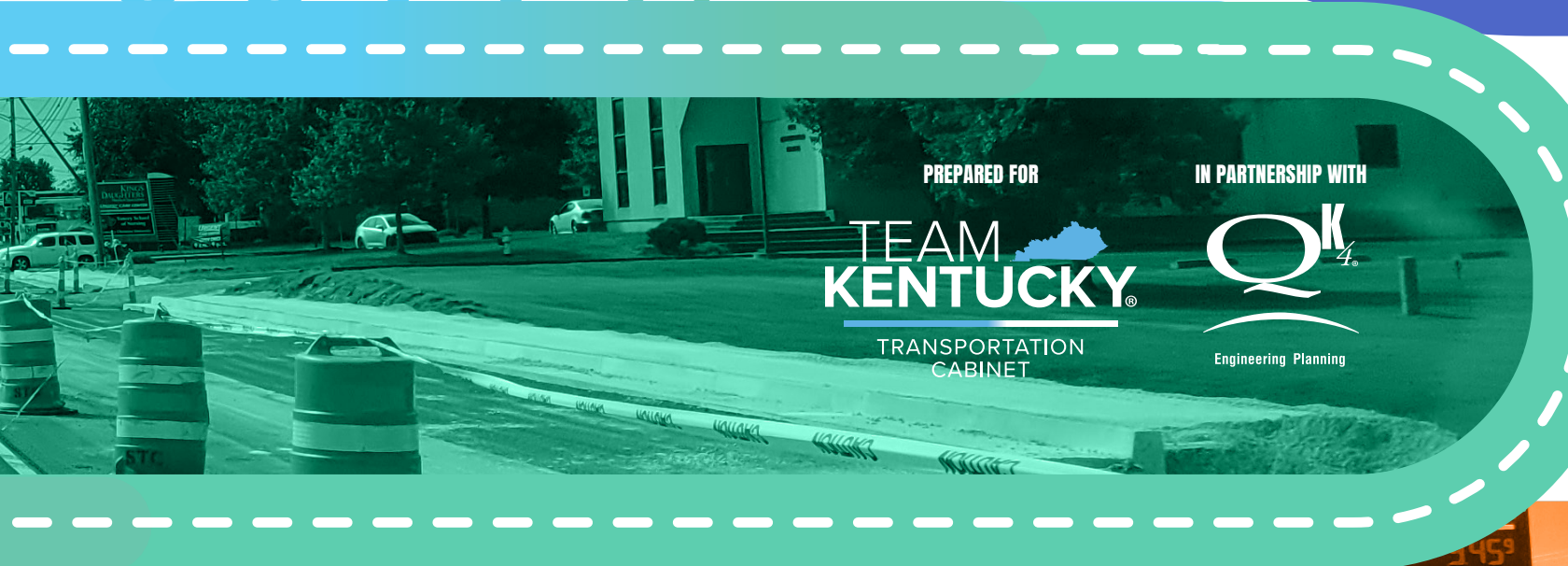
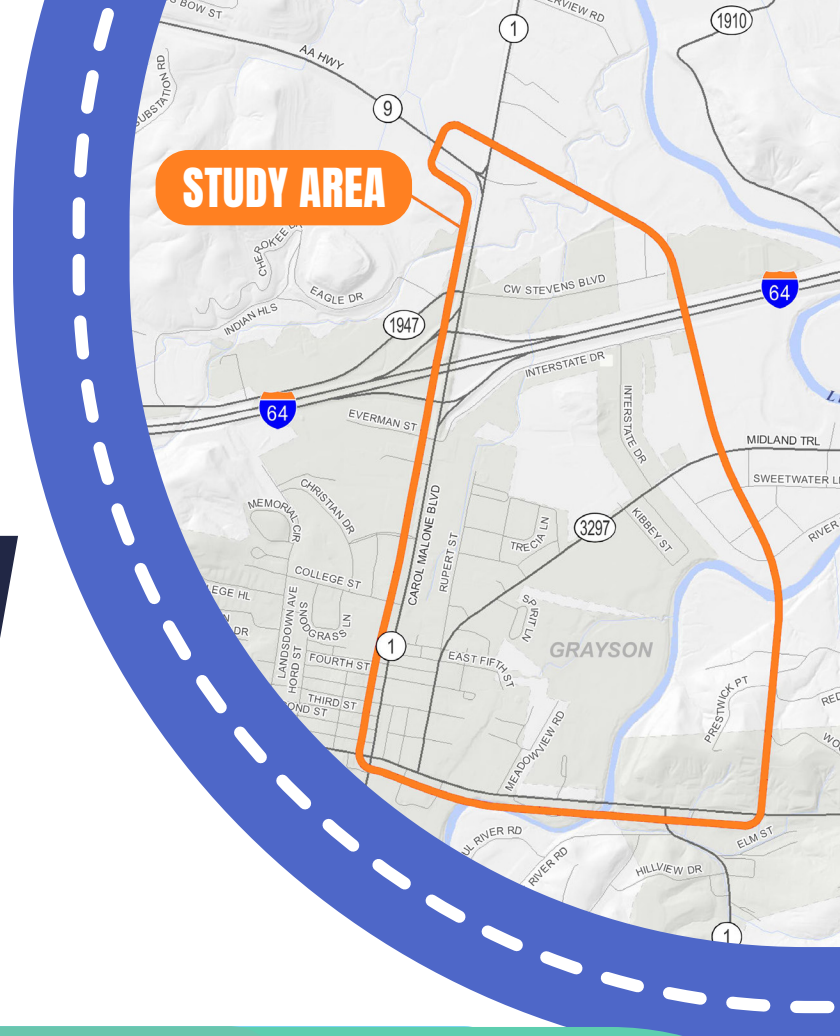


FINAL REPORT | MAY 2023

Grayson Mobility Study

CARTER COUNTY, KY



PREPARED FOR

TEAM
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TRANSPORTATION
CABINET

IN PARTNERSHIP WITH



Engineering Planning



EXECUTIVE SUMMARY

Study Background

The Kentucky Transportation Cabinet (KYTC) initiated a corridor study in summer 2022 to identify mobility needs in and around the city of Grayson in Carter County. Grayson is in northeastern Kentucky, along the Little Sandy River, and accessible from Interstate 64 (I-64) at exit 172. KY 1/7 (Carol Malone Boulevard), the primary north-south highway through town, provides connections to KY 9 (AA Highway), I-64, and US 60 (Main Street). Downtown Grayson is located at the crossroads of US 60 and KY 1/7.

KYTC completed the *Grayson Small Urban Area (SUA)* Study for the city in 2018, identifying transportation improvement projects to address existing traffic and safety issues. A new eastern bypass between KY 9 and US 60 was one of the high priority projects identified in the SUA. Shown in **Figure ES-1**, the study area follows KY 1/7 from its intersection with US 60 at milepoint (MP) 10.646 north to its intersection with KY 9 (MP 12.000) and includes areas to the east near the initial bypass concept.

Study tasks include creating an inventory of existing conditions, defining goals for the study, coordinating with local officials and stakeholders, and forecasting existing and future traffic. The intent is to determine if the previously identified bypass concept merits further consideration in light of recent development and transportation changes in the city—including construction of the new Grayson Sports Park and ongoing widening efforts along KY 1/7 (Item No. 9-144). When

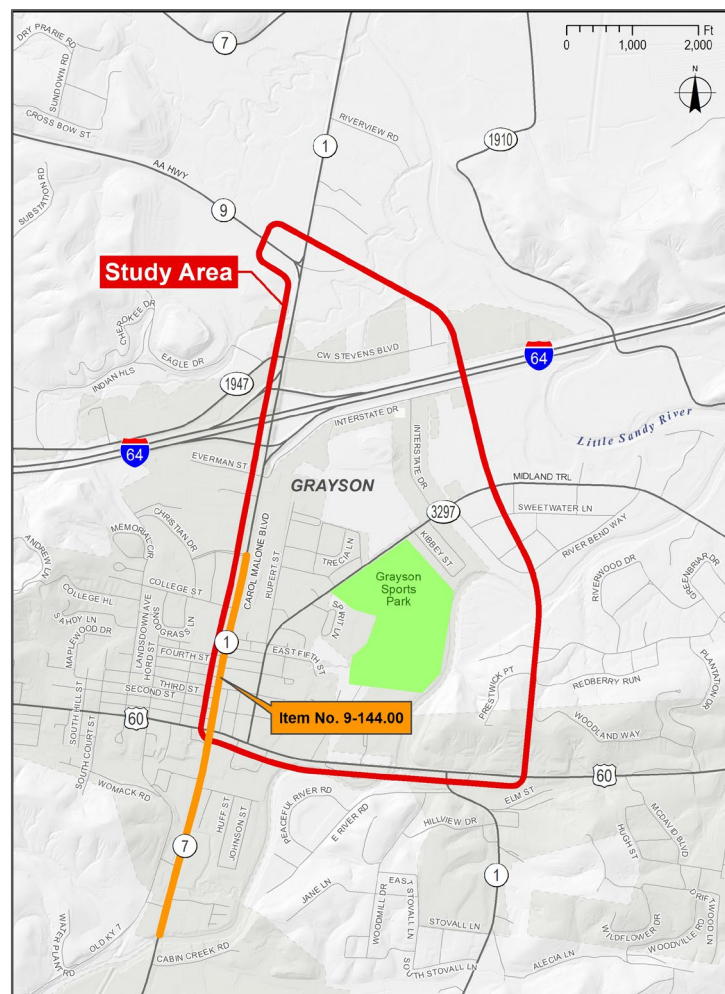


Figure ES-1: Study Area

complete, this portion of KY 1/7 will have a five-lane typical section with sidewalks plus dedicated turn lanes at key intersections.

