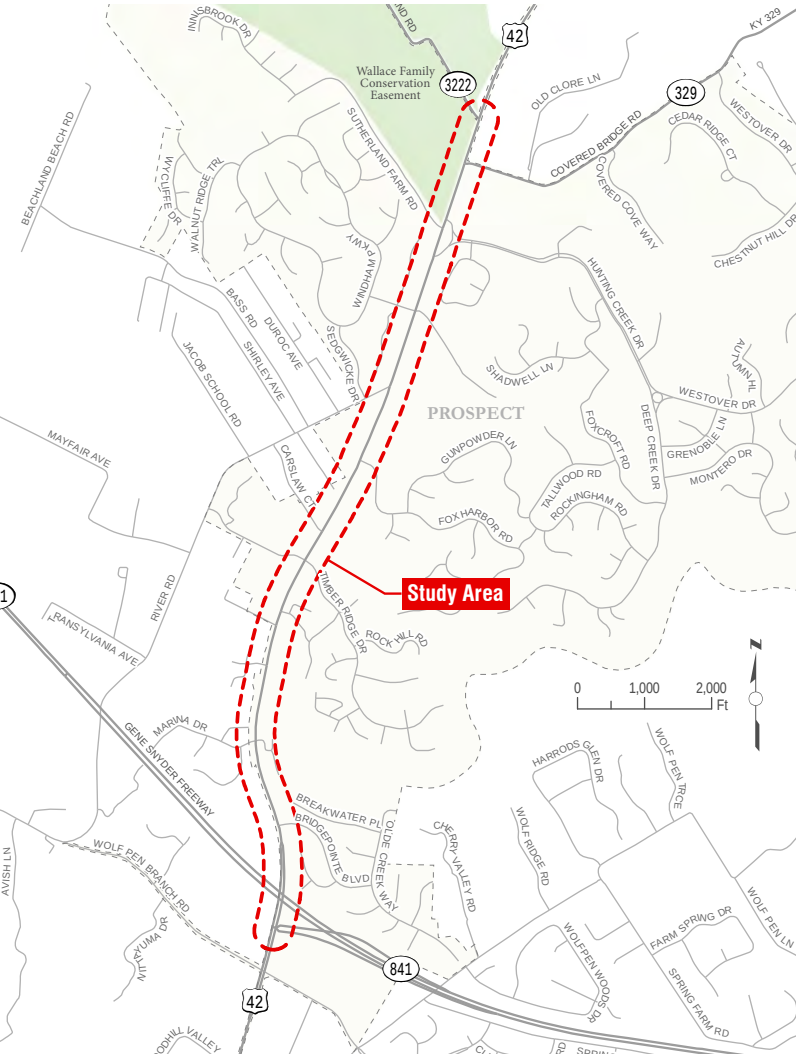

Final Report | July 2022

PROSPECT US 42 TRANSPORTATION PLANNING STUDY

Jefferson County | Item No. 5-214

Prepared for City of Prospect, Kentucky
In partnership with KYTC

QK4 Engineering Planning

KENTUCKY TRANSPORTATION CABINET

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Acronyms

BCA	Benefit-Cost Analysis
CCRF	Critical Crash Rate Factor
CHAF	Continuous Highway Analysis Framework
CRF	Crash Rate Factor
EBL	Eastbound Left
EBR	Eastbound Right
EBT	Eastbound Through
EEC	Excess Expected Crashes
EMS	Emergency Medical Services
ES	Executive Summary
FHWA	Federal Highway Administration
FY	Fiscal Year
GPS	Global Positioning System
HCS	Highway Capacity Software
HDM	Highway Design Manual
HIS	Highway Information System
KABCO	Auto Collision Injury Scale[1]
KHC	Kentucky Heritage Council
KIPDA	Kentuckiana Regional Planning and Development Agency
KY	Kentucky
KYTC	Kentucky Transportation Cabinet
LEP	Limited English Proficiency
LO / S	Local Officials and Stakeholders
LOS	Level of Service
LOSS	Level of Service of Safety
LWCF	Land and Water Conservation Fund
MP	Milepoint
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NBL	Northbound Left
NEPA	National Environmental Policy Act
NHS	National Highway System
NRHP	National Register of Historic Places
ORVNE	Ohio River Valley Northeast
SBL	Southbound Left
SHIFT	Strategic Highway Investment Formula for Tomorrow
SR	State Route
STIP	Statewide Transportation Improvement Program
TIP	Transportation Improvement Program
TWLTL	Two-Way Left-Turn Lane
USACE	United States Army Corps of Engineers
VISSIM	Microscopic Multi-Modal Traffic Flow Simulation Model Software
WBL	Westbound Left
WBR	Westbound Right

[1] K: fatal, A: Severe Injury, B: Minor Injury, C: Possible Injury, O: No Injury Detected

Executive Summary

The City of Prospect, Kentucky, in coordination with the Kentucky Transportation Cabinet (KYTC), is studying improvements to US 42 between KY 841 (Gene Snyder Freeway) and KY 3222 (Rose Island Road), as highlighted in **Figure ES - 1**. The approximately 2.3-mile corridor is the main thoroughfare through Prospect, connecting area residents to city amenities and serving as a minor arterial for adjacent Oldham County residents.

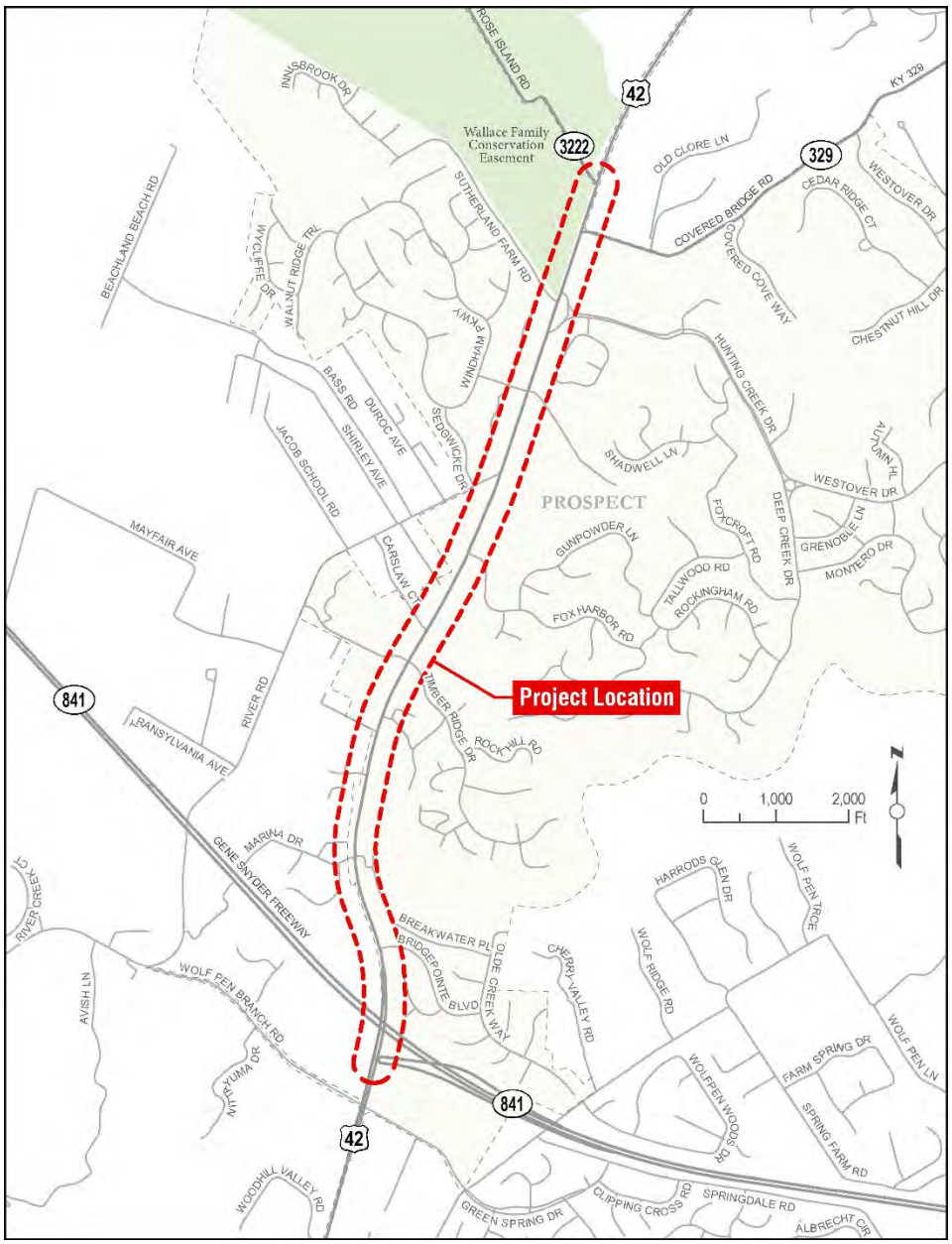


Figure ES - 1. Study Area

Study Background

A previous design project undertaken by the Kentucky Transportation Cabinet (KYTC Item No. 5-972) considered improving a portion of the corridor from the Harrods Creek Bridge to River Road with either the addition of a center two-way left-turn lane (TWLTL) or a raised center median with U-turns at primary intersections. This project was put on hold when a consensus regarding the preferred solution could not be reached. Differing concerns regarding the costs and impacts of widening to the north/west versus south/east created an impasse without a clear direction forward.

The current study leverages this previous work while taking a fresh look at current conditions. Existing (2021) conditions and future (2045) projections are reviewed to provide an in-depth transportation planning study of the US 42 corridor between KY 841 and Rose Island Road. The goal of this effort is to build consensus on potential improvements to address safety, congestion, and traffic flow while considering corridor aesthetics and the long-term effectiveness of proposed improvements. This study examines the need for turn lanes, evaluates intersection issues, and considers bicycle and pedestrian facilities that would provide connectivity along the corridor. Additionally, opportunities for improving mobility within the city are explored.

The overall vision of this study is to explore opportunities to improve safety and mobility along the US 42 corridor for all users—vehicles and pedestrians—and to create a sense of community through a built environment that is attractive for families, businesses, and visitors to Prospect. That is, to create a small-town environment while respecting the regional travel needs of US 42. The goals include improving vehicular and pedestrian safety, enhancing the corridor's aesthetics, and improving mobility throughout the community.

The rich history of planning efforts for the area was reviewed, along with area projects that may reasonably impact the US 42 corridor.

Existing Conditions

US 42 is a four-lane (11 to 12 feet lane width) minor arterial roadway through rolling terrain. The speed limit is 45 mph within the study limits. Sidewalk connections are few. An inventory of existing lighting along the corridor identified about 50 fixtures along 2.5 miles, but few illuminate US 42 itself.

Traffic

Traffic data collection during October and November 2021 was compared to historic traffic data, drone footage, and speed data to create a microsimulation model of existing AM and PM peak-hour traffic operations. This forms a baseline to forecast future traffic and test different build scenarios. The corridor carries up to 33,600 vehicles per day. Individual intersections operate at Level of Service

(LOS) D or better in both peak hours but strongly favor US 42 through movements. Individual turns, particularly left turns from cross streets, experience more delay—many at LOS E or F in the PM peak.

Travel speeds show significant slowdowns at several intersections during the peak periods. Coming down the hill near Bridgepointe Boulevard, top speeds were 55+ mph. Through Prospect, speeds were 30–35 mph during the afternoon rush hour. Several community comments suggest a lower speed limit be considered.

Safety

For the period 2017–2019, 240 crashes were reported along the study corridor. This included one fatality and 28 injury collisions. According to Prospect Police Department records, 2020 crash rates were significantly lower, which is likely a result of reduced travel during the COVID-19 pandemic. Therefore, the analysis did not focus on 2020 data. By type, most crashes were rear ends (52%) followed by same direction sideswipes (12%). Drivers headed north/east accounted for 62% of crashes, 24% of crashes occurred on wet/icy pavement, and 17% occurred at night. Statistical analyses highlight crash concentrations at US 42 intersections with KY 841, Bridgepointe Boulevard, Timber Ridge Drive/Carslaw Court, and Fox Harbor Road.

A November 2021 road safety audit was also completed with city, state, and consultant personnel to review safety conditions in the field.

Environmental

Sensitive environmental features in the study area include wetlands, floodplains, and wooded habitat for endangered bats. Harrods Creek is a US Army Corps of Engineers (USACE) designated navigable (Section 10) stream. The numerous historic resources in the study area include Drumanard Estate Historic District to the south and the Wallace Conservation Easement to the north. City Hall, the fire station, and several parks represent key community features abutting the corridor.

Improvement Concepts

Potential improvement concepts were developed considering existing conditions data, environmental constraints, community input, year 2045 traffic forecasts, and project team feedback. Concepts were categorized as short-, mid-, and long-term improvements based on the scale of anticipated costs and impacts. Short-term concepts represent smaller-scale improvements within the existing right-of-way that might be implemented more quickly than larger projects. Mid-term projects may require right-of-way and are costlier than small-scale projects. Long-term projects are anticipated to have more impacts and higher costs, which require more programming and a somewhat longer implementation timeline.

Figure ES - 2 maps general concept locations. A summary of each is in **Table ES - 1**. Cost estimates represent planning-level estimates for design, right-of-way, utilities, and construction plus a 30% contingency. **Project sheets (pp. 56–63),** provide additional information and conceptual drawings of each concept.

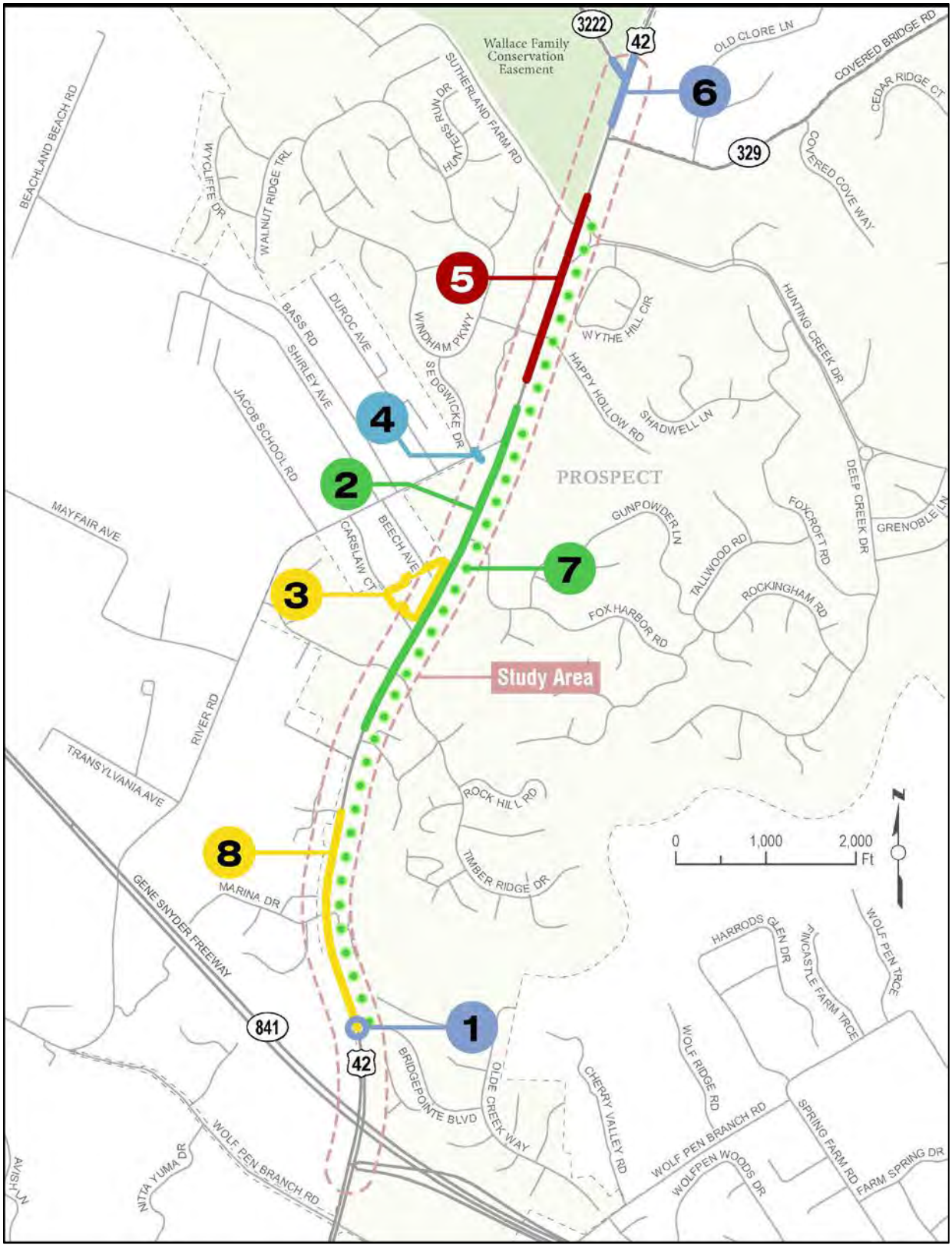


Figure ES - 2. Concept Locations

Table ES - 1. Summary of Build Concepts

#	Concept	Term	Total Cost
1.	**Bridgepointe Boulevard**		**$2,485,000**
1a.	**Bridgepointe Boulevard. Lighting + Dynamic Signage**	**Short**	**$145,000**
	US 42 is on a steep grade at the intersection with Bridgepointe Boulevard. This concept would add intersection lighting and dynamic warning signage on US 42 to alert drivers of potential left-turning vehicles exiting Bridgepointe Boulevard... These options could potentially be implemented as maintenance-level improvements through coordination with KYTC.		
1b.	**Bridgepointe Boulevard, Left-turn Lane**	**Mid**	**$2,340,000**
	A left-turn lane would be added on southbound US 42 to provide refuge for drivers waiting to turn into Bridgepointe Boulevard. Due to the grade, an adjacent historic property, and steep rock outcrops, a retaining wall would be required to construct this turn lane. The retaining wall would allow this concept to minimize utility impacts and be constructed primarily within the existing right-of-way.		
2.	**Timber Ridge Drive to River Road**		**$11,700,000**
2a.	**Timber Ridge Dive + Fox Harbor Road Roundabouts**	**Long**	**$8,230,000**
	These signalized intersections would be converted to roundabouts, eliminating all left-turn maneuvers between the two, aside from Carslaw Court. Roundabouts are a proven safety countermeasure, reducing crash rates by as much as half. This would also serve as a traffic calming measure through city center. Traffic would be divided by a raised, curbed median, and sidewalks could be provided along both sides of US 42, with enhanced crossing measures.		
2b.	**River Road Roundabout**	**Long**	**$3,470,000**
	In addition to the Timber Ridge and Fox Harbor roads' roundabouts, a third roundabout could replace the signalized intersection at River Road. This would create signature entrances on either side of the commercial area within Prospect. With fewer left-turn opportunities, a raised median is recommended for part of the distance between Fox Harbor Road and River Road. Sidewalk connections along both sides of US 42 would be created in this area. This would create a series of three roundabouts. Based on operational projections, the roundabout at River Road could be constructed at a later date yet would still complement the operation of the system created with the other two roundabouts.		
3.	**Prospect City Center Connectivity**		**$520,000**
3a.	**Connectivity between Business Parking Lots**	**Short**	**-**
	Three separate commercial developments west of US 42 have no internal connections; therefore, multiple left-turns onto and from US 42 are required to access these developments. Two minor connections between existing parking lots could eliminate these multiple left turns. This could be completed through local or private efforts with development owner coordination.		
3b.	**New Business Access Road**	**Mid**	**$520,000**
	Another opportunity to improve access to local businesses would be to add a new backage road connecting US 42 to Beech Avenue and Carslaw Court behind two of the commercial developments. A future connection could also be made to Prospect Pointe, farther north. If realized, these connections could divert local trips off US 42.		
4.	**Pedestrian Business Connectivity**	**Short**	**$55,000**
	This concept would add a mid-block crosswalk on River Road, connecting pedestrians from the residential area along Sedgewicke Drive to local businesses in adjacent Prospect Pointe. This mid-block connection could include enhanced pedestrian crossing measures to improve visibility and safety.		

5. Greenmere Boulevard to Hunting Creek Drive — $1,350,000

5a. Greenmere Boulevard Left-turn Lane — Mid — $660,000

A northbound left-turn lane could be added on US 42 to facilitate vehicles turning onto Greenmere Boulevard. This lane could likely be added within the existing right-of-way.

5b. Sutherland Farm Road and Hunting Creek Drive Left-turn Lane — Mid — $690,000

Similarly, left-turn lanes could be added on US 42 to access Sutherland Farm Road and Hunting Creek Drive. Both turn lanes could likely be constructed within the existing right-of-way.

5c. Move "Hunting Creek Drive" Sign — Short

To help drivers unfamiliar with the area, a small-scale maintenance option could relocate the Hunting Creek Drive sign from the overhead signal pole to the subdivision entrance located farther south. This could be completed through a maintenance call to Louisville Metro, the entity responsible for maintaining signals in Jefferson County.

6. Rose Island Road — $1,090,000

6a. Rose Island Road Left-turn Lane — Short — $530,000

A left-turn lane could be added for northbound US 42 drivers accessing Rose Island Road. This turn lane could likely be constructed within the existing right-of-way.

6b. Raise Grade of Rose Island Road — Mid — $560,000

Rose Island Road ascends a hill to its skewed intersection with US 42. Adjacent, protected Wallace Farm Conservancy and wetland area limits the ability to correct the skew; however, the grade may be raised with minimal impacts to improve sight distance for drivers turning onto US 42 from Rose Island Road. This grade change would require replacing the small bridge on Rose Island Road.

7. US 42 Lighting — $1,780,000

7a. US 42 Lighting from Bridgepointe Boulevard to Harrods Creek Bridge — Short — $390,000

To improve nighttime visibility and overall aesthetics of the corridor, consistent decorative lighting could be added from Bridgepointe Boulevard to the Harrods Creek bridge. The lights would be installed on one side of the road in this segment to minimize costs associated with the steep slopes and rock outcrops.

7b. US 42 Lighting from Harrods Creek Bridge to Hunting Creek Drive — Mid — $1,390,000

Similarly, decorative lighting could be added to improve nighttime visibility from Harrods Creek bridge to Hunting Creek Drive. Pedestrian lighting could be added along the backside of the pole to illuminate the sidewalks. Light poles could alternate sides of US 42 for consistent illumination and greater pole spacing. Adding lighting was the third most cited public request.

8. US 42 Guardrail, Rumble Strip, and Reduced Lane Width from Bridgepointe Boulevard to Marina Drive — Short — $380,000

These improvements could potentially be implemented through coordination with KYTC maintenance division to improve safety in this hilly section of US 42. Proposed safety measures include replacing/upgrading the existing substandard guardrail from Bridgepointe Boulevard to Marina Drive, adding a centerline rumble strip to guide drivers to stay in their driving lane, and reducing the short segment of 12-foot-wide lanes to match the existing 11-foot-wide lanes through most of the study area. This could potentially help to reduce travel speeds descending the hill.

Recommendations

During the prioritization process (see **Chapter 6.0** and **Chapter 7.0**), the project team chose to combine the concepts based on partnership opportunity and logical termini to facilitate seeking future funds, with the understanding that the individual concepts could be broken out into individual projects, advancing independently as feasible. **Table ES - 2** and **Table ES –** 3 summarize the project priorities by partnership opportunity with KYTC and Louisville Metro, and include a brief justification for each assigned priority level.

Table ES - 2. Recommended KYTC–Prospect Partnership Priorities

KYTC–Prospect Partnership Priorities

#	Concept Name	Term	Total Cost	Benefit-Cost Analysis (BCA)	Average Public Rating
Priority #1 – Harrods Creek to Hunting Creek Drive MP 9.628 – 10.548					
2a	Timber Ridge Drive + Fox Harbor Road Roundabout	Long	$8,230,000	2.80	52
2b	River Road Roundabout	Long	$3,470,000	2.92[1]	51
7b	US 42 Lighting–Harrods Creek Bridge to Hunting Creek Drive	Mid	$1,390,000	1.96	73
		Long	**$13,090,000**	**2.12[2]**	**59[2]**

These concepts best addressed the purpose, needs, and goals of the study—safety and mobility for all users within Prospect. This segment covers the worst crash concentration areas. The proposed roundabouts would provide both safety and travel time savings.

These limits align with ongoing KYTC design project 5-972 (MP 9.628 to MP 10.548), which has been on hold in the design phase. These concepts could potentially be a preferred option considered for that project.

The Timber Ridge Drive + Fox Harbor Road roundabouts would operate as one combined system with the River Road roundabout added later. Although it is not needed to achieve operational improvements, it does provide added safety and operational benefits. A future design project could consider left-turn lanes at the River Road signal as an option as well.

Priority #2 – Bridgepointe Boulevard to Harrods Creek MP 9.263 – 9.628					
1a	Bridgepointe Boulevard Lighting + Dynamic Signage	Short	$145,000	215.26	70
1b	Bridgepointe Boulevard Left-turn Lane	Mid	$2,340,000	15.58	83
7a	US 42 Lighting - Bridgepointe Boulevard to Harrods Creek Bridge	Short	$560,000	1.96	73
8	US 42 Guardrail + Centerline Rumble Strip + Narrowed Lanes	Short	$380,000	88.88	69
		Short	**$3,425,000**	**37.61[2]**	**74[2]**

As a top public and team safety concern area, the US 42 segment from Bridgepointe Boulevard to the Harrods Creek bridge (MP 9.263 to MP 9.628) also rose to the top of the priority list. Having among the highest BCA ratings of all concepts considered, and with this area being the site of the fatal crash in the analysis period, these combined concepts were determined to best address the safety issues in this segment.

Priority #3 – Hunting Creek Drive to KY 3222 (Rose Island Road) MP 10.777 – 11.355					
5a	Greenmere Boulevard Left-turn Lane	Mid	$660,000	0.85[3]	78
5b	Sutherland Farm Road + Hunting Creek Drive Left-turn Lane	Mid	$690,000	4.12[3]	83
5c	Move "Hunting Creek Drive" Sign to subdivision entrance	Short	$0	-	67
6a	Rose Island Road Left-turn Lane	Short	$530,000	3.08	86
6b	Raise Grade of Rose Island Road	Mid	$560,000	-	69
		Short	**$2,440,000**	**1.08[2]**	**79[2]**

The series of left-turn lanes received the most positive public feedback, and collectively would address the safety and mobility concerns of the northern section of the study area from Greenmere Boulevard to Rose Island Road (MP 10.776 to MP 11.355). Most of these concepts could likely be completed within existing right-of-way, and would require less programming and design time than the higher priority concepts.

[1]BCA is for all three roundabouts. (Did not model constructing only the River Road roundabout.)
[2]Weighted Average; Individual ratings are the sum of all ratings received for the concept divided by the number of responses received per concept on a 100-point scale. A score of 100 is the most positive rating.
[3]BCA for all three left-turn lanes is 2.52.

