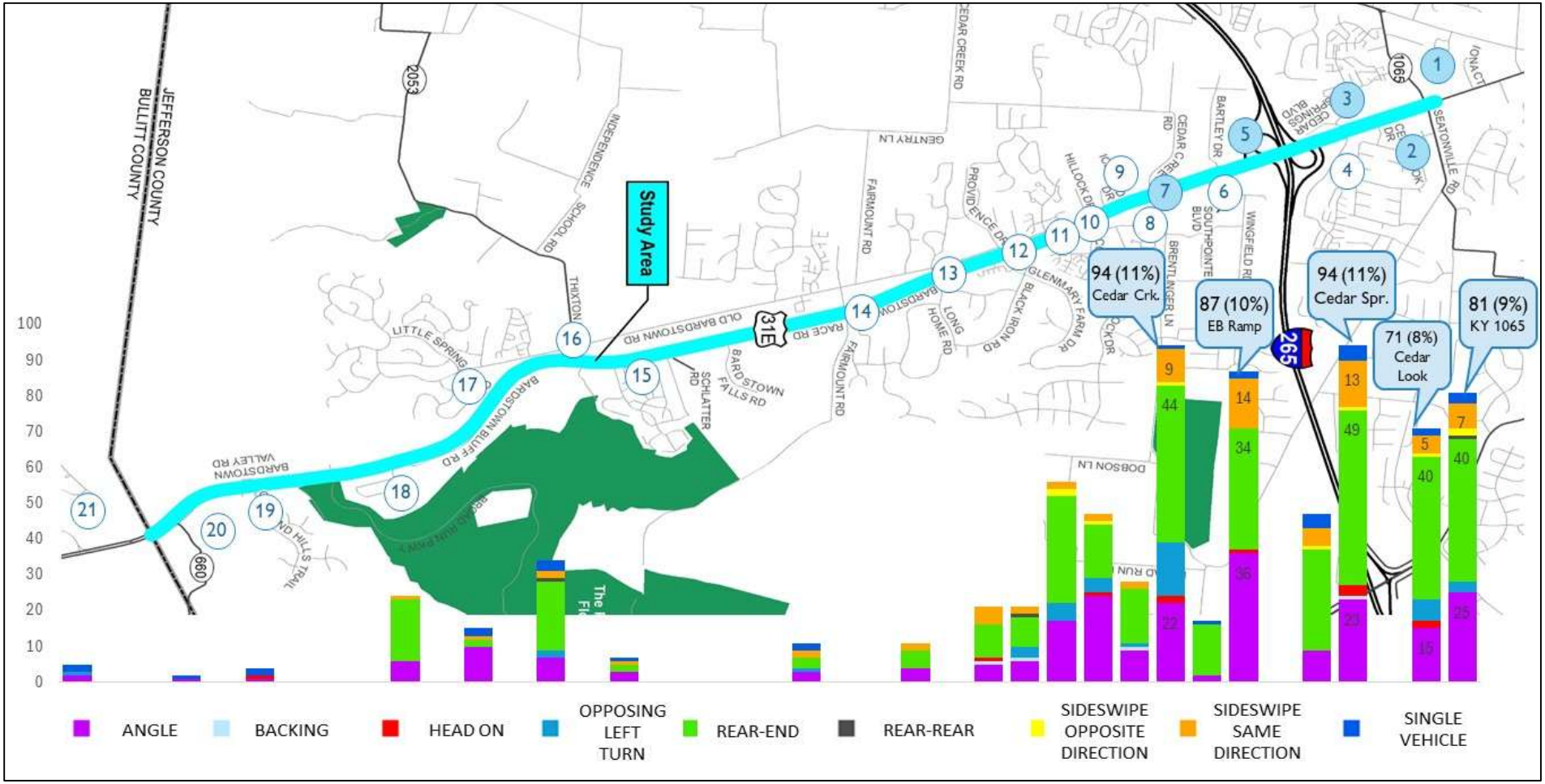
- Cedar Creek Road / Brentlinger Lane
- I-265 EB Off Ramp
- I-265 WB Off Ramp
- KY 660 (Waterford Road)
- KY 1065 (Beulah Church Road / Seatonville Road)
- KY 2053 (Thixton Lane)

The result of the evaluation led to consideration of innovative intersection options for Cedar Creek Road / Brentlinger Lane and Beulah Church Road / Seatonville Road. The evaluation showed potential reductions in congestion and crashes at these intersections with reconfiguration to a bowtie. A bowtie is an intersection where left-turn movements are completed at an adjacent roundabout. The roundabouts are on the side street, before and after the main intersection. For the other intersections evaluated through ICE, the evaluation showed more traditional approaches to intersection modifications such as changes in access / traffic control / turn lanes may be more efficient to address congestion and safety needs. For additional reference, the KYTC spreadsheet and CAP-X results are included in **Appendix G**.

## Crash Data

In consideration of development of improvement concepts to address safety issues, a review of number and type of crashes was performed. The following figure (**Figure 29**) illustrates the number of crashes recorded at study area intersections between January 2018 and December 2023. Each bar represents a different intersection, allowing for a comparison of crashes throughout the study area. Using this information, the potential for crash reductions is explored as part of concept development.

**Figure 29. Intersection Crash Locations and Types**



**Initial Intersection / Spot Improvement Concepts**

Initial intersection / spot improvement concept locations were identified using the collected and analyzed data (count data, traffic operations analysis, ICE analysis, and crash data). Using the previous information combined with public input, preliminary concepts are shown for individual intersections / spots. Improvement concepts were developed for ten locations and comprised the initial concept development set. The remaining intersections (within the study area), did not have individual concepts developed at this time based on several factors:

- Lower operational benefit
- Less potential crash benefit
- Physical or environmental constraints
- Redundancy with HSIP proposed improvements
- Intersection traffic operations / safety considerations addressed through corridor concept.

At this point in the study, general information is shown for each concept. For comparison this includes a percentage assessment of the potential crash reduction associated with the identified improvement, high-level change in travel time / delay, and a general assessment of cost (high, medium, low). In some cases, multiple concepts are presented for one intersection / spot if more than one concept was identified. The intent is to present a first look at concepts, then through input from the project team and public combined with further evaluation, determine if the preliminary concepts merit further review / if there are additional needs throughout the corridor. **Figure 30 – Figure 39** show the identified locations and improvement concepts.

**Figure 30. Spot Improvement Concepts – KY 660 (Waterford Road)**

**Figure 31. Spot Improvement Concepts - Little Spring Boulevard**

**Figure 32. Spot Improvement Concepts – KY 2053 (Thixton Lane)**

**Figure 33. Spot Improvement Concepts - Long Home Road**

**Figure 34. Spot Improvement Concepts - Hillock Drive / Colonel Hancock Drive**

**Figure 35. Spot Improvement Concepts - Cedar Creek Road / Brentlinger Lane**

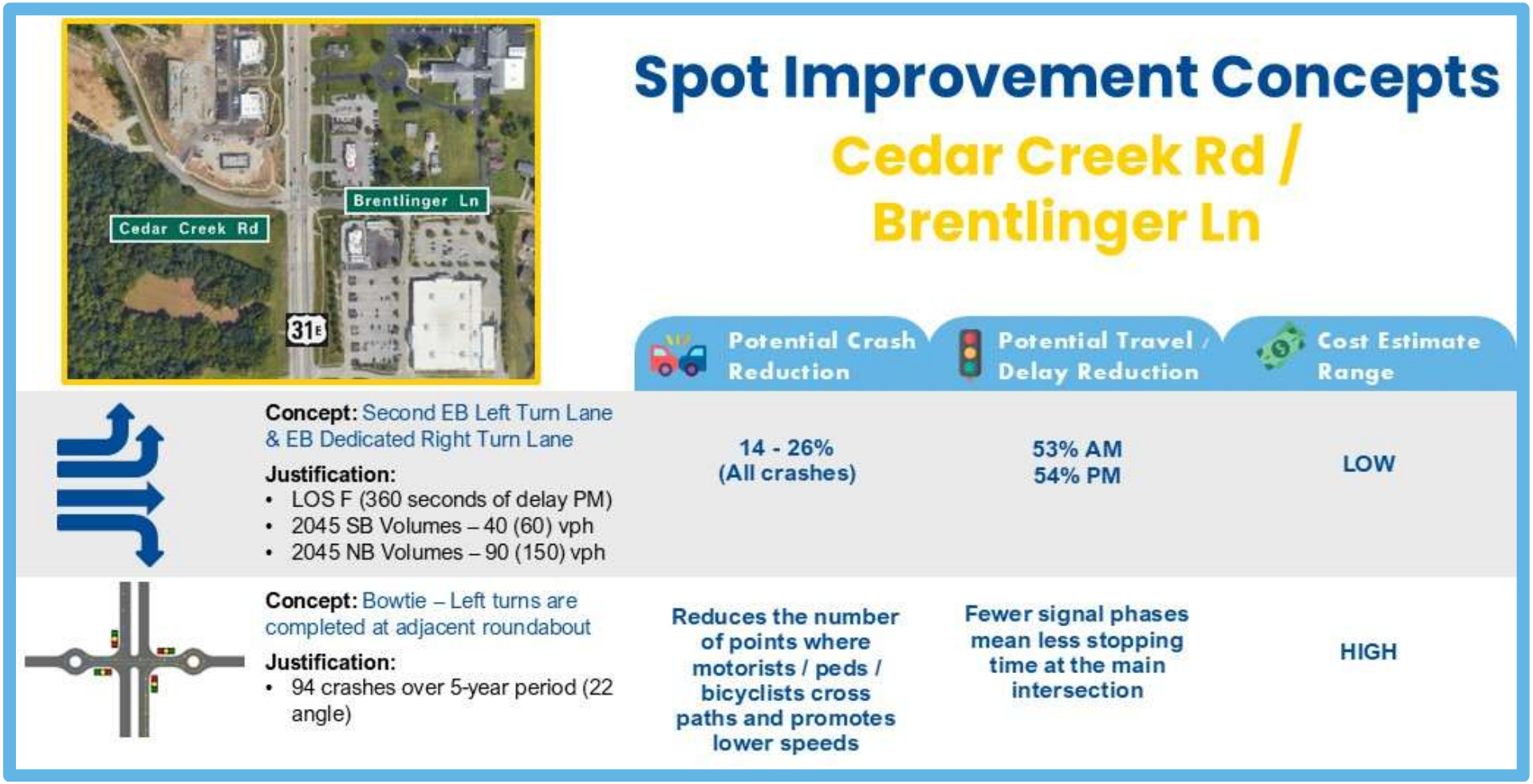


**Figure 36. Spot Improvement Concepts – Bartley Drive**


# Spot Improvement Concepts

## Bartley Dr

**Concept:** Realign Bartley Dr to intersection with Southpoint Blvd; Expand lane separator curb from HSIP project to new aligned intersection

**Issue:**

- 13 rear-end or angle crashes over 5-year period (2 injury)

| Potential Crash Reduction | Potential Travel / Delay Reduction | Cost Estimate Range |
|---|---|---|
| Directing traffic to the signalized intersection at Southpointe will eliminate the possibility of crashes associated with turning in / out of Bartley Dr across US 31E | N/A | MEDIUM |

**Figure 37. Spot Improvement Concepts - Cedar Springs Boulevard / Brookridge Village Boulevard**

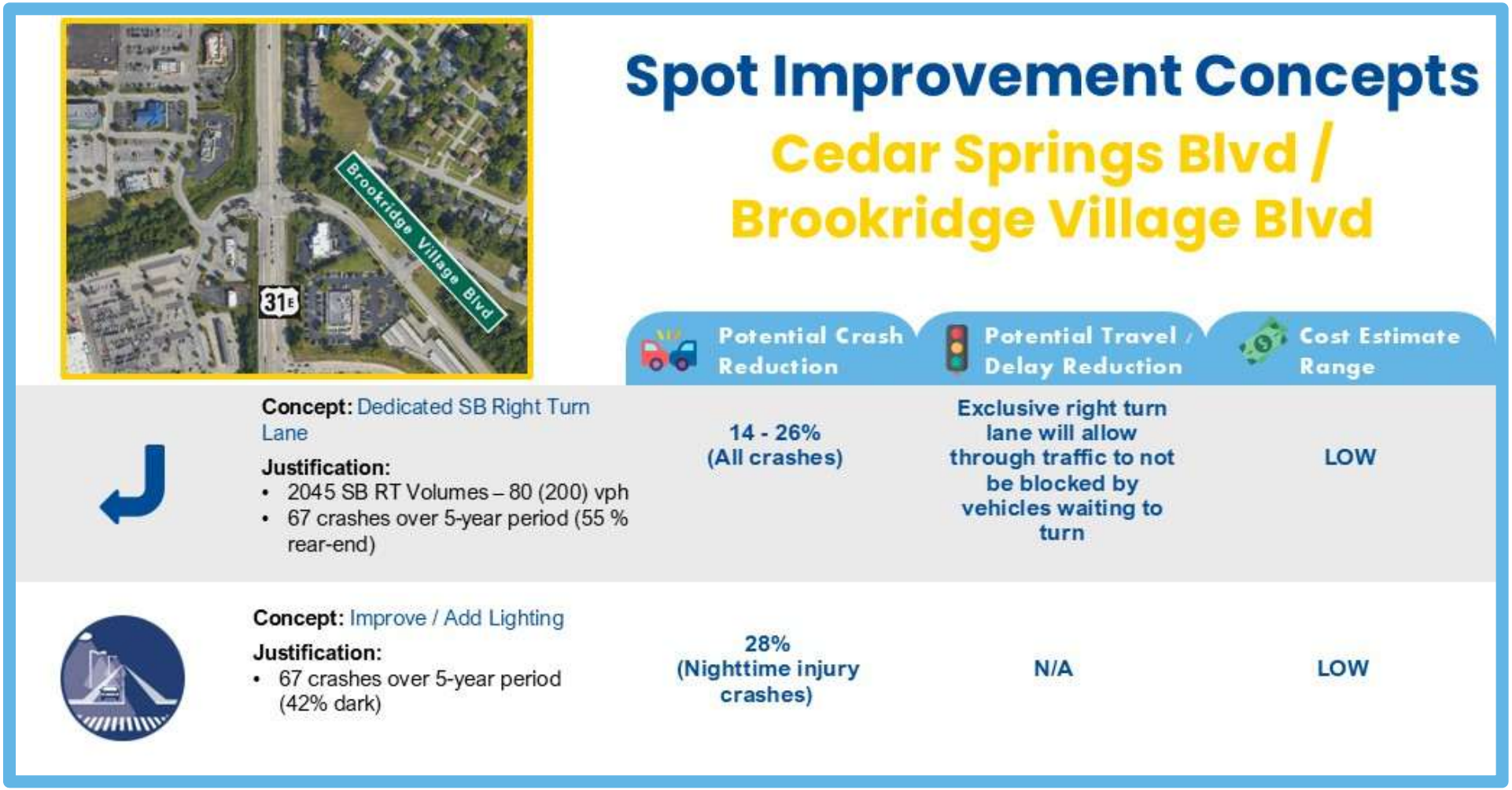


**Figure 38. Spot Improvement Concepts - Cedar Look Drive**


# Spot Improvement Concepts

## Cedar Look Dr

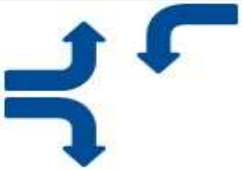
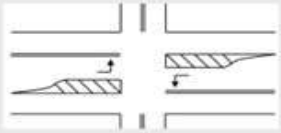
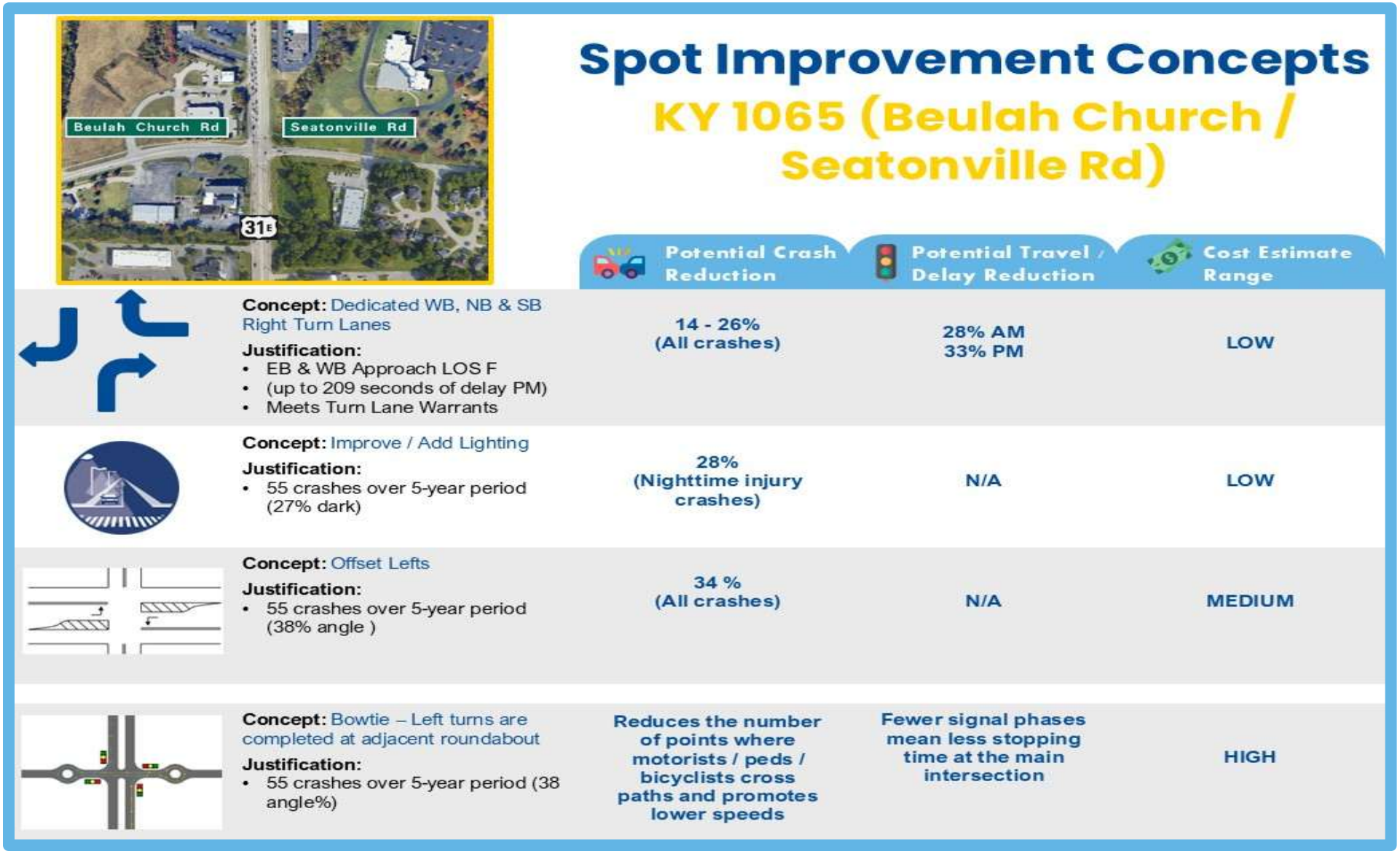
| | | Potential Crash Reduction | Potential Travel / Delay Reduction | Cost Estimate Range |
|---|---|---|---|---|
|  | **Concept:** Extend SB Right Turn Lane<br>**Justification:**<br>• Existing and 2045 Queue length = available storage (150 feet)<br>• 55 crashes over 5-year period (53% rear-end) | N/A | Extension of right turn lane will allow through traffic to not be blocked by vehicles waiting to turn | LOW |
|  | **Concept:** Separate EB Right & Left Turn Lanes; Dedicated WB Left<br>**Justification:**<br>• LOS F (132 seconds of delay PM) | 14 - 26% (All crashes) | 88% PM | LOW |
|  | **Concept:** Offset Lefts<br>**Justification:**<br>• 55 crashes over 5-year period (24% angle) | 34% (fatal and injury crashes) | N/A | MEDIUM |
|  | **Concept:** Improve / Add Lighting<br>**Justification:**<br>• 55 crashes over 5-year period (24% dark) | 28% (Nighttime injury crashes) | N/A | LOW |