Existing Conditions

KY 1/7 is classified as an urban principal arterial from the interchange with I-64 north to the AA Highway and classified as an urban minor arterial from the interchange south to US 60. It has four 12-foot-wide lanes with varying width shoulders. The posted speed limit is 35 mph south of the interchange with I-64.

During 2017-2021, 451 crashes occurred throughout the study area: 336 along KY 1/7 and the remainder associated with other highways. There were no fatalities but 13% resulted in injuries. By type, most are rear end crashes (34%), followed by angle crashes (29%), and same direction sideswipes (15%).

Estimates show 7,000 to 19,200 vehicles per day (vpd) travel along KY 1/7, with the busiest segment between Interstate Drive (MP 11.391) and the I-64 eastbound ramps (MP 11.543). Seven study intersections operate at Level of Service (LOS) D or better during both peak hours. The one exception is the signalized KY 1/7 intersection with KY 1947 and C.W. Stevens Boulevard, which operates at LOS E during the PM peak hour. Traffic is a mix of passenger cars, school buses, semi-trucks, and other vehicle types. Heavy truck traffic is common near the interchange, accessing the adjacent truck stops. Pedestrian traffic is also common along KY 1/7, with up to 260 pedestrians per day estimated.

Future Traffic

The KYTC District 9 Area Travel Demand Model, along with recent mainline and turning movement counts, formed the basis of future year 2045 traffic projections. Overall, the 2045 No-Build model projects a 0.65% annual growth rate; along KY 1/7, this increases traffic to 8,100 to 22,100 vpd. With increased volumes, stop-controlled cross-streets at Everman Street and Academic Parkway exhibit LOS E-F during the 2045 PM peak hour.

Build Concepts

Improvement concepts were developed based on a combination of input from the project team, a review of previous planning efforts, traffic projections, stakeholder feedback, and field reconnaissance. Concept types (**Figure ES-2**) were organized into three basic categories, based on geography: a partial KY 1/7 bypass, an improved east-west linkage, and a new western interchange.

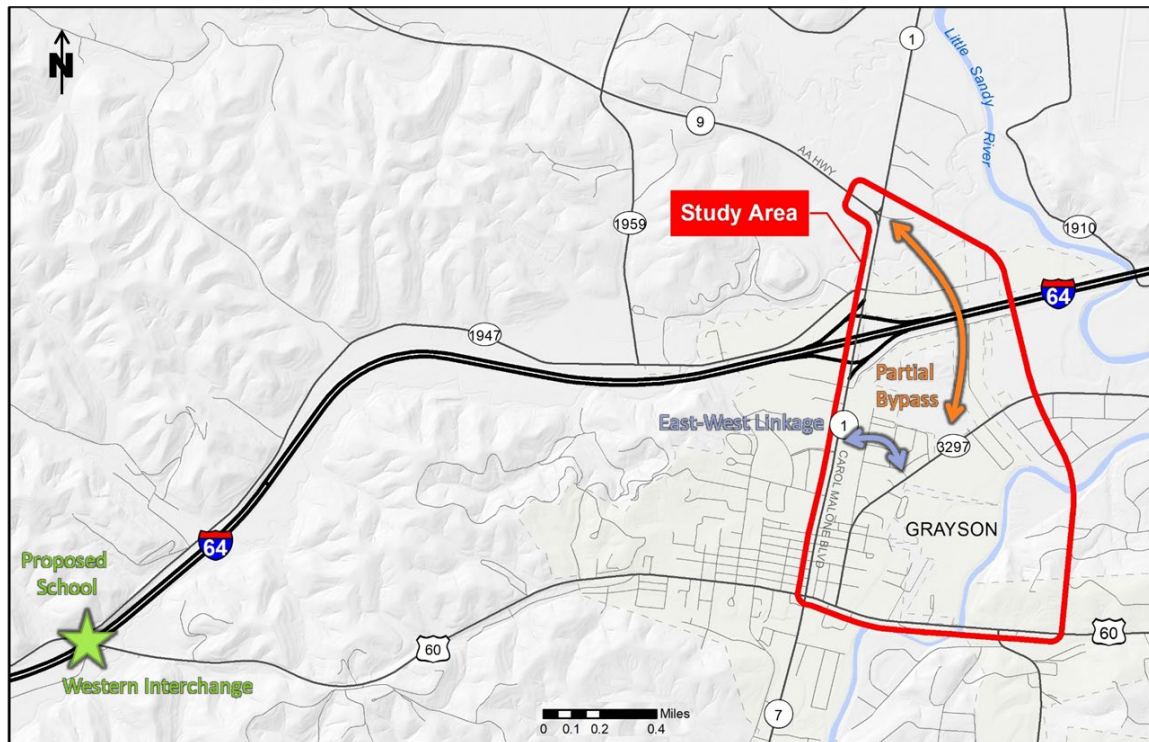


Figure ES-2: Build Concept Types

KY 1/7 Carol Malone Bypass. Initial concept development efforts examined the Grayson bypass concept identified in the 2018 SUA. The proposed bypass stretched from the KY 1/7/KY 9 (AA Highway) intersection to the US 60/KY 1 intersection east of town. The bypass was intended to reduce congestion along KY 1/7 and shift left turns away from its I-64 interchange. Each was identified as a long-term, high priority project at that time. However, economic and transportation changes around Grayson altered the city’s vision and priorities. These changes—including the new Grayson Sports Park, protected by federal Section 4(f) laws—have increased costs and impacts associated with the SUA bypass concept compared to the initial concept.

A range of Build concepts (**Figure ES-3**) were developed to illustrate the level of costs and impacts associated with a new cross-I-64 connection. Each assumes two 12-foot-wide travel lanes with 4-foot-wide paved shoulders and the option to add a 5-foot-wide sidewalk on one side. Grades pose a challenge as I-64 is higher in elevation than the parallel roads, with limited distance between to provide vertical clearance and tie back to ground level. Traffic forecasts show the bypass would carry an estimated 2,700 to 2,900 vpd if constructed north of KY 3297 (Midland Trail), diverting around 2,300 vpd from the congested KY 1/7 corridor. Planning-level costs by phase are presented in **Table ES-1**.

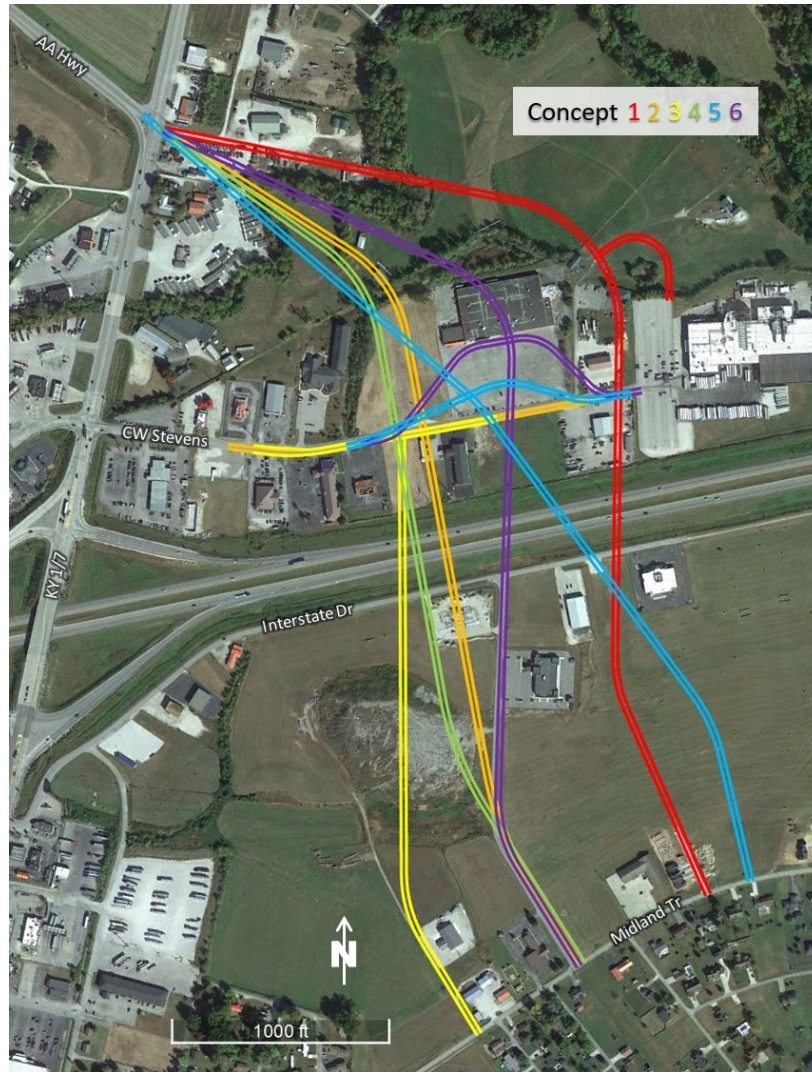


Figure ES-3: Range of Cross-I-64 Build Concepts

Table ES-1: Bypass Concept Cost Estimates (2022 Dollars)