Table ES – 3. Recommended Louisville Metro–Prospect Partnership Priorities

Louisville Metro–Prospect Partnership Priorities					
#	Concept Name	Term	Total Cost	BCA	Average Public Rating
Priority #1 – Local Access within Prospect					
3a	Add Connections between Businesses	Short	$0	-	76
3b	Construct New Access Road to Businesses	Mid	$520,000	-	72
4	Enhance Pedestrian Connectivity to Businesses	Short	$55,000	-	64
		Short	**$575,000**	**-**	71[1]
The concepts that address mobility issues within Prospect were recommended as the City's top priority. These options have the lowest costs and, based on improvement types, did not receive benefit-cost analyses. They would divert some trips off and onto US 42 and improve local access.					

[1]Weighted Average

Additional Information

Written requests for additional information should be sent to:

City of Prospect
Prospect City Hall
9200 U.S. Hwy 42
Prospect, KY 40059
502.228.1121

or

KYTC District 5 Planning
KYTC District 5
8310 Westport Road
Louisville, KY 40242
502.210.5400

1.0 Introduction

The City of Prospect, Kentucky, in coordination with the Kentucky Transportation Cabinet (KYTC), is studying improvements to US 42 between KY 841 (Gene Snyder Freeway, milepoint [MP] 8.960) and KY 3222 (Rose Island Road, MP 11.355), as highlighted in **Figure 1**. The approximately 2.3-mile corridor is the main thoroughfare through Prospect, connecting area residents to city amenities and serving as a minor arterial for Oldham County residents.

The overall vision of this study is to explore opportunities to **improve safety and mobility along the US 42 corridor for all users**—vehicles and pedestrians—and to **create a sense of community through a built environment** that is attractive for families, businesses, and visitors to Prospect. That is, to create a small-town environment while respecting the regional travel needs of US 42.

The study goals include improving vehicular and pedestrian safety, enhancing aesthetics along the corridor, and improving mobility throughout the community.

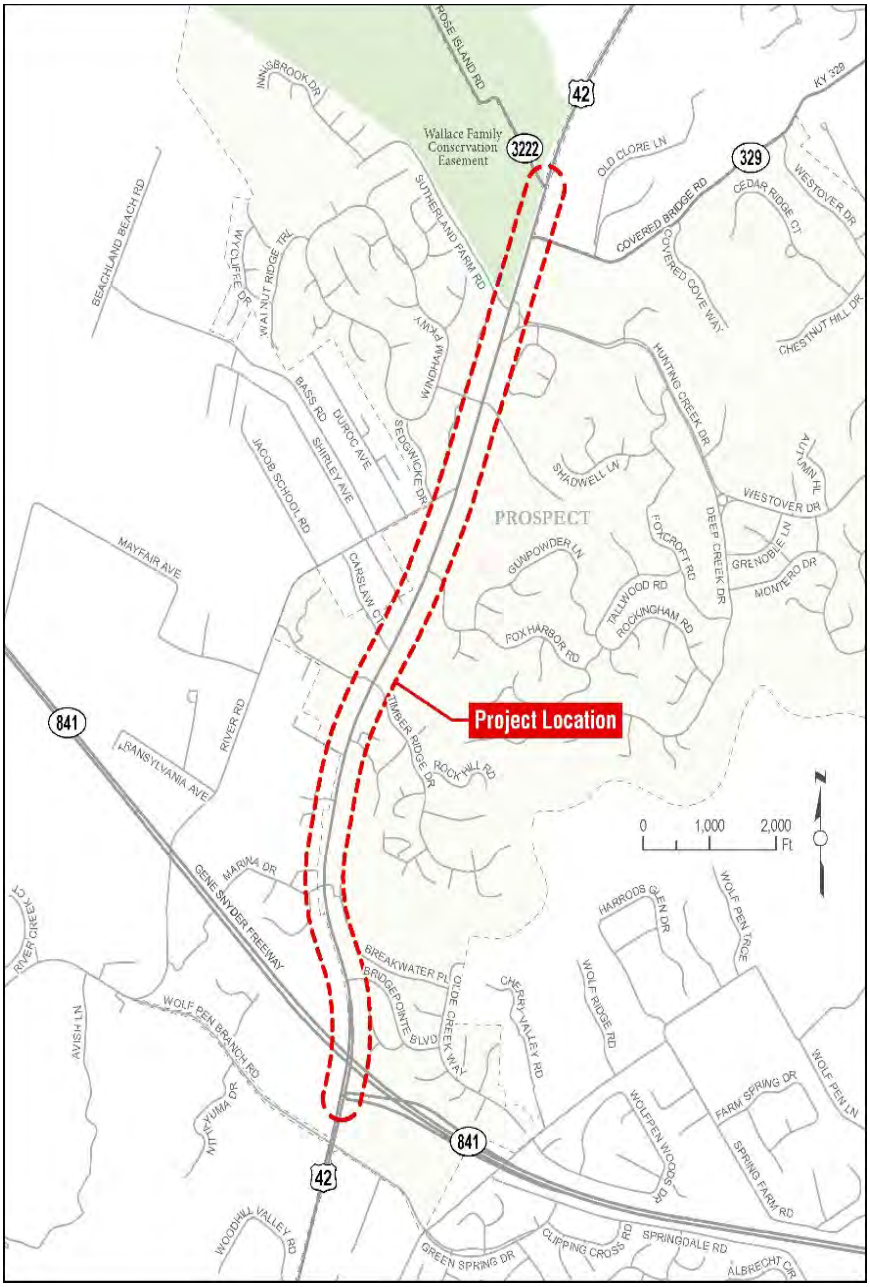


Figure 1. Study Location

The study inventoried existing conditions to identify needs and deficiencies for consideration in the development of solutions proposed herein. The associated impacts and cost estimates were identified during prioritization of the concepts. Coordination with local officials, stakeholders, and the public informed project team decisions. The following chapters detail the study tasks outlined in **Figure 2**.

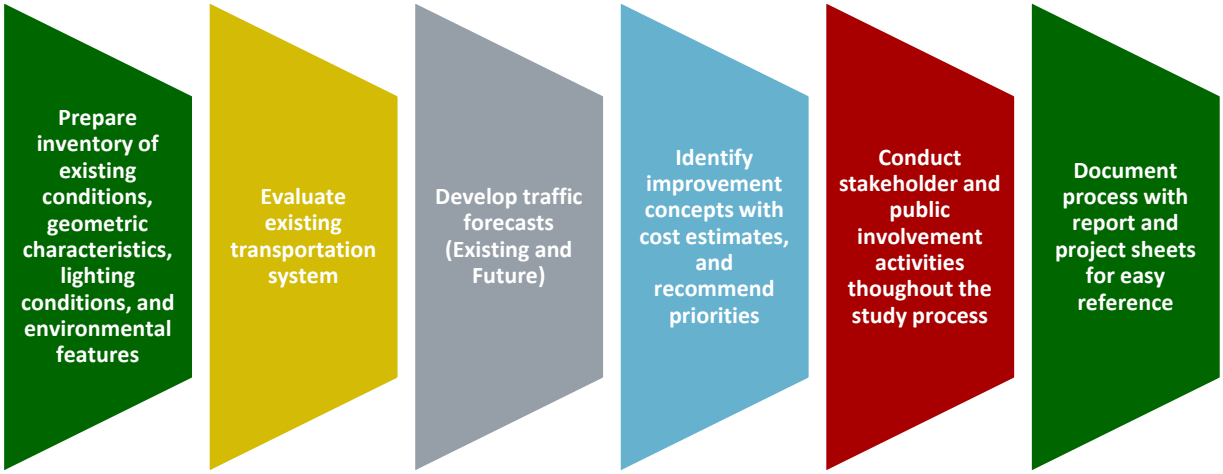


Figure 2. Study Tasks

This study was prepared for the City of Prospect (local agency) with financial assistance from the Federal Highway Administration (FHWA) and KYTC oversight.

Prospect is within the boundaries of the Kentuckiana Regional Planning and Development Agency (KIPDA), which serves as the Area Development District (ADD) and Metropolitan Planning Organization (MPO).

1.1 Project History

A previous design project undertaken by the Kentucky Transportation Cabinet (KYTC Item No. 5-972) considered improving a portion of the corridor from the Harrods Creek Bridge to River Road with either the addition of a center two-way left-turn lane (TWLTL) or a raised center median with U-turns at primary intersections. This project was put on hold when a consensus regarding the preferred solution could not be reached. Differing concerns regarding the costs and impacts of widening to the north/west versus south/east created an impasse without a clear direction forward.

The current study leverages this previous work while taking a fresh look at current conditions. Existing (2021) conditions and future (2045) projections are reviewed to provide an in-depth transportation planning study of the US 42 corridor between KY 841 and Rose Island Road. The goal of this effort is to build consensus on potential improvements to address safety, congestion, and traffic flow while considering corridor aesthetics and the long-term effectiveness of proposed improvements. This study also examines the need for turn lanes, evaluates intersection issues, and considers bicycle and pedestrian facilities that would provide connectivity along the corridor. Additionally, opportunities for improving mobility within the City are explored.

1.2 Previous Studies and Potential Projects

Kentucky's *FY 2022 – FY 2024 Biennial Highway Construction Plan,*[2] *FY 2020-2026 Highway Plan,*[3] the Continuous Highway Analysis Framework (CHAF) database, KIPDA's *Metropolitan Transportation Plan*[4] (MTP) and Transportation Improvement Program[5] (TIP), local transportation plans, and local planning studies were reviewed to identify previous studies and potential projects in the vicinity of US 42.

Completed Planning Studies

A rich history of planning efforts informs future concepts, including:

- **2010 | Prospect Mobility Study**[6] examined and documented the need for a more comprehensive and interconnected mobility network for Prospect residents and visitors.
- **2016 | US 42 Corridor Master Plan** provided recommendations for corridor aesthetic improvements and community connectivity along the US 42 and River Road corridors.
- **2016 | MOVE Louisville**[7] identified an aspirational concept of a new road completely within Oldham County, extending on new alignment from US 42 at Goshen Elementary School south to KY 22, and including a new I-71 interchange that would alter traffic patterns in Prospect.
- **2017 | Ohio River Valley Northeast (ORVNE) Section of the Louisville Loop**[8] would connect Prospect to the regional Louisville Loop trail network.

Additionally, studies outside Prospect were reviewed to understand how potential future implementation may affect traffic within the City. These studies include:

- **2019 | Oldham County's Comprehensive Plan**[9] identified population growth and land use development along US 42 north of Prospect.
- **2020 | James Taylor–Jacob School Neighborhood Plan**[10] identified priorities to preserve the family-oriented, residential character of the diverse neighborhood—developed in 1922 as an African American subdivision—to reduce ongoing issues with flooding and drainage, and to

[2] https://apps.legislature.ky.gov/record/22rs/budget/HB242/SCS1.pdf
[3] https://transportation.ky.gov/Program-Management/Pages/2020-Highway-Plan.aspx
[4] https://www.kipda.org/transportation/core-products/metropolitan-transportation-plan/
[5] https://www.kipda.org/transportation/core-products/transportation-improvement-program/
[6] https://kipdatransportation.org/wp-content/uploads/2021/06/Prospect-Mobility-Study-2010-02.pdf
[7] https://louisvilleky.gov/government/advanced-planning-and-sustainability/move-louisville
[8] https://louisvilleky.gov/government/louisville-loop/northeast-corridor-louisville-loop
[9] https://www.oldhamcountyky.gov/sites/default/files/pdf/Oldham%20Comprehensive%20Plan%20Public%20Document_0.pdf
[10] https://louisvilleky.gov/advanced-planning-and-sustainability/document/james-taylor-jacob-school-neighborhood-plan

enhance mobility and safety for children and ensure residents' access to adjacent and nearby amenities.

Planned and Committed Projects

Other planned projects in the vicinity are mapped in **Figure 3** and include:

- KYTC Item No. 5-441.01 reconstructs US 42 in Oldham County from the Jefferson/Oldham County line to Ridgemoor Drive by adding a TWLTL. This project is currently in the utility phase.

- KYTC No. 5-499.00 (Louisville Metro project) includes bicycle and pedestrian facilities along River Road between downtown Louisville and Prospect.

- KYTC Item No. 5-483.01 widens I-71 from 4 to 6 lanes from I-265 to KY 329 in Crestwood. This project is included in KYTC's ongoing I-MOVE construction project.[11]

- KYTC Item No. 5-537 widens I-265 from 4 to 6 lanes from the I-71 interchange to KY 155 (Taylorsville Road). This project is also a part of the ongoing I-MOVE construction project.[11]

- KYTC Item No. 5-557 improves safety and reduces congestion on I-71 from I-264 (Watterson Expressway) to I-265 (Gene Snyder Freeway). This project completed a planning study in 2021, which examined the need for improvements to the I-71/I-264 interchange with preliminary design efforts to improve safety and reduce congestion from I-264 to Zorn Avenue, and then to I-265.[12]

- KYTC Item No. 5-972 explored design concepts along US 42 from Harrods Creek Bridge to River Road. This project considered widening the corridor to five lanes with a TWLTL or a raised center median with U-turns and roundabouts. The design phase of this project was previously put on hold. (See Section 1.1 herein.)

- KYTC Item No. 5-3036 (Louisville Metro project) would construct a segment of the ORVNE Louisville Loop from Prospect to the SR 265/KY 841 Lewis and Clark Bridge. This project is in the design phase. See parent project KYTC Item No. 5-499 for information on the complete section from downtown Louisville to Prospect.

[11] https://i-moveky.com/
[12] https://transportation.ky.gov/Planning/Pages/Project-Details.aspx?Project=I-71%20and%20I-264%20Interchange%20Study

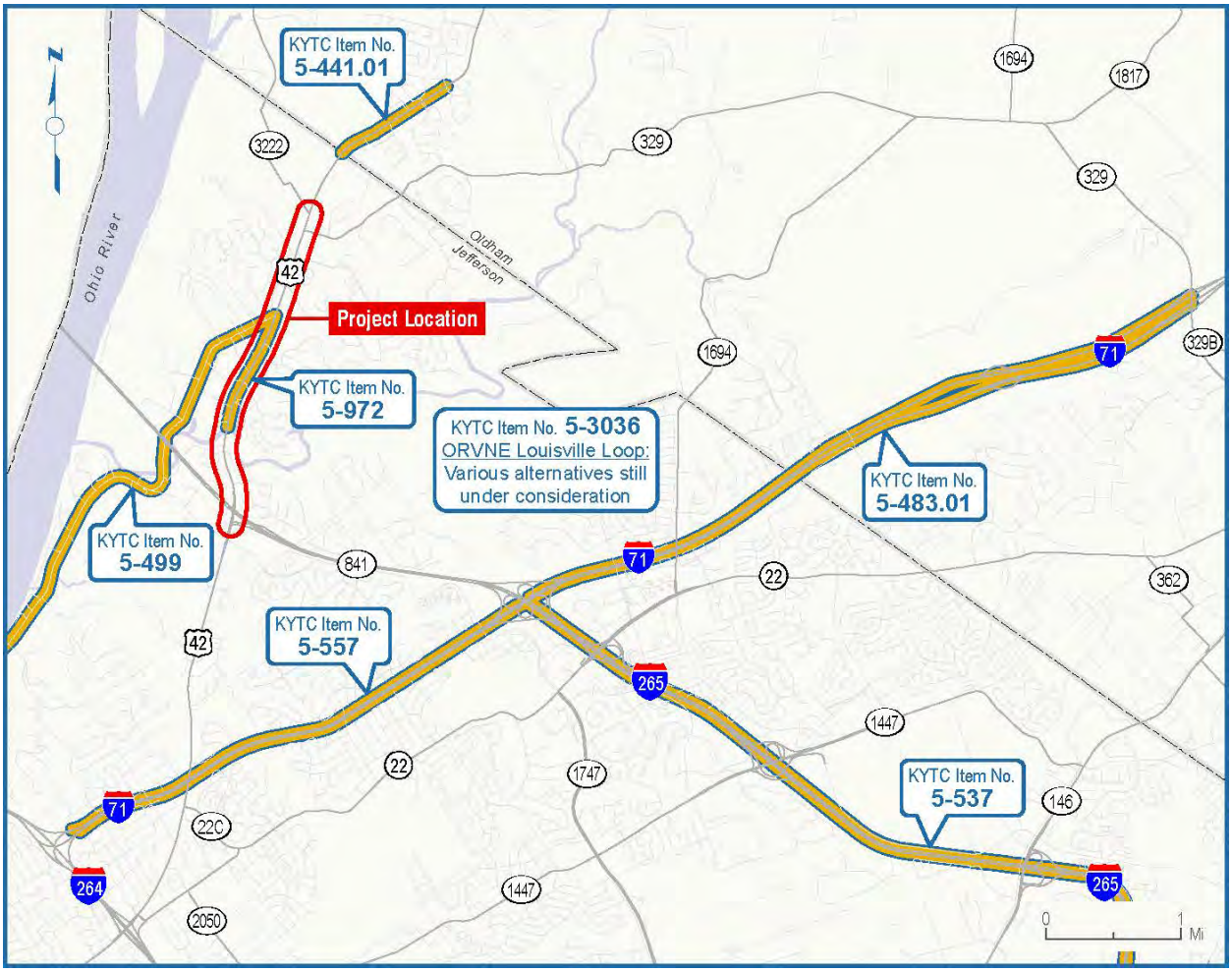


Figure 3. KYTC Planned Projects

2.0 Existing Conditions

The following sections detail the existing conditions of the corridor, including roadway system designations, roadway geometric characteristics, traffic volumes and operations, and crash history. This information was gathered from KYTC's Highway Information System (HIS) database, KYTC's Transportation Enterprise Database (TED), Kentucky State Police (KSP) records, bridge inspection reports, traffic counts, and field reviews.

2.1 Roadway System Designations

Roadway system designations indicate the purpose of the road to connect people and places. The designations are used to determine design parameters based on a road's intended use and are often the basis for eligibility for certain funding sources.

Functional Class

Functional Classification is the process of grouping streets and highways according to the character of travel service and access to adjacent land use they provide. This classification system recognizes travel involves movement through a hierarchical system of facilities that progress from lower classifications handling short, locally oriented trips to higher classifications serving longer distance travel at higher mobility levels. A roadway's classification is further designated as urban or rural based upon whether it is located within the FHWA Adjusted Urban Area boundaries. The major functional classes with brief definitions are listed in **Figure 4**.

Local Roads	Collectors	Minor Arterials	Principal Arterials	Freeways & Interstates
•Not intended for long distance travel, except at the origin or destination end of the trip, due to their direct access to abutting land. Often designed to discourage thru traffic.	•Gather traffic from local roads and funnel them to the arterial network. Classified as either a major or minor collector; generally serve intra-county travel and shorter trips.	•Provide service for trips of moderate length, serve geographic areas smaller than their Principal Arterial counterparts, and offer connectivity to the Principal Arterial system.	•Serve major centers for metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas.	•Provide high speed, high mobility links for long distance trips.

Figure 4. Functional Classification Definitions

Additionally, functional classification is used as a tool for transportation agencies and designers. A roadway's functional class suggests expectations about roadway design—specifically vehicle speed, capacity, and the roadway's relationship to land use development. Federal legislation uses functional classification in determining eligibility under the Federal-aid program. Transportation agencies typically describe roadway system performance, benchmarks, and goals by functional classification.

US 42 is classified as an urban minor arterial. From south to north, its major intersecting roads, the milepoints (MP) they intersect on US 42, and road classes include:

• KY 841/I-265	MP 9.035	Principal Arterial/Other Freeway and Expressway
• River Road	MP 10.548	Minor Arterial
• KY 329/Covered Bridge Road	MP 11.222	Major Collector
• KY 3222/Rose Island Road	MP 11.355	Major Collector

Truck Route

Kentucky established a network of highways on which commercial vehicles with increased dimensions may operate in compliance with the Surface Transportation Assistance Act of 1982 (STAA). These "STAA" vehicles include semi-trailers with 53-foot-long trailers and single-unit trucks with a total

length of 45 feet. US 42 is listed in Kentucky's Highway Freight Network in Tier 3, meaning it is a statewide, regionally significant route. It is not on the National Truck Network. The truck weight limit is considered AAA or 40-ton gross vehicle weight.

Highway Systems

Roadways important to the nation's economy, defense, and mobility are included in the National Highway System (NHS). US 42 is not a part of the NHS.

The Kentucky State Primary Road System (SPRS) classifies state-maintained roadways by the type of service and function they provide. US 42 is on the State Primary System, meaning it is a long-distance, high-volume route of statewide significance that links to a major urban area: Louisville Metro.

2.2 Roadway Geometric Characteristics

Geometric characteristics, including number of lanes and widths, median types, shoulder characteristics, posted speed limits, horizontal curve and vertical grade deficiencies, bridge details, bicycle and pedestrian accommodations, and lighting types were compiled from KYTC's HIS database and field reviews, and are summarized in the following sections and in **Figure 7**.

Lane Characteristics

US 42 has four travel lanes in the study area, two per direction. Lane widths are 12 feet wide from KY 841 to just past Bridgepoint Boulevard (MP 9.282). The lane width reduces to 11 feet from that point to the study area terminus at Rose Island Road.

KYTC's 2020 Highway Design Manual (HDM)[13] recommends 11- to 12-foot-wide lanes for urban minor arterial highways, for segments less than 45 mph and greater than 45 mph, respectively.

Median Characteristics

As shown in **Figure 7**, there are three flush medians on US 42, varying in width from 11 to 20 feet, serving as turn lanes. Through most of the study area, the roadway is undivided.

Shoulder Characteristics

Total shoulder width varies from 2 to 10 feet, as pictured in **Figure 7**. The paved shoulder width is typically 1 foot or less, with 10-foot-wide paved shoulders near KY 841.

Speed Limits

The posted speed limit on US 42 is 45 mph through the entirety of the study area.

[13] https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf

Horizontal and Vertical Curves

At a planning level, KYTC sorts horizontal curves into six classes graded A (most sweeping) through F (sharpest). Vertical grades are also classified into six classes on a similar grade scale from A (flattest) to F (steepest). Curve and grade classes are summarized in **Table 1**.

Table 1. Curve and Grade Class Descriptions

Horizontal Curve Class	
Code	**Description (degrees)**
A	0.0-3.4
B	3.5-5.4
C	5.5-8.4
D	8.5-13.9
E	14.0-27.9
F	28+

Vertical Grade Class	
Code	**Description (percent)**
A	0.0-0.4
B	0.5-2.4
C	2.5-4.4
D	4.5-6.4
E	6.5-8.4
F	8.5+

HIS data were compared with HDM design recommendations for maximum vertical grades and minimum horizontal curves to identify substandard curves and grades.

HDM exhibit 700-04 recommends maximum vertical grades for rolling, urban minor arterial highways by speed limit, with 7% for 45 mph (grade class E). Reviewing HCS data, there are no grade class E vertical curves. However, there is a vertical grade class D as the terrain descends past KY 841, as shown in **Figure 7**.

Minimum horizontal curve radii are determined considering various parameters in accordance with Chapter 3 of AASHTO's *A Policy on Geometric Design of Highways and Streets*, current edition. Converting these radii to degree of curves reveals curve class C or worse for 45 mph speeds are considered deficient. There are no deficient horizontal curves along US 42 in the study area.

Bridges

There are two structures in the study area: a crossing of Harrods Creek (KYTC Bridge ID 056B00004N) and a tunnel under US 42, as pictured in **Figure 5**.

The Harrods Creek Bridge, constructed in 1938, spans US 42 from MP 9.63 to MP 9.69. It was last inspected November 19, 2020, and was determined to be in fair condition and not substandard.

The I-265/KY 841 East End Tunnel (leading to the Lewis and Clark Bridge) opened to traffic in 2016. Kentucky's second longest tunnel, at 1,700 feet, it runs under the historic Drumanard Historic District and US 42. The tunnel has no recorded deficiencies.

Figure 5. Structures

Bicycle and Pedestrian Accommodations

Bicycle and pedestrian accommodations along US 42 are limited. There are non-connecting sidewalk segments (pictured in purple on the right panel of **Figure 7**) in Prospect.

Publicly available Strava[14] heat maps were reviewed to identify existing bicycle and pedestrian demand in the area. Current maps indicate bicycle usage, as pedestrian usage along US 42 was negligible, with more activity in adjacent shopping centers, neighborhoods, and recreational areas.