**Figure 39. Spot Improvement Concepts - KY 1065 (Beulah Church / Seatonville Road)**



## 6.2 Identification of Corridor Improvement Concepts

This section provides detail on the identification and operational assessment of large-scale improvement concepts applied to the full corridor or longer segments. A Microsimulation model (developed through Vissim) provides the mechanism to compare baseline operations versus network improvements. More detail on the modeling effort and results follow. **Figures 39** and **40** display the concept options

### Vissim

A microsimulation model of the corridor was prepared to consider vehicle interactions, lane-changing behavior, and signal control. The model enables scenario testing for the corridor to evaluate traffic operation changes resulting from existing conditions and proposed concepts such as access modification, lane additions, etc. Performance measures such as queue lengths, travel times, and delays are provided as output for concept comparison.

An existing Vissim model was obtained from the consultant performing the HSIP Safety Study which extended from south of Fairmount Road to north of KY 1065 (Beulah Church Road / Seatonville Road). The model was updated to include the full study area and include roadway configuration changes that had occurred since the original model was developed.

### Vissim Model Calibration

Model development utilized PTV Vissim version 2024.00-06, the latest KYTC Vissim Seed File (June 2022), and the recommended guidance from the KYTC Microsimulation Guidelines (November 2021). Modifications were made where appropriate to match the existing conditions. The Base Year model includes the 2024 balanced turning movement volumes, the updated corridor signal timing, and existing lane configurations with the incorporation of the proposed HSIP Safety Study improvements. To accurately reflect origin-destination patterns, an O-D matrix was developed and utilized for study analysis.

To develop metrics and analyze results, 10 runs were completed for the Base 2024 AM and PM models. Results were aggregated into an average over the set of runs while looking for any outliers. The simulations were run with a seeding period of 30 minutes to ensure that the roadway network was properly loaded with the expected conditions by the time the evaluation of the roadway network begins during the peak hour. The volumes used for seeding reflect the actual 30 minutes of counts before the peak hour.

Model parameters were considered during the calibration process and updated until the model results fell within the KYTC Microsimulation Guidelines Calibrations Targets and showed a reasonable replication of field-observed conditions. The KYTC calibration targets include volumes, travel times, speeds, queues, and visual attributes. The specific targets are shown in **Figure 11**.

**Table 11. KYTC Vissim Calibration Targets**

| Calibration Metric | Calibration Measure | Calibration Target |
|---|---|---|
| Volume | Individual Link Flows:<br>Within 15%, for 700 veh/h < Flow < 2,700 veh/h<br>Within 100 veh/h, for Flow <700 veh/h<br>Within 400 veh/h, for Flow >2,700 veh/h[1] | >85% of cases |
| | Sum of all Link Flows | Within 5% of sum of all link counts |
| | GEH Statistic < 5 for Individual Link Flows | >85% of cases |
| | GEH Statistic for Sum of All Link Flows | GEH <5 for sum of all link counts |
| Travel Time | Within 15% (or 1 min, if higher) | >85% of cases |
| Speed | Within 10% (or 10 mph, if higher)[2] | >85% of cases |
| Queues | (Qualitative)<br>Queues in observed conditions | Observation of similar conditions within model (presence, magnitude, and duration) |
| | (Quantitative)<br>Collected queue length data | Model queues within 20% of observed queue lengths |
| Visual Attributes | Matching Field Observed Conditions (Qualitative) | Reasonable replication of field observed conditions. Documentation/ photos preferable. |

*[1]For conditions with significantly higher volumes this metric may not be achievable.*
*[2]For oversaturated flow conditions that extend over several time periods, it may be difficult to achieve this speed calibration metric.*

Base Year volumes were developed using a mix of previous count volumes from the HSIP Safety Study and new counts for this study which were then combined by forecasting and balancing. As parts of the model had previously been developed and calibrated, adding on to a model resulted in some discrepancies where the volume on the model network may not reflect the existing travel times, speeds, and queueing collected during the recent field review. Therefore, calibration targets were limited to volume flows to ensure correct O-D parameters and visual attribute checks. After calibration, the Base Year models met all volume calibration measures as well as matching field observed conditions.

### Vissim Future Year Models

The following 2045 Future Year models were developed for the comparison of alternatives. The Future Year models did not include any intersection improvements beyond those already committed or described below:

- No Build
- Six-Lane Widening
- RCUT Corridor System
- Additional Northbound Lane from Colonel Hancock Drive to I-265

**No Build** – This model includes the Base Year configuration including the selected HSIP Safety Study improvements as well as an upcoming lane configuration change for the approaches of Cedar Creek Road and Brentlinger Lane which also includes an additional eastbound right-turn lane.

**Six-Lane Widening** – This model includes the No Build model plus lane additions to have six lanes throughout the corridor from the county line to I-265. The signal system was adjusted accordingly and optimized for the additional lanes. Generally, permitted left-turn phasing is prohibited across three lanes, so mainline left turns were converted to protected-only.

**Additional Northbound Lane from Colonel Hancock Drive to I-265 –** The HSIP Safety Study will widen the southbound direction to six lanes from I-265 to Colonel Hancock Drive. Widening in the northbound direction was found to improve operations as well during the intersection analysis of Cedar Creek Road and Brentlinger Drive. This was included as a preliminary improvement option in

the HSIP Safety Study as well but not carried forward due to constraints. As an alternative to modeling most of the corridor with six lanes, this option was modeled to see the impact of only having six lanes along the corridor north of Colonel Hancock Drive to I-265.

**RCUT Corridor System –** This model includes the No Build changes plus access modifications to create a system of RCUT intersections. An iterative process was utilized to determine the configuration and extent of the RCUT system including which intersections to include, number of lanes, and whether the intersections or U-turns should be signalized. The signal system was adjusted and optimized as needed.

A comparison of the network results for each scenario is shown in **Table 12.** All alternatives show improvement to average network delays, speeds and travel times. However, the analysis showed that the RCUT alternative would provide the most improvement.

**Table 12. Vissim Network Results for Future Year Scenarios**

| Alternative | AM | | | PM | | |
|---|---|---|---|---|---|---|
| | Average Delay (sec) | Average Speed (mph) | Average Travel Time (sec) | Average Delay (sec) | Average Speed (mph) | Average Travel Time (sec) |
| No Build | 360 | 14.4 | 520 | 381 | 14.3 | 547 |
| Build - Six Lane Widening | 273 | 18.4 | 451 | 274 | 18.2 | 451 |
| Build - Add NB Lane From Col Hancock to I-265 | 270 | 18.2 | 441 | 340 | 15.8 | 512 |
| Build - RCUT (Colonel Hancock to Fairmount) | 184 | 23.3 | 361 | 243 | 19.5 | 417 |

The corridor scenarios evaluated in this section do not extend north of the I-265 interchange to KY 1065 (Beulah Church Road / Seatonville Road). Although the initial HSIP study examined this segment for possible widening and other improvements, the scale of work required to meaningfully improve operations exceeds what can be funded through HSIP. Given the limited right-of-way and the dense, closely spaced development along this portion of the corridor, targeted intersection upgrades and signal timing adjustments - previously noted - remain the most practical strategies for addressing congestion and safety concerns.

Additionally, adding southbound capacity between Beulah Church Road / Seatonville Road and I-265 would require both northbound and southbound left-turn movements to operate as protected-only, which would in turn increase queue lengths. For these reasons, widening to add capacity was not carried forward for further consideration in this area.

**Figures 40 - 41** show the resulting identified corridor concepts per the traffic operations results as well as identified potential safety benefits.

**Figure 40. Corridor Improvement Concepts – General**

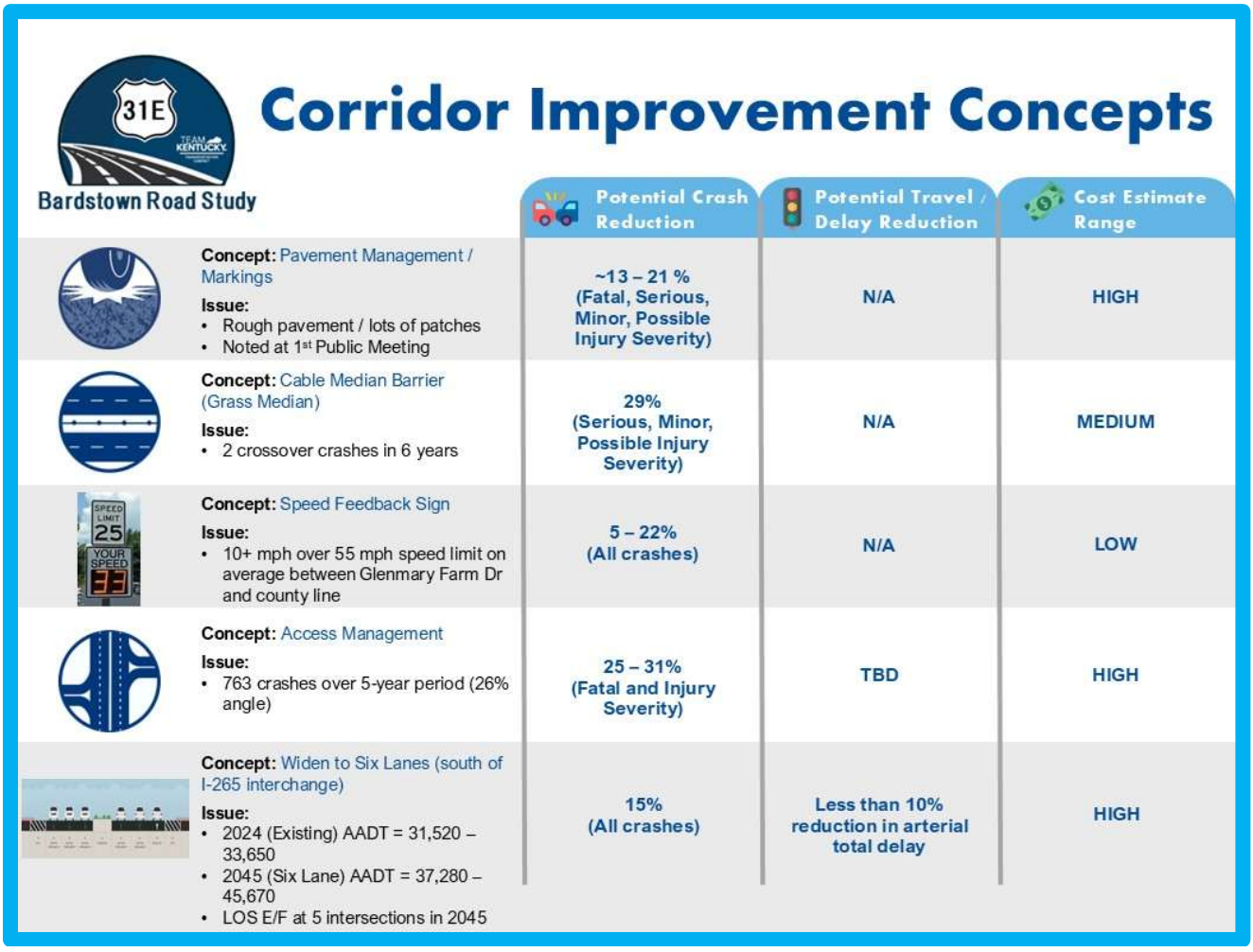
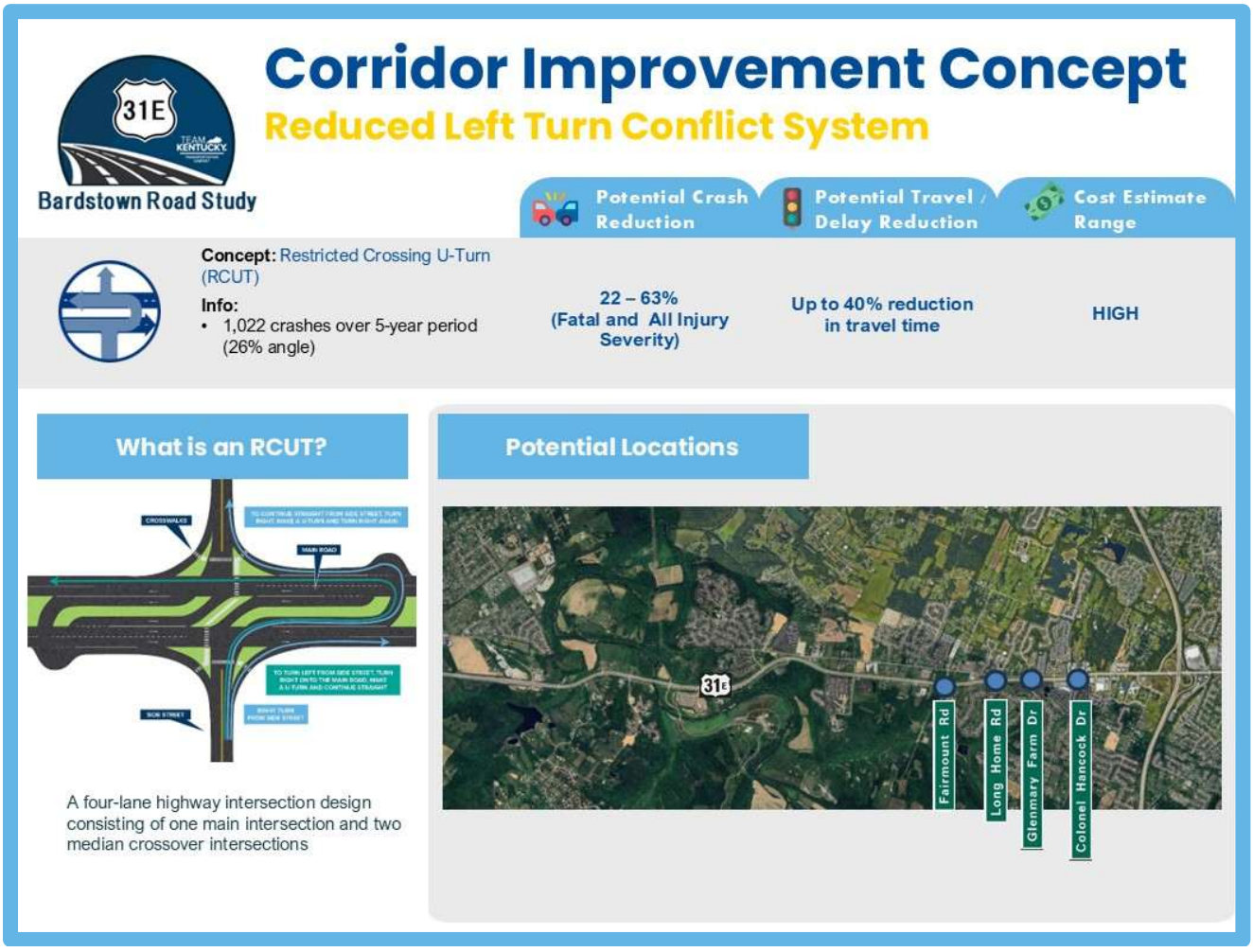


**Figure 41. Corridor Improvement Concepts – RCUT**



## 6.3 Multimodal Improvement Concepts

The purpose of this study is to also improve multimodal transportation options along the US 31E corridor. Through the existing conditions evaluation, transit, pedestrian, and bicycle use was identified along with the existing infrastructure. Initial improvement concepts developed in this section focus on enhancement to current transit operations and connectivity / facilities for pedestrians and bicyclists.