Bypass Concept	Design	Right-of-Way	Utilities	Construction	Total
Concept 1 (Red)	\$4.5 M	\$7.0 M	\$7.1M	\$44.8 M	\$63.4 M
Concept 2 (Orange)	\$4.8 M	\$24.5 M	\$5.0 M	\$48.0 M	\$82.3 M
Concept 3 (Yellow)	\$3.3 M	\$17.9 M	\$7.8 M	\$33.4 M	\$62.4 M
Concept 4 (Green)	\$5.9 M	\$9.1 M	\$6.0 M	\$59.2 M	\$80.2 M
Concept 5 (Blue)	\$4.5 M	\$15.5 M	\$7.3 M	\$44.5 M	\$71.8 M
Concept 6 (Purple)	\$4.6 M	\$21.8 M	\$5.1 M	\$46.1 M	\$77.6 M

Midland Trail East-West Linkage. Another group of concepts explored an improved connection between KY 1/7 and KY 3297 (Midland Trail), driven by two transportation objectives:

- Provide safe, efficient routing (ideally with protected left turn signal phase) from the I-64 interchange to the new sports park.
- Improve accessibility to developable areas east of KY 1/7, along Interstate Drive and Midland Trail.

Shown in **Figure ES-4**, a range of Build concepts was developed to illustrate the level of costs and impacts associated with a new east-west linkage between KY 1/7 and KY 3297.

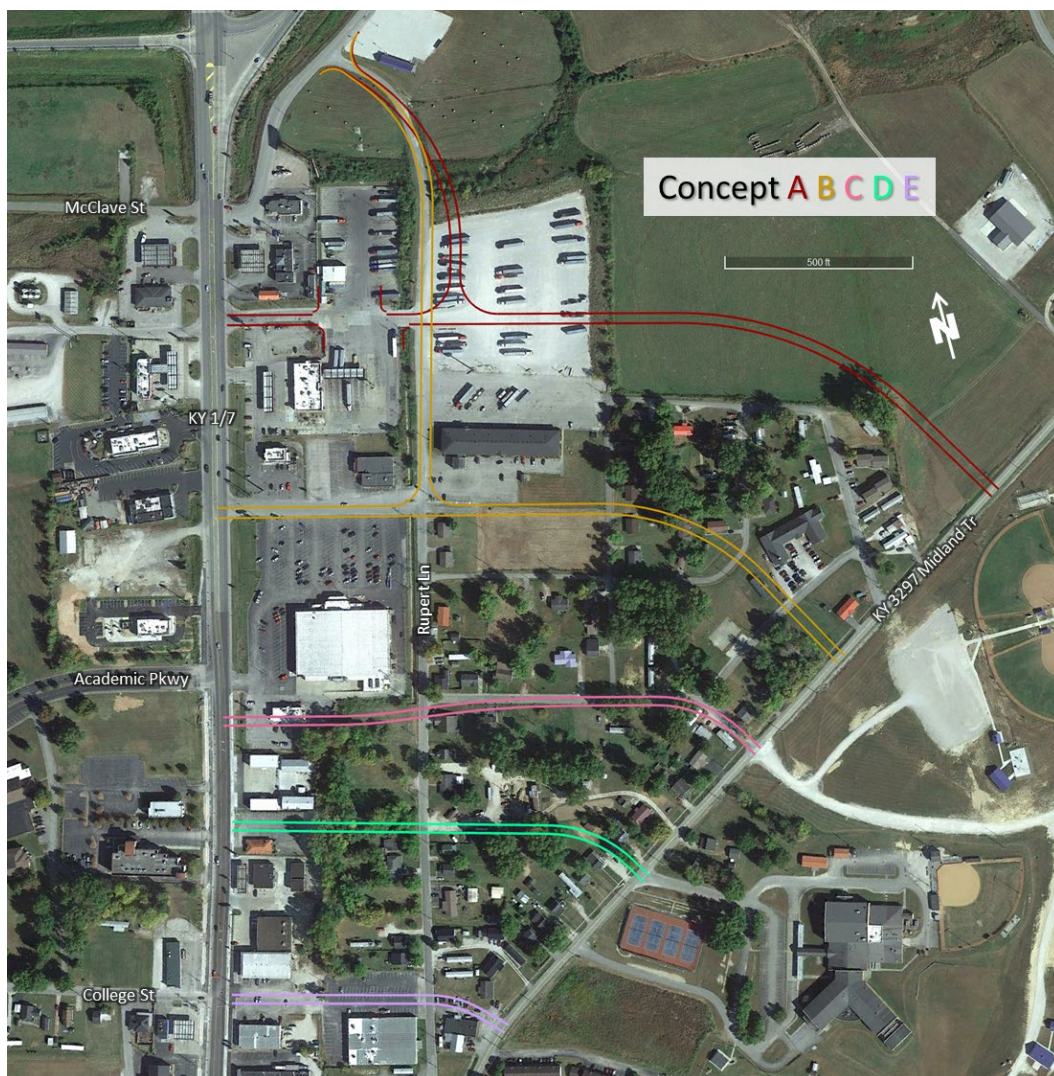


Figure ES-4: Range of Build Concepts for Midland Trail Links

Each assumes two 11-foot-wide travel lanes with curb/gutter and 5-foot-wide sidewalk on one side (Concepts B-E) or 4-foot shoulders (Concept A). Access management along KY 1/7 is incorporated into each Build concept, though specifics would be worked out during future project development phases. The northernmost (Concept A) impacts truck parking, likely requiring mitigation, but has the fewest impacts on homes and businesses. The central three options (Concepts B-D) lead to property impacts within a likely environmental justice neighborhood. Planning-level costs by phase are presented in **Table ES-2**.

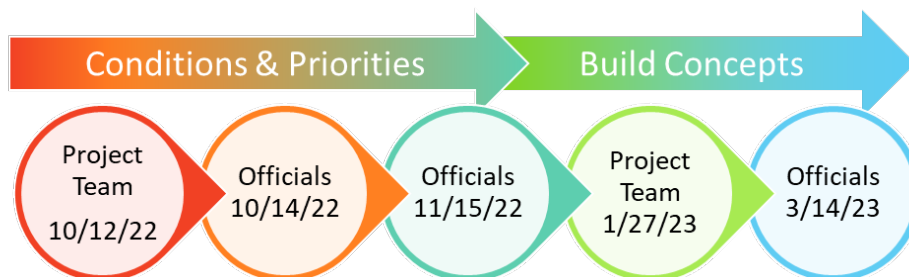
Table ES-2: East-West Concept Cost Estimates (2022 Dollars)

East-West Concept	Design	Right-of-Way	Utilities	Construction	Total
Concept A (McClave)	\$0.5 M	\$5.2 M	\$4.7 M	\$5.1 M	\$15.5 M
Concept B (Super 8)	\$0.5 M	\$3.0 M	\$2.1 M	\$5.0 M	\$10.6 M
Concept C (Academic)	\$0.3 M	\$3.3 M	\$1.6 M	\$2.8 M	\$8.0 M
Concept D (UTC)	\$0.2 M	\$3.1 M	\$0.5 M	\$2.3 M	\$6.1 M
Concept E (College)	\$0.2 M	\$4.3 M	\$0.5 M	\$1.6 M	\$6.6 M

New Western Interchange. While no Build concepts were developed for a new interchange, potential traffic impacts were modeled to help local officials and stakeholders determine whether future project development activities are warranted. Even with the new school drawing additional trips to the vicinity, all four ramps combined are projected to carry an estimated 2,800 vpd in 2045.

Meetings

Collaborative project team and local official/stakeholder (LO/S) coordination efforts occurred throughout the course of the study.



Recommendations

In light of anticipated 2045 traffic volumes, benefits (e.g., crash reductions, travel time savings, congestion reductions) would not outweigh costs for either the western interchange or cross-I-64 connector. Neither Build concept is recommended to advance at this time; however, each concept is included within the Continuous Highway Analysis Framework (CHAF) database should conditions or priorities change over time.

Likewise, the southernmost bypass segment (Item No. 9-80202) is not recommended to advance at this time. This is consistent with local officials' input expressed during fall 2022 coordination meetings, which noted concerns with impacts to area businesses and the newly constructed Grayson Sports Park.

A new East-West Linkage between KY 1/7 and Midland Trail is recommended to advance for additional project development efforts. Concept A (McClave) was preferred by LO/S and provides an opportunity to reduce conflict points near the interchange by incorporating more stringent access control measures in the vicinity. However, any of the five Build concepts serves a similar purpose and should be evaluated during preliminary engineering phases. Further funding will be necessary to advance any Build concept to the design phase. Coordination with local officials, key stakeholders, and the public will be critical considering the potential for impacts to nearby community resources.