Lighting

An inventory of existing lighting along the corridor identified about 50 fixtures along the 2.3-mile corridor, with few illuminating US 42. Representative fixture types are pictured in **Figure 6**. The angle of many existing fixtures sends the light outward rather than down onto the roadway. There is research to confirm that lighting reduces crashes, particularly those involving pedestrians. Geotechnical conditions described in **Section 3.0** indicate installing lighting may be challenging in locations where bedrock is present near the surface, particularly near the study area's southern terminus. Prospect City officials are specificly focused on reducing light pollution. While some fixtures respond to this initiative, the pattern is inconsistent and the wide mix of fixtures (modern and older) are neither consistent nor responsive to the traditional "night sky" lighting ordinance.[15]

Figure 6. Representative Lighting Types

[14] https://www.strava.com/heatmap#12.80/-85.63170/38.33742/hot/all
[15] https://codelibrary.amlegal.com/codes/prospect/latest/prospect_ky/0-0-0-3832

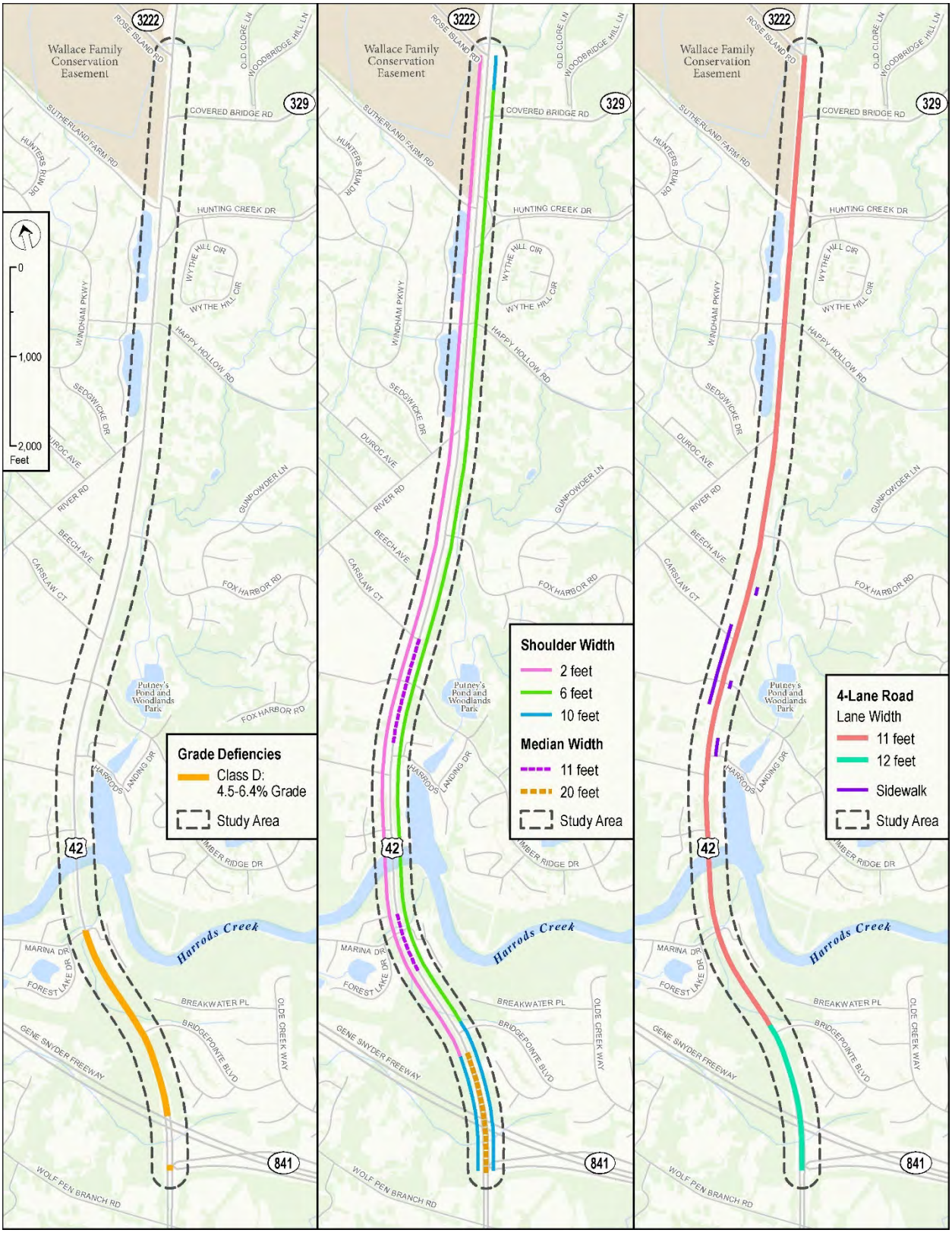


Figure 7. Summary of HIS Characteristics

2.3 Existing Traffic Volumes and Operations

KYTC, KIPDA, and Louisville Metro existing roadway traffic volumes were reviewed, including truck percentages, K factors,[16] and directional distributions, where available. Additionally, 12-hour turning movement counts were collected during fall 2021 to provide up-to-date traffic information at the following intersections, from north to south:[17]

1. Rose Island Road*
2. Covered Bridge Road*
3. Hunting Creek Drive/Sutherland Farm Road*
4. Greenmere Boulevard/Happy Hollow Road
5. River Road*
6. Fox Harbor Road*
7. Timber Ridge Drive*
8. Marina Drive
9. Bridgepointe Boulevard
10. I-265/KY 841 Gene Snyder Freeway Ramps
11. Wolf Pen Branch Road*

Counts classified vehicles into one of five categories: motorcycles, cars, buses, single unit trucks, and articulated trucks. There are six signalized intersections spaced throughout the corridor. From north to south they include Covered Bridge Road, Hunting Creek Road, River Road, Fox Harbor Road, Timber Ridge Drive, and KY 841. All remaining study intersections are stop-controlled on the minor approaches. Additional traffic data are available in the attached *Traffic Forecast Report* in **Appendix A.**

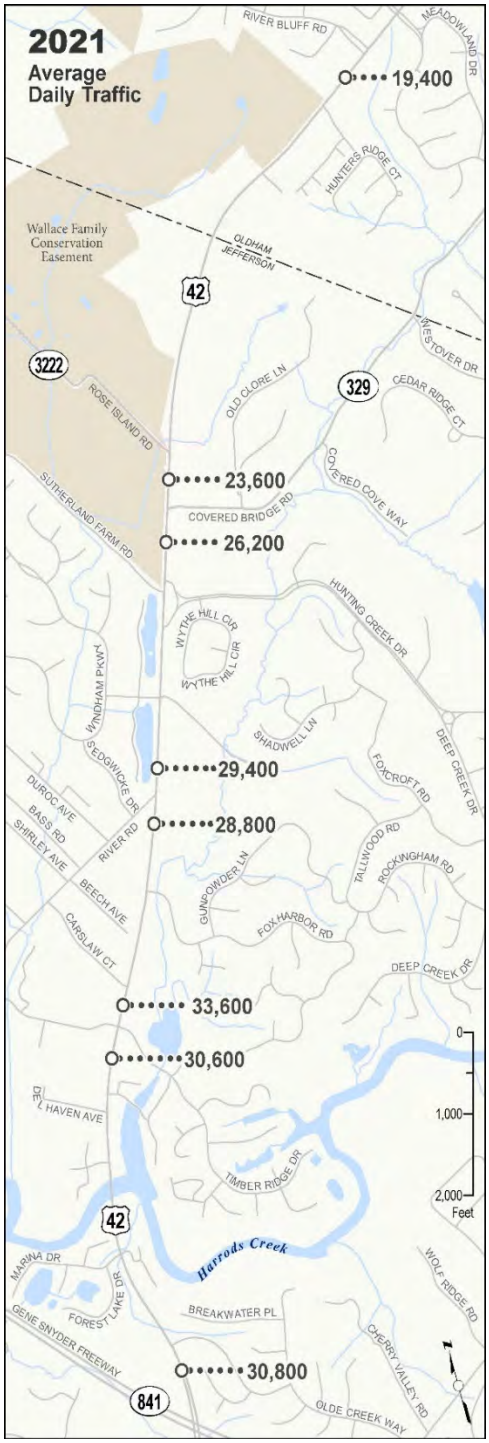


Figure 8. Existing (2021) Average Daily Traffic Volumes

Existing Traffic Volumes

Traffic data collected during October and November 2021 was compared to historic traffic data, drone footage, and speed data to create a microsimulation model of existing AM and PM peak-hour traffic operations. This forms a baseline to forecast future traffic and test different build scenarios. As shown in **Figure 8**, the corridor carries up to 33,600 vehicles per day (vpd), with approximately

[16] K-factor is defined as the proportion of annual average daily traffic occurring in the design hour.
[17] * Indicates Miovision cameras were connected at these locations to collect travel time information.

15% trucks according to factored turning movement counts. From 2021 video counts, heavy vehicles represent up to 6% of the traffic mix in the AM peak hour and up to 18% of the traffic mix in the PM peak hour.

Historically, traffic volumes had been increasing, as displayed in **Figure 9**. However, KYTC's 2020 traffic counts showed a decrease in traffic volumes, which is likely a result of reduced travel during the COVID-19 pandemic. Since the most recent KYTC count prior to 2020 was nearly a decade prior, more recent Louisville Metro counts were reviewed, as summarized in **Table 2**, for comparison with existing 2021 counts. This confirms the 2021 counts are reasonable and are consistent with historic traffic growth trends.

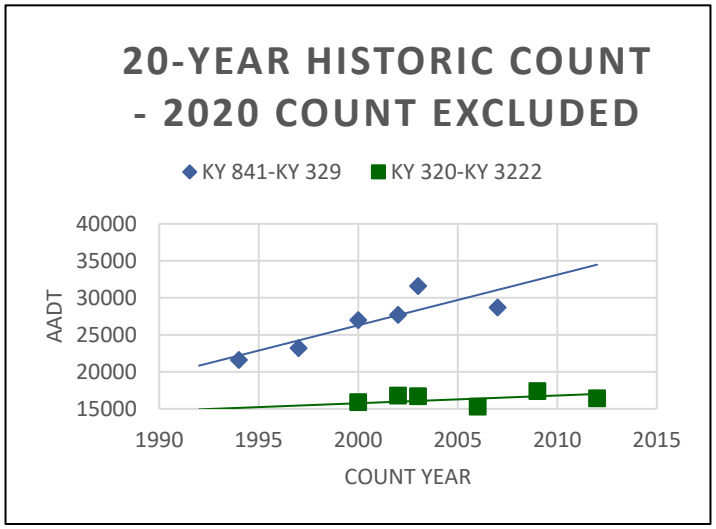


Figure 9. Historic KYTC Traffic Counts

Table 2. Comparison of Recent Traffic Counts to Current (2021) Average Daily Traffic

Segment	Metro 2018	Metro 2019	KYTC 2020	Qk4 Counts 2021
Oldham County South of River Bluff		19,400	13,300	19,400
North of Covered Bridge Road	21,700		16,000	23,600
South of Covered Bridge Road	23,800		23,900	26,200
North of River Road	29,000			29,400
South of River Road	24,100			28,800
North of Timber Ridge	26,400			33,600
South of Timber Ridge	28,200			30,600
North of KY 841		30,800		30,800

Existing Travel Times

To capture representative travel speeds during the peak periods, the corridor was driven multiple times with GPS technology onboard to collect real-time data. These runs are mapped in **Figure 10** and show significant slowdowns at several intersections. Speeds reduce to a typical 30 to 35 mph through Prospect during the PM peak hours. Coming down the hill near the southern terminus, speeds topped 55 mph.

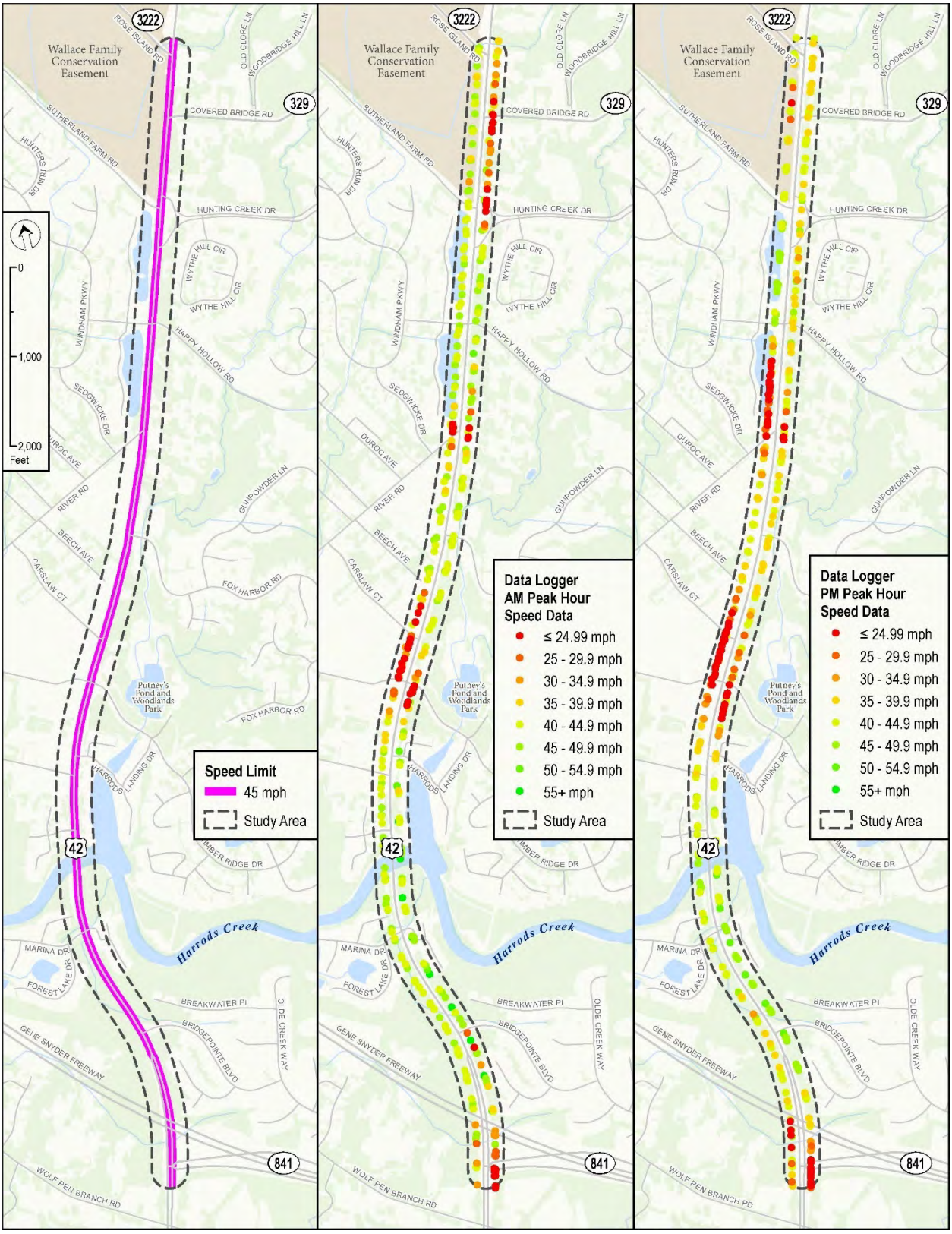


Figure 10. GPS-based Travel Time Data Collected Fall 2021 Compared to Posted Speed Limit

Existing Traffic Operations

In accordance with *Highway Capacity Manual* (HCM) 6th edition procedures for study segments and intersections, several metrics were reviewed to assess US 42's performance, including determining level of service (LOS), volume-to-capacity (v/c) ratios, delay, and queue lengths at intersections to understand the quality of performance along US 42.

Both Highway Capacity Software (HCS) and a more refined VISSIM microsimulation model were used as tools to analyze corridor operations. The VISSIM model was calibrated to serve as a baseline for understanding traffic operations of potential future improvement concepts. Additional technical information is available in **Appendix A.**

- **Level of Service** LOS is a qualitative measure that describes traffic conditions based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS typically represents a driver's perspective of traffic conditions based on perceived congestion. As illustrated in **Figure 11**, LOS A is associated with free flow conditions, high freedom to maneuver, and little or no delay. Conditions at or near capacity typically are associated with LOS E. LOS F represents oversaturated traffic conditions beyond capacity, with low travel speeds, little or no freedom to maneuver, and lengthy delays. LOS D is generally considered acceptable in urban areas.

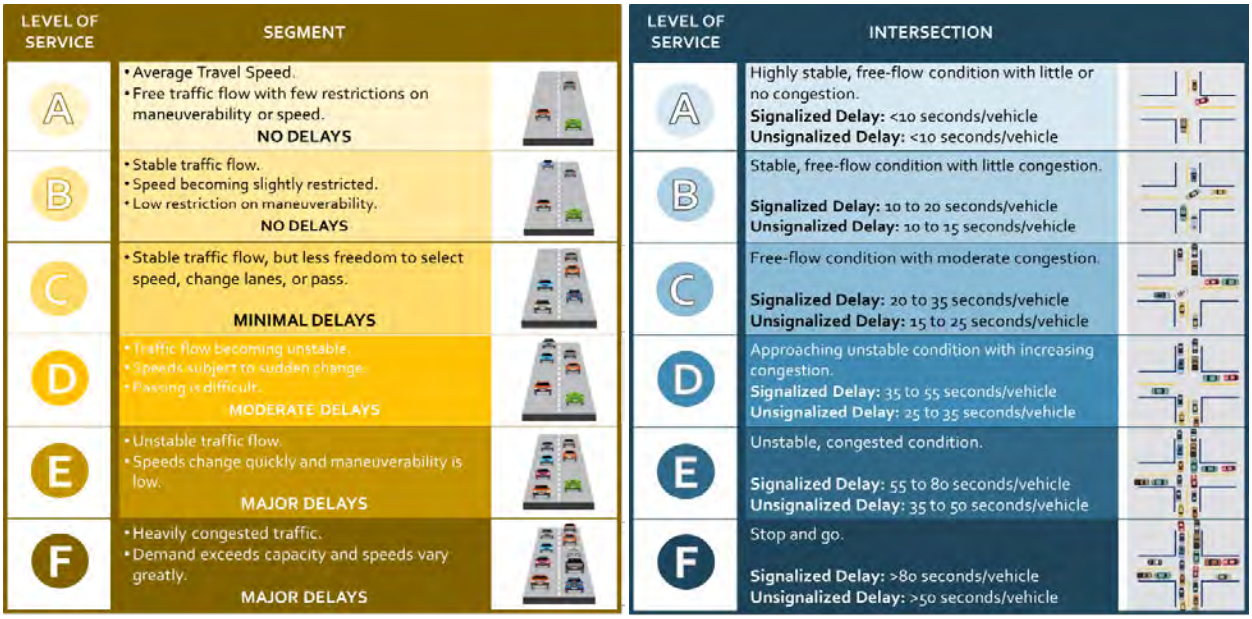


Figure 11. Intersection and Segment Level of Service Descriptions

Using HC, existing segment LOS was determined for the highest traffic hour based on design hourly volume (DHV) calculations, applying K- and d-factors (i.e., hourly and directional adjustments) to average daily traffic (ADT) counts to approximate operations. Segment LOS during the peak periods is generally acceptable: ranging from LOS A to C. Operationally, the northbound PM peak is the

worst, operating at LOS C from KY 841 to Fox Harbor Road, and LOS B from Fox Harbor Road to Rose Island Road. Segments LOS is summarized in **Table 3**.

Specific intersections tend to provide a more accurate measure of corridor operations in urban areas, particularly where signals control mainline throughput. LOS is measured for the overall intersection and each approach at signals but only for stop-controlled movements at unsignalized intersections. Individual intersections operate at LOS D or better in both AM and PM peak hours but strongly favor US 42 through movements. Individual turns, particularly left turns from cross streets, experience more delay—many at LOS E or F in the PM peak, as shown in **Table 4**.

- Volume-to-Capacity (v/c) ratios are another measure of operations. This ratio compares traffic volumes to a facility's theoretical capacity over a specific duration, one hour in this instance. A v/c ratio greater than 1.0 indicates a route has exceeded its theoretical capacity. As v/c is measured over an hour period by segment, a roadway or intersection could be congested during peak commuter periods but show a relatively low v/c averaged over a longer duration.

Table 3 shows segment v/c ratios are 0.5 or less, suggesting adequate capacity exists. The v/c ratios are measured by approach at intersections.

Table 3. Study Segment Operations

Segment Begin	Segment End	Northbound				Southbound			
		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
Rose Island Rd.	Covered Bridge Rd.	A	0.16	B	0.32	B	0.30	A	0.24
Covered Bridge Rd.	Hunting Creek Dr.	A	0.18	B	0.38	B	0.32	B	0.32
Hunting Creek Dr.	Greenmere Blvd.	A	0.20	B	0.42	B	0.41	B	0.30
Greenmere Blvd.	River Rd.	A	0.20	B	0.43	B	0.41	B	0.30
River Rd.	Fox Harbor Rd.	A	0.20	B	0.41	B	0.38	B	0.31
Fox Harbor Rd.	Timber Ridge Dr.	A	0.25	C	0.50	C	0.43	B	0.38
Timber Ridge Dr.	Bridgepointe Blvd.	A	0.26	C	0.43	B	0.37	B	0.34
Bridgepointe Blvd.	KY 841	B	0.27	C	0.44	B	0.38	B	0.35

- Delay is a commonly used measure of congestion, particularly at intersections. It is measured in seconds per vehicle. **Table 4** lists the seconds of delay for the worst operating movement(s) per intersection. The PM peak experiences more delay, with many movements experiencing more than a minute of delay per vehicle.

Table 4. Existing (2021) Intersection LOS/Delay and Poor LOS Movements

US 42 Intersection	AM Delay	AM LOS E/F Moves	PM Delay	PM LOS E/F Moves
KY 841	34	SBL, WBL	32	SBL, WBL
Bridgepointe Boulevard	1	-	1	-
Timber Ridge Drive	27	NBL	27	All Lefts EBT, WBR, WBL
Fox Harbor Road	6	-	8	EBL, EBT, WBL
River Road	4	-	21	-
Greenmere Boulevard	1	-	1	-
Hunting Creek Drive (south)	0	-	1	-
Hunting Creek Drive/Sutherland Farm Road	7	-	7	-
Covered Bridge Road	8	-	6	WBL, WBR
Rose Island Road	4	-	17	NBL

To further support the traffic analyses and development of the model, peak hour drone footage was captured to observe operations in congested conditions, particularly at intersections to measure real-time queue lengths, as pictured in **Figure 12**.

Figure 12. PM Peak Drone Imagery at Timber Ridge Drive Intersection

2.4 Crash History

Kentucky State Police historical crash records were reviewed from January 2017 through December 2020 and are attached in **Appendix B**. As shown in **Figure 13**, while total annual crashes had been decreasing since 2017, year 2020 crash rates were significantly lower than previous years. Conversations with the Prospect Police Department revealed they continued to respond to motor vehicle collisions despite staffing restrictions due to the COVID-19 pandemic. Therefore, the analysis did not focus on 2020 data, as it reported nearly half as many crashes as recent years prior, which is likely a result of reduced travel during the COVID-19 pandemic. The three-year crash details, including concentations, manner of collision, and severity, are mapped in **Figure 16.**

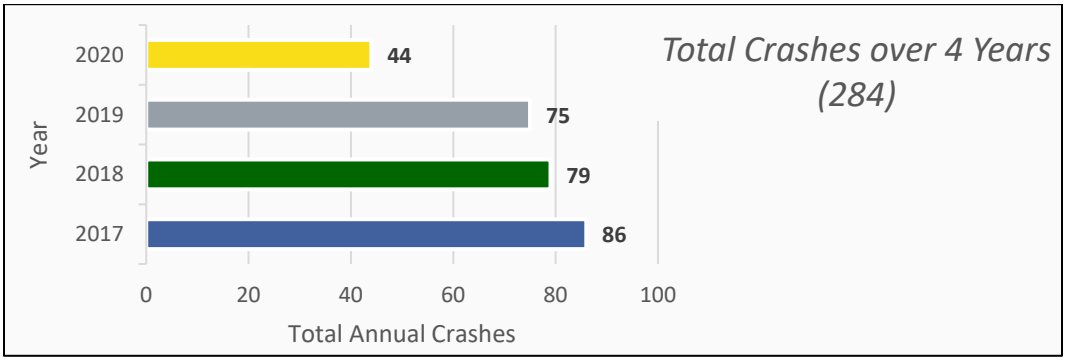


Figure 13. Comparison of Total Crashes per Year

Crash Data

Raw crash data was reviewed to identify trends and understand the general safety operations of the corridor. During the three-year analysis period (2017–2019), there were 240 crashes along the study corridor, including one fatality and 28 injury collisions. Most crashes (62%) involved drivers headed northeast towards Oldham County, 24% of crashes occurred on wet/icy pavement, and 17% occurred at night. Half of all crashes occurred at intersections. The top three crash intersections were Fox Harbor Road (18%), Timber Ridge Drive (16%), and KY 841 (10%).

- **Severity** By severity, there were one fatality, 28 injury collisions, and 211 property damage only crashes, as mapped in **Figure 16**. Further subdividing injury collisions by the standard KABCO [18] classifications (pictured in **Figure 14**), there were 3 suspected serious injuries, 10 suspected minor injuries, and 15 possible injury crashes.

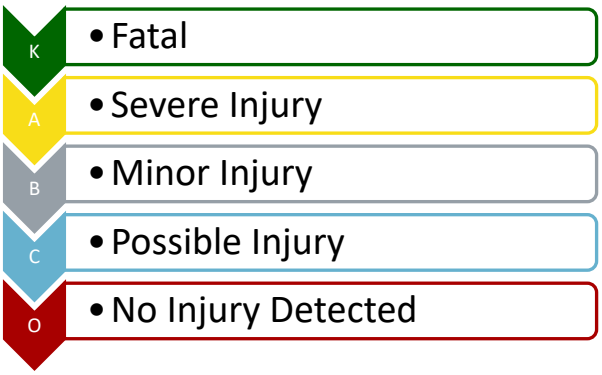


Figure 14. KABCO Classifications

The leading manners of collision for injury crashes were rear ends (12), followed by opposing left turns (8). About 29% of injury crashes occurred on wet pavement.

The fatal crash was a multi-vehicle, same direction sideswipe coming down the hill on dry pavement during the day.

[18] KABCO scale was established by FHWA to evaluate the severity of auto collision injuries and express how they impact crash costs.

• Manner of Collision By type, most crashes were rear ends (52%) followed by same direction sideswipes (12%) and single vehicles (12%), as shown in **Figure 15** and mapped in **Figure 16**. About half of the rear ends occurred at intersections, and 29% of rear ends occurred on wet/icy pavement.