A key reference for determining context-appropriate applications for multimodal improvements to the corridor is the recently developed Complete Streets, Roads, and Highways Manual (Kentucky Transportation Cabinet).

**Figure 42 – Figure 45** display preliminary multimodal improvement concepts.

**Figure 42. Transit Improvement Concept**

# Transit Improvement Concept

Bardstown Road Study

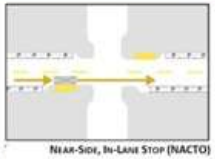
| Potential Crash Reduction | Potential Travel / Delay Reduction | Cost Estimate Range |
|---|---|---|
| N/A | Depends on investment level | Depends on investment level |

**Concept:** Enhance Transit Service

**Info:**
- Standardize bus stop locations
- Upgrade higher usage stops
- Provide faster bus running times

## Standardized Bus Stops

- Relocate stops between intersections to an intersection
- Be consistent in stop location (either before or after intersection)
- Align NB and SB stops so they are directly across each other
- Improve signage – should be larger signs with larger fonts that exceed TARC Transit Design Standards Manual





## Upgrade Stops

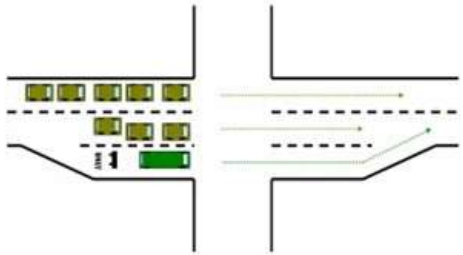
Higher usage stops include:
- Glenmary Plaza
- Cedar Look
- Brookridge Village

- Provide bus shelter, concrete pad, bench, and trash bin.


Near-side bus stop with shelter, trash receptacle and wheelchair landing pad

## Enhanced Efficiency

- Queue jump lanes
- Dedicated transit signaling at intersections
- Transit signal pre-emption



Queue jump lane example

**Figure 43. Shared Use Path Concept**

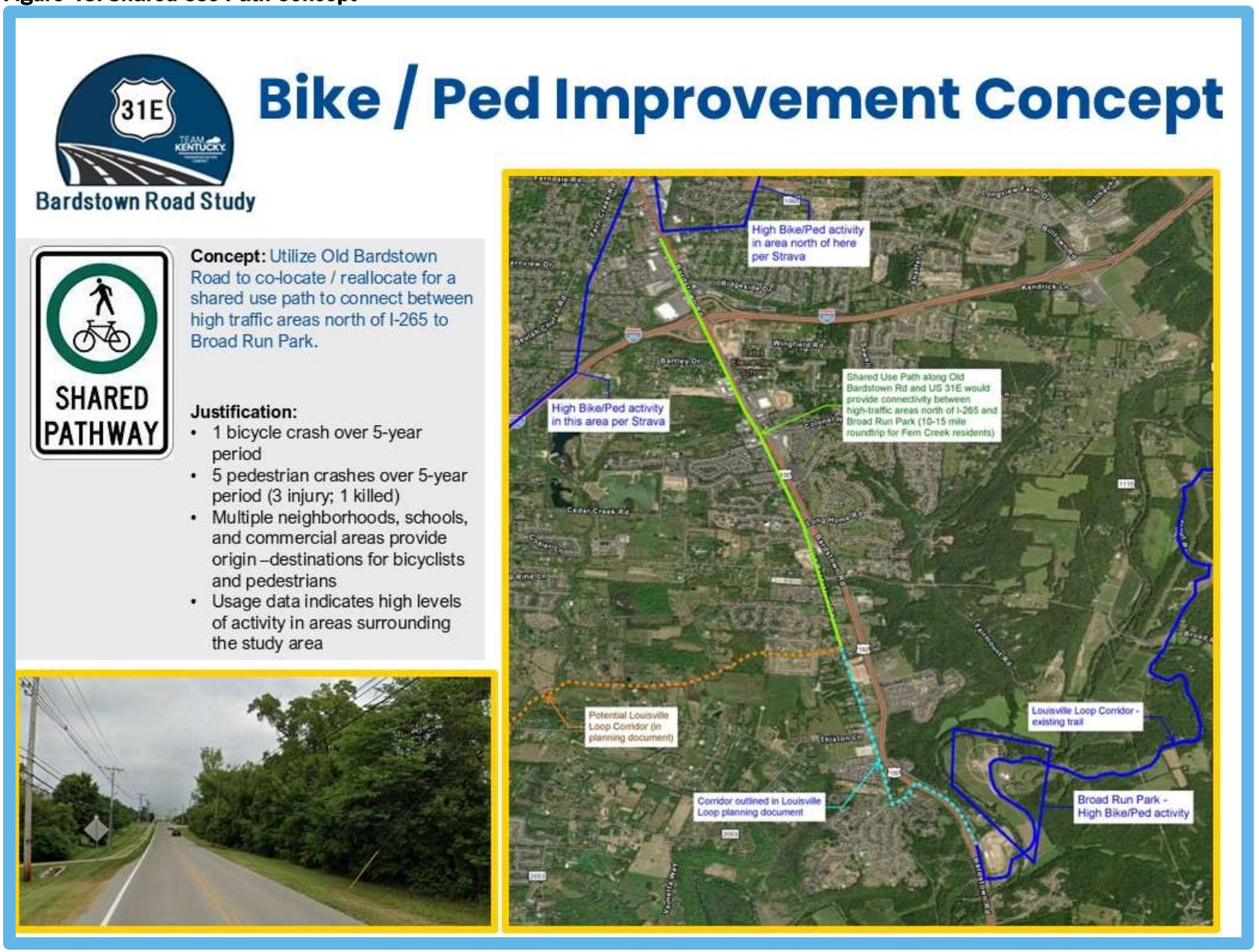


**Figure 44. Sidewalk Connectivity Concept**

Bardstown Road Study

# Sidewalk Connectivity Improvement Concept

**Concept:** Extend / construct new segments of sidewalk for continuity of pedestrian network in the commercial / residential areas along US 31E. South of Glenmary Farm Drive / Providence Drive utilize Old Bardstown Road to continue facilities to furthest extent of existing sidewalk.

**Issue:**

- As development continues - sidewalks are being added but may not connect to previous / adjacent facilities creating a discontinuous network between neighborhoods and commercial / community facilities.

ADA Ramp with No Connectivity

Example Segment of Sidewalk

**Figure 45. Pedestrian Interchange Connectivity Concept**

# Pedestrian Interchange Connectivity Improvement Concept

Bardstown Road Study

**Concept:** Place pedestrian path in median with concrete median barrier separators and connect to all crossings at existing signalized intersections.

**Issue:**

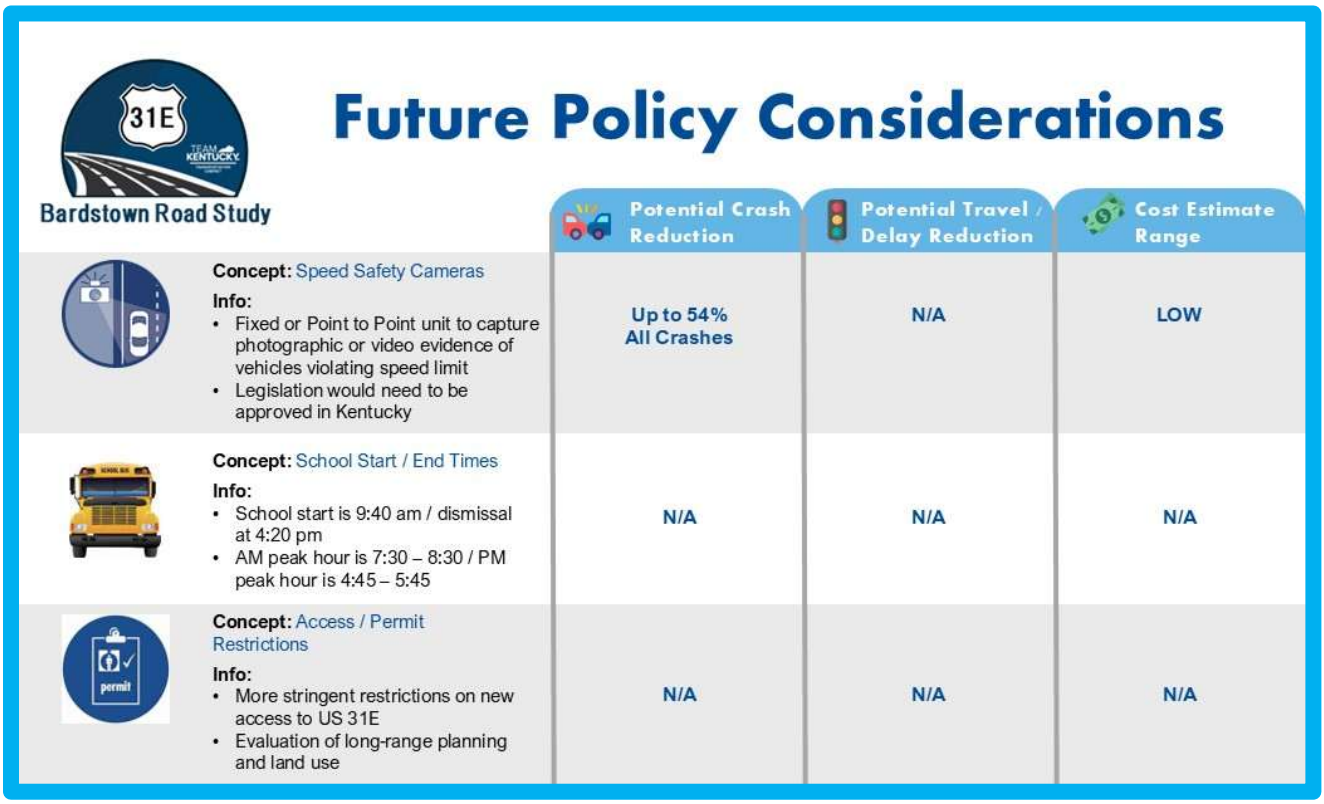
- Commercial development and neighborhoods exist north and south of the I-265 interchange and I-265 serves as a barrier to connectivity.
- 2 crashes involved pedestrians in the interchange area over a 5-year period.

Example – I-275 / Graves Road Interchange

## 6.4 Future Policy Considerations

Additional improvement options identified that do not result in infrastructure modifications are presented in **Figure 46**. These focus on modifications to current policies, with the intended result to provide positive changes in transportation operations. Further evaluation / pursuit by KYTC / Louisville Metro / Jefferson County / other legislative or decision-making bodies would be necessary to implement.

**Figure 46. Future Policy Considerations**



## 6.5 Concepts Dismissed from Further Study

During the initial screening process, several concepts were considered but ultimately dismissed from further study based on feasibility, effectiveness, or alignment with project goals. These concepts were evaluated against criteria such as cost, environmental impact, constructability, and ability to meet projected demand. Concepts that did not sufficiently address key issues, posed significant implementation challenges, or offered limited benefit relative to other options were removed from further consideration. Concepts considered and the rationale for dismissing are shown in **Figure 47** for documentation and to ensure transparency in the decision-making process.

**Figure 47. Concepts Dismissed From Further Study**


Note: While full interchange reconfiguration was dismissed from this study, a recommendation could be made to evaluate the interchange as a separate study to better address full system operations in the context of US 31E and I-265.

# Chapter 7 – Continuing Community Outreach

A second focused effort on public engagement occurred following the development of improvement concepts. This outreach effort included a meeting with the Local Elected Officials / Stakeholders, a Public Meeting, and an online survey.

## 7.1 Local Elected Officials / Stakeholders Meeting No. 2

The meeting with the Local Elected Officials / Stakeholders was held on the same day as the Public Meeting at the Bates Elementary School library. A virtual option was available for those that could not attend in person. Representatives included:

- Louisville Metro
- Bike Louisville
- State and local elected officials
- Jefferson County Public Schools
- Fern Creek Fire and EMS

For a full list of attendees – refer to the meeting minutes included in **Appendix E**.

Locations and draft concepts for improvements were presented at this meeting. Attendees provided input and were able to ask questions about the concepts presented. Information obtained from the meeting is summarized below. Additional information can be found in the meeting minutes.

- Attendees noted several intersections with more development expected in the future – Cedar Creek Road and Southpointe Boulevard.
- Further clarification was requested on the safety impact of widening US 31E from four to six lanes.
- Discussion was held on consideration of transportation systems management operations (TSMO) concepts, in particular managed lanes. Tradeoffs would occur between access and mobility.

## 7.2 Public Meeting No.2

This public meeting provided an opportunity for residents and users of the corridor to view and provide input on initial improvement concepts. It was held at the Bates Elementary School Cafeteria on November 14, 2024, from 5:30 – 7:30 PM (EST). The meeting format was open-house style with handouts, displays, a looping video and interactive stations. A total of 154 individuals signed-in (excluding project team members). Outreach efforts included:

- KYTC District 5 website
- KYTC District 5 social media
- Newspapers (Louisville Courier Journal and Bullitt County Pioneer News)
- Variable message signs stationed along US 31E corridor
- Flyers distributed to target areas for outreach to traditionally underrepresented populations. This included distribution to the Cedar Heights Mobile Home Park and the Cedar Creek Baptist Church

Meeting materials and surveys were provided in both English and Spanish. **Appendix H** contains a complete summary of information.

A packet listing all improvement concepts was provided to attendees. They could select “Like”, “Dislike” or “Neutral" for each concept. The following charts (**Figure 48 – Figure 50**) display the number of responses for each improvement concept category.