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APPENDICES

- A. Traffic Forecast Report
- B. Crash Records
- C. Meeting Summaries

ACRONYMNS LIST

ADT	Average Daily Traffic
CHAF	Continuous Highway Analysis Framework
DHV	Design Hourly Volume
EEC	Excess Expected Crashes
EJ	Environmental Justice
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
HCM	Highway Capacity Manual
HDM	Highway Design Manual
HIS	Highway Information System
KYTC	Kentucky Transportation Cabinet
LO/S	Local Officials/Stakeholders
LOS	Level of Service
LOSS	Level of Service of Safety
MP	Milepoint
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
NBI	National Bridge Inventory
NHS	National Highway System
NTN	National Truck Network
SHIFT	Strategic Highway Investment Formula for Tomorrow
SPR	Statewide Planning and Research
STAA	Surface Transportation Assistance Act
SUA	Small Urban Area
TED	Transportation Enterprise Database
v/c	Volume-to-Capacity Ratio
vpd	Vehicles per day

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated a corridor study in summer 2022 to identify mobility needs in and around the city of Grayson in Carter County (**Figure 1**). Grayson is in northeastern Kentucky, along the Little Sandy River, and accessible from Interstate 64 (I-64) at exit 172. With a population of 3,800 in 2020, Grayson is the county seat for Carter County (population 26,600), which is also home to Carter Caves and Grayson Lake state parks.

KY 1/7 (Carol Malone Boulevard), the primary north-south highway through town, provides connections to KY 9 (AA Highway), I-64, and US 60 (Main Street). Downtown Grayson is located at the crossroads of US 60 and KY 1/7.

The study area is in the FIVCO Area Development District but not within the boundaries of a metropolitan planning organization (MPO).

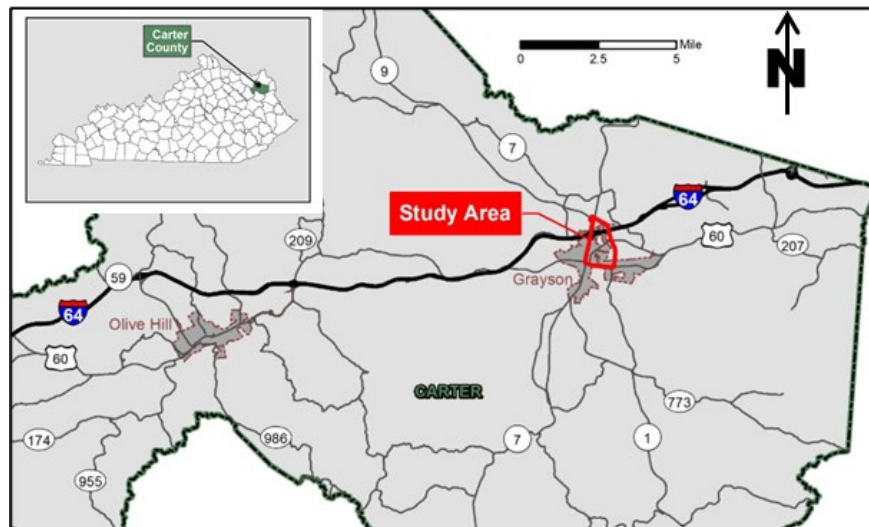


Figure 1: Project Location

KYTC completed the *Grayson Small Urban Area (SUA) Study*¹ for the city in 2018, identifying numerous transportation improvement projects to address existing traffic and safety issues. A new eastern bypass between KY 9 and US 60 was one of the high priority projects identified in the SUA. Design funding was awarded for the project's southernmost section in Kentucky's *2022 – 2028 Enacted Highway Plan*,² representing the impetus for this Grayson Mobility Study. This study was completed with federal Statewide Planning and Research (SPR) funds. Shown in **Figure 2**, the study area follows KY 1/7 from its intersection with US 60 at milepoint (MP) 10.646 north to its intersection with KY 9 (MP 12.000) and includes areas to the east near the initial bypass concept.

¹ Online at <https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx>

² Online at <https://transportation.ky.gov/Program-Management/Pages/2022-Enacted-Highway-Plan.aspx>

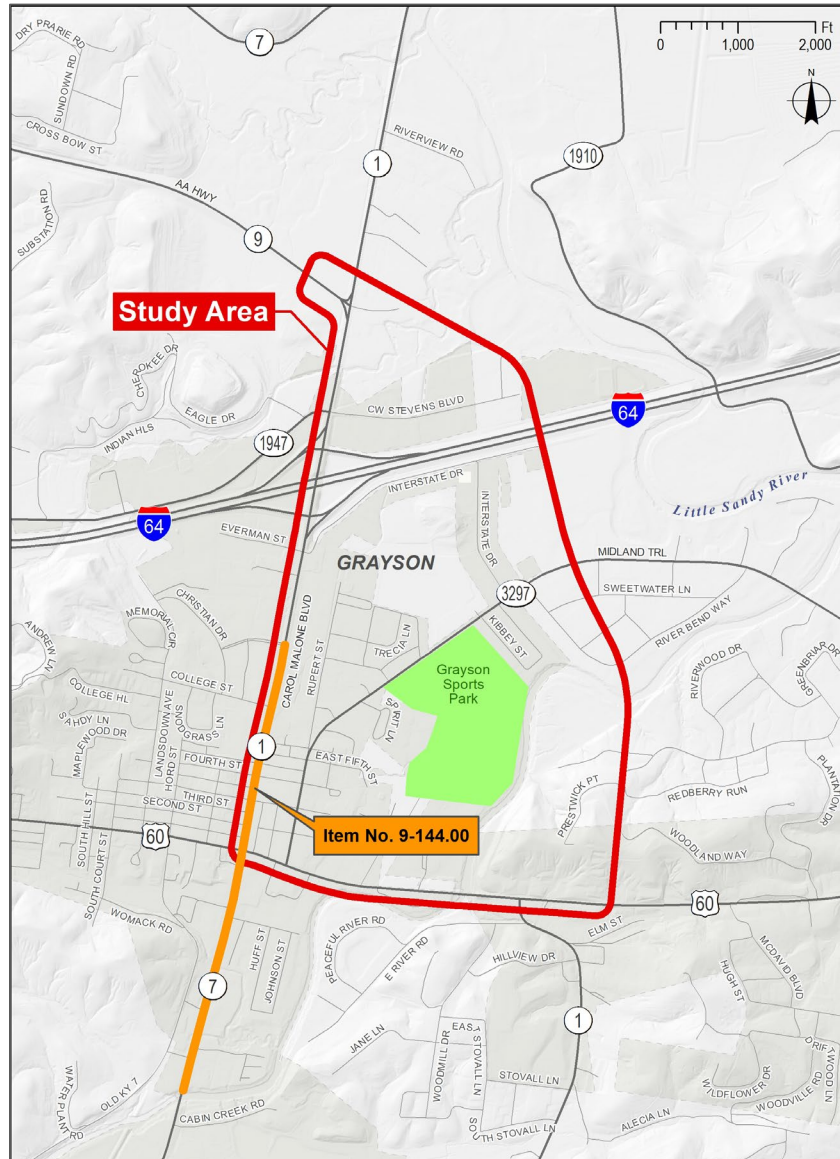


Figure 2: Study Area

Initial study tasks (**Figure 3**) include creating an inventory of existing conditions, defining goals for the study, coordinating with local officials and stakeholders, and forecasting existing and future traffic to determine if the previously identified bypass concept merits further consideration in light of recent development and transportation changes in the city:

- Construction of the new Grayson Sports Park
- Ongoing widening efforts along KY 1 (KYTC Item No. 9-144)

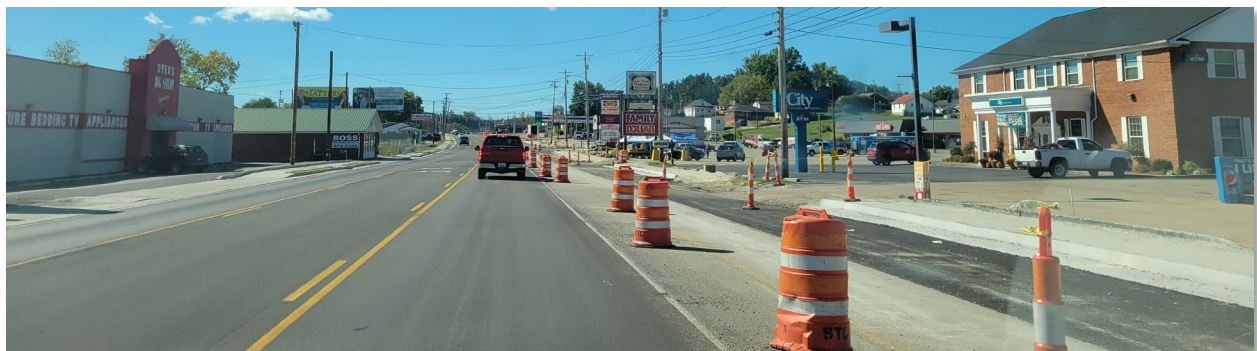
Phase II of the planning effort takes a closer look at Build concepts and traffic analyses. The following chapters explore these efforts.