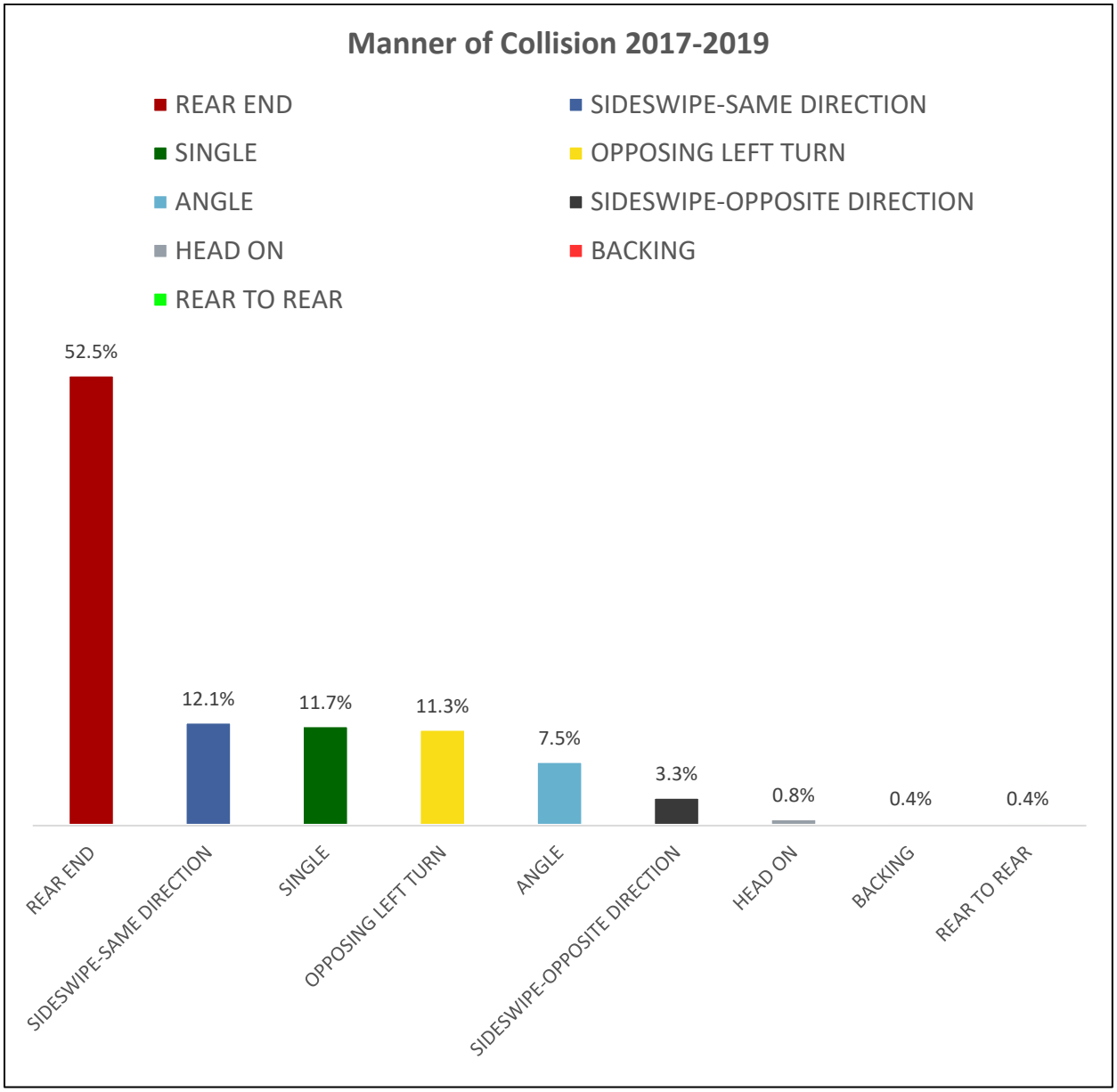


Figure 15. Crash Manner of Collision

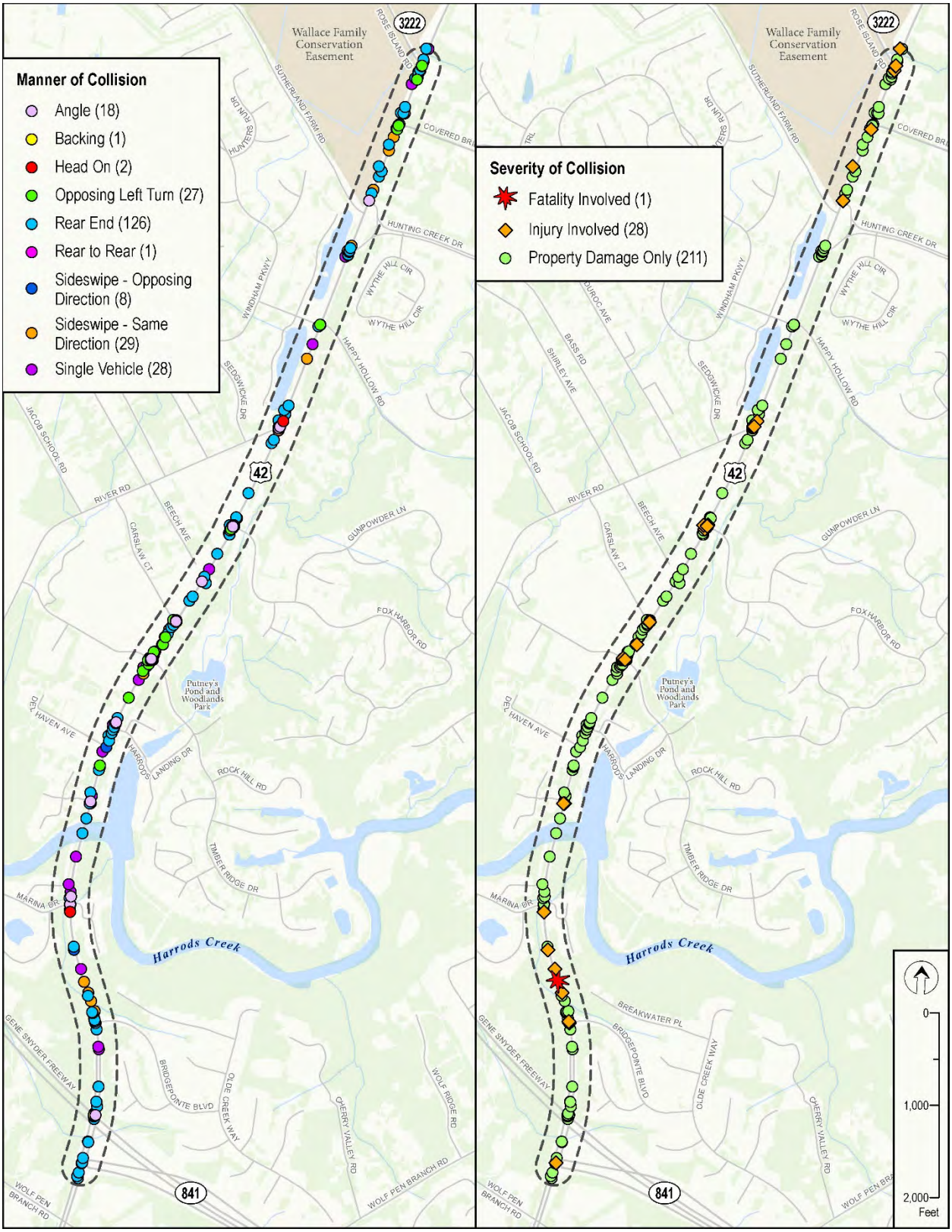


Figure 16. Crash Manner of Collision and Severity (2017–2019)

Statistical Crash Analyses

Two statistical analyses highlight high crash concentrations: Critical Crash Rate Factors (CCRF) and Level of Service of Safety (LOSS). Both are statistical comparisons of safety performance for similar highways statewide. LOSS is a newer, more refined calculation that makes statistical corrections and accounts for intersections. It also considers concentrations of severe (KAB) and non-severe (CO) crash types (per KABCO scale).

A comparison of these statistical analyses is shown in **Figure 18**. Crash concentrations at US 42 intersections with KY 841, Bridgepointe Boulevard, Timber Ridge Drive/Carslaw Court, and Fox Harbor Drive may benefit from spot improvements to improve safety conditions.

- Critical Crash Rate Factor geospatially references and compares crashes to statewide data to identify locations experiencing above-average crash rates. This methodology is defined by Kentucky Transportation Center (KTC) research report *Analysis of Traffic Crash Data in Kentucky (2014–2018).*[19] It defines two types of analyses for "segments" and "spots."

  - **Segments** vary in length and are divided along roadways as geometry or traffic volumes change.
  - **Spots** are identified by analyzing 0.1-mile or 0.3-mile locations for concentrated crash areas.

The CCRF for each roadway segment and spot was determined using crash numbers, traffic volumes, roadway types, lane numbers, and segment length. A CCRF greater than 1.0 indicates crashes may be occurring more often than can be attributed to random occurrence. This procedure is a screening technique identifying locations where further analysis may be needed; it is neither a definitive statement nor a measure of a crash problem.

There is one high crash **segment** (from Harrods Landing to Carslaw Court) and two high crash **spots** (Carslaw Court and Fox Harbor Road), as detailed in **Table 5** and mapped in **Figure 18**.

Table 5. High CCRF Locations

Type	Location	Begin MP	End MP	ADT	Fatal	Injury	PDO	CCRF
Segment	Harrod Landing to Carslaw Court	9.897	10.110	24,000	0	5	45	1.28
0.1-mi spot	Carslaw Court	10.000	10.100	24,000	0	3	27	1.13
0.1-mi spot	Fox Harbor Road	10.300	10.400	24,000	0	5	25	1.13

- Level of Service of Safety (LOSS) is a more refined statistical methodology based on the *Highway Safety Manual* (HSM). LOSS evaluates the safety needs of projects. It determines the amount of excess expected crashes (EEC) a roadway is experiencing using a crash predication model that estimates the number of crashes expected on an average roadway segment of a given type and length., adjusting for

[19] https://uknowledge.uky.edu/ktc_researchreports/1645/

traffic volumes and a statistical correction. EEC is positive when more crashes are occurring than expected and negative when fewer crashes are occurring than expected.

EECs are then grouped into one of four categories, identified as the LOSS. **Figure 17** displays how the four categories are grouped. LOSS categories 1 and 2 represent sites with fewer than anticipated crashes, while categories 3 and 4 represent sites with more than anticipated crashes. As the figure illustrates, LOSS category 4 has above 1.5 standard deviations more crashes than expected. Because LOSS 4 sites experience such elevated crash rates, there is a higher probability that safety countermeasures at these locations will result in larger improvements.

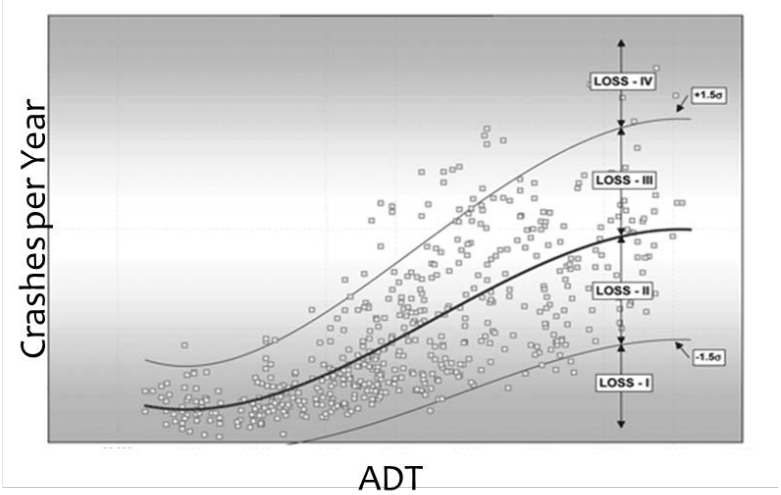


Figure 17: LOSS Categorical Thresholds

US 42 was analyzed as a single segment, separated into segments at median changes and shoulder changes, to compare segment scores and potential locational opportunities to reduce crashes. All segments demonstrate LOSS 3 for severe (KAB) crashes; thus, there is a moderate to high potential to reduce these types of crashes. **Figure 18** highlights locations with an LOSS 3 or higher by severity, including the following.

- Wolf Pen Branch Road to KY 841
- Bridgepointe Boulevard to Marina Drive
- Timber Ridge Drive to Carslaw Court
- Carslaw Court to Fox Harbor Road

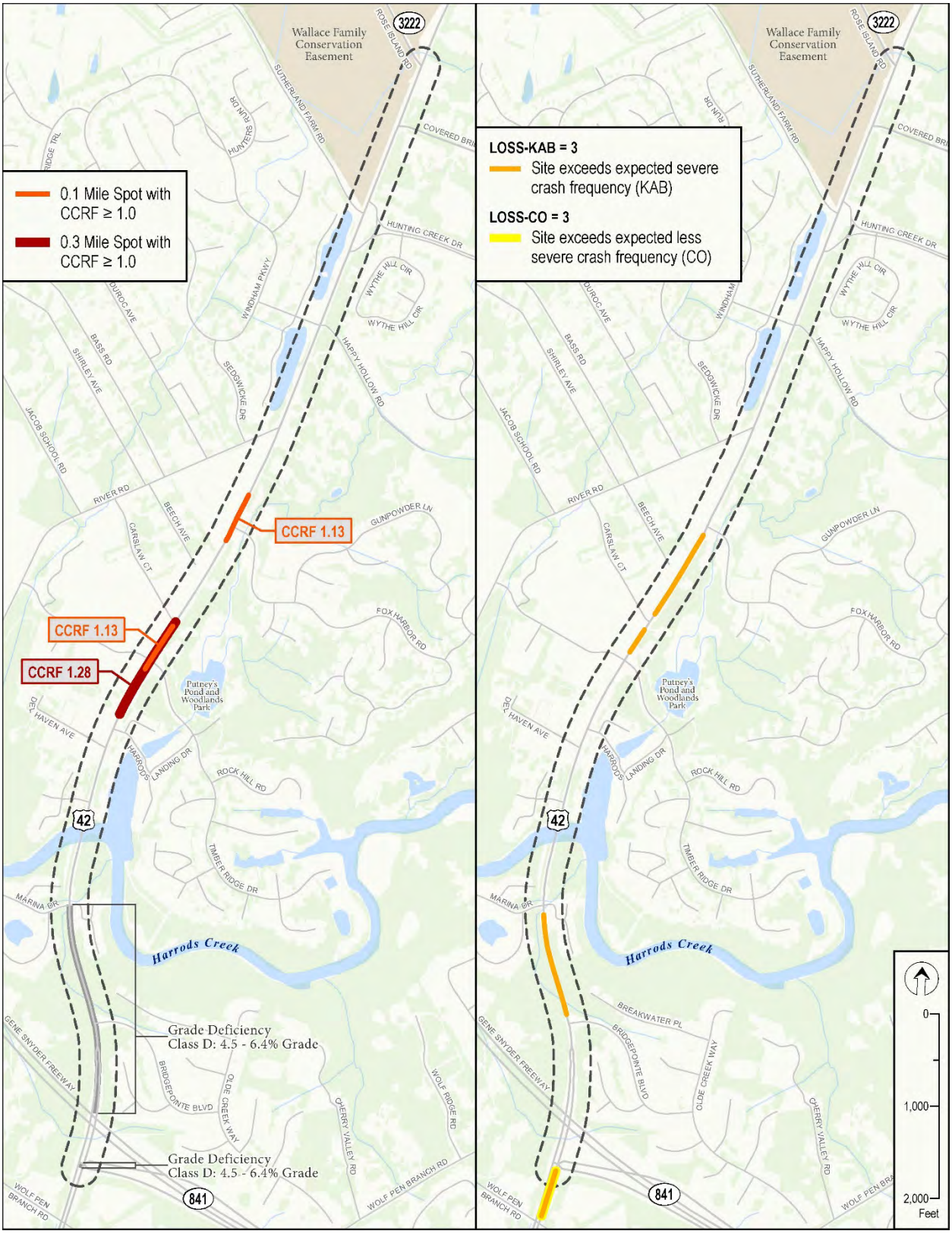


Figure 18. Comparison Between Statistical Crash Analyses

3.0 Environmental Resources

A red-flag review of environmental resources—both natural and human—identifies potential elements that may affect the design, development, and/or implementation of proposed improvements. An electronic review of available databases was conducted to identify sensitive resources (see **Figure 19**) for further consideration in the next phase of project development. Such consideration includes planning to avoid, minimize, or mitigate for potential future impacts where appropriate. Note that this study does not quantify potential impacts, a task that would be included in additional environmental studies that may be required should future projects advance from this planning study. If there is a federal nexus (e.g., federal funds, lands, permits, etc.) on a future project, then the procedures established in the National Environmental Policy Act (NEPA) must be followed. NEPA requires an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The potential environmental impacts and need for safe and efficient transportation must be considered to reach a decision that is in the best overall public interest.

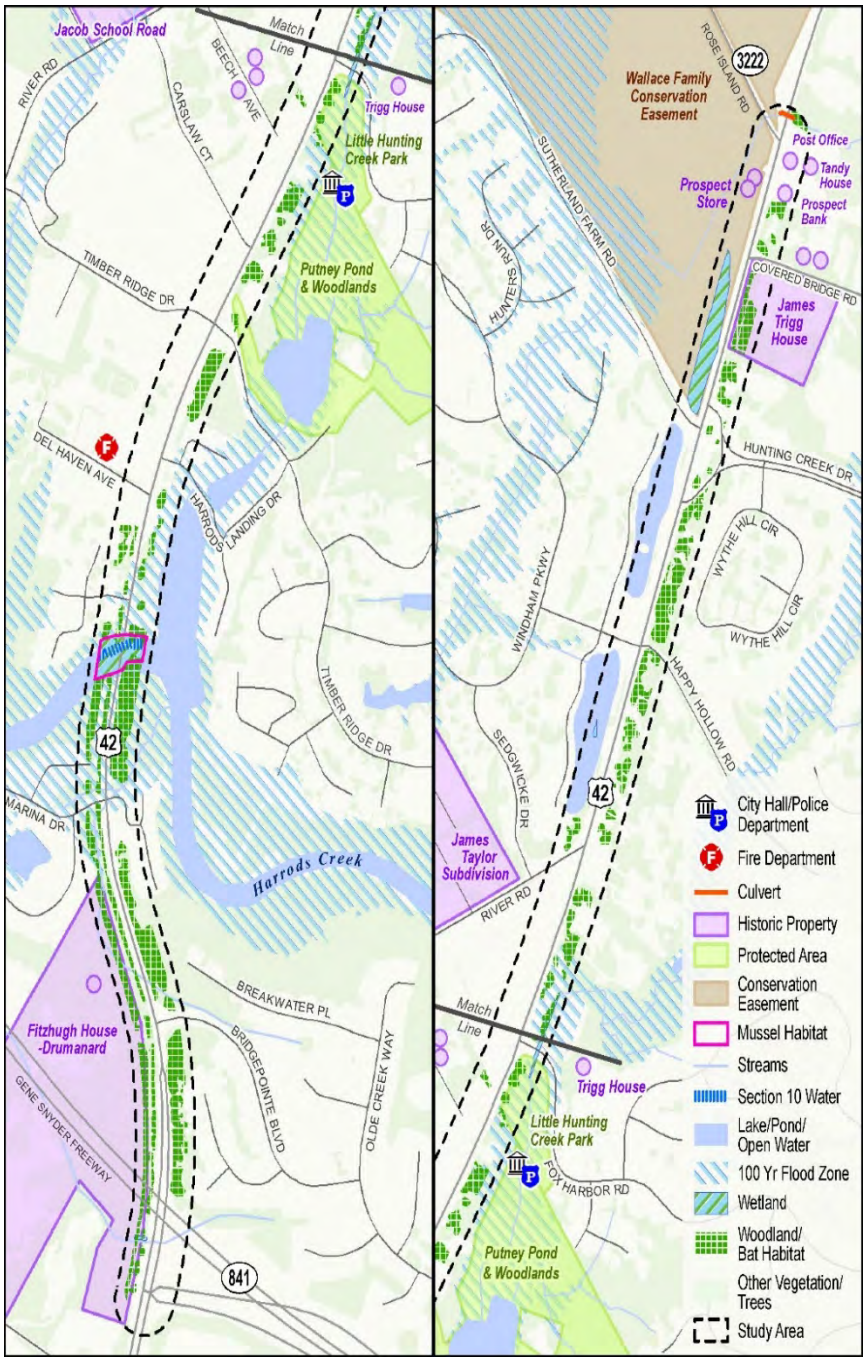


Figure 19. Environmental Resources

3.1 Natural Environment

The natural environment includes all living and non-living things occurring naturally (not artificial or human-built). This includes aquatic ecology, such as rivers, streams, and wetlands; threatened and endangered species; farmlands; and geotechnical resources.

For this study, an Ecological Overview and Geotechnical Overview were completed to help identify the natural site conditions. These efforts included online research, in-field reconnaissance, and coordination with federal and state resource agencies to identify resources that may occur within the study area. The Geotechnical and Ecological reports are in **Appendices C** and **D**, respectively.

Water Resources

Perennial and intermittent streams, including one Section 10 stream (Harrods Creek), open waters, wetlands, hydric soils, and a 100-year floodplain along Harrods Creek and unnamed tributaries to Harrods Creek were identified. These aquatic features were not fully delineated or assessed in the field and have not been verified by the USACE.

No outstanding state resource waters, cold-water aquatic habitats, reference reach waters, exceptional waters, or wild rivers were identified within the study area.

The study area is within the Louisville Water Company's Wellhead Protection Area and Source Water Assessment and Protection Program (SWAPP), and well as within a Municipal Separate Storm Sewer System (MS4).

Listed Species

The Information for Planning and Consultation (IPaC) website administered by the United States Fish and Wildlife Service (USFWS) was used to obtain the list of threatened/endangered species and critical habitat that may occur in the study area.[20] As summarized in **Table 6**, there are 14 potential species and no critical habitat. No occurrence for state or federally listed species has been documented within the study area.

Table 6. Listed Threatened and Endangered Species

Group	Common Name	Scientific Name	Status
Mammals	Gray bat	*Myotis grisescens*	Endangered
	Indiana bat	*Myotis sodalis*	Endangered
	Northern long-eared bat	*Myotis septentrionalis*	Threatened
Clams	Clubshell	*Pleurobema clava*	Endangered
	Fanshell	*Cyprogenia stegaria*	Endangered
	Northern riffleshell	*Epioblasma torulosa rangiana*	Endangered
	Orangefoot pimpleback (pearlymussel)	*Plethobasus cooperianus*	Endangered
	Pink mucket	*Lampsilis abrupta*	Endangered
	Rabbitsfoot	*Quadrula cylindrica*	Threatened

[20] https://ecos.fws.gov/ipac/

Group	Common Name	Scientific Name	Status
	Ring pink (mussel)	*Obovaria retuse*	Endangered
	Rough pigtoe	*Pleurobema plenum*	Endangered
	Sheepnose mussel	*Phethobasus cyphyus*	Endangered
	Spectacleacase (mussel)	*Cumberlandia monodonta*	Endangered
Insect	Monarch butterfly	*Danaus plexippus*	Candidate

The study area is located within known Summer 1 habitat for the Indiana and northern long-eared bats. Two perennial streams, Harrods Creek and one unnamed tributary to Harrods Creek, were identified in the project corridor that could provide suitable foraging and commuting habitat for the gray bats. Harrods Creek is also considered potential habitat for the pink mucket mussel species.

No caves, sinkholes, mine portals, or other underground features were identified within the project area. Therefore, no potential hibernacula for the gray, Indiana, or northern long-eared bats appear to be present in the corridor. The existing bridge over Harrods Creek could potentially provide suitable non-winter roosting habitat for gray bats.

Farmland Classifications

Natural Resource Conservation Service (NRCS) soil survey maps were reviewed to identify farmland classifications within the study area.[21] The geographic distribution of the farmland classifications is shown in **Figure 20**. Most (87%) of the study area is not considered prime farmland. About 5% of the study area contains prime farmland soils; another 5% is considered prime farmland if protected from flooding, is not frequently flooded, or is drained; and the remaining 3% is classified as farmland of statewide importance.

Protected Areas Database of the United States[22] reveals there is a protected agricultural

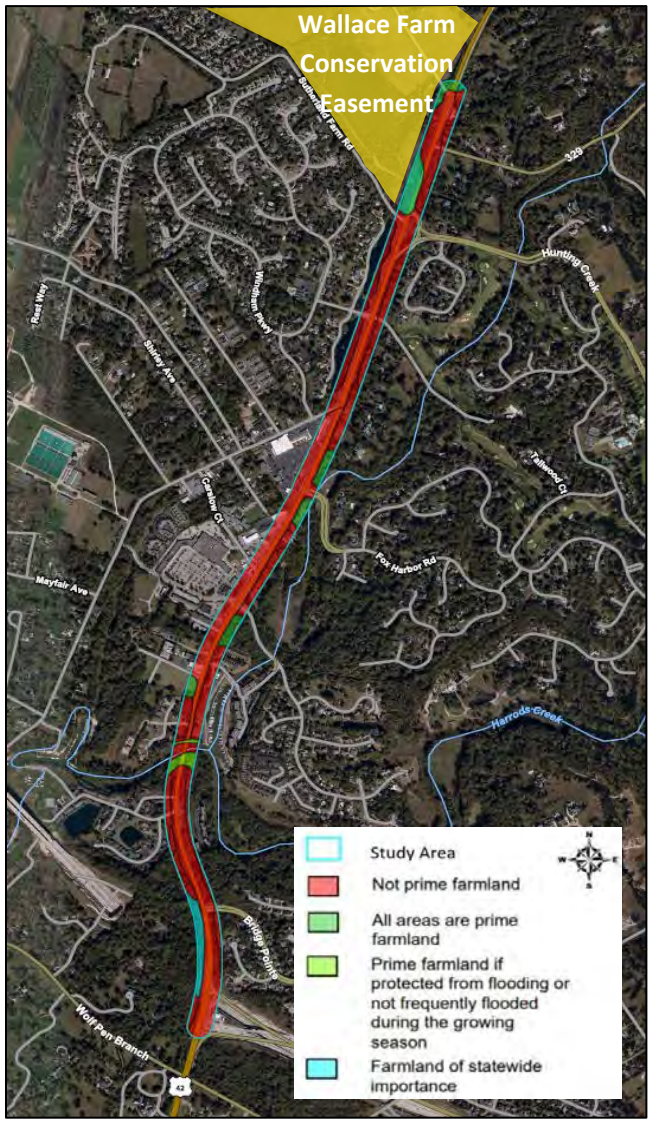


Figure 20. NRCS Farmland Soil Classifications

[21] https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx
[22] http://www.protectedlands.net/map/

conservation easement on the Wallace Farm property, also known as Moncada Farms, near the northern terminus of the study area. Wallace Farm comprises 659.8 acres and all but 33.7 acres are held, by River Fields, Inc., [23] in the agricultural conservation easement as one indivisible tract. The easement holder is a land conservation and environmental advocacy group that is accredited by the Land Trust Accreditation Commission. Their mission is to protect, preserve, and enhance natural and cultural resources along the Ohio River, as well as the region surrounding it, for the benefit of the public.[24]

Geotechnical

Prospect is in the Outer Bluegrass Physiographic Region, which is characterized by rolling terrain with very little flat land. The bedrock of this region typically consists of limestone, dolomite, and shale of the Late Ordovician age. Additionally, limestones of the Mid-Silurian and Mid-Devonian ages are exposed in the Louisville area.

The soils along US 42 are underlain by several geologic formations. Subgrade soils are expected to primarily consist of clay, with some areas of silt and silty sand. Upper clay and silt are moisture sensitive; new fill will need to be stabilized by either wrapping soils or aggregate in geotextile fabric or through chemical stabilization. Cut slopes in soil may be assumed to be 2H:1V, and rock cuts of 0.5H:1V may be used to cut back rock faces at the south end of the study area.

Significant portions of US 42 near the southern limits of the study area are underlain by limestone formations, which are susceptible to solution weathering and sinkhole development. While most of the study area is mapped as non-karst, near the southern limit there is medium potential for karst, and nearest the Gene Snyder Freeway there is high potential for karst.