**Figure 48. Public Meeting No. 2 – Intersection Improvement Input**

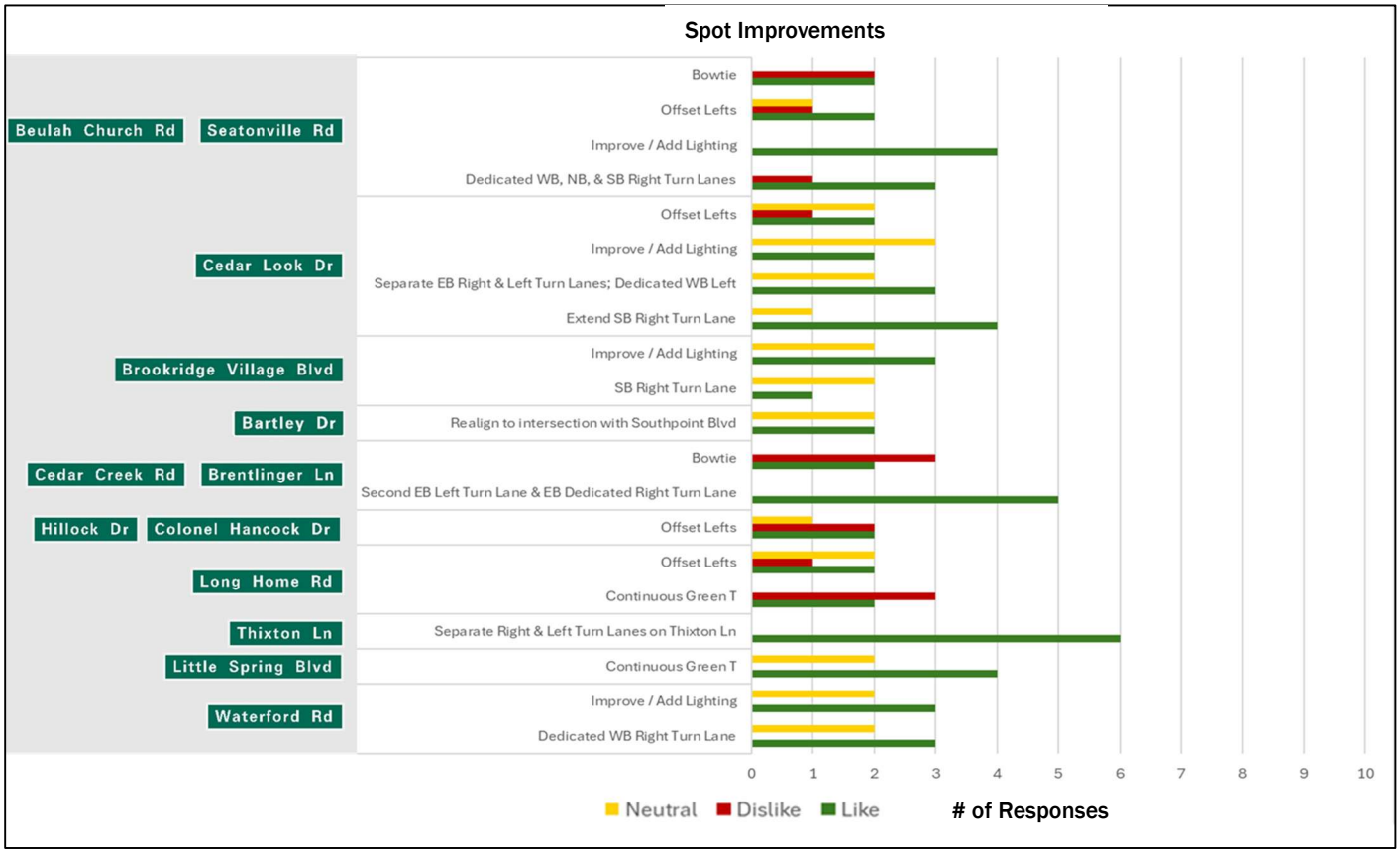


**Figure 49. Public Meeting No. 2 – Road Segment Improvement Input**

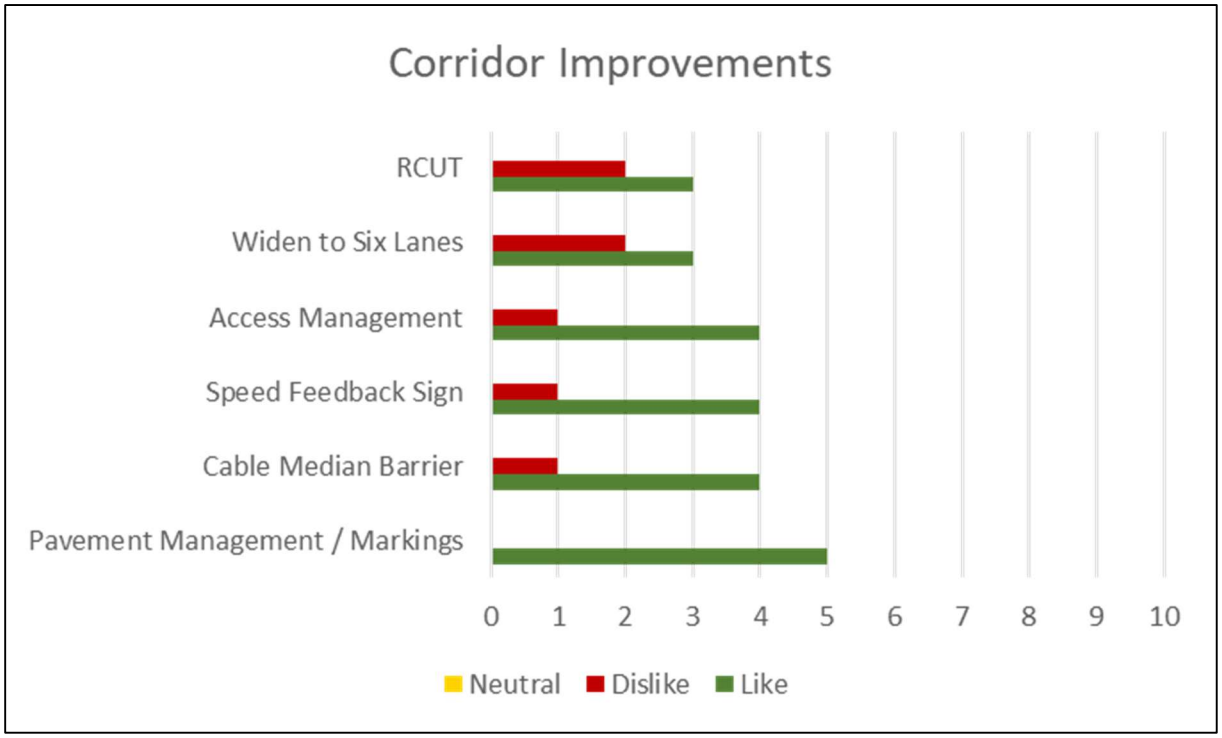
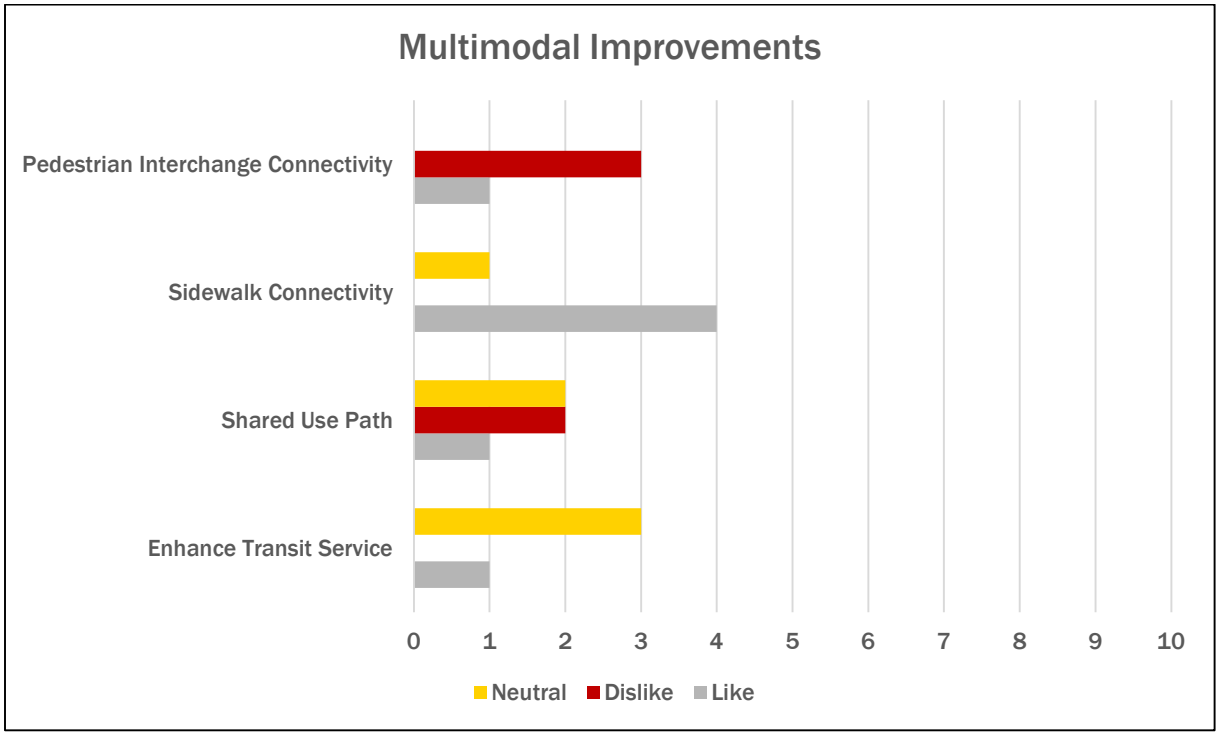



**Figure 50. Public Meeting No. 2 – Multimodal Improvement Input**



## 7.3 Online Survey No. 2

Similar information presented at the public meeting was published as a StoryMap and accessible through the KYTC District 5 website. A link to an online survey was distributed at the public meeting, through flyers, and through social media. The survey opened on November 7, 2024, and closed on January 10, 2025, with a total of 273 responses. **Figure 51 – Figure 53** display the number of responses for each improvement concept category.

**Figure 51. Online Survey No. 2 – Intersection Improvement Input**

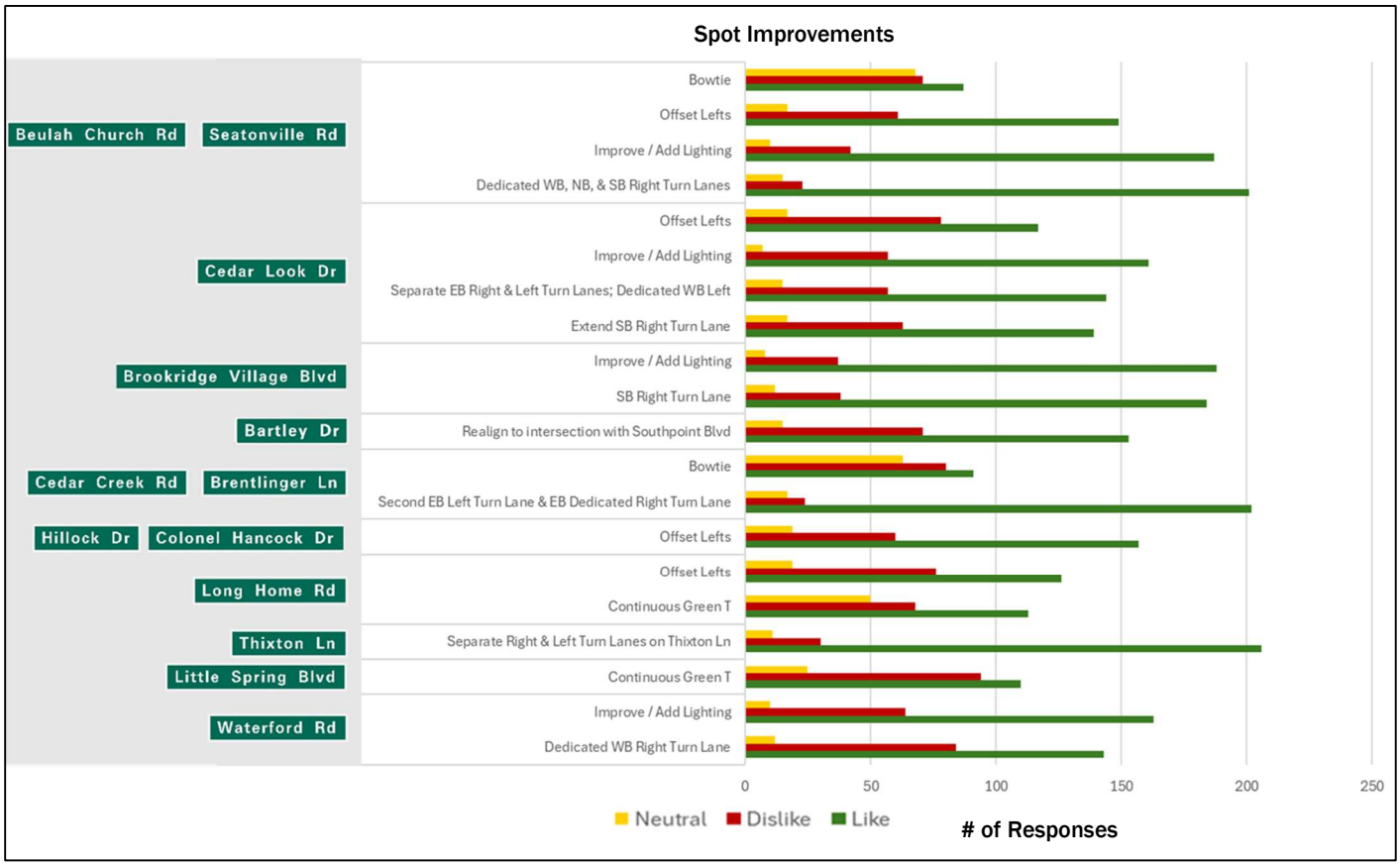


**Figure 52. Online Survey No. 2 – Road Segment Improvement Input**

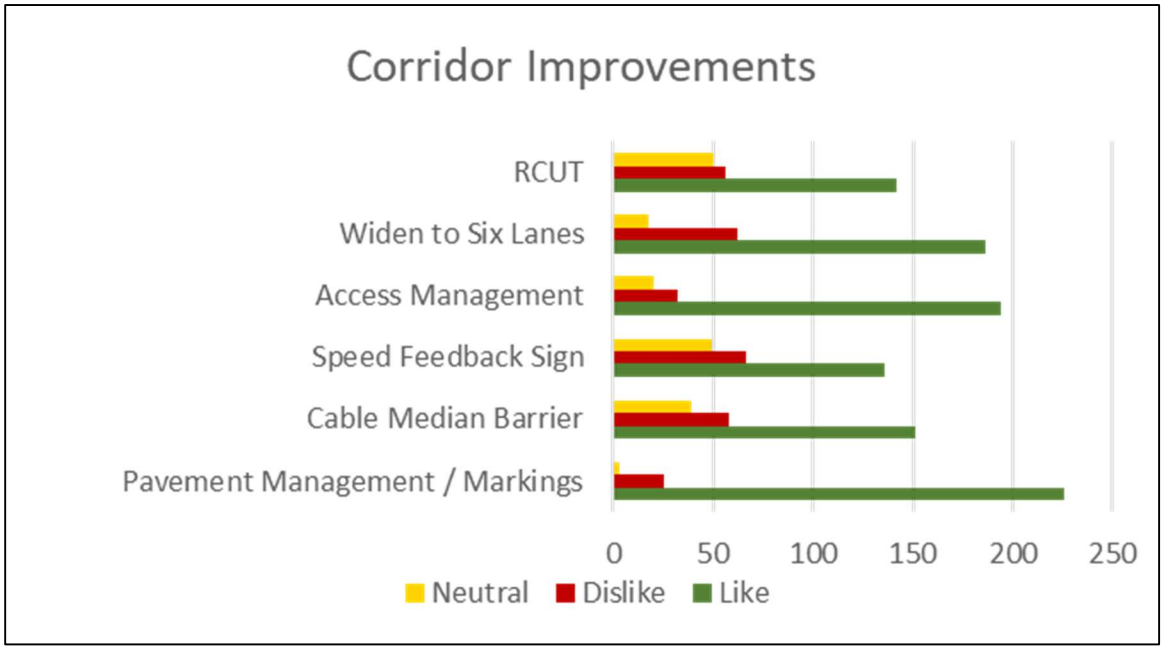
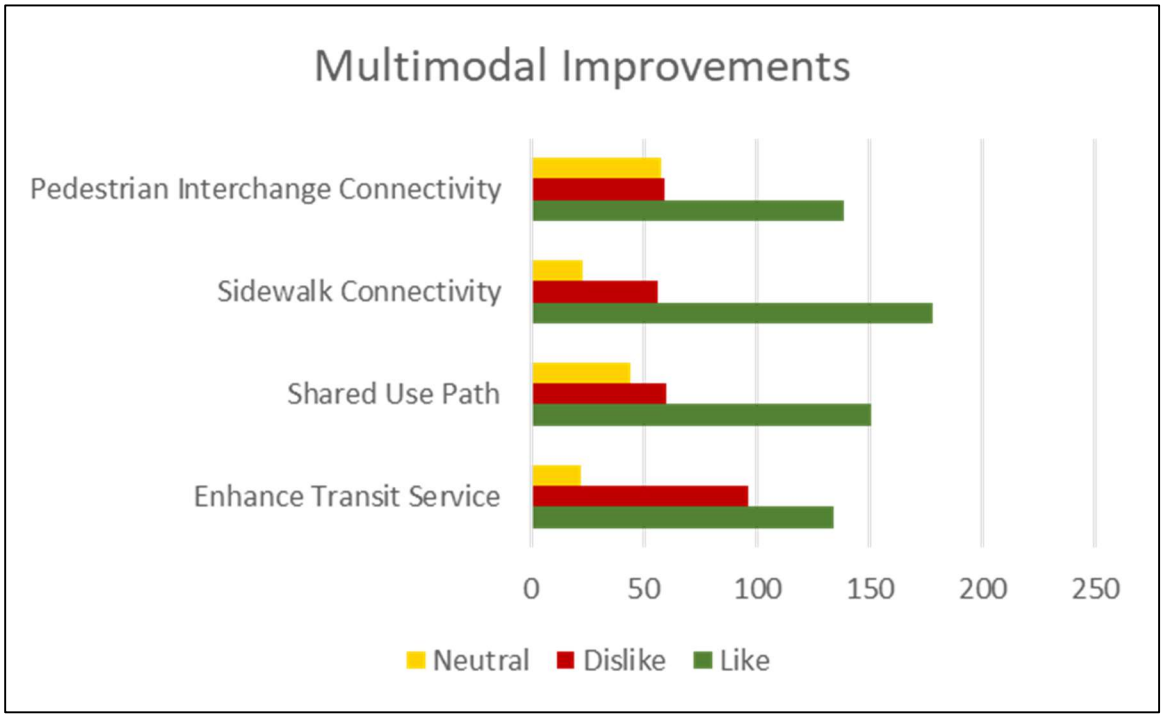



**Figure 53. Online Survey No. 2 – Multimodal Improvement Input**



# Chapter 8 – Improvement Concept Refinement

Following the second community outreach effort, additional information and analysis was compiled and refinements were made to the improvement concepts. Conceptual drawings were prepared to better understand impacts and benefits. Traffic operations analysis was further evaluated along with number and severity of crashes. To aid in evaluation / prioritization, cost estimates specific to each concept were prepared along with a calculated return on investment.

## 8.1 Cost Estimates

Planning-level (high-level) cost estimates were produced for each of the improvement concepts by estimating the 2024 costs of Design, Right-of-way acquisition, Utilities, and Construction. No surveying or detailed design was performed. Construction quantities such as pavement, earthwork, traffic items, etc. were estimated for each item determined to be necessary to construct the proposed improvements. Factors were applied to increase this amount to account for contingencies, miscellaneous items not estimated, and small-project inflation. This cost was then multiplied by a factor to estimate the design cost if it was over the base design amount.

KYTC District 5 utility staff provided an assessment of major utilities and unit prices along the corridor. This is included in **Appendix I**. High-level utility location and identification was performed for each improvement concept using this information and available online utility mapping sources.

For improvements that had a potential impact on areas outside of right-of-way, the impact area was estimated with a per acre cost assigned.

Additional information and calculations of cost estimates are provided in **Appendix J**. Costs by phase (i.e., design, right-of-way, utilities, and construction) are included on the final improvement concept summary sheets found later in this chapter.

## 8.2 Return on Investment

Benefits of a transportation investment measure the direct and positive effects of that project over a specified period of time. A return on investment (ROI) analysis can be leveraged as one of the many tools to consider improvements and support decisions for infrastructure investment. Relying upon guidance from the U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs (January 2024), there are four primary areas of project benefit that can be translated into monetary values. These include:

- Travel Time Savings (vehicle-hours traveled or VHT)
- Vehicle Operating Costs (vehicle-miles traveled or VMT, which is the most common variable that affects vehicle operating costs)
- Safety Benefits (reduction in the likelihood of fatalities, injuries, and property damage resulting from crashes on the investment)
- Emissions Reduction Benefits

Costs for this planning stage are focused on capital costs – the total investment required to prepare an improvement for service. Maintenance costs are not included as the initial period focuses on the benefit of construction. All monetary values are in constant (2024) dollars. Discounting (the process of converting the costs and benefits that take place in different years into a common year) is not included in this high-level analysis.