Figure 3: Study Tasks

1.1 Other Nearby Projects

One of the initial steps in the planning process was to understand what committed projects near the study area are ongoing, influencing the existing conditions. Shown in **Figure 4**, there is one transportation project is under construction within the study area: KYTC Item No. 9-144.00, major widening along KY 1/7, covering just over one mile between the Little Sandy River (KY 7 MP 10.318) and Academic Parkway (KY 1 MP 11.160). When complete, this portion of KY 1/7 will have a five-lane typical section with sidewalks plus dedicated turn lanes at key intersections.



Ongoing 9-144 construction

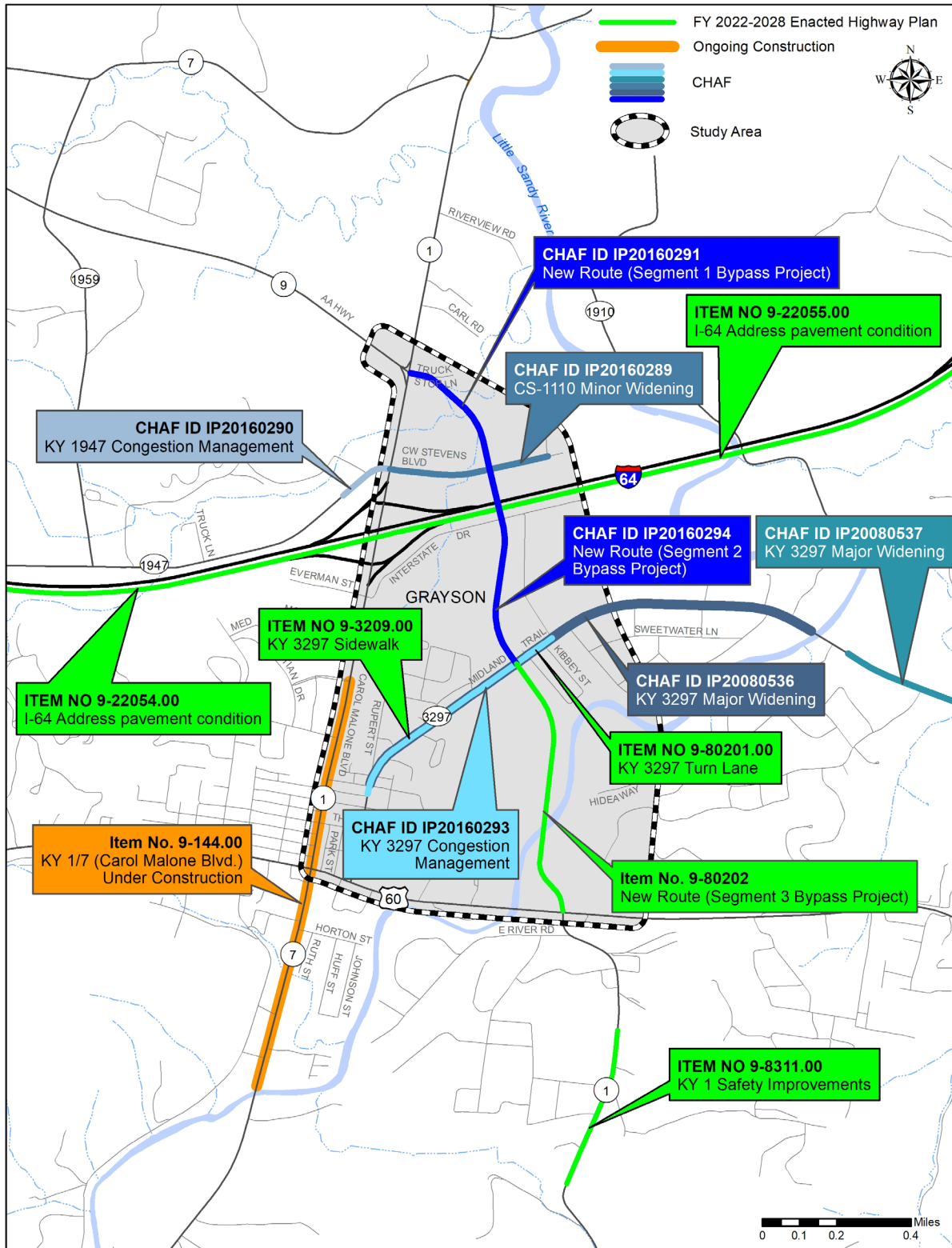


Figure 4: Other Projects in Vicinity

In addition, several highway projects (shown in green in **Figure 4**) are under development with funding for one or more project phases in the current Highway Plan.

- **Item No. 9-8311** covers a portion of KY 1 south of the study area, intended to address safety at the East Carter High School. Discussed further in the 2018 Grayson SUA, the Plan identifies \$1.9 million in construction federal funding in FY 2024.
- **Item No. 9-80201** includes safety and operational improvements along KY 3297 (Midland Trail) near East Carter Middle School and the new sports complex. The Plan identifies state funding begin design in FY 2024.
- **Item No. 9-3209** is a local transportation enhancement project to construct sidewalks on the east side of KY 3297.
- **Item No. 9-80202** covers the southern portion of the KY 1 Bypass proposed in the 2018 Grayson SUA with federal design funding identified in FY 2023.
- **Items No. 9-22054 and 9-22055** address pavement condition along I-64; design funding for each is designated in FY 2025.

Other previous studies and potential future projects near the study area have been compiled from the Continuous Highway Analysis Framework (CHAF) database, which is the starting point for the biennial SHIFT process³ that evolves into the two-year budget cycle identified in the Highway Plan. CHAF projects relevant to the current study are shown in shades of blue in **Figure 4** with additional information summarized in **Table 1**.

Table 1: KYTC CHAF Database Projects

CHAF	Route	BMP	EMP	Purpose	Total Cost
IP20080536	KY 3297	0.279	1.634	Major widening: improve operational efficiency and provide congestion relief	\$12.6M
IP20080537	KY 3297	1.750	2.932	Major widening: correct geometric and width deficiencies to improve operational efficiency and systems connectivity	\$12.5M
IP20160289	CS-1110	0.000	0.430	Minor widening: provide an improved two-lane, curb and gutter roadway with sidewalk to address congestion	\$2.8M
IP20160290	KY 1947	3.250	3.400	Right turn pocket to address congestion	\$600,000
IP20160291	New	-	-	Improve safety and operational efficiency of CW Stevens Blvd. with new connection to KY 9	\$5.6M

³ SHIFT, or the Strategic Highway Investment Formula for Tomorrow, is a data-driven project scoring process to compare and prioritize statewide capital improvement projects to make better use of limited transportation funds in the Commonwealth’s biennial budget.

CHAF	Route	BMP	EMP	Purpose	Total Cost
IP20160293	KY 3297	0.250	0.900	Improve safety and operational efficiency near East Carter Middle School/Sports Complex (Overlaps with Item No. 9-80201)	\$830,000
IP20160294	New	-	-	Improve safety and operational efficiency of north-south traffic in Grayson	\$13.4M

2.0 EXISTING CONDITIONS

Existing transportation conditions are described in the following sections. Information on the characteristics of roadway geometry, functional classification, bridges, traffic volumes and operations, and crash history were obtained from KYTC’s Highway Information System (HIS) database, KYTC’s Transportation Enterprise Database (TED), bridge inspection reports, traffic counts, and field reviews.

2.1 Roadway System Designations

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 that 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 within the Federal Highway Administration’s (FHWA) Adjusted Urban Area boundaries. The major functional classes with brief definitions are listed below.

Freeways & Interstates	Provide high speed, high mobility links for long distance trips.
Principal Arterials	Serve major centers for metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas.
Minor Arterials	Provide service for trips of moderate length, serve geographic areas smaller than their Principal Arterial counterparts, and offer connectivity to the Principal Arterial system.
Collectors	Gather traffic from local roads and funnel to the arterial network. Classified as either a major or minor collector; generally serve intra-county travel and shorter trips.
Local Roads	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 through traffic.

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.

Functional Class. **Figure 5** presents functional classifications for state-maintained highways within the study area. KY 1/7 is classified as an urban principal arterial from its interchange with I-64 north to the AA Highway and classified as an urban minor arterial from its interchange south to US 60.

Truck Route. In compliance with the Surface Transportation Assistance Act of 1982 (STAA), Kentucky established a network of highways on which commercial vehicles with increased dimensions may operate. These "STAA" vehicles include semi-trucks with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. STAA routing in Kentucky corresponds to the National Truck Network (NTN), plus state-maintained highways within five miles of the NTN, 15 miles from interstate or parkway interchanges, and one mile from the interchange on other public highways.

I-64 is the only federally designated truck route within the study area. It is on the Kentucky Highway Freight Network, as are KY 1/7, KY 9, and US 60.