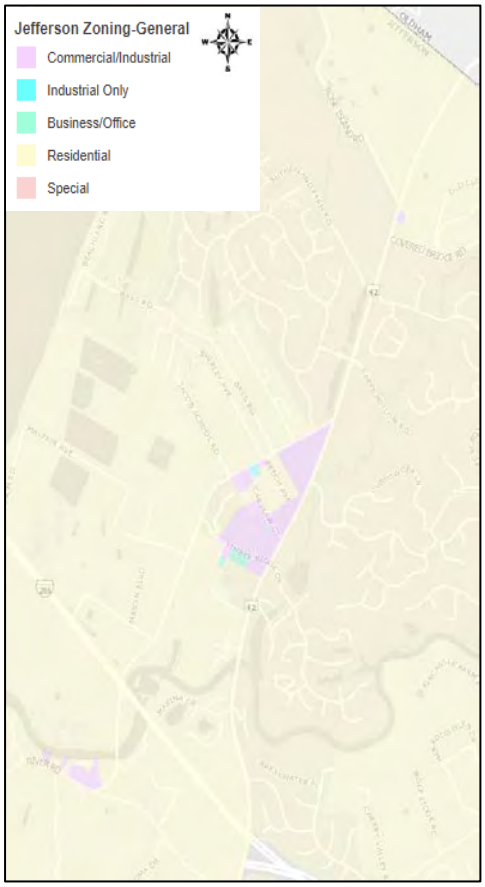


Figure 21. Land Use Map

3.2 Human Environment

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

[23] http://www.moncadafarms.com/about.html
[24] http://riverfields.org/

Land Use

Review of the Louisville/Jefferson County Information Consortium (LOJIC)[25] online GIS tool shows the study area currently zoned primarily as residential, with commercial/industrial and business/office locations on the west side of US 42 in the heart of Prospect (see **Figure 21**). Prospect's Village Center serves nearby residents and Oldham County neighbors.

Remaining developable land in Prospect is limited; however, adjacent Oldham County growth is still on the rise; it is one of the top 15 fastest growing counties in the state.[26] US 42 serves as an arterial for many Oldham County residents who use US 42 to commute into Louisville.

There are a few parks and a marina in the vicinity that provide recreational options for residents.

Community Features

The study is in the City of Prospect, an incorporated, home-rule city in Jefferson County, Kentucky. The year 2020 US Census recorded the City's population as 4,592. Prospect includes multiple types of residential housing, including: single-family subdivisions; more densely populated residential developments including condominiums, apartment complexes; and an assisted living facility south of River Road. The seven primary subdivisions in Prospect are Bridgepointe, Harrods Landing, The Landings, Fox Harbor, Hunting Creek, Sutherland, and Innisbrook. These clusters of homes likely engender a sense of community cohesion due to their proximity, lifestyle, and neighborhood engagement.

Prospect Village Center is located west of US 42, near the center of the study area, and primarily contains the community resources serving the area. The commercial developments of Prospect Village, Prospect Plaza, Prospect Professional Center, and Prospect Pointe comprise the Prospect Village Center. They include shopping centers which, together, provide a variety of services to residents, such as chiropractors, tutoring centers, tailors, cleaners, car wash, orthodontists, dentists, the US Post Office, the UPS store, banks, hardware store, gift shops, restaurants, animal clinic, grocery, pharmacies, and fire protection and EMS (Anchorage Middletown-Station 10).

Community resources on the east side of US 42 include Harrods Landing Yacht Club, Putney Pond and Woodlands Park, Prospect Police Department and City Hall, and Little Hunting Creek Park. The First Baptist Church, on the north side of US 42, is the only house of worship within the City limits.

Historic and Archeological Resources

A Cultural Resources Overview was completed for a 500-foot-wide buffer along either side of US 42 and is in **Appendix E**. For this report, previously documented cultural resources were researched and the potential for the presence of undiscovered cultural resources was assessed.

[25] https://apps.lojic.org/lojiconline/
[26] https://www.courier-journal.com/story/news/local/2021/08/13/us-census-results-kentucky-2020-counties-grew-most/8121437002/

• **Archaeological Resources** have not been identified within the boundaries of the study area and little of the corridor has been surveyed for archaeological sites. However, pre-contact Native American archaeological remnants are expected along level or gently sloping, undisturbed uplands, as well as lowlands, particularly around features such as springs, floodplains, and terraces. Historic archaeological remains are expected at locations where infrastructure, buildings, and structures have been indicated on aerials and mapping or are still extant.

• **Cultural Historic Resources** vary in date and National Register of Historic Places (NRHP) status (i.e., listed in, eligible for listing in, or not eligible). Many potential resources have yet to be surveyed, and others have yet to be evaluated. Due to the rapid suburbanization in the 1960s and 1970s, much of the area is approaching or surpassing the 50-year age mark.

Two NRHP-listed districts (Country Estates of River Road Historic District and Drumanard Historic District) and one eligible historic district (James T. Taylor Subdivision District) are within or are adjacent to the study area, as are two individually listed NRHP properties: the James Trigg House (JF-588) pictured in **Figure 22,** and Fitzhugh House now Drumanard (JF-565). The latter includes two preservation easements held by the Kentucky Heritage Council (KHC). Stone Place Stables (JF-1949), at least a portion of which has been determined NRHP eligible, occupies the same parcel as the Prospect Store (JF-444, Parcel 0002 – 0001 – 0000, 7616 Rose Island Road). Although not returned with the KHC data, the associated agricultural fields and pastures that extend into the study area have potential to be included with this listing.

Figure 22. NRHP Listed Property

The field visit reveals some undocumented resources have been demolished, including the former Prospect Post Office (JF-4422), Prospect Bank (JF-445), the house (JF-980) at 7113 Covered Bridge

Road, and the house (JF-1868) at 6904 Beech Avenue. The Prospect Store (JF-444) has been moved. Many undocumented resources have since been evaluated, including the Prospect Store (JF-444) and the Tandy House (JF-440), which are both individually eligible for listing in the NRHP.

No known cemeteries or traditional cultural properties were identified.

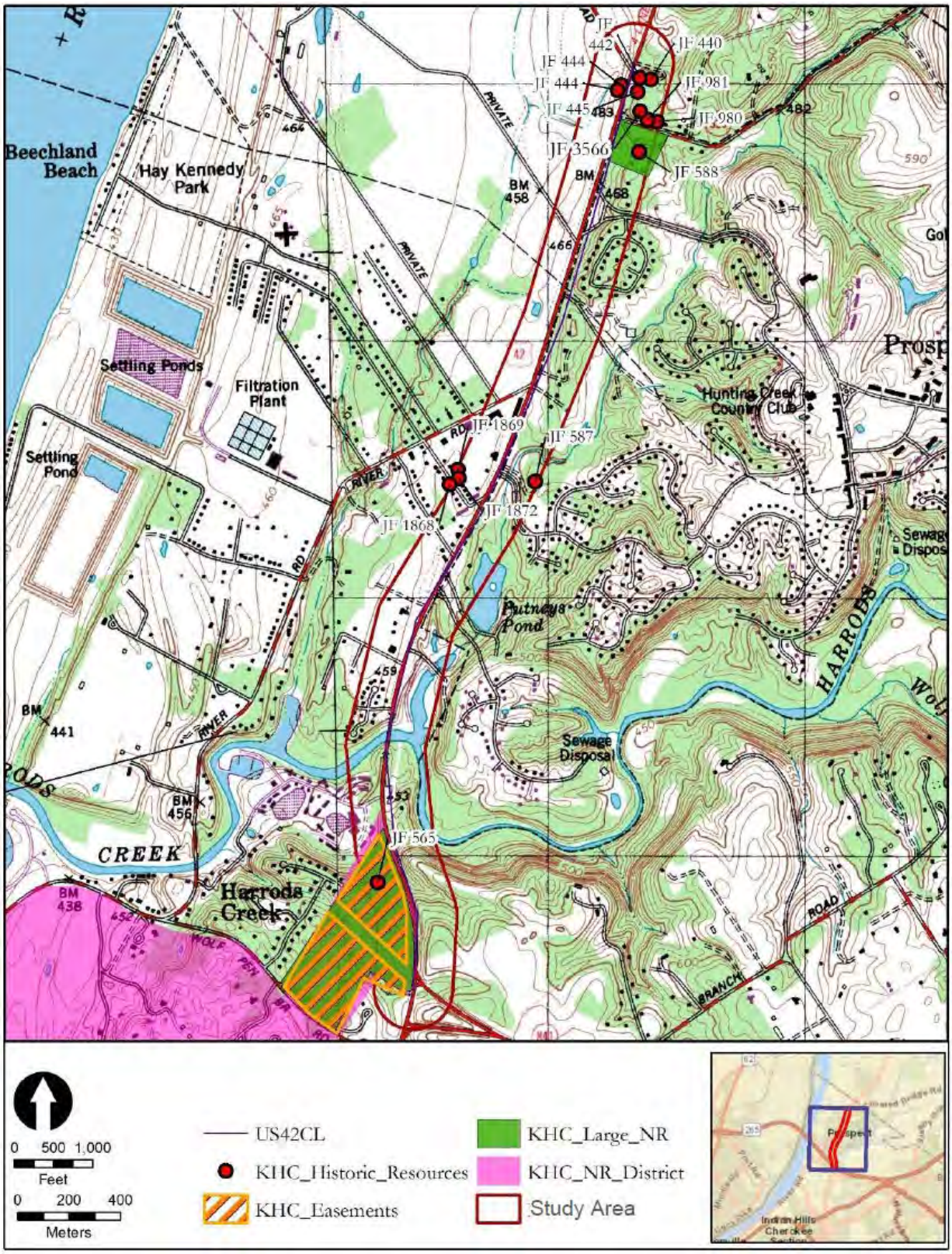


Figure 23. Cultural Historic Resources

Socioeconomic Profile

A Socioeconomic Study was prepared to review the demographics in the study area, The study is provided in **Appendix F**. The study is intended to assist the City of Prospect and KYTC in making informed and prudent transportation decisions, especially with regard to the requirements of *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (signed February 11, 1994).

The study compared 2019 American Community Survey (ACS) 5-year estimates and data tables for the populations of the census divisions within the study area, the county, and the state. Statistics were obtained on minority, low-income, elderly, disabled, and limited English proficiency (LEP) populations. Study area census boundaries were compared with the reference threshold of the county level. The following census tracts and block groups intersect the study area: Census Tract 75.02 Block Groups 1 and 4, Census Tract 103.12 Block Groups 1 and 2, Census Tract 103.13 Block Group 1, and Census Tract 103.17 Block Group 1.

Most of the properties abutting the study area are commercial, suburban residential, or rural residential. Three of the five categories reviewed have at least one statistical geographic area exceeding the county reference threshold, as highlighted in **Figure 24**. The following characteristics should be considered during future phases of project development.

- The **entire study area** has a higher percentage of person aged 65 and over than Jefferson County.
- **Census Tract 103.13 Block Group 1**—bounded by KY 841/I-265, Wolf Pen Branch Road, Chamberlain Lane, KY 1694, the Jefferson/Oldham County line, Harrods Creek Bridge, and US 42—represents 1,700 individuals, includes minority, persons aged 65 and over, and LEP population concentrations above the Jefferson County thresholds.

Although the areas highlighted herein exceed the thresholds of the county reference level, there may not necessarily be a concentrated population in those locations. These areas should be noted in future project development phases; and, if necessary, a more robust analysis may be required to identify and assess the potential for adverse and disproportionate impacts to low-income and minority populations.

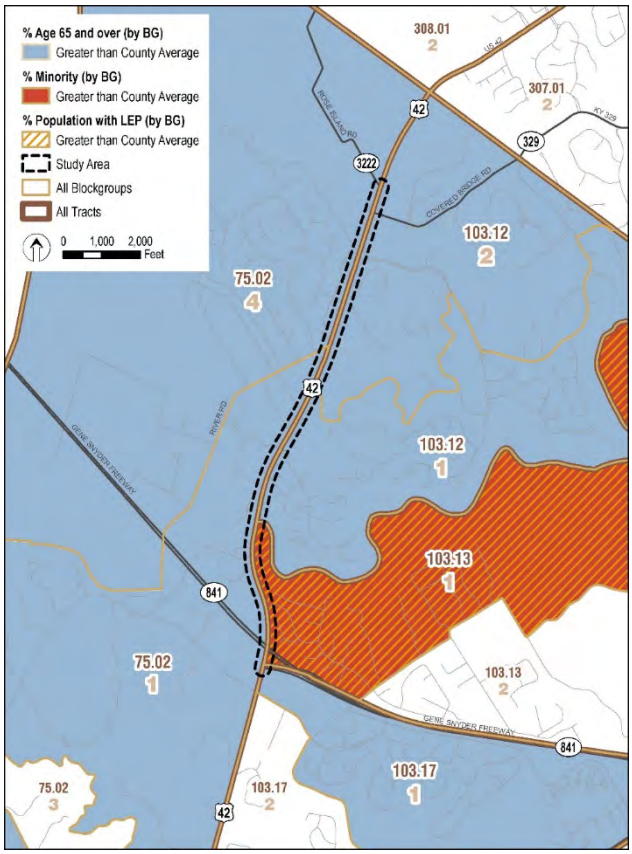


Figure 24. Socioeconomic Populations

Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 applies to federally funded projects. It is a substantive law that applies to land from publicly-owned parks, recreation areas, wildlife and waterfowl refuges, and public or private historic sites eligible for or listed in the NRHP. A federally funded highway project that uses any portion of a Section 4(f) property can only be approved after a determination is made that no prudent or feasible alternative to the use of the property exists and that project planning minimizes harm to Section 4(f) sites. Potential Section 4(f) protected properties within the study area are cultural historic and archaeological sites eligible for listing or listed in the NRHP (see "Cultural Historic and Archaeological," p. 28), and two publicly owned recreational areas: Putney Pond and Woodlands Park Area,[27] and Little Hunting Creek Park.[28]

Section 6(f)

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act applies to both state and federally funded projects. The LWCF provides federal grants to acquire land for outdoor recreation, to protect important natural areas, and to develop or renovate outdoor recreation facilities (campgrounds, picnic areas, swimming facilities, etc.). Impacts must be addressed when projects result in permanent conversion of outdoor recreation property that was acquired or developed using LWCF grant assistance. No properties that have received LWCF funds were identified along the corridor.

The only property that has received LWCF funds along the corridor is the Little Hunting Creek Park that is currently construction adjacent to the north side of City Hall. The park received these LWCF funds in June 2022.

Hazardous Materials Considerations

The United States Environmental Protection Agency (USEPA) publicly-available records were reviewed to identify potential hazardous materials concerns in the area. There are minimal concerns in the area. The Walgreens Pharmacy and Kroger Gas Station are the only Resource Conservation and Recovery Act Information (RCRA) inventoried properties in the study area. There are open USTs at Harrods Creek Fire Department, Prospect Circle K, and Five Points Food Mart and Gas Station.

Air Quality Considerations

USEPA has established National Ambient Air Quality Standards (NAAQs) for six criteria pollutants: ozone, lead, nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter ($PM_{2.5}$ and PM_{10}). Jefferson County is currently in non-attainment for 8-hour ozone.

The study area is located within the KIPDA MPO region; therefore, any federally funded transportation projects should be included in both the Statewide Transportation Improvement Program (STIP) and the local MPO Transportation Improvement Program (TIP) to ensure air quality

[27] https://www.prospectky.us/parks-and-recreation/about-parks/pages/putney-pond-and-woodlands
[28] https://www.prospectky.us/parks-and-recreation/about-parks/pages/little-hunting-creek-park

conformity requirements are satisfied. Future federal projects may need to analyze potential Mobile Source Air Toxin (MSAT) impacts based on the project type.

Noise Considerations

There are noise sensitive receptors in the vicinity of potential future improvements. Noise sensitive receptors include all outdoor areas of frequent human use such as residential areas, parks, cemeteries, hospitals, churches, schools, and some commercial properties with exterior use. As the area is primarily residential, receptors are present along much of the study corridor.

Specific traffic noise impact analyses may be required in future project development activities. State - funded projects do not require a traffic noise impact analysis unless directed by the legislature. However, federally-funded projects that add capacity or shift traffic closer to sensitive receptors do require the consideration of traffic noise impacts.

4.0 Future Traffic Volumes and Operations

A 2045 horizon year was chosen for the analysis to ensure improvement concepts considered would address future mobility needs. Year 2045 forecasts were generated using a combination of KYTC's statewide model and KIPDA's current regional travel demand model. KIPDA's model incorporates current transportation projects from the MTP, as well as population and employment growth projections developed in conjunction with local elected officials. It tends to represent a very aggressive future growth scenario. Results from both models were considered as described in Traffic Forecast Report in **Appendix A**. The future No-Build forecasts developed for this study reflect an annual 1.0% growth rate for the US 42 corridor.

4.1 Future Traffic Volumes

Table 7 summarizes projected 2045 No-Build daily volumes by segment. As shown, daily traffic volumes are expected to continue increasing to as high as 43,000 vpd, which represents an approximately 25% increase in traffic from the existing analysis year.

Table 7. Comparison of Recent Traffic Counts to Current (2021) Average Daily Traffic

Segment	2021	2045
Oldham County South of River Bluff Road	**19,400**	**25,200**
North of Covered Bridge Road	**23,600**	**28,400**
South of Covered Bridge Road	**26,200**	**32,000**
North of River Road	**29,400**	**36,800**
South of River Road	**28,800**	**36,000**
North of Timber Ridge Drive	**33,600**	**43,000**
South of Timber Ridge Drive	**30,600**	**38,800**
North of KY 841	**30,800**	**38,400**

With this level of projected congestion, it is likely drivers would shift to other routes during the busiest travel periods and/or spread into other, less busy travel times. That is, a 25% growth in daily volumes does not directly correlate to a 25% increase in peak-hour volumes. Forecasted peak-hour turning movements at study intersections are included in **Appendix A**.

4.2 Future Traffic Operations

Future year traffic projections were applied to the existing highway network to analyze the future No-Build scenario. This serves as a baseline for comparison against other build options to measure impacts to travel time, delays, queue lengths, etc.

Table 8 provides a summary of overall delay at each study intersection, listing turning movements that are anticipated to operate at LOS E or F during each peak hour by 2045.

Table 8. No-Build (2045) Intersection LOS/Delay and Poor LOS Movements

US 42 Intersection	AM Delay	AM LOS E/F Moves	PM Delay	PM LOS E/F Moves
KY 841	39	-	36	SBL, WBL
Bridgepointe Boulevard	2	-	2	-
Timber Ridge Drive	44	NBL	45	NBL, EBL, WBL EBT, WBR
Fox Harbor Road	35	EBL, EBR, WBL	18	EBT, EBL,WBL
River Road	13	-	44	NBL, NBT, EBL
Greenmere Boulevard	2	-	3	-
Hunting Creek Drive (south)	0	-	1	-
Hunting Creek Drive/Sutherland Farm Road	6	-	8	WBR, WBL
Covered Bridge Road	10	-	10	WBR, WBL
Rose Island Road	10	NBL	17	NBL

5.0 Initial Coordination Efforts

There were multiple coordination efforts throughout the course of the study to allow local officials/stakeholders, the public, community officials, and state agency input. Summaries of all engagement efforts are included in **Appendix G**.

5.1 Road Safety Audit

A road safety audit was conducted by representatives of the City of Prospect, KYTC D-5 staff, and the consultant team on November 9, 2021. A road safety audit is a formal performance examination where a multi-disciplinary team evaluates operational characteristics of a facility for all roadway users.

Figure 25: November 2021 Road Safety Audit

Concerns and opportunities for improvement at study intersections were documented. This effort identified existing features such as signs, lighting, drainage, access points, sight distance issues, shoulders, clear zones, etc. to inform the safety analysis and improvement concepts and is detailed in **Appendix G**.

5.2 Online Public Data Collection

During November and December 2021, the project team launched an online survey and crowdsourcing application to collect community input on corridor needs. Local elected officials, homeowners' associations, and other public agencies helped promote the effort. Throughout the comment period, 503 individuals completed survey forms and 111 geo-referenced (GIS) pins with comments were collected. Over 90% of survey respondents travel the US 42 corridor daily, suggesting individuals are very familiar with the area.

Summarized in **Figure 26**, participants were asked to select which items represent needed improvements for the corridor. Top cited needs were vehicular turns to/from US 42 and improved lighting. The written-in themes for the "other" category included sidewalks, bike lanes, speed limit, congestion, enforcement, and noise. Maps summarizing site-specific comments are in **Appendix G**.

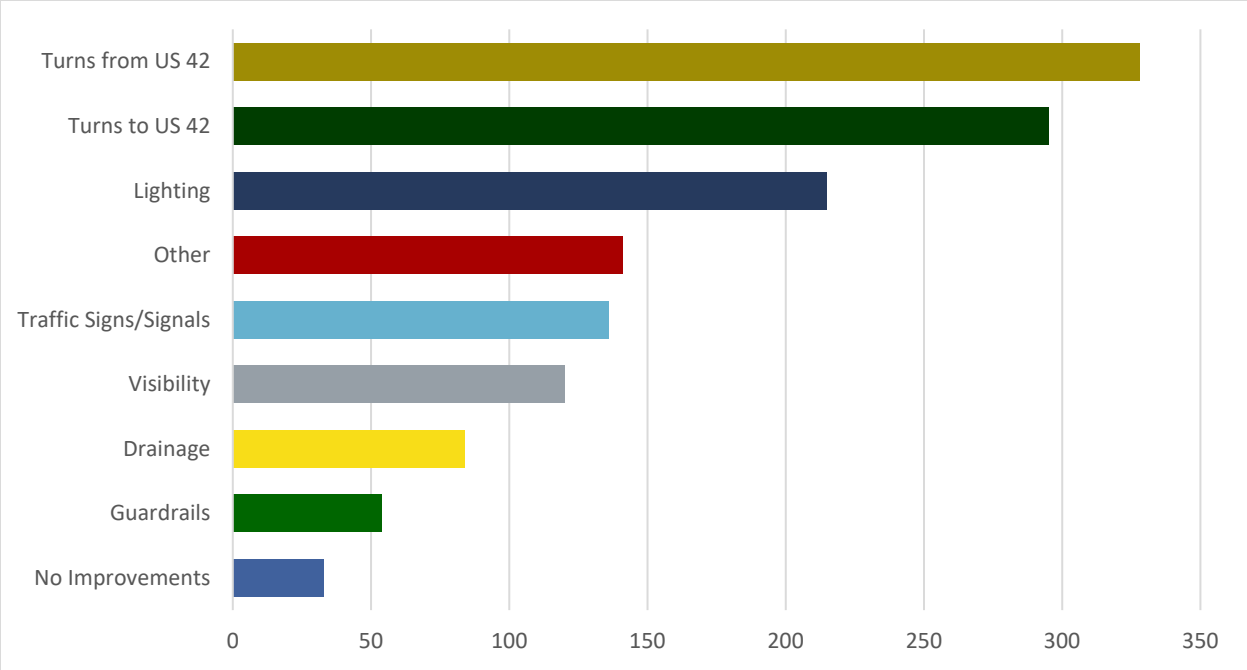


Figure 26: Survey Responses on Corridor Needs

5.3 Project Team Meeting No. 1

The first project meeting was Wednesday, December 22, 2021, at 10:00 AM at Prospect City Hall with Prospect elected officials/representatives, KYTC D5 staff, and consultant team personnel. The team reviewed existing conditions, including nearby studies and projects, current US 42 geometry and lighting conditions, 2021 traffic operations, historic safety data, area environmental resources, and public engagement efforts.

5.4 Local Official and Stakeholder Meeting No. 1

A virtual Local Officials/Stakeholder (LO/S) meeting was held Wednesday, January 12, 2022, at 2:00 PM, to review existing conditions and collect LO/S input. Local concerns included:

- Lowering the speed limit through Prospect.
- Considering roundabouts.
- Prospect Pointe Shopping Center is changing owners soon.
- Crashes with deer.
- Neighborhood connectivity.
- Future concepts to include a benefit/cost analysis.
- Considering the James Taylor– Jacob School Neighborhood Plan.[29]

[29] https://louisvilleky.gov/advanced-planning-and-sustainability/document/james-taylor-jacob-school-neighborhood-plan

5.5 Virtual Public Meeting No. 1

A virtual Public Meeting was held the same day (January 12, 2022) as the LO/S meeting at 7:00 PM via Zoom. The meeting was advertised via the Prospect website, email blasts, and social media posts. The purpose of the meeting was to inform the public of the transportation study, describe identified existing conditions, and collect input on perceived needs. Forty-five individuals attended. A publicly accessible study website contained the same content covered during the public meeting, giving interested parties an opportunity to explore independently.

Public comment themes from the meeting are summarized below. Additional details are in **Appendix G**.

- Which bicycle/pedestrian connections were considered? Sidewalks are needed. Demand for pedestrian facilities is skewed, as safe connections today are limited.
- How were forecast traffic volumes developed?
- What factors are considered when planning turn lanes or roundabouts? How much will improvements cost? What are the priorities?
- Without left-turn lanes, traffic switches freely between lanes to dodge slowed/stopped cars waiting to turn.
- Lighting should limit spillover to reduce urban "glow."
- Can the City enforce connectivity between properties/neighborhoods?

6.0 Concept Development

Initial concepts were developed considering existing conditions data, environmental constraints, community input, year 2045 traffic forecasts, and project team feedback. The consultant team examined identified needs intersection by intersection, considering suggested improvements plus other feasible engineering solutions to address observed trends. The project team met during January 2022 to brainstorm solutions, discussing all public suggestions and recommendations from previous studies before eliminating any options.

Table 9 lists the range of improvement sites and solutions considered, although some were subsequently dismissed as infeasible. Corridor-wide applications of lighting, signing/striping, bicycle/pedestrian facilities, and guardrail upgrades were discussed.

Table 9: Initial Range of Potential Improvements

US 42 Intersection with	Improvement Options Suggested
Bridgepointe Boulevard MP 9.263	• Install rumble strips or traffic calming measures for US 42 • Replace guardrail to current standards • Increase warning signage for turning traffic • Extend northbound right turn lane • Add a southbound left-turn lane on US 42 • Open backdoor connection to Wolf Pen Branch Road • Signalize intersection • Reconstruct as roundabout
Marina Drive MP 9.504	• Improve drainage south of intersection • Improve warning signage for turning traffic • Add turn lane(s) or restrict left turns
Harrods Creek Bridge	• Increase maintenance for drainage structures • Replace with more aesthetic signature structure • Add parallel structure for non-motorized users
Downtown Prospect: Ken Carla Drive MP 9.712 to River Road MP 10.548	• Reduce posted speed limit • Increase connectivity between adjacent developments • Improve pedestrian connection across River Road • Add shared use path, along US 42 or off alignment • Incorporate signature gateway(s) • Add left-turn lanes and/or TWLTL • Add raised median to improve access management • Eliminate left turns to/from US 42 with roundabouts, R-cuts, or other intersection reconfigurations
Greenmere Boulevard/ Happy Hollow Road MP 10.776	• Construct northbound left-turn lane on US 42

US 42 Intersection with	Improvement Options Suggested
Hunting Creek Drive/ Sutherland Farm Road MP 10.940-11.054	• Clear vegetation to improve visibility • Adjust stop bar and signing • Add left-turn lanes on US 42 • Realign approaches to share traffic signal • Reconstruct as roundabout
KY 329 Covered Bridge Road MP 11.222	• No suggested improvements
KY 3222 Rose Island Road MP 11.355	• Clear vegetation to improve visibility • Improve warning signage for turning traffic • Construct northbound left turn lane on US 42 • Add merge/acceleration lane for right turns onto US 42 • Realign Rose Island to improve visibility

As the intersection approaching the KY 841 ramps was recently reconstructed, no improvements at this location were considered, though several were suggested.