The emphasis for this study has been on the consideration of improving safety and operational performance. As noted through the existing conditions analysis and development of future year volumes, traffic operations are generally at an acceptable level for the corridor throughout the study area. Therefore, this analysis focuses on identifying the safety benefits and comparing that to the investment cost to determine a ROI ratio.

To translate the safety benefits associated with an improvement, crash modification factors (CMFs) from the Crash Modification Factors Clearinghouse were applied to the number of applicable crashes at each location to determine an estimated number of crashes "saved" by implementing the countermeasure. The estimated crash reduction number was then multiplied by an estimated cost per crash. The costs per crash were determined based on initial research completed by Vanasse Hangen Brustlin, Inc. (VHB) and broken down by the KABCO severity scale. KYTC has further developed a spreadsheet using these costs calibrated by the severity distribution for each District using the historic crash severity breakdown. Comparing the estimated crash benefit to the estimated project cost yields a ROI value. Anything over a value of 1 indicates a positive return on investment. Simplified, the process for determining ROI for this study is:

(Estimated Crash Reduction % (from CMF)) x (Total Number of Crashes CMF Applies To) x (Average Crash Cost) = Estimated Crash Benefit

ROI = Estimated Crash Benefit / Estimated Project Cost

For the shorter-term, lower-cost spot improvements, the ROI value is provided for a five-year period. For larger scale investments such as full intersection reconstruction, the ROI is provided for a 20-year period.

ROI values are shown in **Table 13 – Table 16** by location along with a brief description of improvements, cost estimate, and public input.

**Table 13. Refined Spot Improvements**

| Concept ID | Location | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) |
|---|---|---|---|---|---|
| **A** | KY 660 (Waterford Rd) | Turn Lanes | $437,000 | 1:1 | 60 |
| **B** | Little Spring Blvd | Continuous T | $2,530,000 | 1:1 | 49 |
| **C** | KY 2053 (Thixton Ln) | Turn Lanes | $459,000 | 23:1 | 84 |
| **D** | Long Home Rd | Offset Lefts | $616,000 | 6:1 | 57 |
| **E** | Long Home Rd | Continuous T | $1,800,000 | 2:1 | 49 |
| **F** | Hillock Dr / Colonel Hancock Dr | Offset Lefts | $399,000 | 24:1 | 66 |
| **G** | Cedar Creek Rd / Brentlinger Ln | Bowtie | $5,480,000 | 2:1 | 39 |
| **H** | Cedar Creek Dr / Brentlinger Ln | Turn Lanes | $1,144,000 | 13:1 | 83 |
| **I** | Bartley Dr | Realign Intersection | $3,500,000 | N/A | 64 |
| **J** | Cedar Springs Blvd / Brookridge Village Blvd | Turn Lanes | $849,000 | 17:1 | 78 |
| **K** | Cedar Look Dr | Offset Lefts | $517,000 | 38:1 | 60 |
| **L** | Cedar Look Dr | Turn Lanes | $1,041,000 | 20:1 | 67 |
| **M** | KY 1065 (Beulah Church / Seatonville Rd) | Bowtie | $6,090,000 | 3:1 | 39 |
| **N** | KY 1065 (Beulah Church / Seatonville Rd) | Offset Lefts | $639,000 | 12:1 | 65 |
| **O** | KY 1065 (Beulah Church / Seatonville Rd) | Turn Lanes | $1,310,000 | 10:1 | 60 |

**Table 14. Refined Corridor Improvements**

| Concept ID | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) |
|---|---|---|---|---|
| A | Old Bardstown Road Management (modify pavement markings and STOP signs) | $100,000 | N/A | N/A |
| B | Widen to Six Lanes | $82,600,000 | 1:1 | 70 |
| C | RCUT | $13.860,000 | 2:1 | 57 |

**Table 15. Refined Multimodal Improvements**

| Concept ID | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) |
|---|---|---|---|---|
| A | Enhance Transit | $730,400 | N/A | 53 |
| B | Sidewalk Connectivity | $2,060,000 | N/A | 69 |
| C | Pedestrian Interchange Connectivity | $1,410,000 | N/A | 54 |

**Table 16. Refined Other Improvements**

| Concept ID | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) |
|---|---|---|---|---|
| A | Pavement Management / Markings | $6,160,000 | 21:1 | 89 |
| B | Speed Feedback Signs | $40,000 | 249:1 | 55 |
| C | Cable Median Barrier | $660,000 | 3:1 | 61 |
| D | Lighting | $880,000 | 25:1 | 74 |
| E | Aesthetics (median and shoulder landscaping and treatment) | Varies | N/A | N/A |

## 8.3 Concept Refinement – Iteration No. 1

The improvement concepts presented at the second community outreach effort were refined as noted with the additional information shared with the project team (Project Team Meeting No. 3). During the meeting, each concept was discussed with the most feasible kept for prioritization and suggestions made to consolidate / further evaluate the remaining concepts. Changes to the projects are documented from **Table 17 – Table 20**. In addition to the existing list of improvement concepts, KYTC requested a project sheet be added to address queuing issues on the I-265 WB Ramp.

**Table 17. Spot Improvement Refinements**

| Concept ID | Location | Description | Discussion | Result |
|---|---|---|---|---|
| SPOT | | | | |
| A | KY 660 (Waterford Rd) | Turn Lanes | No comment | Include – no modifications |
| B | Little Spring Blvd | Continuous T | Minor improvement in traffic operations. | -Dismiss Continuous T<br>-Evaluate Signalization<br>-Evaluate removing left turn movement from Little Spring Blvd |
| C | KY 2053 (Thixton Ln) | Turn Lanes | No comment | Include – no modifications |
| D | Long Home Rd | Offset Lefts | May combine to one sheet for all offset left locations | |
| E | Long Home Rd | Continuous T | The current option is essentially an RCUT without loons. | -Dismiss Continuous T<br>-Evaluate as an RCUT (standalone and as part of a system) |
| F | Hillock Dr / Colonel Hancock Dr | Offset Lefts | May combine to one sheet for all offset left locations | |
| G | Cedar Creek Rd / Brentlinger Ln | Bowtie | -Roundabout east of US 31E too far from main intersection / potential impacts to apartments<br>-Does not fully address congestion | -Dismiss Bowtie |
| H | Cedar Creek Rd / Brentlinger Ln | Turn Lanes | No comment | Include – no modifications |
| I | Bartley Dr | Realign Intersection | -Concept provides a more efficient system<br>-Allows left turns from Bartley | -Update background imagery |
| J | Cedar Springs Blvd / Brookridge Village Blvd | Turn Lanes | -Look at providing 2nd NB left turn lane to Walmart | -Consider feasibility (traffic and cost) for 2nd NB left turn lane |
| K | Cedar Look Dr | Offset Lefts | Combine offset lefts and turn lanes into one project sheet. | Combine K & L |
| L | Cedar Look Dr | Turn Lanes | Combine offset lefts and turn lanes into one project sheet. | Combine K & L |
| M | KY 1065 (Beulah Church / Seatonville Rd) | Bowtie | Merits further study | Include |
| N | KY 1065 (Beulah Church / Seatonville Rd) | Offset Lefts | Combine offset lefts and turn lanes into one project sheet. | Combine N & O |
| O | KY 1065 (Beulah Church / Seatonville Rd) | Turn Lanes | Combine offset lefts and turn lanes into one project sheet. | Combine N & O |

**Table 18. Corridor Improvement Refinements**

| Concept ID | Description | Discussion | Result |
|---|---|---|---|
| CORRIDOR | | | |
| A | Old Bardstown Road Management (modify pavement markings and STOP signs) | Old Bardstown Road is maintained by Louisville Metro | Note on sheet Louisville Metro jurisdiction |
| B | Widen to Six Lanes | -Additional lane results in added traffic per travel demand model results<br>-Full corridor widening to county line infeasible (per return on investment). Revise limits to determine if portion of corridor may benefit from additional lane. | -Revise limits of widening; consider adding a lane in both directions as well as individually NB & SB<br>-Take off typical section from sheet – too prescriptive at this stage |
| C | RCUT | Strategic placement of RCUTS addresses some of the access management issues. | -Evaluate each RCUT individually and make a project sheet if reasonable as stand-alone project<br>-Keep system RCUT option as a sheet<br>-Review / revise pedestrian accessibility<br>-Consider hybrid option of widening + RCUTS |

**Table 19. Multimodal Improvement Refinements**

| Concept ID | Description | Discussion | Result |
|---|---|---|---|
| MULTIMODAL | | | |
| A | Enhance Transit | -Need to reword statement under issues about poor on-time performance – not necessarily true | Investment in system needs to be led by TARC who is currently re-evaluating system |
| B | Sidewalk Connectivity | -Look for opportunities to include segments in other construction projects<br>-Need to be clear on maintenance responsibilities | Include |
| C | Pedestrian Interchange Connectivity | -Look for opportunities to include segments in other construction projects<br>-Need to be clear on maintenance responsibilities | Include |

**Table 20. Other Improvement Refinements**

| Concept ID | Description | Discussion | Result |
|---|---|---|---|
| OTHER | | | |
| A | Pavement Management / Markings | See comments in meeting minutes regarding resurfacing | Take out |
| B | Speed Feedback Signs | Like ones that are:<br>-Portable (can move around)<br>-Capture data<br>-Use ones that display “Slow Down” if going over posted limit – do not encourage speeding by showing real speed. | Include but modify to be portable |
| C | Cable Median Barrier | Need to check HSIP process that evaluates risk vs liability. Determine if on list for improvements or dismissed through process. | Keep pending results from HSIP evaluation |
| D | Lighting | Lighting modifications / installations should be completed at intersections or where there is noted ped activity. | Project sheet lists priority locations: will review to determine if any additional locations should be added based on activity. |
| E | Aesthetics (median and shoulder landscaping and treatment) | Where appropriate combine with other projects. | Take out |

## 8.4 Concept Refinement – Iteration No. 2

The list of improvement concepts was modified following the discussion from Project Team Meeting No. 3. Adjustments were made to the cost estimates and associated impacts as a result. The revised improvement concept sheets were presented at a virtual meeting with the Project Team. Additional review focused on the widening and RCUT concepts. Suggested changes to the presentation of these concepts included:

- Move NB thru lane addition concept to spot / segment list
- Add widening concept back to corridor list with phases
- Review cost / constructability of RCUTs and confirm there is no overlap between individual RCUT projects to a transition of RCUTs. Each RCUT should be shown both as an individual project sheet (stand-alone) and as a system. As a result, project sheets were added for the Fairmount Road and Providence Drive / Glenmary Farm Drive intersections. The public input shown is based on overall public opinion of RCUT option.

The Project Team also requested consideration of lane splits for dedicated southbound lanes accessing I-265 ramps. The split of peak hour ramp traffic southbound (AM 440, 190; PM 415, 165) does not support additional lane capacity compared to higher northbound volumes (AM 905, 825; PM 580, 630).

## 8.5 Improvement Concept Summary Sheets

The final set of improvement concepts for intersections / spots, the corridor, multimodal options, and other modifications was prepared for use to assign priority. The following pages present each concept for these categories with a summary of information for programming / further project development as funding permits.

# A
INTERSECTION

## MP 0.111
## US 31E AT KY 660 (WATERFORD ROAD) TURN LANES

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES
- Congestion
- Safety

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| WB Approach | |
|---|---|
| LOS AM (PM) | Delay (s) AM (PM) |
| F (E) | 54.8 (43.1) |

### 2018 – 2023 SAFETY ANALYSIS
- 2 Total crashes
- Intersection LOSS KAB = 4

### CONSTRUCTABILITY CONSIDERATIONS
- None currently

## IMPROVEMENT CONCEPT

Add WB Right Turn Lane on Waterford Road to US 31E.

**60%**

### PUBLIC INPUT
- 60% Liked
- 244 Total responses

### COST ESTIMATE

**$437,000**

D:$37,000 U:$30,000
R:$0 C:$370,000

**2:1**

### RETURN ON INVESTMENT
- 14-26% reduction in total crashes
- LOS D (D) / Delay 30s (30.8s) (up to 45% improvement)

### PRIORITY
LOW

**B**

INTERSECTION

# MP 1.563
# US 31E AT LITTLE SPRING BOULEVARD
# RCUT

Bardstown Road Study

Item No. 5-80261

Jefferson County


## INFORMATION

**ISSUES**

- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| NB Left | | EB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| B (F) | 11.1 (62.4) | C (F) | 18.5 (265.7) |

**2018 – 2023 SAFETY ANALYSIS**

- 15 Total crashes
- 67% Angle crashes
- 1 Fatality
- 8 Injury
- Intersection LOSS KAB = 4

**CONSTRUCTABILITY CONSIDERATIONS**

- Potential utility pole relocation near loon
- Potential impact to rock cut for clear zone

## IMPROVEMENT CONCEPT

Restrict left turns from Little Spring Boulevard. Left turn traffic must make a right turn first, then enter left turn lane to make a U-turn through the median.

**PUBLIC INPUT**

57%

- 57% Liked RCUT Options
- 253 Total Responses

**COST ESTIMATE**

$1,290,000

D:$110,000 U: $30,000
R: $50,000 C: $1,100,000

**RETURN ON INVESTMENT**

13:1

- 63% reduction in fatal & injury crashes
- EB Approach: PM LOS F / Delay 67.4s (up to 75% improvement)

**PRIORITY**

LOW

# C
INTERSECTION

## MP 1.946
## US 31E AT KY 2053 (THIXTON LANE) TURN LANES

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES
- Congestion
- Safety
- On-going area development and permitting

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| EB Approach | |
|---|---|
| LOS AM (PM) | Delay (s) AM (PM) |
| F (F) | 87.0 (364.8) |

### 2018 – 2023 SAFETY ANALYSIS
- 34 Total crashes
- 56% Rear-end crashes
- 1 Fatality
- Intersection LOSS KAB = 1

### CONSTRUCTABILITY CONSIDERATIONS
- Coordination with Louisville Metro

## IMPROVEMENT CONCEPT

Add dedicated turn lanes from Thixton Lane to US 31E:
- EB Right Turn Lane
- EB Left Turn Lane

**84%**

### PUBLIC INPUT
- 84% Liked
- 253 Total Responses

### COST ESTIMATE

**$459,000**

D: $39,000 U: $30,000
R: $0 C: $390,000

### RETURN ON INVESTMENT

**54:1**

- Up to 48% reduction in total crashes
- LOS F (F) / Delay 82.7s (138.1s) (up to 62% improvement)

### PRIORITY

HIGH

# D
INTERSECTION

## MP 3.039
## US 31E AT FAIRMOUNT ROAD
## RCUT

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

**ISSUES**
- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| EB Left | | WB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| D (F) | 32.2 (486.8) | E (F) | 46.9 (67.9) |

**2018 – 2023 SAFETY ANALYSIS**
- 11 Total crashes
- 27% Angle crashes
- 2 Injury
- Intersection LOSS KAB = 1

**CONSTRUCTABILITY CONSIDERATIONS**
- None currently

## IMPROVEMENT CONCEPT

Restrict left turns from Fairmount Road. Left turn traffic must make a right turn first, then enter left turn lane to make a U-turn through the median.

**PUBLIC INPUT**

57%
- 57% Liked RCUT Options
- 253 Total Responses

**COST ESTIMATE**

$2,336,000

D: $200,000 U: $70,000
R: $66,000 C: $2,000,000

**RETURN ON INVESTMENT**

7:1
- 63% reduction in fatal & injury crashes
- EB Approach: PM LOS F / Delay 150.4s (up to 69% improvement)
- WB Approach: PM LOS B / Delay 14.14s (up to 79% improvement)

**PRIORITY**
MEDIUM

# E
INTERSECTION

## MP 3.432
## US 31E AT LONG HOME ROAD
## OFFSET LEFTS

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

**ISSUES**
- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| NB Left | | SB Left | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| B (D) | 11.1 (32.2) | C (C) | 17.3 (15.1) |

**2018 – 2023 SAFETY ANALYSIS**
- 11 Total crashes
- 45% Rear-end crashes
- 5 Injury
- Intersection LOSS KAB = 3

**CONSTRUCTABILITY CONSIDERATIONS**
- None currently

## IMPROVEMENT CONCEPT

Provide offset of left turn lanes on US 31E to increase visibility.