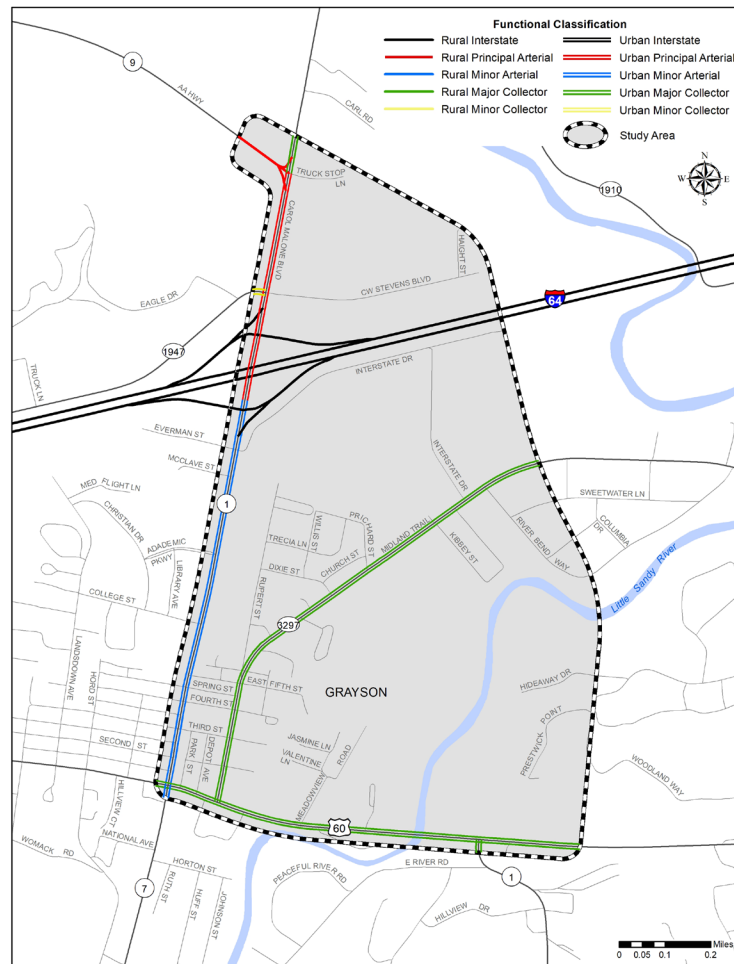


Figure 5: Functional Classification of Study Area Routes

Highway Systems. The National Highway System (NHS) includes roadways important to the nation’s economy, defense, and mobility. I-64 and the AA Highway are the only NHS routes within the study area.

The Kentucky State Highway System classifies state-maintained roadways by the type of service and function they provide. KY 1/7 between US 60 and KY 9 is classified as the state primary system, representing long distance, high volume intrastate routes of statewide significance that generally link major urban areas within the state.

2.2 Roadway Geometric Characteristics

KYTC’s HIS database was queried to obtain route geometric characteristics, including speed limits, number of lanes and lane widths, shoulder type and width, and horizontal curve data.

Lanes and Shoulders. Lane and shoulder widths for other study area routes are presented in **Figure 6**. KYTC's *Highway Design Manual (HDM)*⁴ recommends at least 11-foot-wide lanes for urban arterial streets. KY 1/7 has 12-foot lanes currently with varying width shoulders.

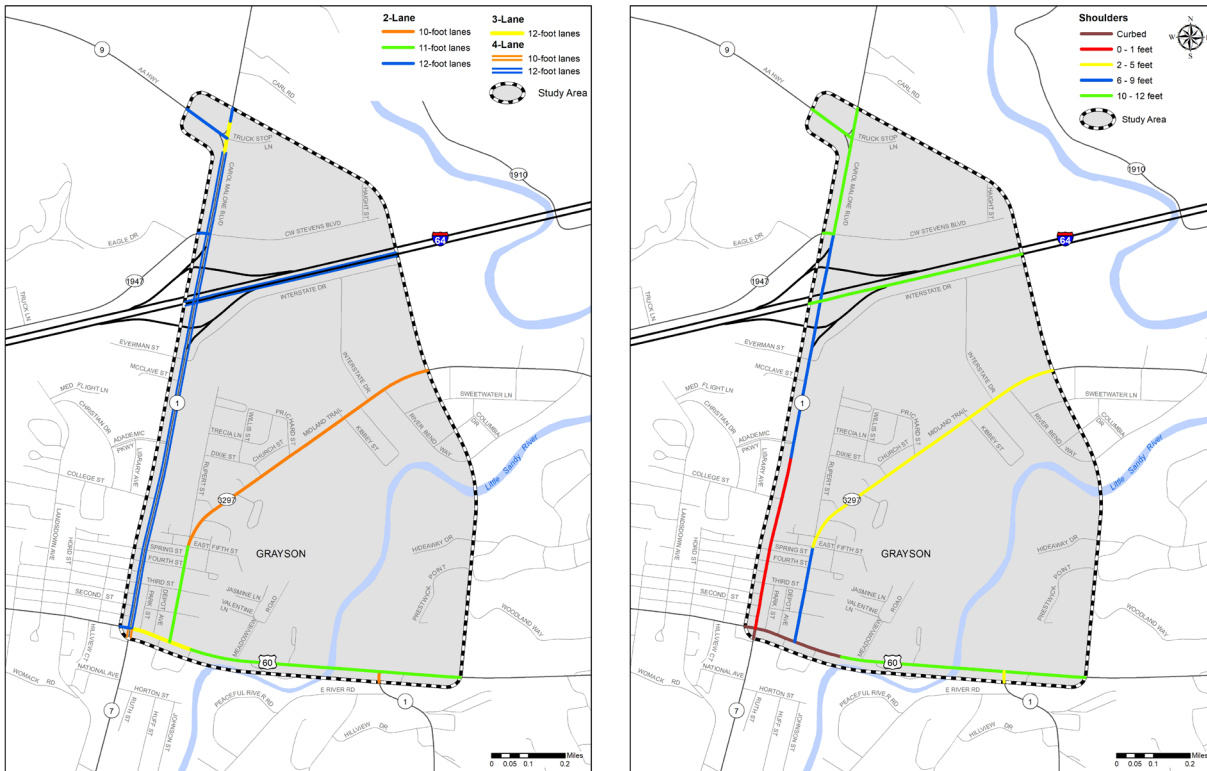


Figure 6: Lane and Shoulder Configurations for Study Routes

Speed Limits. The posted speed limit is 35 mph for most of the study area, increasing to 45 mph along US 60 east of the river and along KY 1/7 north of C.W. Stevens Boulevard.

Horizontal and Vertical Curves. HIS data were reviewed to identify any substandard grades or curves along the study route and major intersecting cross-streets. Collected data were compared to HDM design recommendations for maximum vertical grades and minimum horizontal curves.

At a planning level, KYTC organizes horizontal curves into six classes, graded A (most sweeping) through F (sharpest), as listed in **Table 2**. Similarly, KYTC organizes vertical grades into six classes, graded A (flattest) through F (steepest), as shown in **Table 3**.

⁴ Online at <https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf>

Table 2: Horizontal Curve Class Table 3: Vertical Grade Class

Code	Description (degrees)	Code	Description (percent)
A	0.0-3.4	A	0.0-0.4
B	3.5-5.4	B	0.5-2.4
C	5.5-8.4	C	2.5-4.4
D	8.5-13.9	D	4.5-6.4
E	14.0-27.9	E	6.5-8.4
F	28+	F	8.5+

HDM Exhibit 700-004⁴ recommends maximum vertical grades of 7% for urban arterial streets with 35 mph design speed in level terrain. Shown in **Figure 7**, there are five notable curve or grade concerns along state-maintained routes within the study area: KY 1947 approaching KY 1/7, two relatively steep segments along US 60, a gentle curve along KY 3297 at the “Y” intersection with Rupert Street, and KY 1 approaching US 60.

2.3 Bridges

There are three highway bridges in the study area, all in fair condition as of their most recent inspection. The National Bridge Inventory (NBI) condition rating is determined by the lowest rating for the deck, superstructure, substructure, or culvert. A bridge is considered structurally deficient if any bridge component (deck, superstructure, substructure, or culvert) is in poor condition, warranting monitoring or repairs.

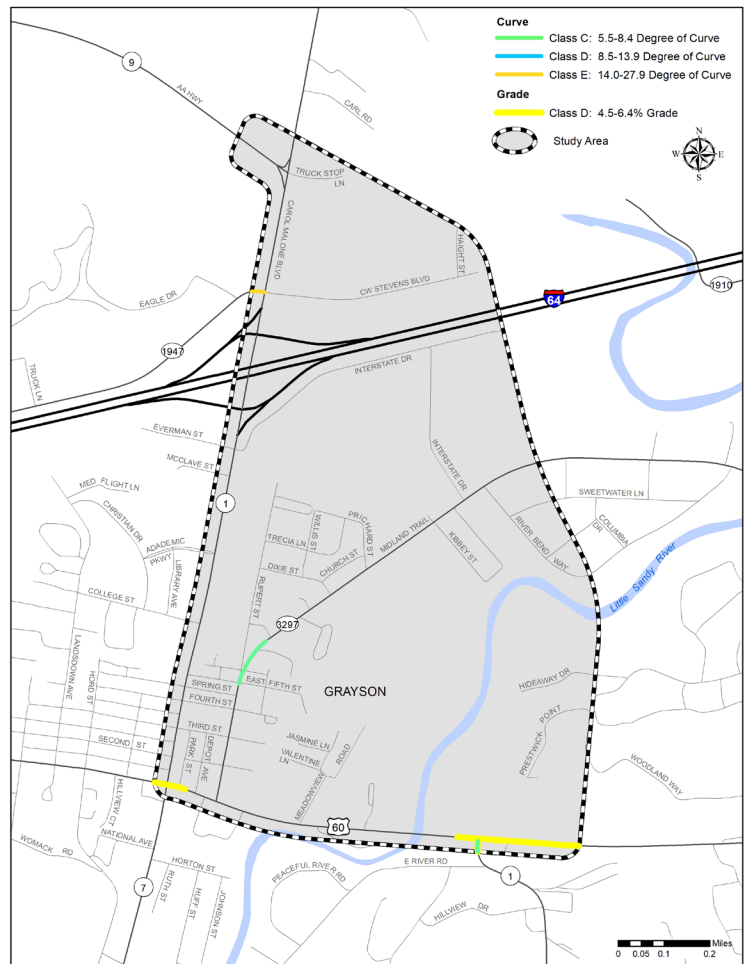


Figure 7: Curves and Grades

Bridge inventory data are in **Table 4** and locations are shown in **Figure 8**.