6.1 Project Team Meeting No. 2

From here, analysts began to examine each proposed concept by evaluating traffic warrants, considering environmental or geotechnical constraints, and weighing conceptual costs versus benefits. Some of the initial suggestions could be readily dismissed as infeasible or cost prohibitive. Others were developed further, illustrating concepts to approximate footprints.

A project team meeting was held March 18, 2022, to review preliminary concepts, as identified in **Figure 31**. The same concepts were presented to a larger KYTC audience on March 24. Full meeting details for each are in **Appendix G**.

Corridor-wide Improvement Concepts

Discussion included corridor-level applications that can stand alone or be incorporated alongside site-specific concepts described below.

Lighting. Studies shows lighting has the potential to reduce fatal collision crashes by as much as 60%. A planning-level lighting strategy was developed to provide consistent illumination at the street level. The analysis assumes 28-foot-tall decorative poles, staggered along alternating sides of the roadway. Between Harrods Creek and Sutherland Farm Road, this equates to about 40 poles spaced at 380 feet along each side, or 190 feet staggered from side to side. For pedestrian lighting along sidewalks, 10-foot-tall poles spaced at 80 feet are recommended, though some of these could be mounted as second arms on street poles where spacing allows. From Harrods Creek south, poles would be installed on the east side of US 42 to reduce impacts. Approximately 14 poles would be required for this section, but some tree trimming would be needed to be effective.

While many details can be worked out during future design phases, research was conducted regarding lighting color/temperature. Beyond aesthetic preferences, some studies cite the lighting color can impact visibility for wildlife. Available studies track the impact of light colors on insects, birds, and turtles rather than on deer that are a concern for the US 42 corridor. If the City opts for a warmer light than used in the initial calculations, a shield can be added but may require reducing pole spacing.

Coordination should continue toward an agreement with KYTC regarding installation and maintenance responsibilities.

Solutions to address security concerns of the lighting infrastructure were also explored; tamper-proof hardware could prove to be a cost-effective solution to protect this investment.

Back-Lit Street Signs. To increase visibility and improve wayfinding, large print, back-lit street signs could be installed at cross streets.

Improved Striping. Improved visibility for pavement markings can positively impact safety for relatively low costs. FHWA identifies wider striping (6 inches instead of standard 4 inches) as a proven countermeasure. Thermoplastic instead of traditional paint can increase visibility and durability.

Beyond the developed downtown core, rumble strips along the edgelines are another proven low-cost safety countermeasure to consider.

Posted Speed Limit. Numerous public comments noted the 45-mph posted speed limit through the downtown core as being too high. Analysts collected speed data to evaluate the proposed adjustment. During January 2022, a radar detector was placed in front of City Hall to collect midday speed data from passing vehicles. Over a two-hour period, nearly 1,000 datapoints were collected, summarized in **Figure 27**. The average observed speed was 40.6 mph, with 63% of traffic within the 36- to 45-mph pace speed. Therefore, no adjustment to the posted speed limit is recommended.

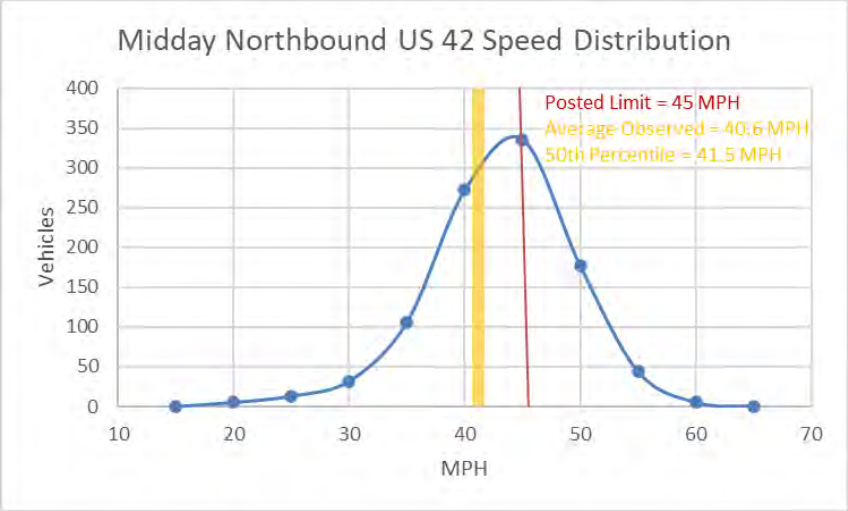


Figure 27: Results of Downtown Speed Study

Signature Gateways. The community also expressed interest in creating a signature gateway for the downtown area. As larger scale improvement concepts are explored, opportunities to incorporate branded signing or other aesthetic features should be considered.

Site-Specific Improvement Concepts

Beyond the corridor-wide considerations, specific concepts at individual intersections were developed.

Bridgepointe Boulevard. A host of measures were suggested at Bridgepointe Boulevard, ranging from small-scale safety improvements to larger-scale reconstruction options. Bridgepointe Boulevard provides access to a 150-home neighborhood. This subdivision's connection to Wolf Pen Branch Road is gated, making it the sole access point for the development. It intersects US 42 on the steeply-graded section, with rock cuts and vegetation bordering US 42. A 120-foot right turn lane is provided for northbound US 42 traffic.

Figure 28: US 42/Bridgepointe Boulevard Intersection

Most smaller scale measures were advanced for consideration, including adding a left-turn lane on US 42, intersection lighting, and dynamic warning signage for left-turning vehicles coming out of Bridgepointe. However, increased connectivity to Wolf Pen Branch Road is beyond the scope of this study. Reconstruction as a roundabout is not recommended due to the grade of US 42, impacts to the Drumanard Historic District, significant rock cuts, and proximity to the signalized intersection with the KY 841 ramps. Based on 2021 traffic volumes, signalization is not warranted.

Marina Drive. West of US 42, Marina Drive provides sole access to a condominium community and marina. To the east, it provides sole access to a smaller collection of townhomes. Left- and right-turn lanes are provided for southbound US 42 coming down the hill. Water sheeting during heavy rainfall was a recurring concern in this section. Particularly for the eastbound approach, vegetation limits visibility pulling out of Marina Drive. For the westbound approach, a small sign notes "Right Turn Only from 6:30 AM to 9:00 AM and 4:00 PM to 6:30 PM."

Due to low volumes accessing the westbound approach, no left-turn lane for southbound US 42 is recommended. Other safety measures proposed were advanced for further consideration.

Harrods Creek Bridge. The existing structure is in fair condition; maintenance needs were shared with KYTC District 5 personnel during March 2022.

Downtown Prospect. The busiest stretch of the study corridor, numerous concepts were suggested between the Harrods Creek Bridge and River Road.

Previous design concepts from KYTC Item No. 5-972 were revisited, specifically the five-lane typical section and the divided median with the dedicated southbound right-turn lane. Concerns about costs and property impacts remain a key consideration for the practicality of either.

Two scenarios would improve connectivity between the commercial developments between Carslaw Court and the professional center opposite City Hall. As shown in **Figure 29**, there are three adjacent developments with no internal connections, forcing trips between sites to return to US 42. With minor adjustments to a few parking spaces, internal circulation could be provided. Alternatively, a backage road could also promote connectivity with a safer facility for pedestrians.

Figure 29: Commercial Connectivity

Connecting pedestrians to local businesses was also explored, specifically connecting residents off Sedgewicke Drive off River Road to adjacent Prospect Pointe. This mid-block connection could include enhanced pedestrian crossing measures to improve visibility and safety for pedestrians.

Another improvement concept in this stretch converts three intersections—Timber Ridge Drive, Fox Harbor Road, and River Road—to roundabouts, eliminating all left-turn maneuvers in this section. Roundabouts are another proven safety countermeasure, reducing crash rates by as much as half. They also reduce delay by eliminating stops. Capacity at the Timber Ridge Drive intersection is the biggest concern, as discussed in **Section 2.4**. Sidewalks and/or multi-use paths could be added along one or both sides of the highway in this section, with upgrades to pedestrian amenities at crossings.

Greenmere Boulevard/Happy Hollow Road.

West of US 42, Greenmere Boulevard provides access to the Sutherland Farm neighborhood of 300+ single family homes. To the east, Happy Hollow Lane is a gravel access route along the southern edge of a golf course. The intersection is unsignalized; no turn lanes exist today. A left-turn lane for northbound US 42 is proposed to separate heavy turning volumes from thru traffic.

Figure 30: US 42/Hunting Creek Intersection

Hunting Creek Drive/Sutherland Farm Road. West of US 42, Sutherland Farm Road provides sole access to the Innisbrook subdivision of 60 single family homes. To the east, Hunting Creek Drive provides access to the Hunting Creek country club and nearly 1,000 single- and multi-family homes. The east approach separates to form two one-way legs climbing a steep grade (**Figure 30**) with a traffic signal at the northern (outbound onto US 42) connector.

Steep grades to the east and a conservation easement extending northwest of the intersection limit the feasibility of aligning the closely spaced approaches or reconstructing the intersection as a roundabout. Small-scale spot improvements and left turn lanes along US 42 were advanced for further consideration.

Rose Island Road. Rose Island Road meets US 42 at a skewed angle; a steep grade coming up to US 42 also limits visibility. A large conservation easement along both west quadrants protects greenspaces abutting existing right-of-way. Turn lanes and small-scale spot improvements were considered, including raising the grade of Rose Island Road and vegetation clearing to improve sight distance. Horizontal realignment of the Rose Island Road approach is not feasible due to the conservation easement.

7.0 Final Coordination Efforts

After the concept development efforts detailed in **Chapter 6.0**, the project team engaged with state and local officials, stakeholders, and the public to present and discuss the potential improvement concepts recommended to advance at the locations indicated in **Figure** 31 and listed here:

1. **Bridgepointe Boulevard**
   - 1a. Bridgepointe Boulevard Lighting + Dynamic Signage
   - 1b. Bridgepointe Boulevard Left-turn Lane
2. **Timber Ridge Drive to River Road**
   - 2a. Timber Ridge Drive + Fox Harbor Road Roundabouts
   - 2b. River Road Roundabout
3. **Prospect City Center Connectivity**
   - 3a. Connectivity between Business Parking Lots
   - 3b. New Business Access Road
4. **Pedestrian Business Connectivity**
5. **Greenmere Boulevard to Hunting Creek Drive**
   - 5a. Greenmere Boulevard Left-turn Lane
   - 5b. Sutherland Farm Road and Hunting Creek Drive Left-turn Lane
   - 5c. Move Hunting Creek Name Sign
6. **Rose Island Road**
   - 6a. Rose Island Road Left-turn Lane
   - 6b. Raise Grade of Rose Island Road
7. **US 42 Lighting**
   - 7a. US 42 Lighting from Bridgepointe to Harrods Creek Bridge
   - 7b. US 42 Lighting from Harrods Creek to Hunting Creek Drive
8. **Guardrail, Rumble Strip, and Reduced Lane Width from Bridgepointe Boulevard to Marina Drive**

Meeting summaries of the coordination efforts are chronologically provided in **Appendix G.**

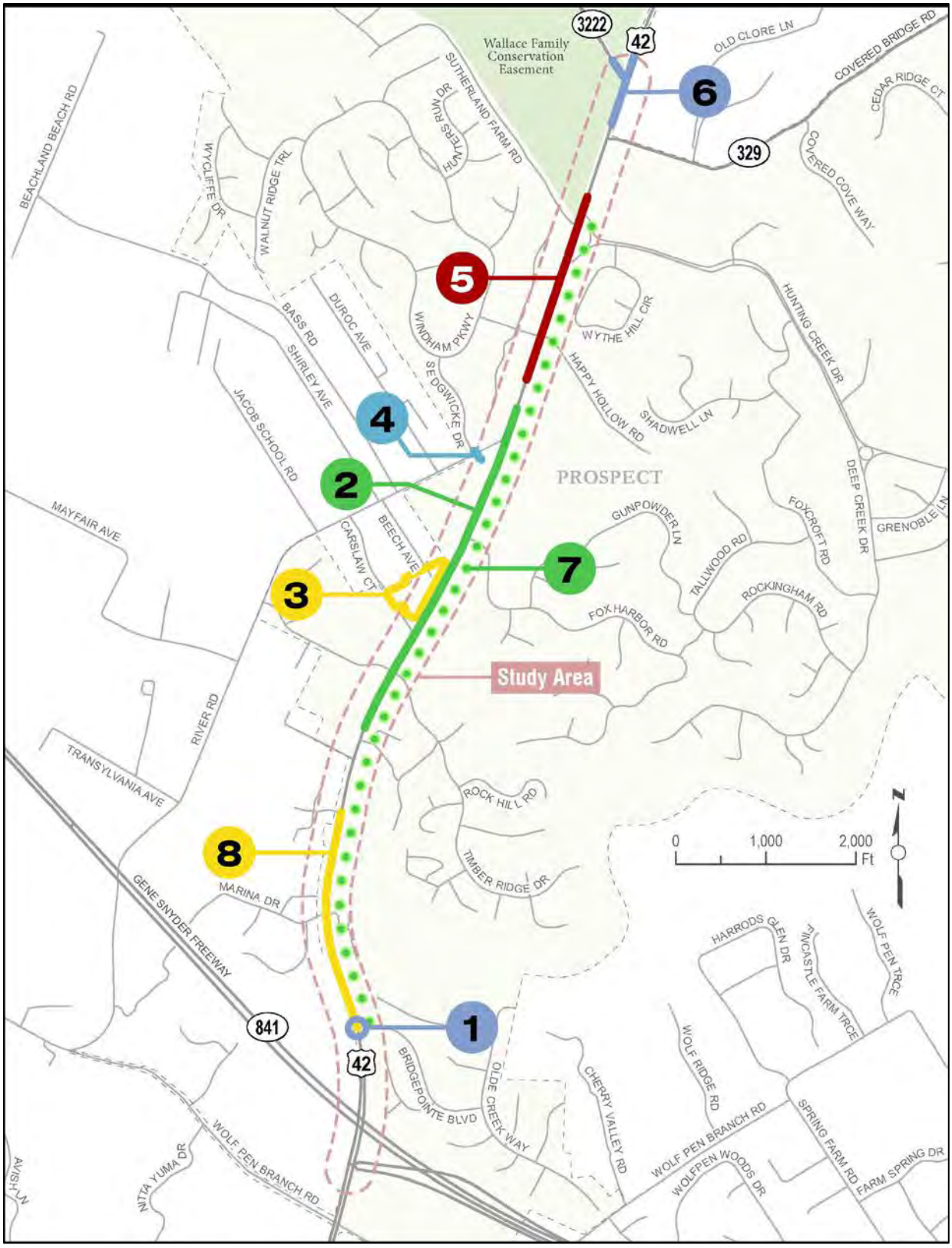


Figure 31. Concept Locations

7.1 KYTC Coordination Meeting No. 1

The project team met with KYTC District 5 staff Thursday, March 24, 2022, at 2:30 PM at the KYTC District office. The purpose of the meeting was to review preliminary improvement concepts for the US 42 corridor. It was noted that the Prospect and KYTC would need a future installation and maintenance agreement should the lighting concept move forward. Speeds of turning vehicles coming from River Road at the proposed mid-block crosswalk at Sedgewicke Drive are a concern. Overall, KYTC viewed the concepts favorably, noting the importance of partnership/support at the local level, and exploring funding and phasing considerations of the roundabout concepts.

7.2 Local Official and Stakeholder Meeting No. 2

A second LO/S meeting was held Thursday, May 12, 2022, at 2:00 PM. The meeting was a hybrid meeting at Prospect City Hall. The purpose of the meeting was to review preliminary improvement concepts for the US 42 corridor. Local concerns include:

- Future vehicles trying to turn left out of the Kroger exit closest to the potential Timber Ridge roundabout.
- Considering future local access connections to Prospect Pointe.
- Safety/security concerns of maintaining future lighting facilities.
- Slowing drivers down as they come down the hill into Prospect.

7.3 Public Meeting No. 2

An in-person public meeting was conducted Wednesday, May 18, 2022, at St. Francis of the Fields, a community church, near the southern terminus of the study corridor, from 4:00 to 7:00 PM. The intent of the meeting was to share preliminary concepts, solicit feedback, and answer questions from the public. All information shared at the meeting was also available online via the project StoryMap.

Key concerns raised at the meeting included reducing speed, specifically when coming down the hill past Bridgepointe Boulevard. Community comments suggested the speed be lowered from 45 mph to 35 mph through town. Radar-based speed data was collected January 2021 to document travel speeds. Consideration of future project impacts (right-of-way, maintenance of traffic, etc.) should project(s) advance was also recommended.

Public Survey on Improvement Concepts

The online public survey was promoted May 3, 2022, through June 7, 2022. The link was emailed to the 213 people who joined the project mailing list during the first survey effort, shared via the Prospect website and KYTC District 5 social media, at the Local Official/Stakeholder Meeting, and at the public meeting. A total 224 responses were received during that timeframe. The survey provided open response opportunities for the public to share their opinion on each concept, and asked respondents to provide their overall opinion via slider scale from 'Terrible Idea' (0) to 'Great Idea' (100). **Figure** 32 shows the average public rating (blue bar) and number of responses (green bar) per concept type.

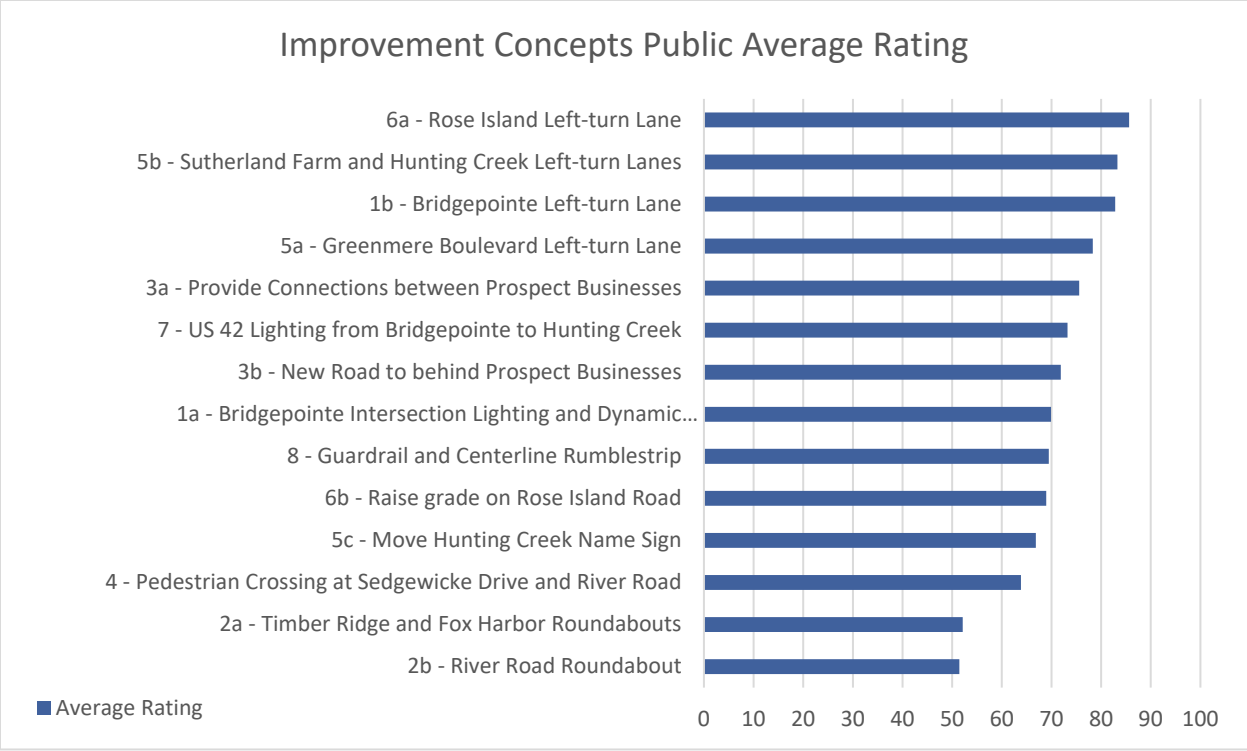


Figure 32. Survey Response Quantities and Average Ratings of Preliminary Concepts

Concepts generally received positive public feedback, ranging from average ratings of 51 (neutral) to 86 (good/great idea). The proposed left-turn lanes received the most positive ratings, ranging from 78 to 86, which aligns with feedback received during the first round of public engagement that indicated turning onto and off US 42 as the top public concerns. The roundabout concepts received mixed reviews, slightly more positive than negative. Typical comments on these concepts revealed driver apprehension about the successfulness of roundabouts compared to raised medians and/or left-turn lanes at signalized intersections.

7.4 Project Team Meeting No. 3

A third in-person project team meeting was Thursday, June 2, 2022, at Prospect City Hall to review study efforts; discuss concept costs, benefits, and impacts; and recommend future project priorities. Input from both public coordination efforts and local officials was considered. The team discussed potential design changes future projects could consider, particularly adding left-turn lanes to the signalized River Road intersection in-lieu of a roundabout at this location.

While the team preferred to implement all concepts as a single project from Bridgepointe Boulevard to Rose Island Road, City representatives agreed to grouping them into logical termini-type projects for future programming of funding and construction. Focusing on the study purpose and goals, specifically to address safety and mobility and create a sense of place, projects were prioritized through team and agency partnership. The team then grouped and prioritized the concepts into potential project implementation packages by segment and agency jurisdiction—i.e., either a future KYTC –

Prospect partnership or a Louisville Metro–Prospect partnership to best facilitate seeking future funding, as discussed in **Chapter 7.0**.

7.5 KYTC Coordination Meeting No. 2

A coordination meeting with KYTC representatives was held Monday, June 20, 2022, at the KYTC District 5 office to review preliminary project team recommendations. KYTC reviewed project team recommendations and provided insight on future project programming, partnership opportunities, and funding outlets, including exploring the potential to restart KYTC's 5-972 to consider the series of roundabouts through Prospect as a potential build alternative.

8.0 Recommendations

This chapter details the assessment of costs, impacts, benefits, and future operations for the short-, mid-, and long-term concepts; and explains why these concepts are recommended to be combined into future projects and prioritized by segment. Each concept within each segment could be implemented individually; however, they are recommended as a single project/implementation package to best address the needs identified by the study effort.

8.1 Potential Impacts and Benefits

The potential impacts and benefits of the recommended improvements are discussed herein, including build traffic operations, cost estimates, benefit-cost analysis, and summary project sheets.

2045 Build Traffic Scenario

None of the proposed improvements are likely to induce additional trips to the US 42 corridor; the No-Build forecasts apply to the Build scenario. Larger-scale concepts were modeled in the 2045 VISSIM network to evaluate impacts to peak-hour traffic flows.

Downtown Roundabouts

Microsimulation results show the Build scenario's series of three roundabouts—Timber Ridge Drive, Fox Harbor Road, and River Road—would reduce delays at each of these intersections, whereas the No-Build scenario would result in delays. **Table 10** compares the number of seconds' delay with the 2045 Build versus No-Build scenarios.

Table 10. Future (2045) Roundabout Operations Compared to No-Build

US 42 Intersection	AM Delay (in seconds)		AM LOS E/F Moves		PM Delay (in seconds)		PM LOS E/F Moves	
	No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
Timber Ridge Drive	44	12	NBL	-	45	22	NBL, EBL, WBL, EBT, WBR	EBT, All WB
Fox Harbor Road	35	5	EBL, EBR, WBL	-	18	5	EBT, EBL, WBR	WBT
River Road	13	5	-	-	44	8	NBL, NBT, EBL	-

It should be noted the intersection with Timber Ridge Drive is approaching capacity, resulting in lengthy queues for heavy north/south traffic flows (as pictured in **Figure 33**) and lengthy delays for the cross street during the PM peak hour. Other microsimulation runs confirmed the roundabouts could be built in phases: Timber Ridge Drive and Fox Harbor Road constructed first, followed by River Road at a later date.

Figure 33. VISSIM 2045 No-Build Typical PM Peak Queue

Table 11 compares corridor-level travel time savings between roundabout build scenarios—measured from north of KY 841 intersection to just south of Rose Island Road. Peak commuter flows (southbound in the morning and northbound in the afternoon) experience the most travel time savings, while the opposite direction of travel sees some disbenefits. Opposite direction increases are due to yielding to the higher volume direction and slower travel speeds introduced by roundabouts.

Table 11. Comparison of Corridor Travel Time Savings in Seconds

US 42 Intersection	AM Peak		PM Peak	
	Northbound	Southbound	Northbound	Southbound
Timber Ridge Drive and Fox Harbor Road	1 second slower	**20 seconds faster**	**39 seconds faster**	24 seconds slower
Timber Ridge Drive, Fox Harbor Road, and River Road	1 second slower	**45 seconds faster**	**89 seconds faster**	24 seconds slower

Cost Estimates

Planning-level design concepts were used to estimate preliminary quantities of high-cost construction items, including earthwork, pavement, and structures. Construction costs were tabulated using the KYTC District 5 average unit bid prices. Right-of-way and utility phase estimates were based on conceptual model disturb limits, aerial imagery, approximate locations of existing right-of-way and property lines generated from property valuation administrator (PVA) data and utility records. **Table 12** summarizes the planning-level cost estimates by phase for each concept option, the total concept options combined, and the total cost should all concepts be programmed in 2022 dollars. Each construction phase estimate includes an additional 30% for contingencies.