**57%** — **PUBLIC INPUT**
- 57% Liked
- 226 Total Responses

**COST ESTIMATE**

**$627,000**

D: $57,000 U: $0
R: $0 C: $570,000

**6:1** — **RETURN ON INVESTMENT**
- 36% reduction in fatal & injury crashes

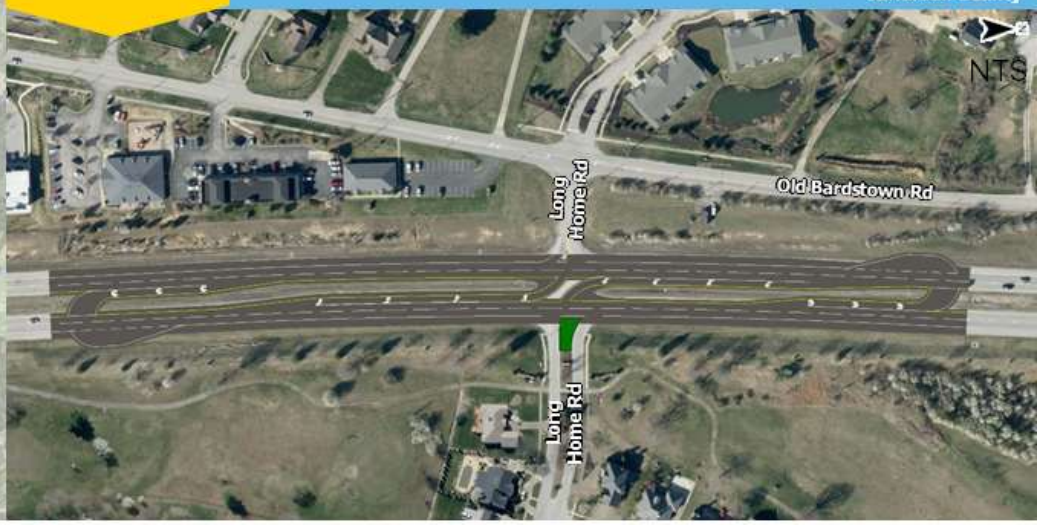
**PRIORITY**

LOW

# F
INTERSECTION

## MP 3.432
## US 31E AT LONG HOME ROAD
## RCUT

Bardstown Road Study
Item No. 5-80261
Jefferson County




## INFORMATION

**ISSUES**
- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| EB Approach | | WB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| E (F) | 47.1 (571.8) | D (F) | 31.1 (52.5) |

**2018 – 2023 SAFETY ANALYSIS**
- 11 Total crashes
- 45% Rear-end crashes
- 5 Injury
- Intersection LOSS KAB = 3

**CONSTRUCTABILITY CONSIDERATIONS**
- None currently

## IMPROVEMENT CONCEPT

Restrict left turns from Long Home Road. Left turn traffic must make a right turn first, then enter left turn lane to make a U-turn through the median.

**57%**

**PUBLIC INPUT**
- 57% Liked RCUT Options
- 253 Total responses

**$2,123,000**

**COST ESTIMATE**

D: $190,000 U: $0
R: $33,000 C: $1,900,000

**11:1**

**RETURN ON INVESTMENT**
- 63% reduction in fatal & injury crashes
- EB Approach: PM LOS E / Delay 36.6s (up to 94% improvement)
- WB Approach: PM LOS C / Delay 16.7s (up to 68% improvement)

**PRIORITY**
MEDIUM

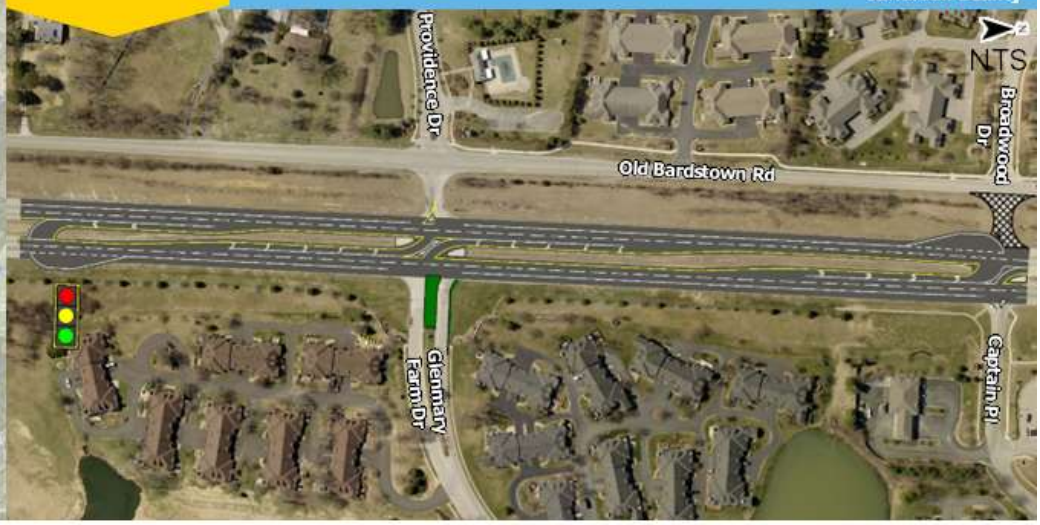
# G

INTERSECTION

## MP 3.714
## US 31E AT GLENMARY FARM DRIVE / PROVIDENCE DRIVE
## RCUT

Bardstown Road Study

Item No. 5-80261
Jefferson County




## INFORMATION

**ISSUES**

- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| EB Approach | | WB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| F (F) | 125.6 (285.7) | F (F) | 93.6 (105.4) |

**2018 – 2023 SAFETY ANALYSIS**

- 21 Total crashes
- 43% Rear-end crashes
- 1 Fatality
- 3 Injury
- Intersection LOSS KAB = 1

**CONSTRUCTABILITY CONSIDERATIONS**

- None currently

## IMPROVEMENT CONCEPT

Restrict left turns from Glenmary Farm Drive / Providence Drive. Left turn traffic must make a right turn first, then enter left turn lane to make a U-turn through the median.

**PUBLIC INPUT**

**57%**

- 57% Liked RCUT Options
- 253 Total responses

**COST ESTIMATE**

**$2,463,000**

D: $220,000 U: $0
R: $43,000 C: $2,200,000

**RETURN ON INVESTMENT**

**9:1**

- 63% reduction in fatal & injury crashes
- EB Approach: PM LOS C / Delay 31.2s (up to 89% improvement)
- WB Approach: PM LOS A / Delay 2.8s (up to 97% improvement)

**PRIORITY**
MEDIUM

# H

INTERSECTION

## MP 4.089
## US 31E AT HILLOCK DRIVE / COLONEL HANCOCK DRIVE
## OFFSET LEFTS

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

**ISSUES**

- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| NB Left | | SB Left | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| A (A) | 6.7 (6.2) | A (B) | 2.4 (13.8) |

**2018 – 2023 SAFETY ANALYSIS**

- 61 Total crashes
- 49% Rear-end crashes
- 2 Fatal
- 10 Injury
- Intersection LOSS KAB = 3

**CONSTRUCTABILITY CONSIDERATIONS**

- None currently

## IMPROVEMENT CONCEPT

Provide offset of left turn lanes on US 31E to increase visibility.

**66%**

**PUBLIC INPUT**

- 66% Liked
- 241 Total Responses

**COST ESTIMATE**

**$451,000**

D: $41,000 U: $0
R: $0 C: $410,000

**21:1**

**RETURN ON INVESTMENT**

- 36% reduction in fatal & injury crashes

**PRIORITY**

MEDIUM

I

INTERSECTION

# MP 4.089
# US 31E AT HILLOCK DRIVE / COLONEL HANCOCK DRIVE
# RCUT

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- Safety

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| EB Approach | | WB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| F (F) | 758.3 (3488.3) | F (F) | 107.3 (187.6) |

### 2018 – 2023 SAFETY ANALYSIS

- 61 Total crashes
- 49% Rear-end crashes
- 2 Fatal
- 10 Injury
- Intersection LOSS KAB = 3

### CONSTRUCTABILITY CONSIDERATIONS

- None currently

## IMPROVEMENT CONCEPT

Restrict left turns from Hillock Drive / Colonel Hancock Drive. Left turn traffic must make a right turn first, then enter left turn lane to make a U-turn through the median.

**57%**

### PUBLIC INPUT

- 57% Liked RCUT Options
- 253 Total Responses

### COST ESTIMATE

**$6,560,000**

D: $590,000 U: $70,000
R: $0 C: $5,900,000

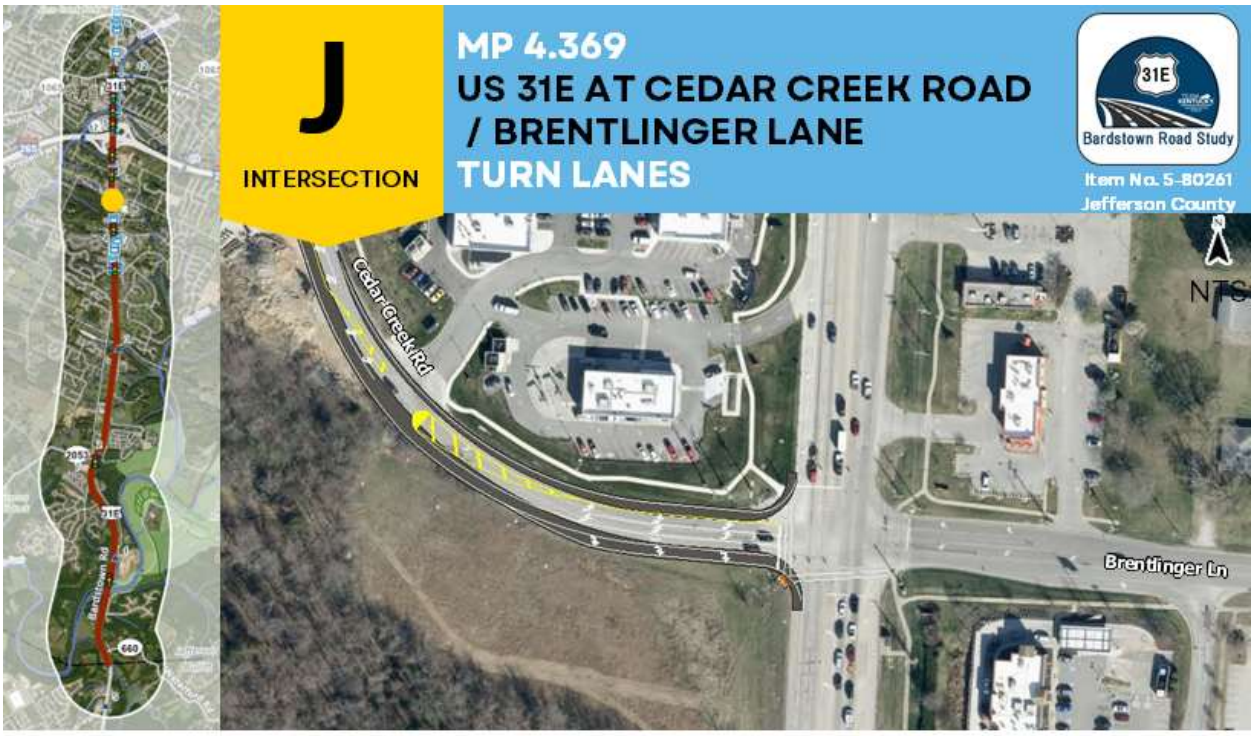
**52:1**

### RETURN ON INVESTMENT

- 22% reduction in fatal & injury crashes
- EB Approach: PM LOS C / Delay 23.2s (up to 99% improvement)
- WB Approach: PM LOS F / Delay 116.0s (up to 38% improvement)

### PRIORITY

MEDIUM




## INFORMATION

### ISSUES

- Congestion
- Safety

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| EB Approach | |
|---|---|
| LOS AM (PM) | Delay (s) AM (PM) |
| F (F) | 240.4 (360.0) |

### 2018 – 2023 SAFETY ANALYSIS

- 94 Total crashes
- 47% Rear-end crashes
- Intersection LOSS KAB = 4

### CONSTRUCTABILITY CONSIDERATIONS

- None currently

## IMPROVEMENT CONCEPT

Add dedicated turn lanes from Cedar Creek Road to US 31E:

- 2nd EB Left Turn Lane
- EB Right Turn Lane

**83%**

### PUBLIC INPUT

- 83% Liked
- 248 Total Responses

### COST ESTIMATE

**$1,144,000**

D: $104,000 U: $0
R: $0 C: $1,040,000

**145:1**

### RETURN ON INVESTMENT

- Up to 48% reduction in total crashes
- LOS F (F) / Delay 113.2s (167.3) (up to 54% improvement)

### PRIORITY

HIGH

# K
INTERSECTION

## MP 4.655
## US 31E AT BARTLEY DRIVE
## REALIGN INTERSECTION

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES
- Safety
- Access

### 2045 TRAFFIC OPERATIONS NO BUILD
- N/A

### 2018 – 2023 SAFETY ANALYSIS
- 18 Crashes
- 5 Injury
- 72% Rear-end and 22% Angle crashes
- LOSS KAB = 2

### CONSTRUCTABILITY CONSIDERATIONS
- Off alignment with property impacts
- May have some environmental considerations with woodland area

## IMPROVEMENT CONCEPT

Realign Bartley Drive to the signalized intersection with Southpointe Boulevard to reduced conflict points and improve accessibility.

### PUBLIC INPUT
**64%**
- 64% Liked
- 243 Total Responses

### COST ESTIMATE
**$3,500,000**

D: $150,000 U: $150,000
R: $1,700,000 C: $1,500,000

### RETURN ON INVESTMENT
**N/A**

### PRIORITY
HIGH

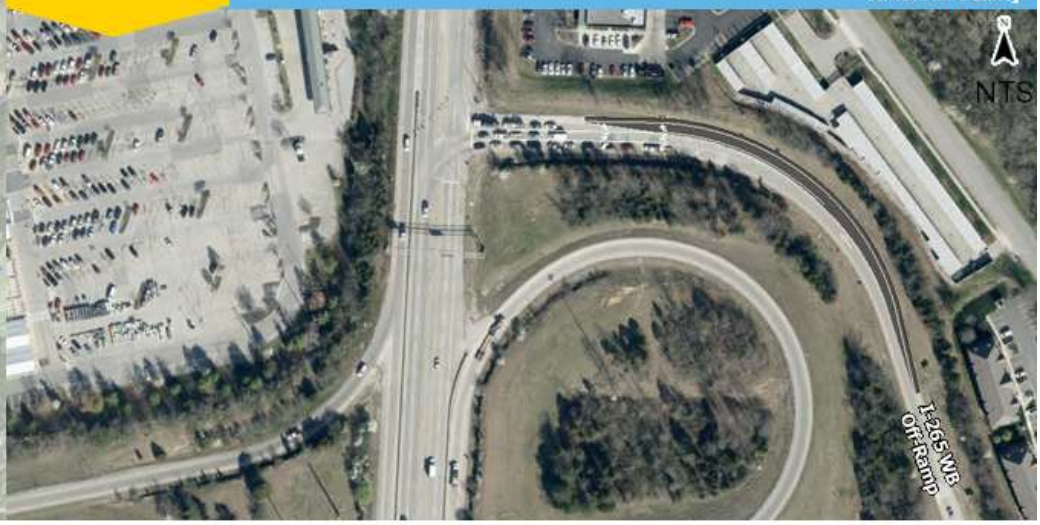
**L**

INTERSECTION

# MP 5.072
# US 31E AT I-265 WB OFF RAMP
# RAMP STORAGE

Bardstown Road Study

Item No. 5-80261
Jefferson County




## INFORMATION

### ISSUES

- Congestion
- Safety
- Queues extend past ramps onto I-265 in Peak Periods

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| WB Approach | |
|---|---|
| **LOS AM (PM)** | **Delay (s) AM (PM)** |
| E (E) | 66.9 (66.4) |

### 2018 – 2023 SAFETY ANALYSIS

- 47 Total crashes
- 60% Rear-end crashes
- LOSS KAB = 1

### CONSTRUCTABILITY CONSIDERATIONS

Multiple I-265 interchange ramps are being evaluated concurrently with this study as part of an HSIP initiative. The I-265 / US 31E ramps are included in the study for evaluation. The evaluation is in the beginning stages and does not have recommendations. Further coordination is recommended.

## IMPROVEMENT CONCEPT

Extend WB right turn lane by approximately 550 feet.

### PUBLIC INPUT

**N/A**

### COST ESTIMATE

**$704,000**

D: $64,000 U: $0
R: $0 C: $640,000

### RETURN ON INVESTMENT

**10:1**

- Reduces queue from extending to I-265

### PRIORITY

LOW

# M
INTERSECTION

## MP 5.191
## US 31E AT CEDAR SPRINGS BOULEVARD / BROOKRIDGE VILLAGE BOULEVARD
## TURN LANES

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES
- Congestion
- Safety
- Intersection of two major routes

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| NB Approach | | SB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| F (B) | 94.5 (11.7) | B (C) | 19.3 (20.5) |

### 2018 – 2023 SAFETY ANALYSIS
- 94 Total crashes
- 52% Rear-end crashes
- 1 Bike/ped related crashes
- Intersection LOSS KAB = 4

### CONSTRUCTABILITY CONSIDERATIONS
- May need to extend box culverts
- May be permitting fees

## IMPROVEMENT CONCEPT

Add a SB right turn lane and additional NB left turn lane on US 31E.

**78%**

### PUBLIC INPUT
- 78% Liked
- 237 Total Responses

### COST ESTIMATE

**$2,264,000**

D: $154,000 U: $150,000
R: $420,000 C: $1,540,000

### RETURN ON INVESTMENT

**12:1**

- Up to 48% reduction in total crashes
- Reduces queue and blocking of access to Cedar Springs Shopping Center
- Minimal change in LOS / Delay

### PRIORITY
MEDIUM

**N**

INTERSECTION

# MP 5.333
# US 31E AT CEDAR LOOK DRIVE
# OFFSET LEFTS & TURN LANES

Bardstown Road Study

Item No. 5-80261

Jefferson County


## INFORMATION

**ISSUES**

- Congestion
- Safety

**2045 TRAFFIC OPERATIONS (NO BUILD)**

| EB Approach | | WB Approach | |
|---|---|---|---|
| LOS AM (PM) | Delay (s) AM (PM) | LOS AM (PM) | Delay (s) AM (PM) |
| E (F) | 71.5 (94.0) | F (F) | 80.1 (2494.4) |

**2018 – 2023 SAFETY ANALYSIS**

- 71 Total crashes (1 fatal and 24 injury)
- 56% Rear-end crashes
- 2 Bike/ped related crashes
- Intersection LOSS KAB = 4

**CONSTRUCTABILITY CONSIDERATIONS**

- None currently

## IMPROVEMENT CONCEPT

Provide offset of left turn lanes on US 31E to increase visibility.