Table 4: Structures Inventory

Bridge ID	BMP	EMP	Description	Inspected	Condition	Built
022B00145N	11.84	11.86	KY 1/7 over Barretts Creek	4/2022	Fair	1972
022B00157N	11.54	11.59	KY 1/7 over I-64	3/2022	Fair	2001
022B00063N	24.48	24.54	US 60 over Little Sandy River	4/2022	Fair	1949

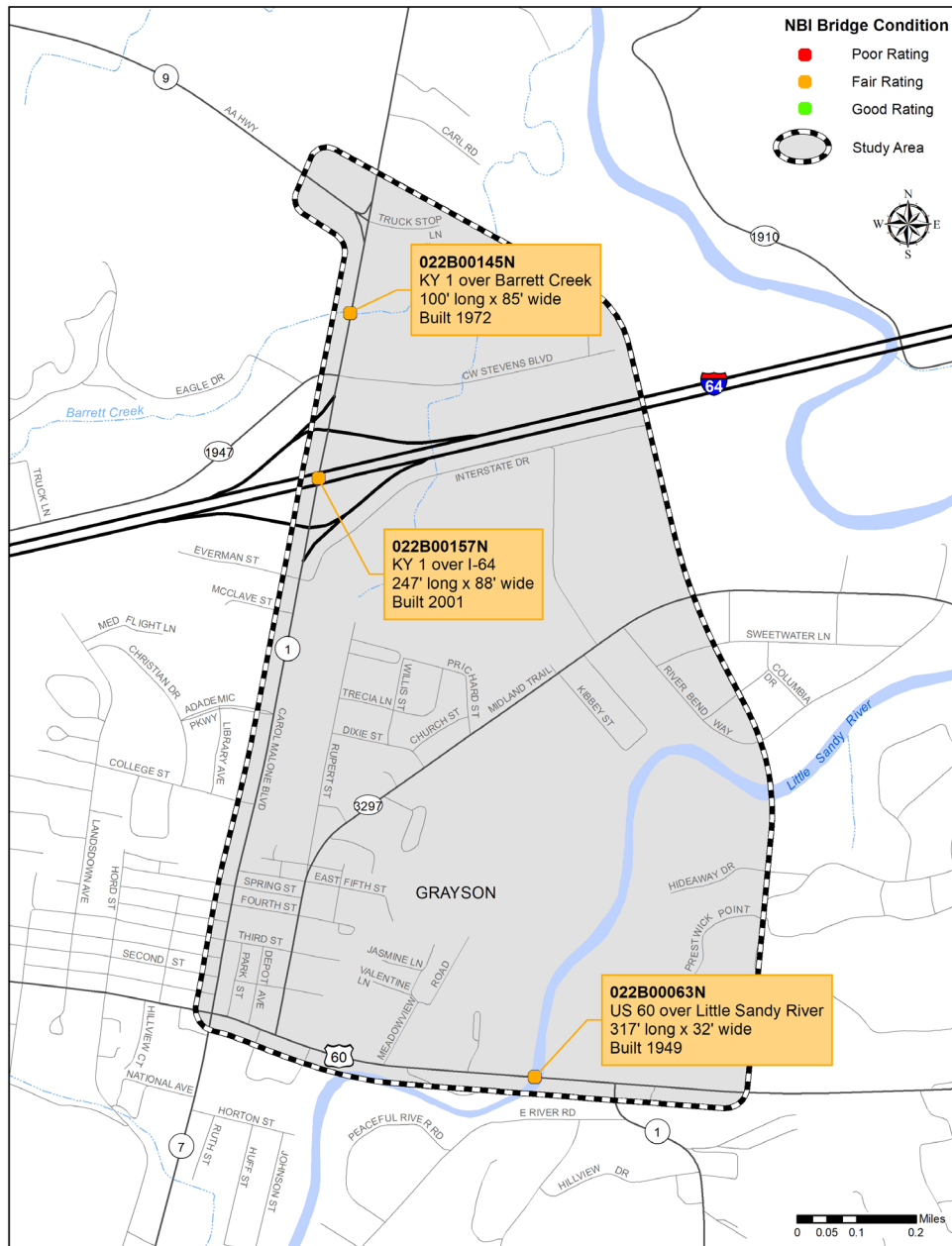


Figure 8: Study Area Structures

2.4 Year 2022 Traffic

Available existing traffic volumes for the study area roadways, including truck percentages, hourly factors, and peak hour directional distributions were reviewed. Because construction along KY 1/7 influenced traffic flows while the current study was underway, other data sources formed the basis of the “existing” traffic scenarios:

- Average Daily Traffic (ADT) counts conducted by KYTC over the past few decades
- Turning movement counts at key intersections collected as part of the 2018 Grayson SUA study
- Third-party GPS-based traffic estimates from StreetLight Insights.

Additional traffic information is presented in the *Traffic Forecast Report* in **Appendix A**.

KYTC collects periodic traffic counts at three locations along KY 1/7 within or adjacent to the study area: Station 022035, north of KY 9 (AA Highway); Station 022048, between KY 9 and I-64; and Station 022A54, between I-64 and US 60. With the large number of driveways and access points along this stretch, the volume along the corridor fluctuates depending on the location. However, each station shows negative growth over the past two decades.

Year 2021 volume data from StreetLight (**Figure 9**) provided a more detailed breakdown of traffic patterns along the corridor, showing 7,000 to 19,200 vehicles per day (vpd) traveling along KY 1/7. The busiest segment is between Interstate Drive (MP 11.391) and the I-64 eastbound ramps (MP 11.543). For comparison, US 60 in the study area carries 4,500 to 9,100 vpd.