Table 12. Concept Estimates

Concept		Design	Right-of-Way	Utility	Construction	Total
1a.	Bridgepointe Blvd. Lighting + Dynamic Signage	$35,000	-	-	$110,000	**$145,000**
1b.	Bridgepointe Blvd. Left-turn Lane	$220,000	-	-	$2,120,000	**$2,340,000**
1. Bridgepointe Boulevard		**$255,000**	**-**	**-**	**$2,230,000**	**$2,485,000**
2a.	Timber Ridge Rd. + Fox Harbor Rd. Roundabouts	$540,000	$410,000	$1,880,000	$5,400,000	**$8,230,000**
2b.	River Rd. Roundabout	$220,000	$420,000	$720,000	$2,110,000	**$3,470,000**
2. Timber Ridge Drive to River Road		**$760,000**	**$830,000**	**$2,600,000**	**$7,510,000**	**$11,700,000**
3a.	Connectivity between Business Parking Lots	-	-	-	-	**-**
3b.	New Business Access Road	$50,000	-	-	$470,000	**$520,000**
3. Prospect City Center Connectivity		**$50,000**	**-**	**-**	**$470,000**	**$520,000**
4. Pedestrian Business Connectivity		**$5,000**	**-**	**-**	**$50,000**	**$55,000**
5a.	Greenmere Blvd. Left-turn Lane	$40,000	-	$230,000	$390,000	**$660,000**
5b.	Sutherland Farm Rd. and Hunting Creek Dr. Left-turn Lanes	$50,000	-	$140,000	$500,000	**$690,000**
5c.	Move Hunting Creek Dr. Name Sign	-	-	-	-	**-**
5. Greenmere Boulevard to Hunting Creek Drive		**$90,000**	**-**	**$370,000**	**$890,000**	**$1,350,000**
6a.	Rose Island Rd. Left-turn Lane	$40,000	-	$100,000	$390,000	**$530,000**
6b.	Raise Grade of Rose Island Rd.	$40,000	$50,000	$120,000	$350,000	**$560,000**
6. Rose Island Road		**$80,000**	**$50,000**	**$220,000**	**$740,000**	**$1,090,000**
7a.	US 42 Lighting from Bridgepointe Blvd. to Harrods Creek Bridge	$100,000	-	-	$460,000	**$560,000**
7b.	US 42 Lighting from Harrods Creek Bridge to Hunting Creek Dr.	$170,000	-	-	$1,220,000	**$1,390,000**
7. US 42 Lighting		**$270,000**	**-**	**-**	**$1,510,000**	**$1,780,000**
8. Guardrail, Rumble Strip, and Reduced Lane Width from Bridgepointe Boulevard to Marina Drive		**$40,000**	**-**	**-**	**$340,000**	**$380,000**
Total Cost for all Concepts		**$1,550,000**	**$880,000**	**$3,190,000**	**$13,910,000**	**$19,360,000**

Benefit-Cost Analysis

Crash modification factors (CMF) from the CMF Clearinghouse[30] were applied to the three years of crash data discussed in **Section 2.5** to estimate potential safety benefits for each of the proposed improvements outlined above. Long-term concepts also consider potential travel time savings benefits. Monetized values of crashes by severity were taken from the 2020 *Kentucky Traffic Collision Facts*[31] report published by the KTC.

Peak-hour travel time savings discussed in the 2045 Build Traffic Scenario earlier in **Section 7.1** were applied for the potential roundabout scenarios (2a and 2b). To create a conservative estimate, all travel time benefits were assumed to occur in the AM and PM peak hour. Monetized travel time savings were taken from the 2022 *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*[32] published by the US Department of Transportation.

Estimated benefit-cost ratios for each proposed concept over a 20-year analysis horizon (2022–2042) are summarized in **Table 13**. A ratio greater than one signifies the discounted present value of benefits exceeds the discounted present value of the costs, suggesting the project is worthwhile. Ratios assume a 3% discount rate. Smaller-scale, lower-cost concepts (3a, 3b, and 4) did not receive benefit/cost analyses as their intended benefits were to improve mobility within the City and not along the analysis route, US 42. Many of the recommended improvements have ratios much greater than one, indicating the intended safety benefits are well worth the cost.

[30] http://www.cmfclearinghouse.org/
[31] http://kentuckystatepolice.org/wp-content/uploads/2021/09/CrashFacts_2020_FY2021_Revised-1.pdf
[32] https://www.transportation.gov/sites/dot.gov/files/2022-03/Benefit%20Cost%20Analysis%20Guidance%202022%20%28Revised%29.pdf

Table 13. Benefit-Cost Summary

Concept	Description	MP Limits	2017-2019 Crashes Total Fatal/Injury/PDO	CMF	Benefit/Cost Ratio Safety Only	Benefit/Cost Ratio w/Travel Time Savings
1a.	Bridgepointe Blvd. Lighting + Dynamic Signage	9.16-9.36	19 1/3/15	0.71 0.88[1]	215.26	-
1b.	Bridgepointe Blvd. Left-turn Lane			0.7 0.83	15.58	-
2a.	Timber Ridge Dr. + Fox Harbor Rd. Roundabouts	9.10-10.45	75[2] 0/10/65	0.495	2.47	2.80
2a. + 2b.	Timber Ridge Dr. + Fox Harbor Rd. + River Rd. Roundabout	9.10-10.65	84[2] 0/12/72		2.11	2.92
5a.	Greenmere Blvd. Left-turn Lane	10.7-10.9	6 0/0/6	0.7	0.85	-
5b.	Sutherland Farm Rd. and Hunting Creek Dr. Left-turn Lanes	10.9-11.1	14 0/1/13	0.7 0.83	4.12	-
5a. + 5b.	Greenmere Blvd. - Hunting Creek Dr. Left-turn Lanes	10.7-11.1	20 0/1/19	0.7 0.83	2.52	-
6a.	Rose Island Rd. Left-turn Lane	11.25-11.45	7 0/2/5	0.7	3.08	-
7a.	US 42 Lighting from Bridgepointe Blvd. to Harrods Creek Bridge	9.0-9.70	9[3] 0/0/9	0.68[4]	0.00	-
7b.	US 42 Lighting from Harrods Creek Bridge to Hunting Creek Dr.	9.70-11.02	35[3] 0/6/29		2.75	-
7a. + 7b.	US 42 Lighting from Bridgepointe to Hunting Creek Dr.	9.0-11.02	44[3] 0/6/38		2.14	-
8.	Guardrail, Rumble Strip, and Reduced Lane Width from Bridgepointe Blvd. to Marina Dr.	8.96-9.71 8.96-9.282	57 1/9/47 30 0/2/28	0.91[5] 0.73[6] 0.76	88.88	-

[1]Only applies to night crashes; [2]Intersection Crashes Only; [3]Night Crashes Only; [4]Only applies to fatal and injury crashes; [5]FHWA Desktop Reference p49; [6]Only Applies to angle, head on, rear end, sideswipe, single vehicle, opposing turn

Project Sheets

The following pages contain project sheets for each of the recommended improvements. These sheets summarize study findings (e.g., crash history, traffic, geometry, costs, etc.) for each location and study concept. Environmental concerns indicate potential sensitive resources in the area, and are not necessarily impacted, instead are noted for future projects to be aware of as designs are developed.

1 US 42 at Bridgepointe Boulevard

Short- to Mid-Term	Jefferson County	US 42 MP 9.263	Bridgepointe MP 0.000

IMPROVEMENT DESCRIPTION:

1A – Short-Term

- Intersection lighting
- Dynamic warning signage on US 42

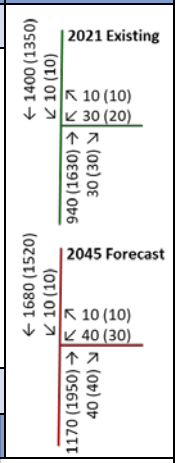
1B – Mid-Term

- Left-turn Lane on southbound US 42, requires retaining wall due to topography and NRHP/4(f) protected property

Phase Estimates	(2022 Dollars)	
Concept:	**1A**	**1B**
Design:	$35,000	$220,000
Right-of-Way:	$0	$0
Utilities:	$0	$0
Construction:	$110,000	$2,120,000
Total Cost:	**$145,000**	**$2,340,000**

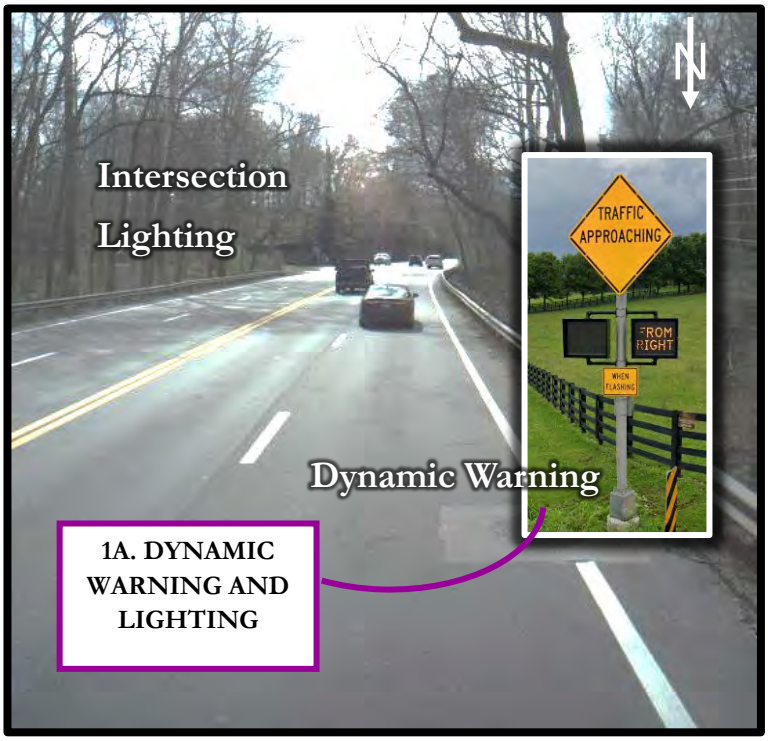
IDENTIFIED NEEDS:

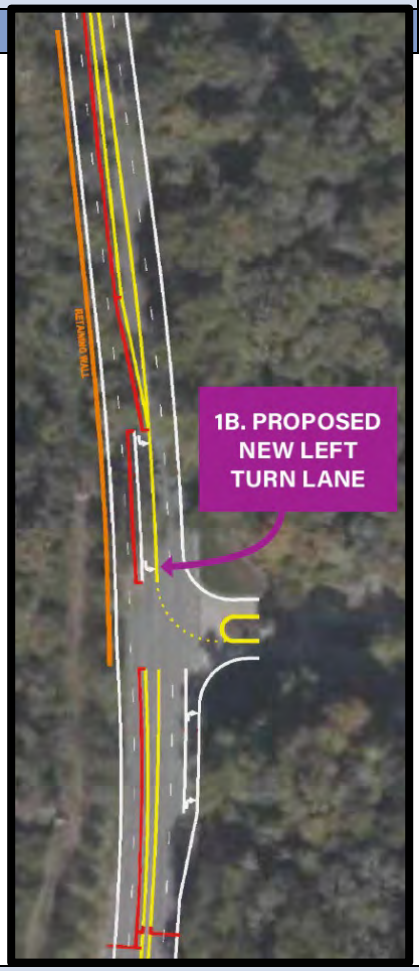
- 2017-2019 Crashes: 9 crashes within 200 ft of intersection; 6 rear ends; 1 fatal; LOSS 3 for KAB crashes
- 2021 Traffic: 30,600-30,800 vpd with 15-18% trucks, PM peak LOS B to turn from Bridgepointe
- 2045 Traffic: 34,800-38,800 vpd with 15-18% trucks, PM peak LOS D to turn from Bridgepointe
- Existing Geometry: Two 12-ft-wide lanes with 1-ft-wide paved shoulders; grade class D
- Other: Speed limit is 45 MPH; speeds exceed 50+ on the descent of the hill



ENVIRONMENTAL CONCERNS: NRHP Drumanard Property, Bat Habitat, Rock Cuts

PROJECT CONCEPT:





Edge line/Arrows | Directional Striping | Taper Areas | Retaining Wall

2 US 42 Roundabouts Through Prospect

Long-Term	Jefferson County	US 42 MP 10.020 – MP 10.548

IMPROVEMENT DESCRIPTION:

2A – Timber Ridge Dr.-Fox Harbor Rd.

- Roundabouts at Timber Ridge Dr. and Fox Harbor Rd.
- Raised median, curb and gutter
- Left-turn Lane at Carslaw Ct.
- Sidewalks along both sides

2B – River Road

- Roundabout at River Rd
- Partial raised median, curb and gutter

Phase Estimates	(2022 Dollars)	
Concept:	**2A**	**2B**
Design:	$540,000	$220,000
Right-of-Way:	$410,000	$420,000
Utilities:	$1,880,000	$720,000
Construction:	$5,400,000	$2,110,000
Total Cost:	**$8,230,000**	**$3,470,000**

IDENTIFIED NEEDS:

- 2017-2019 Crashes: 44 crashes within 20 ft of intersections; 18 rear ends, 13 opposing left-turns, 6 angle; LOSS 3 for KAB crashes near Timber Ridge Dr. and Fox Harbor Rd.
- 2021 Traffic: 28,800-33,600 vpd with 15-18% trucks
- 2045 Traffic: 36,000-43,000 vpd with 15-18% trucks
- Existing Geometry: Two 11-ft-wide lanes with 1-ft-wide paved shoulders
- Other: 20+ access points through this section

Intersection	2021 Existing		2045 No Build		2045 Build	
	LOS	Delay	LOS	Delay	LOS	Delay
AM Peak Hour						
Timber Ridge	C	27	D	44	A	12
Fox Harbor	A	6	D	36	A	5
River Rd	A	9	B	14	A	5
PM Peak Hour						
Timber Ridge	C	28	D	47	C	24
Fox Harbor	A	19	B	25	A	9
River Road	C	21	D	37	A	8

ENVIRONMENTAL CONCERNS: Putney Pond & Woodlands, Little Hunting Creek Park, Bat Habitat, 100-yr Flood zone

PROJECT CONCEPT:

Edge line/Arrows | Directional Striping | Decorative Median | Paved Median/Curb and Gutter/Sidewalk

3 Improved Access between Prospect Businesses

Short- to Mid-Term	Jefferson County	US 42 MP 10.110 – 10.287

IMPROVEMENT DESCRIPTION:

3A – Short-Term

- Provide two connections between businesses' parking lots at Prospect Place and Prospect Center
- This would require developers to provide access if there are building or zoning changes

3B – Mid-Term

- New road behind Prospect Place and Prospect Center, between Carslaw Ct. and US 42, with possible access to Beech Ave., with 10-ft-wide multi-use trail

Phase Estimates	(2022 Dollars)
Concept:	**3B**
Design:	$50,000
Right-of-Way:	$0
Utilities:	$0
Construction:	$470,000
Total Cost:	**$520,000**

IDENTIFIED NEEDS:

- 2017-2019 Crashes: 13 crashes from MP 10.100-10.300; 9 rear ends, 2 angle
- 2021 Traffic: 28,800-33,600 vpd with 15-18% trucks
- 2045 Traffic: 36,000-43,000 vpd with 15-18% trucks
- Existing Geometry: Two 11-ft-wide lanes with 1-ft-wide paved shoulders; no left-turn lanes;
- Other: Lack of pedestrian and vehicular connectivity between businesses, requires multiple turns on-/off- US 42 to access various businesses; 10+ access points on US 42 in this 0.177 mile
  Turning on- and off-US 42 were top public concerns

ENVIRONMENTAL CONCERNS: Bat Habitat, 100-Year Flood Zone

PROJECT CONCEPT:

Edge line/Arrows | Directional Striping | New Pavement | Multi-use Path | Divided Businesses

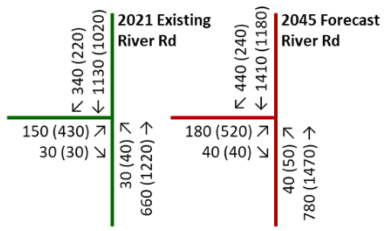
4 Pedestrian Connectivity to Prospect Businesses

Short-Term	Jefferson County	River Rd MP 6.684	Sedgewicke Dr MP 0.000

IMPROVEMENT DESCRIPTION:	Phase Estimates	(2022 Dollars)
4 – Short-Term	Concept:	4
• Mid-block crosswalk with ped-actuated flashing signage	Design:	$5,000
	Right-of-Way:	$0
	Utilities:	$0
	Construction:	$50,000
	Total Cost:	**$55,000**

IDENTIFIED NEEDS:

- 2021 Traffic: 3,000 vpd
- 2045 Traffic: 3,600 vpd
- Other: Speed limit is 45 mph; lack of residential pedestrian connectivity to local businesses; existing Sedgewicke Dr. sidewalk terminates at entrance



ENVIRONMENTAL CONCERNS: Bat Habitat

PROJECT CONCEPT:

Crosswalk ■ New Pavement/Sidewalk

5 US 42 Residential Area Left-Turn Lanes

Mid-Term	Jefferson County	US 42 MP 10.776 – MP 11.054

IMPROVEMENT DESCRIPTION:

5A – Greenmere Blvd

- Left-turn Lane at Greenmere Blvd.

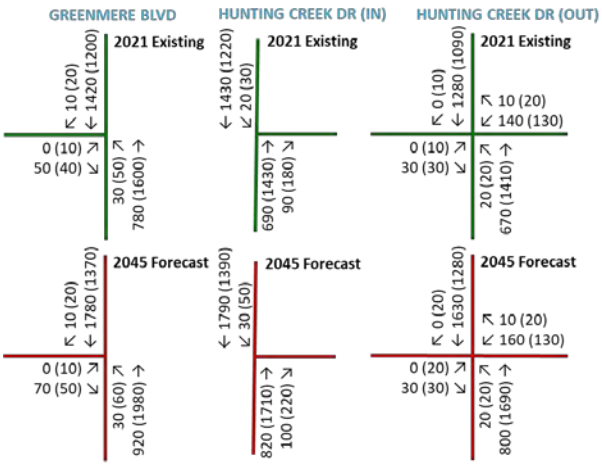
5B – Sutherland Farm Rd. + Hunting Creek Dr.

- Left-turn Lane at Hunting Creek Dr. entrance
- Left-turn Lane at Sutherland Farm Rd.
- Move Hunting Creek Dr. name sign from exit road to entrance road

Phase Estimates	(2022 Dollars)	
Concept:	**5A**	**5B**
Design:	$40,000	$50,000
Right-of-Way:	$0	$0
Utilities:	$230,000	$140,000
Construction:	$390,000	$500,000
Total Cost:	**$660,000**	**$690,000**

IDENTIFIED NEEDS:

- 2017-2019 Crashes: 22 crashes at the intersections; 4 at Greenmere Blvd., 12 at Hunting Creek Dr. (in), 6 at Hunting Creek Dr. (out) Half (11) crashes were rear ends
- 2021 Traffic: 26,200-29,400 vpd with 15-18% trucks
- 2045 Traffic: 32,000-36,800 vpd with 15-18% trucks
- Existing Geometry: Two 11-ft-wide lanes with 1-ft-wide paved shoulders, no existing left-turn lanes
- Other: Public requests for left-turn lanes at Greenmere Blvd. and Hunting Creek Dr. (in)



ENVIRONMENTAL CONCERNS: Bat Habitat, 100-yr Flood Zone, Pond, Wetland, Wallace Conservation Easement

PROJECT CONCEPT:

Edge line/Arrows | Directional Striping | New Pavement

6 US 42 at Rose Island Road (KY 3222)

Short- to Mid-Term	Jefferson County	US 42 MP 11.355	Rose Island Rd MP 0.000

IMPROVEMENT DESCRIPTION:

6A – Short-Term

- Left-turn Lane at Rose Island Rd.

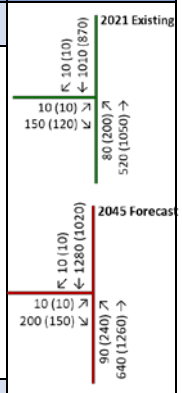
6B – Mid-Term

- Raise grade of Rose Island Rd; requires structure replacement

Phase Estimates	(2022 Dollars)	
Concept:	**6A**	**6B**
Design:	$40,000	$40,000
Right-of-Way:	$0	$50,000
Utilities:	$100,000	$120,000
Construction:	$390,000	$350,000
Total Cost:	**$530,000**	**$560,000**

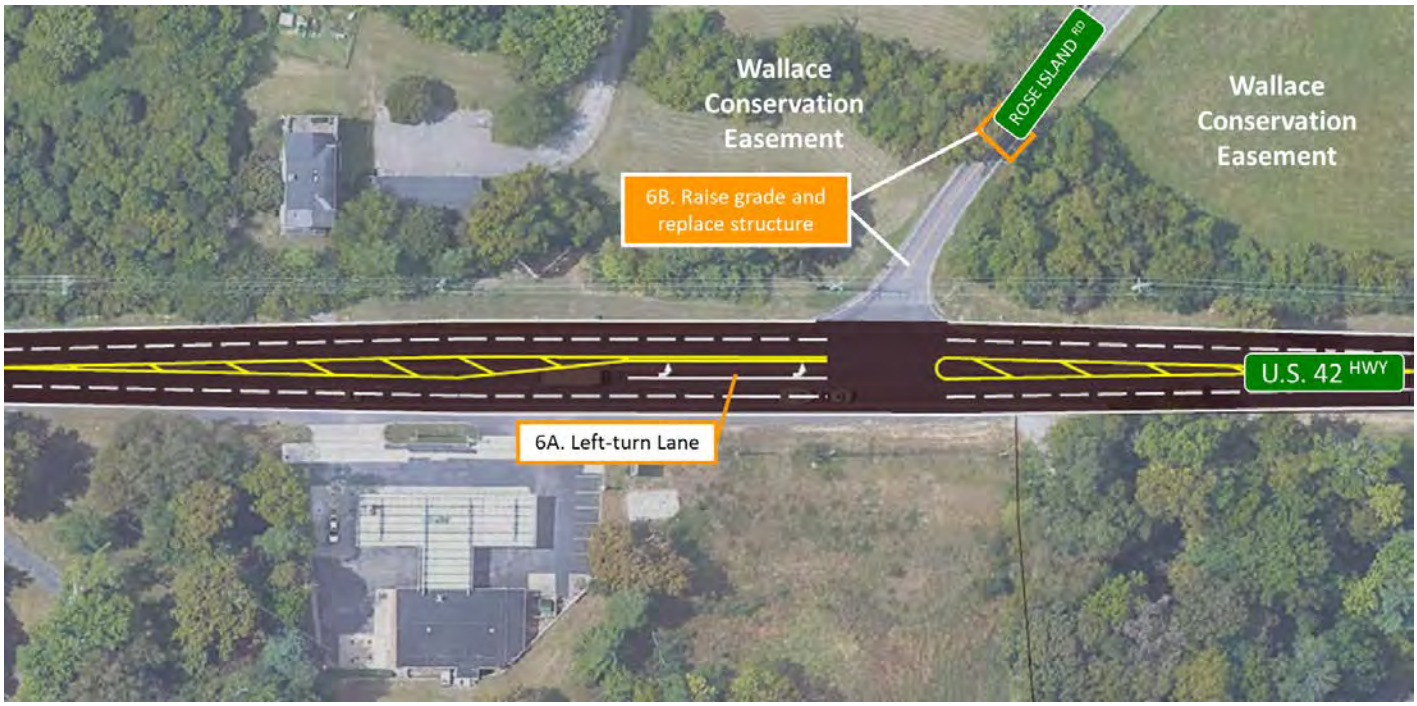
IDENTIFIED NEEDS:

- 2017-2019 Crashes: 16 crashes within 200 ft of intersection; 9 rear ends, 3 opposing left turns; 4 injury
- 2021 Traffic: 30,600-30,800 vpd with 15-18% trucks, PM peak LOS E to turn left from US 42 to Rose Island Rd.
- 2045 Traffic: 34,800-38,800 vpd with 15-18% trucks, PM peak LOS F to turn left from US 42 to Rose Island Rd.
- Existing Geometry: Two 11-ft-wide lanes with 1-ft-wide paved shoulders, skewed intersection with steep grade and dense vegetation limiting visibility
- Other: Public comments noted visibility and left-turning issues



ENVIRONMENTAL CONCERNS: Wallace Conservation Easement., NRHP Properties, Wetland, Bat Habitat

PROJECT CONCEPT:



Edge line/Arrows | Directional Striping | New Pavement

7 US 42 Lighting Plan

Mid-Term	Jefferson County	US 42 MP 9.263 – MP 11.054

IMPROVEMENT DESCRIPTION:

7a – Lighting from Bridgepointe Boulevard to Harrods Creek

- Consistent decorative lighting plan on the east side of US 42 from Bridgepointe Boulevard to Harrods Creek (MP 9.263-9.504), including decorative light and pole for vehicular and pedestrian (over sidewalks) lighting, minimizing light pollution and spillover.

7b – Lighting from Harrods Creek to Hunting Creek Drive

- Consistent decorative lighting plan on alternating sides of US 42 from Harrods Creek to Hunting Creek Dr (MP 9.504-11.054), including decorative light and pole for vehicular and pedestrian (over sidewalks) lighting, minimizing light pollution and spillover.

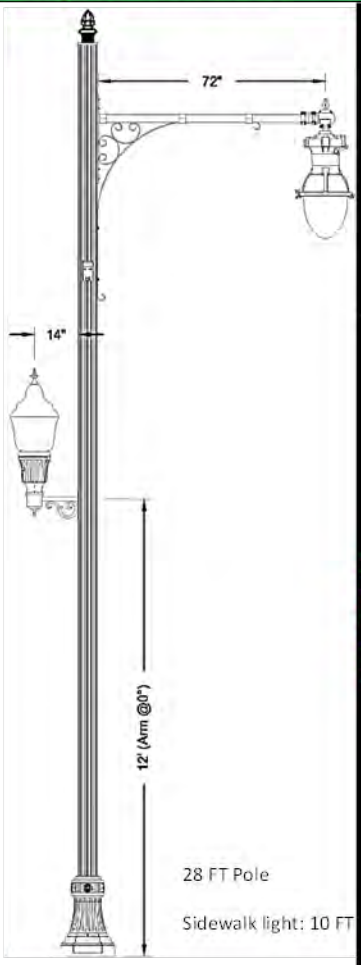
Phase Estimates	(2022 Dollars)	
Concept:	7a	7b
Design:	$100,000	$170,000
Right-of-Way:	$0	$0
Utilities:	$0	$0
Construction:	$290,000	$1,220,000
Total Cost:	**$390,000**	**$1,390,000**

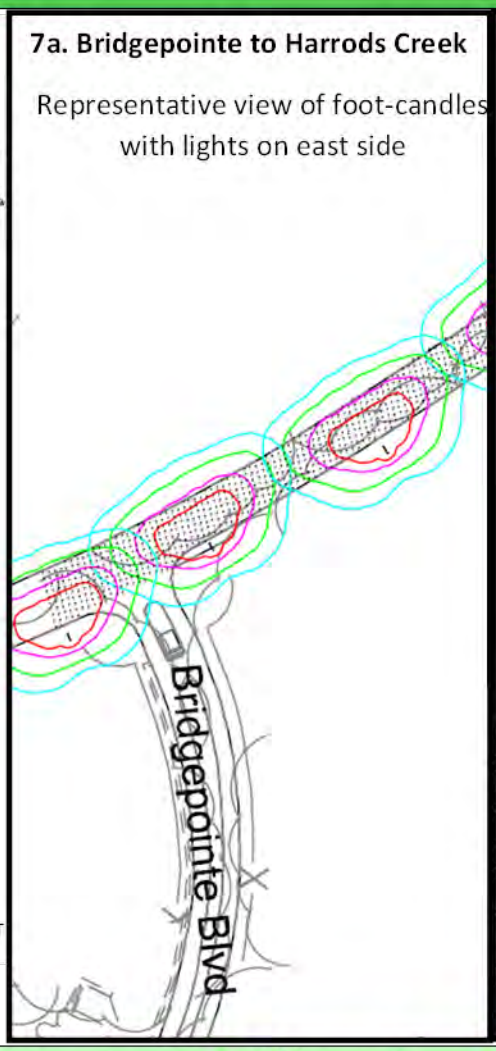
IDENTIFIED NEEDS:

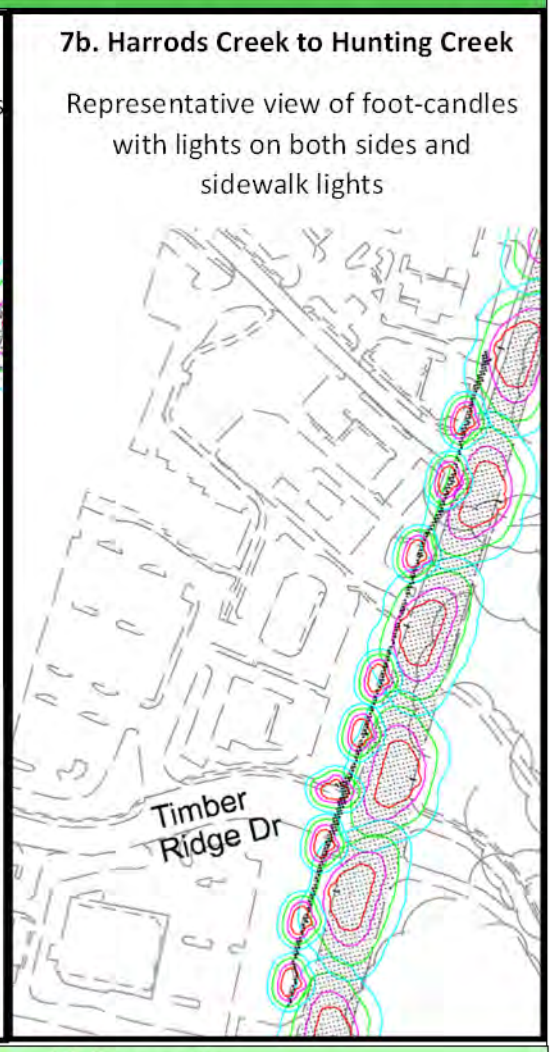
- 2017-2019 Crashes: 17% of 240 crashes occurred at night
- Other: Third top request from the public

ENVIRONMENTAL CONCERNS: Bat Habitat

PROJECT CONCEPT:







1.0 foot-candle | 0.5 foot-candle | 0.2 foot-candle | 0.1 foot-candle

8 Guardrail & Rumble Strips

Short-Term	Jefferson County	US 42 MP 9.263 – MP 9.712

IMPROVEMENT DESCRIPTION:

8 – Guardrail and Rumble Strips from Bridgepointe Blvd. to Marina Dr.