Add turn lanes on US 31E and Cedar Look Drive:

- Separate EB Right and Left Turn Lanes
- WB Left Turn Lane
- Extend SB Right Turn Lane

**60 -67%**

**PUBLIC INPUT**

- 60%-67% Liked
- 221 Total Responses

**$1,726,000**

**COST ESTIMATE**

D: $136,000 U: $160,000
R: $70,000 C: $1,360,000

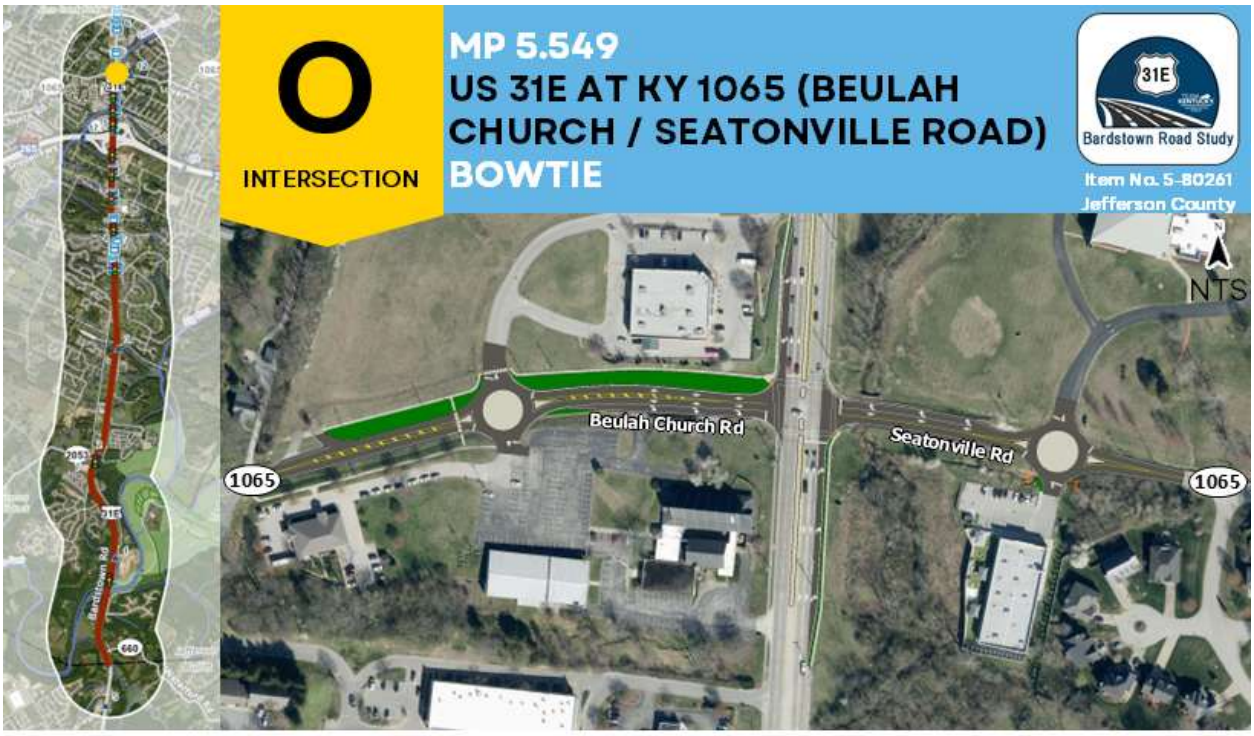
**81:1**

**RETURN ON INVESTMENT**

- Combined up to 67% reduction in fatal and injury crashes
- EB Approach: PM LOS F / Delay 90.9 (up to 3% improvement)
- WB Approach: PM LOS E / Delay 66s (up to 97% improvement)

**PRIORITY**

HIGH




## INFORMATION

### ISSUES

- Congestion
- Safety
- Intersection of two major routes

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| Intersection | |
|---|---|
| LOS AM (PM) | Delay (s) AM (PM) |
| D (E) | 44.3 (58.6) |

### 2018 – 2023 SAFETY ANALYSIS

- 81 Total crashes (10 injury)
- 49% Rear-end crashes
- 30% Angle crashes
- 2 Bike/ped related crashes
- Intersection LOSS KAB = 4

### CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic

## IMPROVEMENT CONCEPT

Install roundabouts at side street intersections, preventing left turns at US 31E to improve safety and reduce congestion.

**39%**

### PUBLIC INPUT

- 39% Liked
- 230 Total Responses

### COST ESTIMATE

**$6,200,000**

D:$450,000 U:$240,000
R:$1,010,000 C: $4,500,000

**7:1**

### RETURN ON INVESTMENT

- Eliminates left turn angle collisions
- LOS B / Delay 19s
- 40s reduction in intersection delay

### PRIORITY

LOW

**P**

INTERSECTION

# MP 5.549
# US 31E AT KY 1065 (BEULAH CHURCH / SEATONVILLE ROAD)
# OFFSET LEFTS & TURN LANES

Bardstown Road Study

Item No. 5-80261

Jefferson County


## INFORMATION

### ISSUES

- Congestion
- Safety
- Intersection of two major routes

### 2045 TRAFFIC OPERATIONS (NO BUILD)

| Intersection | |
|---|---|
| LOS AM (PM) | Delay (s) AM (PM) |
| D (E) | 44.3 (58.6) |

### 2018 – 2023 SAFETY ANALYSIS

- 81 Total crashes (10 injury)
- 49% Rear-end crashes
- 2 Bike/ped related crashes
- Intersection LOSS KAB = 4

### CONSTRUCTABILITY CONSIDERATIONS

- None currently

## IMPROVEMENT CONCEPT

Provide offset of left turn lanes on US 31E to increase visibility.

Add turn lanes on US 31E and Seatonville Road:

- WB, NB, and SB Right Turn Lanes

**60-65%**

### PUBLIC INPUT

- 60 - 65% Liked
- 243 Total Responses

**$1,975,000**

### COST ESTIMATE

D:$135,000 U: $170,000
R:$320,000 C: $1,350,000

**15:1**

### RETURN ON INVESTMENT

- Combined up to 67% reduction in fatal and injury crashes
- Intersection: PM LOS D / Delay 39.0 (up to 33% improvement)

### PRIORITY

HIGH

# Q SPOT

## MP 4.089 – 4.593
## HILLOCK DRIVE TO SOUTHPOINTE BOULEVARD
## ADD NB LANE

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- High travel times during peak periods
  - Free flow = 45 mph
  - Measured NB Peak Hour = 18 - 20 mph (average)

### 2045 TRAFFIC OPERATIONS

| | AM | | PM | |
|---|---|---|---|---|
| | Avg. Delay (s) | Avg. Speed (mph) | Avg. Delay (s) | Avg. Speed (mph) |
| No Build | 360 | 14.4 | 381 | 14.3 |
| Add Lane | 270 | 18.2 | 340 | 15.8 |

Note: Full corridor operations shown for reference

### 2018 – 2023 SAFETY ANALYSIS

- 222 Total Crashes
- 50 Fatal and injury Crashes
- LOSS KAB = 3 to 4

### CONSTRUCTABILITY CONSIDERATIONS

- Major construction / maintenance of traffic considerations

## IMPROVEMENT CONCEPT

Add NB travel lane from Hillock Drive / Colonel Hancock Drive to the auxiliary lane just south of Southpointe Boulevard.

**70%**

### PUBLIC INPUT

- 70% Liked (Widening Concept in General)
- 271 Total Responses

### COST ESTIMATE

**$6,150,000**

D: $490,000 U: $540,000
R: $220,000 C: $4,900,000

### RETURN ON INVESTMENT

**4:1**

- 24% reduction in fatal & injury crashes
- Assessment of Return on Investment based on Safety benefits only

### PRIORITY

HIGH

Q

SPOT

## MP 4.089 – 4.593
## HILLOCK DRIVE TO SOUTHPOINTE BOULEVARD
## ADD NB LANE

Bardstown Road Study

Item No. 5-80261
Jefferson County

# R
SPOT

## MP 4.593 TO MP 4.850
## SOUTHPOINTE BOULEVARD TO I-265 EB ON RAMP
## ADD NB LANE

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES
- Congestion
- High travel times during peak periods
  - Free flow = 45 mph
  - Measured NB Peak Hour = 18 - 20 mph (average)

### 2045 TRAFFIC OPERATIONS
- Freeway Volume to Capacity Ratio = 0.80
- Ramp Volume to Capacity Ratio = 0.47
- Merge LOS = D
- Average Density (pc/mi/ln) = 33.3

### 2018 – 2023 SAFETY ANALYSIS
- 128 Total Crashes
- 26 Fatal and injury Crashes
- LOSS KAB = 2

### CONSTRUCTABILITY CONSIDERATIONS
- Minor rock cut at start of ramp.
- Overhead truss would need to be relocated / rebuilt with additional truss added for lane designation signage.

## IMPROVEMENT CONCEPT

Add NB travel lane from Southpointe Boulevard. Additional lane will be signed for I-265 EB On Ramp with existing lane used for I-265 WB On Ramp.

**70%**

### PUBLIC INPUT
- 70% Liked (Widening Concept in General)
- 271 Total Responses

### COST ESTIMATE

**$7,050,000**

D: $560,000 U: $190,000
R: $700,000 C: $5,600,000

**2:1**

### RETURN ON INVESTMENT
- 24% reduction in fatal & injury crashes
- Assessment of Return on Investment based on Safety benefits only

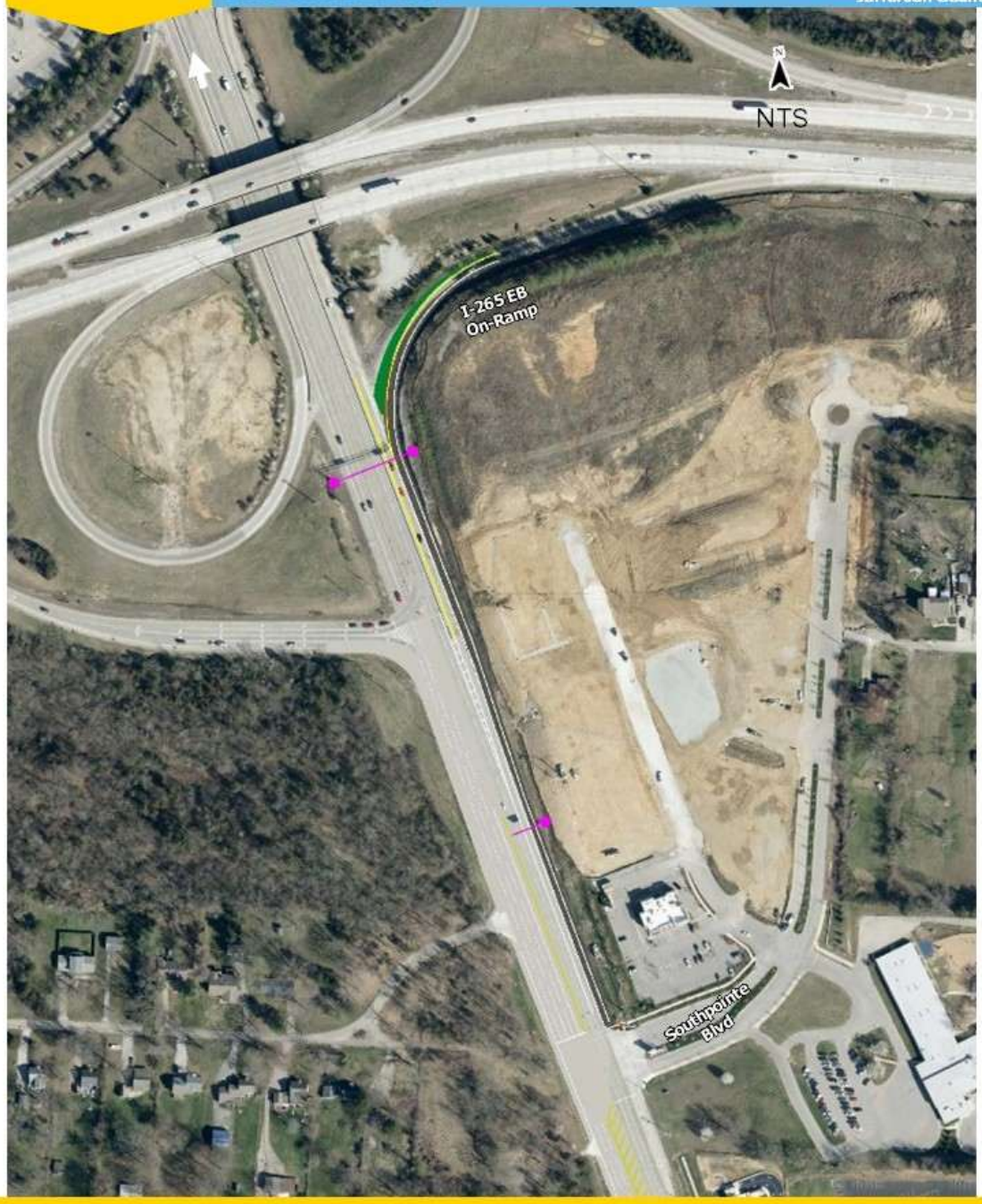
### PRIORITY
HIGH

R

SPOT

MP 4.593 TO MP 4.850
SOUTHPOINTE BOULEVARD
TO I-265 EB ON RAMP
ADD NB LANE

Bardstown Road Study
Item No. 5-80261
Jefferson County



# A

CORRIDOR

## MP 3.432 – 4.089
## OLD BARDSTOWN ROAD MANAGEMENT

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Closely spaced intersections connecting Old Bardstown Road to US 31E – results in vehicles blocking the intersections and safety issues with numerous conflict points
- Old Bardstown Road has an AADT of 4,600 and provides an alternate option to US 31E for connectivity west of US 31E

### 2045 TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- N/A

### CONSTRUCTABILITY CONSIDERATIONS

- Old Bardstown Road is maintained by Louisville Metro. Funding and construction would need to be obtained and led by Louisville Metro in coordination with KYTC.

## IMPROVEMENT CONCEPT

Modify Old Bardstown Road:

- Add pavement markings
- Add / remove STOP signs
- Improve pavement approaches and striping to US 31E

### PUBLIC INPUT

**N/A**

### COST ESTIMATE

**$ 100,000**

D: $20,000
U: $0
R: $0
C: $80,000

### RETURN ON INVESTMENT

**N/A**

### PRIORITY

LOW

# B

CORRIDOR

## MP 0.000 – 4.700
## COUNTY LINE TO I-265 EB ON RAMP
## WIDEN TO SIX LANES

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- High travel times during peak periods (compared to 8 minutes free flow)
  - AM - 18 minutes NB
  - PM – 12 minutes SB

### TRAFFIC OPERATIONS

| | AM | | PM | |
|---|---|---|---|---|
| | Avg. Delay (s) | Avg. Speed (mph) | Avg. Delay (s) | Avg. Speed (mph) |
| No Build | 360 | 14.4 | 381 | 14.3 |
| 6-Lane | 273 | 18.4 | 274 | 18.2 |

### 2018 – 2023 SAFETY ANALYSIS

- 625 Total Crashes
- 149 Fatal and injury Crashes

### CONSTRUCTABILITY CONSIDERATIONS

- Major construction / maintenance of traffic considerations

## IMPROVEMENT CONCEPT

Add SB travel lane from the Bullitt County line to Hillock Drive / Colonel Hancock Drive. Add NB travel lane from the Bullitt County line to the I-265 EB On Ramp

**70%**

### PUBLIC INPUT

- 70% Liked
- 271 Total Responses

**$ 88 M**

### COST ESTIMATE

D: $7,340,000 U: $3,640,000
R: $3,560,000 C: $73,400,000

**5:1**

### RETURN ON INVESTMENT

- 24% reduction in fatal & injury crashes
- Average delay improvement is 26%

### PRIORITY

LOW

# B-1

CORRIDOR

## MP 0.000 – 2.581
## COUNTY LINE TO COOPER CHAPEL EXTENSION
## WIDEN TO SIX LANES

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- High travel times during peak periods

### TRAFFIC OPERATIONS

- Model analysis not available for segment level.

### 2018 – 2023 SAFETY ANALYSIS

- 136 Total Crashes
- 44 Fatal and injury Crashes

### CONSTRUCTABILITY CONSIDERATIONS

- Major construction / maintenance of traffic considerations

## IMPROVEMENT CONCEPT

Add NB and SB travel lane from the Bullitt County line to Cooper Chapel Extension..

**70%**

### PUBLIC INPUT

- 70% Liked (Widening Concept in General)
- 271 Total Responses

### COST ESTIMATE

**$ 47.2M**

D: $4,040,000 U: $1,454,000
R: $1,324,000 C: $40,400,000

**1:1**

### RETURN ON INVESTMENT

- 24% reduction in fatal & injury crashes
- Assessment of Return on Investment based on Safety benefits only

### PRIORITY

LOW

# B-2

CORRIDOR

## MP 2.581 – 4.089
## COOPER CHAPEL EXTENSION TO HILLOCK DRIVE / COLONEL HANCOCK DRIVE
## WIDEN TO SIX LANES

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- High travel times during peak periods

### TRAFFIC OPERATIONS

- Model analysis not available for segment level.

### 2018 – 2023 SAFETY ANALYSIS

- 132 Total Crashes
- 29 Fatal and injury Crashes

### CONSTRUCTABILITY CONSIDERATIONS

- Major construction / maintenance of traffic considerations

## IMPROVEMENT CONCEPT

Add NB and SB travel lane from Cooper Chapel Extension to Hillock Drive / Colonel Hancock Drive.

**70%**

### PUBLIC INPUT

- 70% Liked (Widening Concept in General)
- 271 Total Responses

### COST ESTIMATE

**$ 27.5M**

D: $2,250,000 U: $1,454,000
R: $1,324,000 C: $22,500,000

**1:1**

### RETURN ON INVESTMENT

- 24% reduction in fatal & injury crashes
- Assessment of Return on Investment based on Safety benefits only

### PRIORITY

MEDIUM

# B-3

CORRIDOR

## MP 4.089 – 4.850
## HILLOCK DRIVE / COLONEL HANCOCK DRIVE TO I-265 EB ON RAMP
## ADD NB LANE

Bardstown Road Study

Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Congestion
- High travel times during peak periods

### TRAFFIC OPERATIONS

- Model analysis not available for segment level.

### 2018 – 2023 SAFETY ANALYSIS

- 350 Total Crashes
- 76 Fatal and injury Crashes

### CONSTRUCTABILITY CONSIDERATIONS

- Major rock cut at start of ramp.
- Overhead truss would need to be relocated / rebuilt with additional truss added for lane designation signage.

## IMPROVEMENT CONCEPT

Add NB travel lane from Hillock Drive / Colonel Hancock Drive to the NB Ramp from US 31E to I-265.

**70%**

### PUBLIC INPUT

- 70% Liked (Widening Concept in General)
- 271 Total Responses

**$ 13.2M**

### COST ESTIMATE

D: $1,050,000 U: $730,000
R: $920,000 C: $10,050,000

**3:1**

### RETURN ON INVESTMENT

- 24% reduction in fatal & injury crashes
- Assessment of Return on Investment based on Safety benefits only

### PRIORITY

HIGH

# C

CORRIDOR

## MP 3.039 – 4.593
## COMBINATION RCUT & WIDENING

Bardstown Road Study

Item No. 5-80261
Jefferson County



## INFORMATION

### ISSUES

- Numerous access points
- Vehicles crossing multiple lanes to make left turns
- Congestion

### 2045 TRAFFIC OPERATIONS

| | AM | | PM | |
|---|---|---|---|---|
| | Avg. Delay (s) | Avg. Speed (mph) | Avg. Delay (s) | Avg. Speed (mph) |
| No Build | 360 | 14.4 | 381 | 14.3 |
| RCUT | 184 | 23.3 | 243 | 19.5 |

### 2018 – 2023 SAFETY ANALYSIS

- 51 Fatal and injury Crashes from I-265 to Fairmount Road

### CONSTRUCTABILITY CONSIDERATIONS

- Intersection at Cedar Creek Road / Brentlinger Lane may need modifications for transition from HSIP project and accommodation of traffic

## IMPROVEMENT CONCEPT

Construct a series of Restricted Crossing U-Turns (RCUT) in conjunction with an additional travel lane northbound from Hillock Drive / Colonel Hancock Drive to Southpointe Boulevard.

### PUBLIC INPUT

**N/A**

### COST ESTIMATE

**$ 19.6M**

D: $1,690,000 U: $680,000
R: $360,000 C: $16,900,000

### RETURN ON INVESTMENT

**30:1**

- Up to 63% reduction of fatal and injury crashes
- Average delay improvement is 41%

### PRIORITY

MEDIUM

# A

MULTIMODAL

## MP 0.000 – 5.600
## ENHANCE TRANSIT

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- Inconsistent bus stop placement
- Sidewalk and ADA facility connectivity
- Low visibility of bus stop signage
- On-time performance (OTP) / reliability of travel time due to corridor congestion

### TRANSIT OPERATIONS

Route 17 Headways:

- 90 minutes

### 2018 – 2023 SAFETY ANALYSIS

Crashes 2018 - 2023

- 1 bike crash
- 5 pedestrian crashes

All bike/ped crashes took place within a 3/4 mile corridor extending from just north to just south of 265.

### CONSTRUCTABILITY CONSIDERATIONS

- Investment in system needs to be led by TARC who is currently re-evaluating their operations and infrastructure future plans.

## IMPROVEMENT CONCEPT

- Improved signage
- Improved facilities at the following stops:
  - Glenmary Plaza
  - Cedar Look
  - Brookridge Village
  - Seatonville
- Queue jump lanes with transit signal pre-emption
- Shorten running times

**71%** Satisfied with transit service

### PUBLIC INPUT[1]

- 56% NOT satisfied with OTP
- 414 responses

### COST ESTIMATE

**$360k** Bus Stop Upgrades and Signage

**$250k** Queue jump lanes: 5 intersections[2]

### RETURN ON INVESTMENT

Seen in cost savings for individuals as well as business productivity gained from workforce access.

### PRIORITY

N/A

1 TARC Customer Experience Survey, February 2023

2 Total does not include signal preemption hardware or overhead for signal updates.

# B

MULTIMODAL

## MP 3.039 – 5.600
## SIDEWALK CONNECTIVITY (EXCLUDING INTERCHANGE)

Bardstown Road Study
Item No. 5-80261
Jefferson County

ADA Ramp with No Connectivity

Example Segment of Sidewalk

## INFORMATION

### ISSUES

- Pedestrians and bicyclists must use shoulder or travel through neighborhoods throughout the corridor
- Some pedestrians use neighborhood sidewalks / cut through yards such as between Captain Place and Glenmary Farm Dr

### TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- 5 pedestrian collisions along segment of US 31E
- 1 bicyclist collision along segment of US 31E

### CONSTRUCTABILITY CONSIDERATIONS

- There is a Sidewalk Program within the Vision Zero Louisville (VZL) initiative in Jefferson County. The list of segments compiled by KYTC / Louisville Metro includes identified gaps along the US 31E corridor. Coordination is recommended as projects are selected for further development.

## IMPROVEMENT CONCEPT

Provide connectivity for pedestrians and bicyclists north and south of the interchange. Connect to existing sidewalk segments and proposed interchange sidewalk modifications. Some segments utilize portions of Old Bardstown Road (see planning design concept). Upgrade signals / crosswalks as appropriate.

### PUBLIC INPUT

**69%**

- 69% Liked
- 262 Responses

### COST ESTIMATE

**$2.1 M**

D: $160,000 U: $100,000
R: $900,000 C: $900,000

### RETURN ON INVESTMENT

**N/A**

### PRIORITY

N/A

# B

MULTIMODAL

## MP 3.039 – 5.600
## SIDEWALK CONNECTIVITY (EXCLUDING INTERCHANGE)

Bardstown Road Study
Item No. 5-80261
Jefferson County

# C

MULTIMODAL

## MP 4.700 – 5.100
## I-265 / US 31E
## PEDESTRIAN INTERCHANGE CONNECTIVITY

Bardstown Road Study

Item No. 5-80261
Jefferson County

## INFORMATION

### ISSUES

- Pedestrians and bicyclists must use shoulder to travel through the interchange – no separation between motorized and non-motorized users

### TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- 2 pedestrian collisions north / south of interchange

### CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic during construction through congested interchange

## IMPROVEMENT CONCEPT

Provide connectivity for pedestrians and bicyclists through interchange. Place pedestrian path in median with concrete median barrier separators and connect to all crossings at existing signalized intersections.

### PUBLIC INPUT

**54%**

- 54% Liked
- 260 Responses

### COST ESTIMATE

**$1.4 M**

D: $110,000 U: $0
R: $0 C: $1,300,000

### RETURN ON INVESTMENT

**N/A**

### PRIORITY

N/A

C

MULTIMODAL

# MP 4.700 – 5.100
# I-265 / US 31E
# PEDESTRIAN INTERCHANGE CONNECTIVITY

Bardstown Road Study
Item No. 5-80261
Jefferson County

# A

OTHER

## MP 0.000 - 3.039
## SPEED FEEDBACK SIGNS

Bardstown Road Study
Item No. 5-80261
Jefferson County


## INFORMATION

### ISSUES

- 10+ mph over 55 mph speed limit on average between Glenmary Farm Drive and county line
- Speeding has been a noted issue during off-peak times

### TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- 65 single vehicle collisions

### CONSTRUCTABILITY CONSIDERATIONS

- Need coordination with law enforcement for regulation and ticketing.
- Coordinate with Louisville Metro on permanent installation / evaluate per KYTC Policy.

## IMPROVEMENT CONCEPT

Reduce excessive speeding through education and / or ticketing of violator. Portable units or fixed signs with solar power can be used.

**55%**

### PUBLIC INPUT

- 55% Liked
- 256 Total Responses

**$40,000**

### COST ESTIMATE

$10,000 per Unit
Initial estimate 4

**249:1**

### RETURN ON INVESTMENT

- 5% reduction in single vehicle collisions

### PRIORITY

N/A

**B**

OTHER

# MP 0.100 - 3.900
# CABLE MEDIAN BARRIER

Bardstown Road Study

Item No. 5-80261

Jefferson County


## INFORMATION

### ISSUES

- Wide median with no barrier between NB and SB lanes

### TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- 3 head on crashes over 6 years in segment

### CONSTRUCTABILITY CONSIDERATIONS

- Cable Median Barriers are identified as a Major Category supported by the HSIP Roadway Departure Initiative. Further coordination with HSIP is recommended for consideration of funding sources.

## IMPROVEMENT CONCEPT

Installation of a cable median barrier in divided portion of US 31E corridor.

**61%**

### PUBLIC INPUT

- 74% Liked
- 253 Responses

### COST ESTIMATE

**$660,000**

D: $60,000 U: $0
R:$0 C: $600,000

**3:1**

### RETURN ON INVESTMENT

- 97% reduction in cross median crashes

### PRIORITY

N/A

C

OTHER

# ROADWAY LIGHTING

Bardstown Road Study

Item No. 5-80261

Jefferson County

## INFORMATION

### ISSUES

- Low light levels at intersections
- Coverage / location of light poles
- No lighting at locations

### TRAFFIC OPERATIONS

- N/A

### 2018 – 2023 SAFETY ANALYSIS

- 37 nighttime injury crashes

### CONSTRUCTABILITY CONSIDERATIONS

- Need coordination with utilities
- Agreement on operations and maintenance responsibility

## IMPROVEMENT CONCEPT

Improve / add lighting at the following intersections:

- Waterford Road
- Cedar Springs / Brookridge Village Boulevard
- Cedar Look Drive
- KY 1065 (Beulah Church / Seatonville Road)

**74%**

### PUBLIC INPUT

- 74% Liked
- 965 Responses

### COST ESTIMATE

**$960,000**

D: $80,000 U: $0
R: $0 C: $880,000

**25:1**

### RETURN ON INVESTMENT

- 28% reduction in nighttime injury and fatal crashes

### PRIORITY

N/A

# Chapter 9 – Study Outcomes

## 9.1 Prioritized Projects

The US 31E Study resulted in a range of conceptual improvements for future implementation. Improvement concepts primarily focused on areas with safety, traffic operations, and multimodal (bicycle / pedestrian) needs. The recommended priorities are based on identification of needs, technical analysis, public input, project team input and KYTC District 5 staff prioritization. Prioritization is presented in the following categories:

- **High Priority** projects include those that were overall in a higher tier of ratings based on crash history, ROI analysis, and public input. There are seven total High Priority projects.
- **Medium Priority** projects include those that were overall in the middle tier of ratings based on crash history, ROI analysis, and public input. There are eight total Medium Priority projects.
- **Low Priority** projects included those that are overall in the lowest tier of ratings based on crash history, ROI analysis, and public input. There are nine total Low Priority projects.

**Tables 21** and **22** list the prioritization category for each spot and corridor project.

Multimodal and Other identified projects do not have an assigned priority. They should be considered and included as additional initiatives / through alternative funding / or in conjunction with future development of identified high, medium, and low priority projects.

An additional recommendation proposes a separate study for the US 31E / I-265 interchange to evaluate the full impacts of the interchange in conjunction with the larger-scale transportation network beyond this corridor.

**Table 21. Spot Priority Improvement List**

| Concept ID | Location | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) | Priority |
|---|---|---|---|---|---|---|
| **SPOT** | | | | | | |
| **A** | KY 660 (Waterford Rd) | Turn Lanes | $437,000 | 2:1 | 60 | LOW |
| **B** | Little Spring Blvd | RCUT | $1,290,000 | 13:1 | 57 | LOW |
| **C** | KY 2053 (Thixton Ln) | Turn Lanes | $459,000 | 54:1 | 84 | HIGH |
| **D** | Fairmount Rd | RCUT | $2,336,000 | 7:1 | 57 | MEDIUM |
| **E** | Long Home Rd | Offset Lefts | $627,000 | 6:1 | 57 | LOW |
| **F** | Long Home Rd | RCUT | $2,123,000 | 11:1 | 57 | MEDIUM |
| **G** | Providence Dr / Glenmary Farm Dr | RCUT | $2,463,000 | 9:1 | 57 | MEDIUM |
| **H** | Hillock Dr / Colonel Hancock Dr | Offset Lefts | $451,000 | 21:1 | 66 | MEDIUM |
| **I** | Hillock Dr / Colonel Hancock Dr | RCUT | $6,560,000 | 52:1 | 57 | MEDIUM |
| **J** | Cedar Creek Rd / Brentlinger Ln | Turn Lanes | $1,144,000 | 145:1 | 83 | HIGH |
| **K** | Bartley Dr | Realign Intersection | $3,500,000 | N/A | 64 | HIGH |
| **L** | I-265 WB Off Ramp | Expand Storage | $704,000 | 10:1 | N/A | LOW |
| **M** | Cedar Springs Blvd / Brookridge Village Blvd | Turn Lanes | $2,264,000 | 12:1 | 78 | MEDIUM |
| **N** | Cedar Look Dr | Turn Lanes / Offset Lefts | $1,726,000 | 81:1 | 60 - 67 | HIGH |
| **O** | KY 1065 (Beulah Church / Seatonville Rd) | Bowtie | $6,200,000 | 7:1 | 39 | LOW |
| **P** | KY 1065 (Beulah Church / Seatonville Rd) | Turn Lanes / Offset Lefts | $1,975,000 | 15:1 | 60 - 65 | HIGH |
| **Q** | Hillock Dr / Colonel Hancock Dr to Southpointe Blvd | Add NB Lane | $6,150,000 | 4:1 | 70 | HIGH |
| **R** | Southpointe Blvd to I-265 EB On Ramp | Add NB Lane | $7,050,000 | 2:1 | 70 | HIGH |

**Table 22. Corridor and Multimodal Priority Improvement List**

| Concept ID | Description | Cost (2024 Total Estimate) | ROI | Public Input (% Liked) | Priority |
|---|---|---|---|---|---|
| **CORRIDOR** | | | | | |
| **A** | Old Bardstown Rd Management (modify pavement markings and STOP signs) | $100,000 | N/A | N/A | LOW |
| **B** | Jefferson / Bullitt County Line to I-265 EB On-Ramp – Widen from 4 to 6 Lanes | $88,000,000 | 5:1 | 70 | LOW |
| **B-1** | Jefferson / Bullitt County Line to Cooper Chapel Extension – Widen from 4 to 6 Lanes | $47,200,000 | 1:1 | | LOW |
| **B-2** | Cooper Chapel Extension to Hillock Dr / Colonel Hancock Dr – Widen from 4 to 6 Lanes | $27,500,000 | 1:1 | | MEDIUM |
| **B-3** | Hillock Dr / Colonel Hancock Dr to I-265 EB On Ramp – Add NB Lane | $13,200,000 | 3:1 | | HIGH |
| **C** | Combination Added NB Lane (B-3) and RCUTs | $19,600,000 | 30:1 | 57 | MEDIUM |
| **MULTIMODAL** | | | | | |
| **A** | Enhance Transit | $730,000 | N/A | 53 | N/A |
| **B** | Sidewalk Connectivity | $2,060,000 | N/A | 69 | N/A |
| **C** | Pedestrian Interchange Connectivity | $1,410,000 | N/A | 54 | N/A |
| **OTHER** | | | | | |
| **A** | Speed Feedback Signs | $40,000 | 249:1 | 55 | N/A |
| **B** | Cable Median Barrier | $660,000 | 3:1 | 61 | N/A |
| **C** | Lighting | $960,000 | 25:1 | 74 | N/A |

## 9.2 Next Steps

The next phase in the project development process for any of the recommendations would be Preliminary Engineering. If federal funds are used or permits are required, additional environmental analysis will be required to satisfy the National Environmental Policy Act (NEPA).

KYTC continues to implement the 2024 HSIP Safety Study recommendations. No additional funding currently exists for any of the recommendations made in this study. Any identified projects, that are not funded through HSIP, would need to be integrated into the KIPDA Metropolitan Transportation Plan (MTP) and the KYTC Strategic Highway Investment Formula for Tomorrow (SHIFT) process as a first step in pursuit of funding. KYTC, KIPDA, and Louisville Metro could potentially collaborate on funding and implementation of some projects.

## 9.3 Additional Information

Additional information or questions regarding this study can be obtained from KYTC. Written requests should be sent to:

KYTC Division of Planning
Attention: Director
200 Mero Street
Frankfort, KY 40622

# APPENDIX A:

## Traffic Forecast Report

# APPENDIX B:

## Crash Analysis

# APPENDIX C:

## Transit Operations

# APPENDIX D:

## Environmental Overview and Socioeconomic Study

# APPENDIX E:

## Project Team & Local Elected Officials / Stakeholder Meeting Minutes

1. Project Team Meeting No. 1
2. Project Team Meeting No. 2
3. Project Team Meeting No. 3
4. Project Team Meeting - Prioritization
5. Local Elected Officials / Stakeholder Meeting No. 1
6. Local Elected Officials / Stakeholder Meeting No. 2

# APPENDIX F:

## Public Meeting No. 1 Notebook

# APPENDIX G:

## ICE Spreadsheets

# APPENDIX H:

## Public Meeting No. 2 Notebook

# APPENDIX I:

## Discussion of Utilities

# APPENDIX J:

## Cost Estimate Information