- Replace current guardrails with new 30-inch above pavement guardrails and improved end treatments
- Add centerline rumble strip
- Reduce lane width from 12 feet to 11 feet from Gene Snyder Fwy. ramp at MP 9.053 to existing 11-foot-wide lanes at MP 9.282

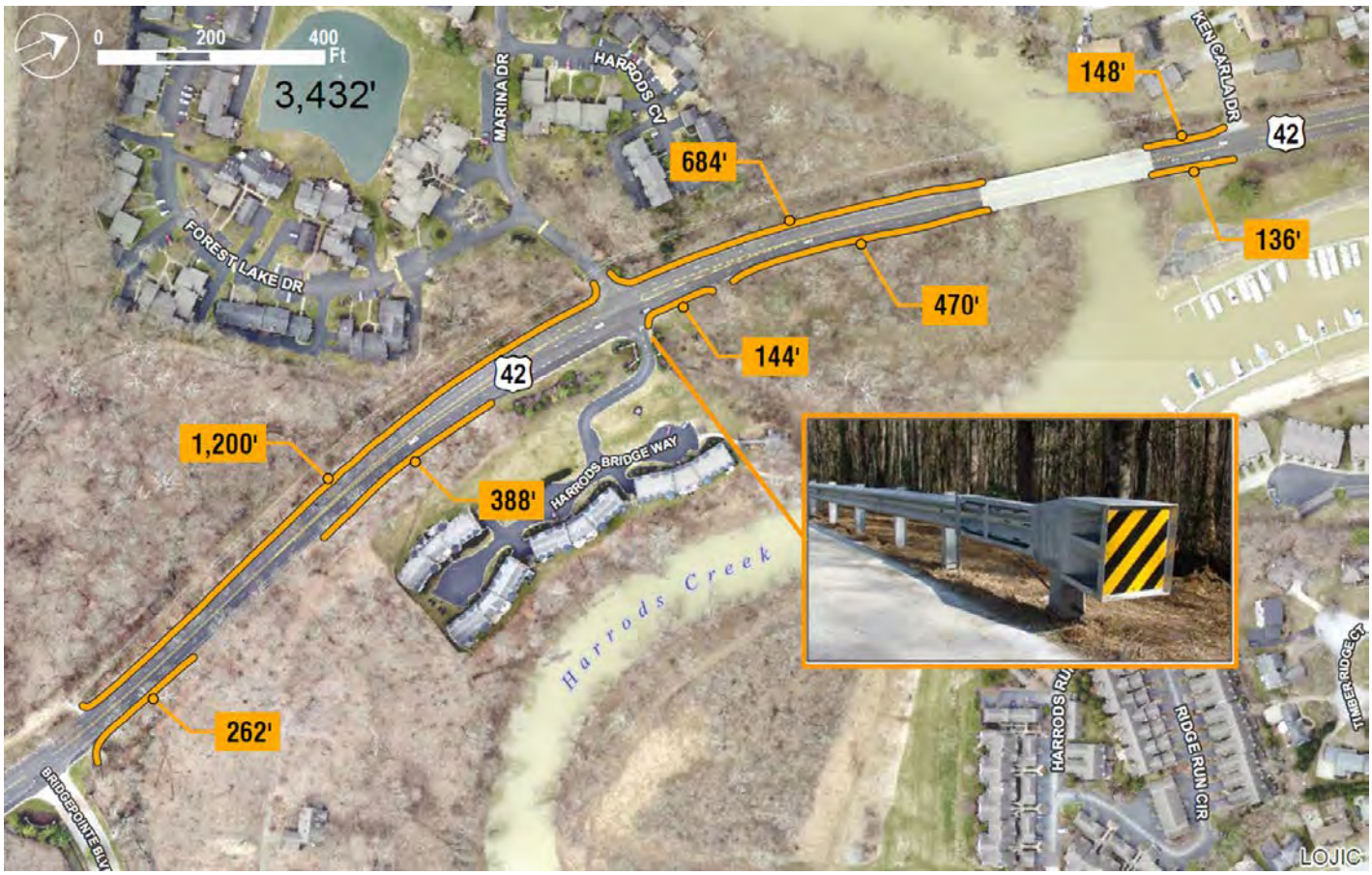
Phase Estimates	(2022 Dollars)
Concept:	8
Design:	$40,000
Right-of-Way:	$0
Utilities:	$0
Construction:	$340,000
Total Cost:	**$380,000**

IDENTIFIED NEEDS:

- 2017-2019 Crashes: 37 crashes from MP 9.263-9.712; 18 rear ends, 7 single vehicles, 5 sideswipe same direction; 1 fatal
- Existing Geometry: Two 12-ft-wide lanes with 2- to 6-ft-wide paved shoulders from MP 9.263-9.282; two 11-ft-wide lanes with 1-ft-wide paved shoulders from MP 9.282-9.712
- Other: Much of the guardrail is damaged or too low—this need was noted in both roadway safety audit and public comment; speed is a local concern coming down the hill past Bridgepointe Blvd.

ENVIRONMENTAL CONCERNS: NRHP Drumanard Property, Bat Habitat, 100-Year Flood Zone, Rock Cuts

PROJECT CONCEPT:



Edge line/Arrows | Directional Striping | Guardrail

8.2 Prioritized Recommendations

As mentioned in **Section 6.4**, the concepts summarized in the project sheets were grouped into potential projects by segment, and prioritized by the Prospect partnership opportunities with KYTC and Louisville Metro to best facilitate seeking future funding. This section details the concepts that comprise each project and reasoning for recommendation, starting with the top priority project.

Each concept may be advanced as an individual projects however, the grouping of several concepts as single projects is recommended to best address the needs in the identified segments. The study's purpose and goals to improve the safety and mobility of the US 42 corridor for all users while creating a sense of community, public and stakeholder feedback, existing conditions data, environmental constraints, and anticipated performance metrics were all considered during the prioritization process.

These concepts may be modified to best address an individual project's purpose and needs should these projects advance to the next project development phase. The information provided herein is estimated based on planning-level concepts and should be considered alongside the No-Build option.

KYTC–Prospect Partnership Priorities

These priorities are focused on infrastructure changes to US 42, a state-maintained route.

Priority #1 – Harrods Creek Bridge to Hunting Creek Drive

Collectively, concepts 2a–Timber Ridge Drive and Fox Harbor Road Roundabouts, 2b–River Road Roundabout, and 7b–US 42 Lighting from Harrods Creek Bridge to Hunting Creek Drive were determined to best address the purpose and needs identified by the study—improving safety and mobility for all users within Prospect. All concepts included in this top priority project have positive BCA's and are centrally located within the study area.

The project limits align with KYTC's 2006 US 42 project, Item No. 5-972, which has been on hold in the design phase. The team recommends these concepts collectively be considered as an alternative design concept for that project. Should this project advance, an alternative future design project concept could also consider adding left-turn lanes (on US 42 and River Road) at the signalized River Road intersection instead of a roundabout at this location.

This segment is statistically the top safety concern as it contains:

- Both identified high CRF spots: Carslaw Court and Fox Harbor Road.
- The high CRF segment from Harrods Landing to Carslaw Court.
- Two of the top three crash intersections: Timber Ridge Drive and Fox Harbor Road.
- Two of the four LOSS 3 segments for severe crash types.

Roundabouts are an FHWA proven safety countermeasure, historically proven to reduce 78% of fatal and injury crashes when signalized intersections are replaced with roundabouts.[33] Roundabouts are also effective in terms of mobility. They can serve as a traffic calming measure, with lower travel

[33] https://safety.fhwa.dot.gov/provencountermeasures/roundabouts.cfm

speeds, reduced conflict points, fewer stops, and a better environment for walking and biking, thereby addressing mobility concerns for all users. Sidewalks are added along both sides of US 42 with this concept.

Continuous roadway segment lighting is also an FHWA proven safety countermeasure, reducing nighttime injury pedestrian crashes at intersection by 42%, nighttime urban intersection crashes by 38%, and nighttime injury crashes on urban highways by 28%.[34] There were 35 nighttime crashes in this segment, 6 of which involved injuries.

Table 14 summarizes the top priority concepts that comprise Priority #1, including phase and total estimated costs, benefit-costs analysis, and public opinion.

Table 14. Summary of KYTC-Prospect Priority #1: Harrods Creek Bridge–Hunting Creek Drive

Harrods Creek – Hunting Creek Drive | MP 9.628 – 10.548					
	Concept	**2a[1]**	**2b[2]**	**7b[3]**	**Project #1**
	Term	Long	Long	Mid	**Long**
Estimated Costs	**Design**	$540,000	$220,000	$170,000	**$930,000**
	Right-of-Way	$410,000	$420,000	-	**$830,000**
	Utility	$1,880,000	$720,000	-	**$2,600,000**
	Construction	$5,400,000	$2,110,000	$1,220,000	**$8,730,000**
	Total Cost	$8,230,000	$3,470,000	$1,390,000	**$13,090,000**
	BCA	2.80	2.92[4]	1.96	**2.12[5]**
	Number of Public Votes	213	207	217	**207-217**
	Average Public Rating	52	51	73	**59[5]**

[1]Timber Ridge Drive and Fox Harbor Road Roundabouts, [2]River Road Roundabout, [3]US 42 Lighting from Harrods Creek Bridge to Hunting Creek Drive, [4]BCA is for all three roundabouts (did not model constructing River Road Roundabout only), [5]Weighted Average

Priority #2 – Bridgepointe Boulevard to Harrods Creek Bridge

To address a top local safety concern—voiced by both the public and project team—and recognizing the fatality during the crash analysis period, concepts 1a—Bridgepointe Lighting and Dynamic Signage, 1b–Bridgepointe Left-turn Lane, 7a–US 42 Lighting from Bridgepointe to Harrods Creek, and 8–Guardrail+Centerline Rumble Strip+Narrowed Lane Width were combined to comprise Priority #2 near the southern section of the study area.

These concepts are primarily short-term improvements to address the immediate safety needs of this section. Most of these concepts have the highest BCA ratings of all improvement options, are relatively low-cost, and are anticipated to be constructed within existing right-of-way with negligible utility impacts. The seemingly high Bridgepointe Boulevard left-turn lane cost is driven by the need to construct a retaining wall to avoid costly blasting requirements and impacts to the adjacent Section 4(f) protected, NRHP property.

[34] https://safety.fhwa.dot.gov/provencountermeasures/lighting.cfm#psc-footnote

Similar to Priority #1, these concepts were developed by implementing FHWA proven safety countermeasures. This segment received an LOSS 3 rating for severe crash types and was the 3rd highest concern identified during the first round of public engagement. In addition to the corridor lighting benefits, centerline rumble strips are proven to reduce total crashes by 40% and fatal and injury crashes by 64%,[35] and left-turn lanes are anticipated to provide a 28% to 48% reduction in total crashes.[36] Upgraded guardrail is intended to shield unmovable objects (rock outcrops) and steep embankments through this hilly (grade class D) section of US 42. Reduced lane width is anticipated to serve as a traffic calming measure for vehicles descending the hill, where observed travel speeds exceed the posted 45 mph speed limit.

Table 15 summarizes key information that informed the prioritization decisions.

Table 15. Summary of KYTC-Prospect Priority #2: Bridgepointe Boulevard–Harrods Creek Bridge

Bridgepointe Boulevard – Harrods Creek | MP 9.263 – 9.628						
	Concept	**1a[1]**	**1b[2]**	**7a[3]**	**8[4]**	**Project #2**
	Term	Short	Mid	Short	Short	**Short**
Estimated Costs	**Design**	$35,000	$220,000	$100,000	$40,000	**$395,000**
	Right-of-Way	-	-	-	-	**-**
	Utility	-	-	-	-	**-**
	Construction	$110,000	$2,120,000	$290,000	$340,000	**$3,030,000**
	Total Cost	$145,000	$2,340,000	$390,000	$380,000	**$3,425,000**
	BCA	215.26	15.58	0.00[5]	88.88	**37.61[6]**
	Number of Public Votes	217	218	217	215	**215-218**
	Average Public Rating	70	83	73	69	**74[6]**

[1]Bridgepointe Boulevard Lighting+Dynamic Signage, [2]Bridgepointe Boulevard Left-turn Lane, [3]US 42 Lighting from Bridgepointe Boulevard to Harrods Creek Bridge, [4]Guardrail+Centerline Rumble Strip+Reduced Lane Width, [5]No night crashes in this segment so no safety benefit; however, BCA is **2.14** is lighting is installed from Bridgepointe Boulevard to Hunting Creek Drive, [6]Weighted Average

Priority #3 – Hunting Creek Drive to Rose Island Road

The northern section of the study area was identified as Priority #3. It includes the area near Hunting Creek Drive to Rose Island Road (MP 10.776–11.355). Concepts include 5a–Greenmere Boulevard Left-turn Lane, 5b–Sutherland Farm Road + Hunting Creek Drive Left-turn Lane, 5c–Move Hunting Creek Drive Sign, 6a–Rose Island Road Left-turn Lane, and 6b–Raise Grade of Rose Island Road.

These concepts are primarily installing left-turn lanes within the existing right-of-way. They received the most positive public ratings during the second round of public engagement. As mentioned above

[35] http://www.cmfclearinghouse.org/studydocs/nchrp_rpt_641-GuidanceRumbleStrips.pdf
[36] https://safety.fhwa.dot.gov/provencountermeasures/left_right_turn_lanes.cfm

in Priority #2, left-turn lanes are an FHWA proven safety countermeasure. Installing them near one another for these closely spaced intersections would also provide operational benefits for the corridor.

Key data supporting these concepts are summarized in **Table 16**.

Table 16. Summary of KYTC-Prospect Priority #3: Hunting Creek Drive–Rose Island Road

Hunting Creek Drive – Rose Island Road | MP 10.776 – 11.355						
	Concept	**5a[1]**	**5b[2]**	**6a[3]**	**6b[4]**	**Project #3**
	Term	Mid	Mid	Short	Mid	**Short**
Estimated Costs	**Design**	$40,000	$50,000	$40,000	$40,000	**$170,000**
	Right-of-Way	-	-	-	$50,000	**$50,000**
	Utility	$230,000	$140,000	$100,000	$120,000	**$590,000**
	Construction	$390,000	$500,000	$390,000	$350,000	**$1,630,000**
	Total Cost	$660,000	$690,000	$530,000	$560,000	**$2,440,000**
	BCA	0.85[5]	4.12[5]	3.08	-	**1.08[6]**
	Number of Public Votes	216	222	224	218	**216-222**
	Average Public Rating	78	83	86	69	**79[6]**

[1]Greenmere Boulevard Left-turn Lane, [2]Sutherland Farm Road + Hunting Creek Drive Left-turn Lanes, [3]Rose Island Road Left-turn Lane, [4]Raise Grade of Rose Island Road, [5]BCA for all three (Greenmere, Sutherland, Hunting Creek) left-turn lanes is **2.52**, [6]Weighted Average

Louisville Metro-Prospect Partnership Priorities

These priorities are focused on infrastructure changes within the cities of Prospect and Louisville, and impact City-level streets and private businesses.

Priority #1 – Local Access within Prospect

Priority #1 includes multi-modal access within the City of Prospect, which primarily focuses on connecting residents to area businesses and services. Concepts grouped within this project include 3a–Add Connections between Businesses, 3b–New Access Road to Businesses, and 4–Pedestrian Connectivity to Businesses.

As smaller/more local-type projects, these concepts would require coordination between Prospect and Metro Louisville (the primary landowners). These concepts would address mobility within the City and could divert trips from US 42 if the connections were constructed. These concepts are the lowest cost and, based on improvement type, did not receive benefit-cost analyses. These projects would require minimal programming and could occur concurrently with other KYTC-Prospect concepts.

Table 17 summarizes key information supporting Priority #1. It should be noted that a nominal construction cost would be associated with concept 3a to add pavement between the existing parking lots; however, since these connections would be on private property and could require zoning changes, an estimate is not provided.

Table 17. Summary of Louisville Metro-Prospect Priority #1: Prospect Local Access

Prospect Local Access					
	Concept	**3a[1]**	**3b[2]**	**4[3]**	**Project #4**
	Term	Short	Mid	Short	**Short**
Estimated Costs	**Design**	-	$50,000	$5,000	**$55,000**
	Right-of-Way	-	-	-	**-**
	Utility	-	-	-	**-**
	Construction	-	$470,000	$50,000	**$520,000**
	Total Cost	-	$520,000	$55,000	**$575,000**
Number of Public Votes		222	213	216	**208-217**
Average Public Rating		76	72	64	**71[4]**

[1]Add Connections between Businesses, [2]New Access Road to Businesses, [3]Pedestrian Connectivity to Businesses, [4]Weighted Average

9.0 Next Steps

Funding beyond that available for this planning study would be necessary to advance any improvement concept into the design phase. The City of Prospect should work with key partners, KYTC, KIPDA, and Louisville Metro to seek additional funding for infrastructure-type projects. Smaller-scale, local projects could potentially be completed within the City's means as soon as feasible. Short-term projects within the existing right-of-way (e.g., concepts 1a and 8) may be able to be completed within KYTC's routine maintenance and traffic programs.

Coordination efforts during this study indicated the KYTC–Prospect Partnership Priority #1 project may be an alternative build solution for KYTC's Item Number 5-972 project that has been on hold in the design phase. The City of Prospect should coordinate with KYTC representatives to see if remaining design funds from KYTC's 5-972 project are available and could be used to advance the Phase I Design and Environmental Process for Priority #1.

Potential projects could also be included in KYTC's CHAF[37] database for consideration alongside other projects in the next SHIFT[38] prioritization cycle (occurring every two years) to secure funding for future project development phases.

Once funding is identified, the next step is Phase I design (Preliminary Engineering), likely including environmental analyses to be eligible for federal funding. KIPDA's MTP, TIP and KYTC's Statewide TIP would need to be amended to reflect any future project development phases.

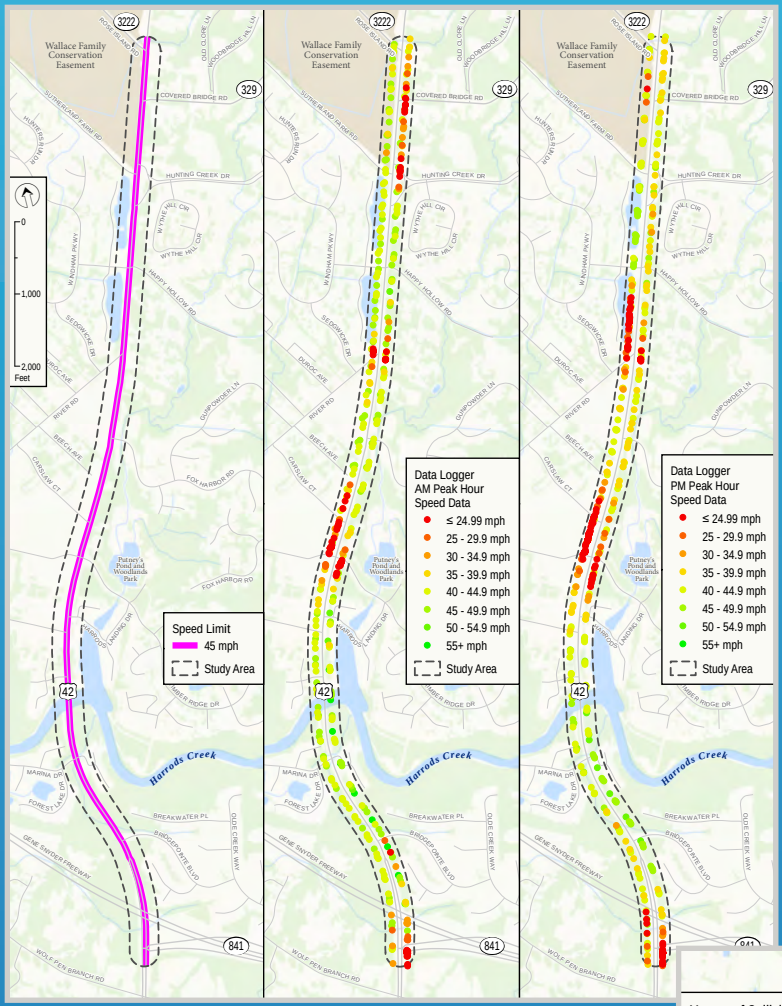
Ongoing coordination with local officials, key stakeholders, and the public will be critical when considering a future project's potential impacts to adjacent properties and area motorists.

[37] CHAF: Continuous Highway Analysis Framework, https://transportation.ky.gov/Planning/Pages/CHAF.aspx
[38] SHIFT: Strategic Highway Investment Formula for Tomorrow, https://transportation.ky.gov/SHIFT/Pages/default.aspx

10.0 Additional Information

Written requests for additional information should be sent to:

City of Prospect	or	**KYTC District 5 Planning**
Prospect City Hall		KYTC District 5
9200 U.S. Hwy 42		8310 Westport Road
Prospect, KY 40059		Louisville, KY 40242
502.228.1121		502.210.5400



Travel Speeds

Significant slow downs at:

AM PEAK (7-9 AM)

- KY 841
- Timber Ridge Dr to Beech Ave
- River Rd
- Sutherland Farm Rd/ Hunting Creek Dr
- Covered Bridge Rd

PM PEAK (4-6 PM)

- KY 841
- Timber Ridge Dr to Beech Ave
- River Rd to Happy Hollow Rd
- Covered Bridge Rd

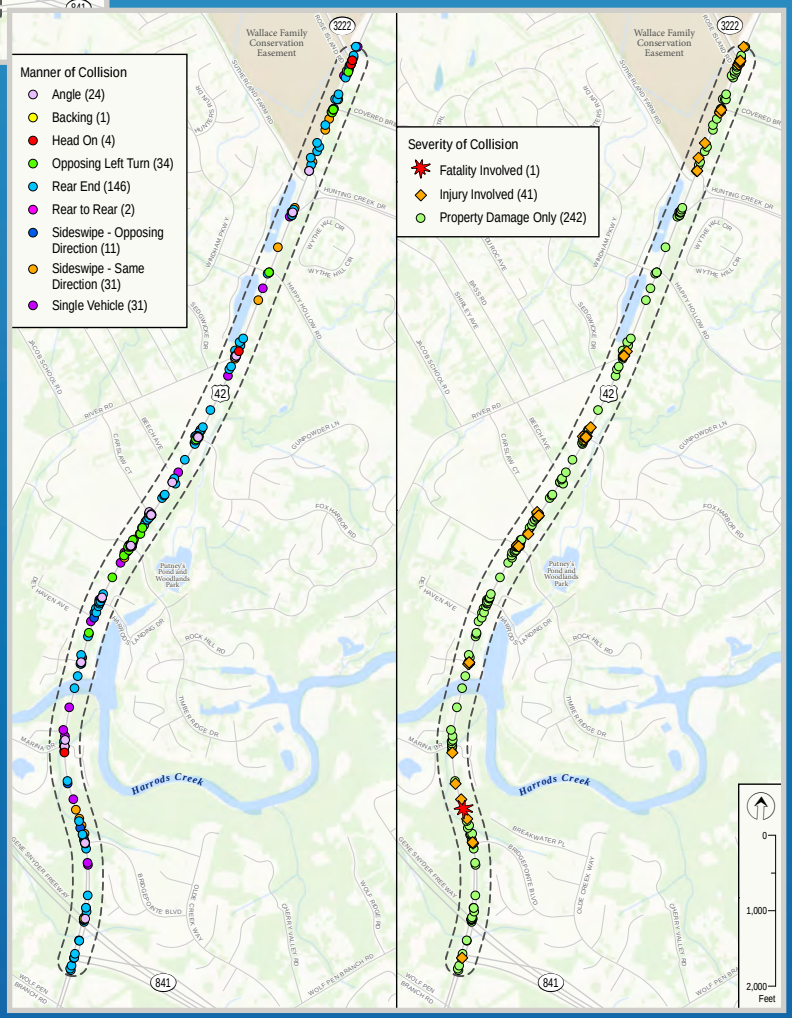
Crash Themes

2017-2019 data shows:

- 28 of 240 crashes included injuries
- 53% of all crashes were rear ends
- 50% of all crashes occurred at intersections

Top 3 Crash Intersections

- Fox Harbor (18%)
- Timber Ridge (16%)
- KY 841 (10%)



Engineering Planning