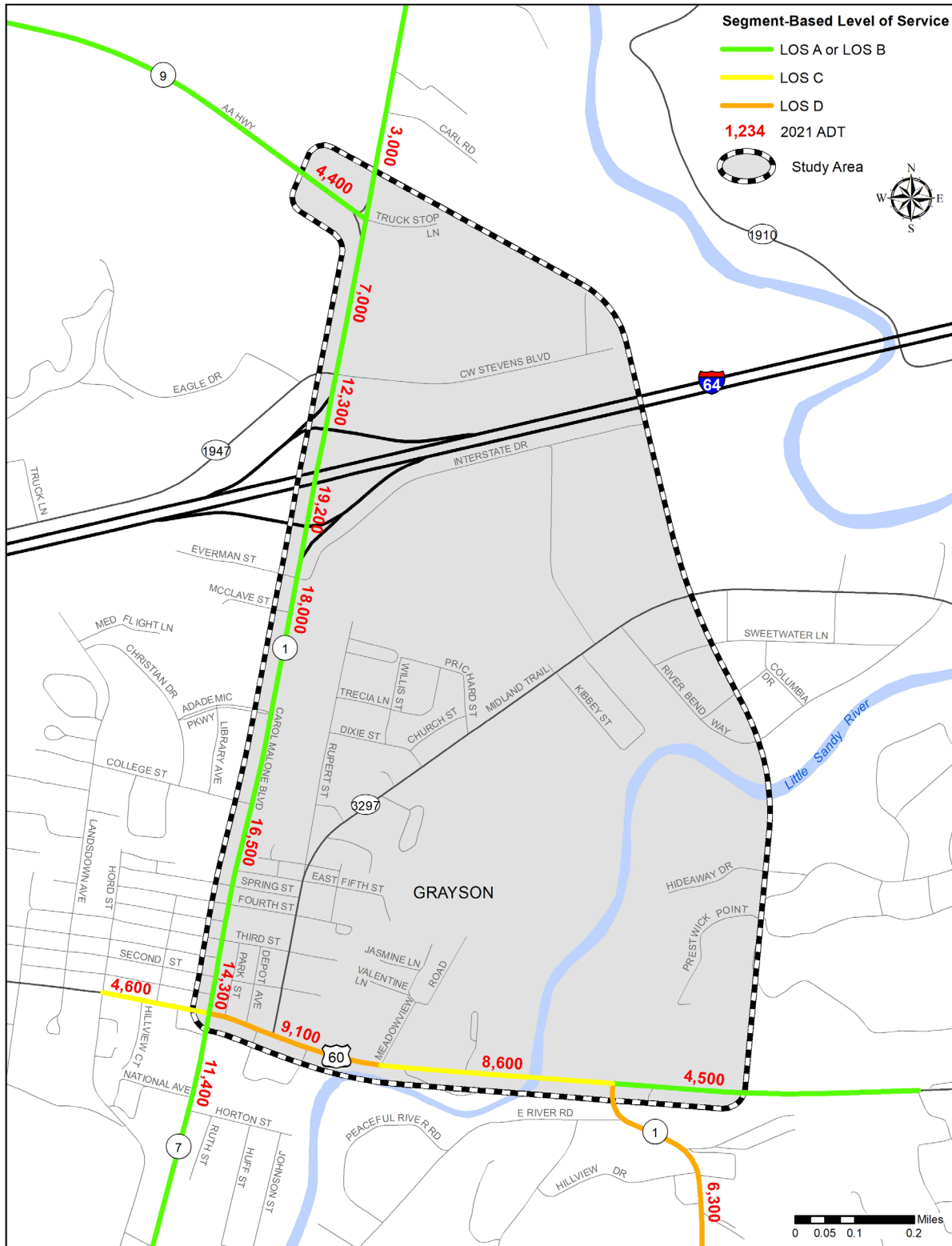


Figure 9: 2022 Traffic Volumes

2.4.1 Traffic Operations

Two commonly applied highway performance indicators, level of service (LOS) and volume-to-capacity (v/c) ratios, were calculated to describe traffic operations along the corridor. Computations were performed in accordance with *Highway Capacity Manual (HCM) 6th Edition* procedures for study route segments.

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 10**, 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 acceptable in urban areas.

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 StreetLight ADT counts to approximate peak hourly flows.

Volume-to-Capacity. Another measure, v/c, compares traffic volume using a facility to its 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 and additional throughput may be justified. 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.

LEVEL OF SERVICE	DESCRIPTION
A	<ul style="list-style-type: none"> Average Travel Speed. Free traffic flow with few restrictions on maneuverability or speed. <p>NO DELAYS</p>
B	<ul style="list-style-type: none"> Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. <p>NO DELAYS</p>
C	<ul style="list-style-type: none"> Stable traffic flow, but less freedom to select speed, change lanes or pass. <p>MINIMAL DELAYS</p>
D	<ul style="list-style-type: none"> Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. <p>MODERATE DELAYS</p>
E	<ul style="list-style-type: none"> Unstable traffic flow. Speeds change quickly and maneuverability is low. <p>SIGNIFICANT DELAYS</p>
F	<ul style="list-style-type: none"> Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. <p>SIGNIFICANT DELAYS</p>

Figure 10: Level of Service (LOS)

At the segment level, KY 1/7 through the study area generally operates at LOS A/B during the peak hours with a maximum v/c of 0.26. However, for a busy urban corridor with several traffic signals, intersection LOS provides a better measure of operations.

Intersection LOS is measured on the same A – F scale as for segments, based on the average delay for motorists. For signalized intersections, LOS is measured for the overall intersection and for each approach; for stop-controlled intersections, LOS is measured individually for stop-controlled approaches.

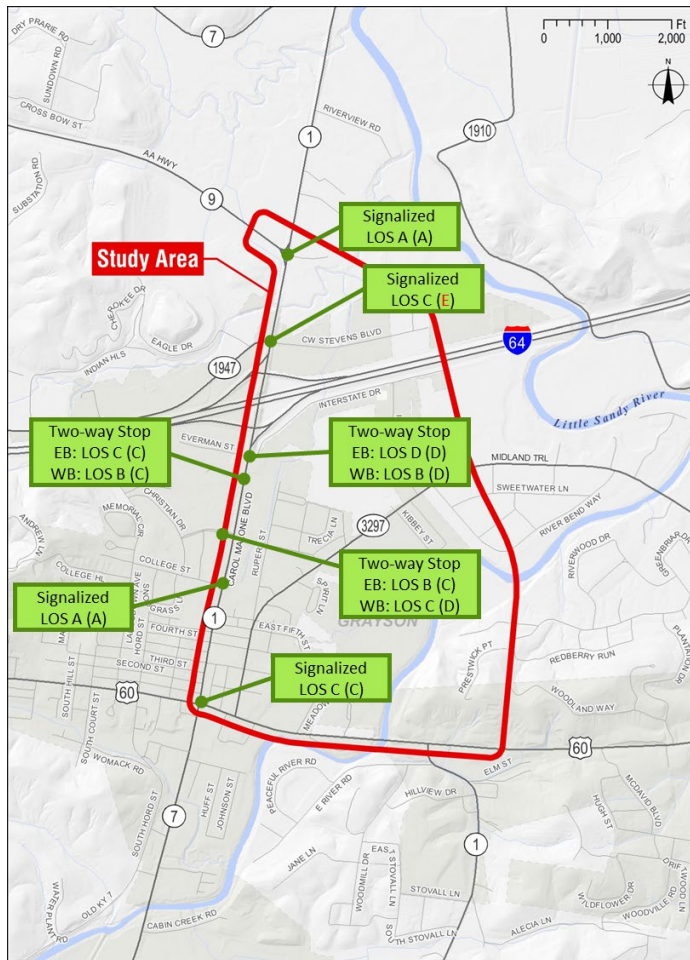


Figure 11: 2022 Study Intersection LOS

Peak hour LOS was calculated at seven study intersections, summarized visually in **Figure 11**. As shown, intersections operate at LOS D or better during both the AM and PM peak hours. The one exception is the KY 1/7 intersection with KY 1947 and C.W. Stevens Boulevard, which operates at LOS E during the PM peak hour. Based on the existing land configuration and signal timing plan, the eastbound and westbound approaches are over capacity with v/c ratios of 1.1 and 1.2, respectively.

Other Roadway Users. A mix of passenger cars, school buses, semi-trucks, and other vehicle types traverse study area highways. Heavy truck traffic is common near the interchange, accessing the adjacent truck stops.

Pedestrian traffic is common along KY 1/7, with up to 260 pedestrians per day estimated based on StreetLight data. This

includes employees accessing area businesses, students at Kentucky Christian University, and large groups of patients walking between care facilities and other nearby services. Sidewalks exist along both sides of KY 1/7 south of Academic Parkway. Both StreetLight and Strava third-party data sources show limited bicycle traffic using the corridor.

KYTC adopted a *Complete Streets Policy*⁵ in September 2022, committing to partnering with other agencies to:

⁵ Online at <https://transportation.ky.gov/BikeWalk/Pages/Complete-Streets.aspx>

- Identify opportunities to promote and provide safe, convenient access and travel for all users of the transportation network while reducing crash rates and the severity of crashes
- Improve mobility and accessibility for all individuals
- Support mode shift to non-motorized transportation
- Ensure early coordination to identify potential actions/strategies

Consideration of the needs of all modal users is critical throughout the planning and project development process.

2.5 Crash History

Historical crash data retrieved from KYTC’s TED warehouse were evaluated for study area roadways for a five-year period (January 2017 through December 2021). Crash location, severity, and manner of collision are shown in **Figure 13** (next page). During this timeframe, 451 crashes occurred throughout the study area: 336 along KY 1/7 and the remainder associated with other highways. A table of corresponding crash data is in **Appendix B**.

Severity. By severity, no fatalities were reported throughout the study area, 58 were injury crashes (13%), and the remaining 393 crashes were property damage only. Considering only KY 1/7 crashes, 13% resulted in injuries.

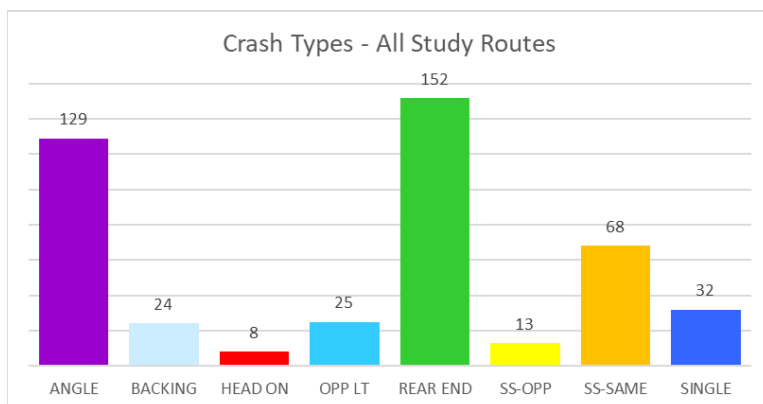


Figure 12: Study Area Crashes by Type

Manner of Collision. The manner of collision breakdown is shown in **Figure 12**. Most are rear end crashes (34%), followed by angle crashes (29%), and same direction sideswipes (15%). Considering only KY 1/7 crashes, the manner of collision distribution is similar: 34% rear end and 30% angle crashes.

Considering all study area crashes, 16% occurred in wet weather and

16% represent nighttime crashes. Only 22% are roadway departures, which tend to be more severe than other crash types. Roadway departures are one of the emphasis areas identified by KYTC’s Office of Highway Safety.

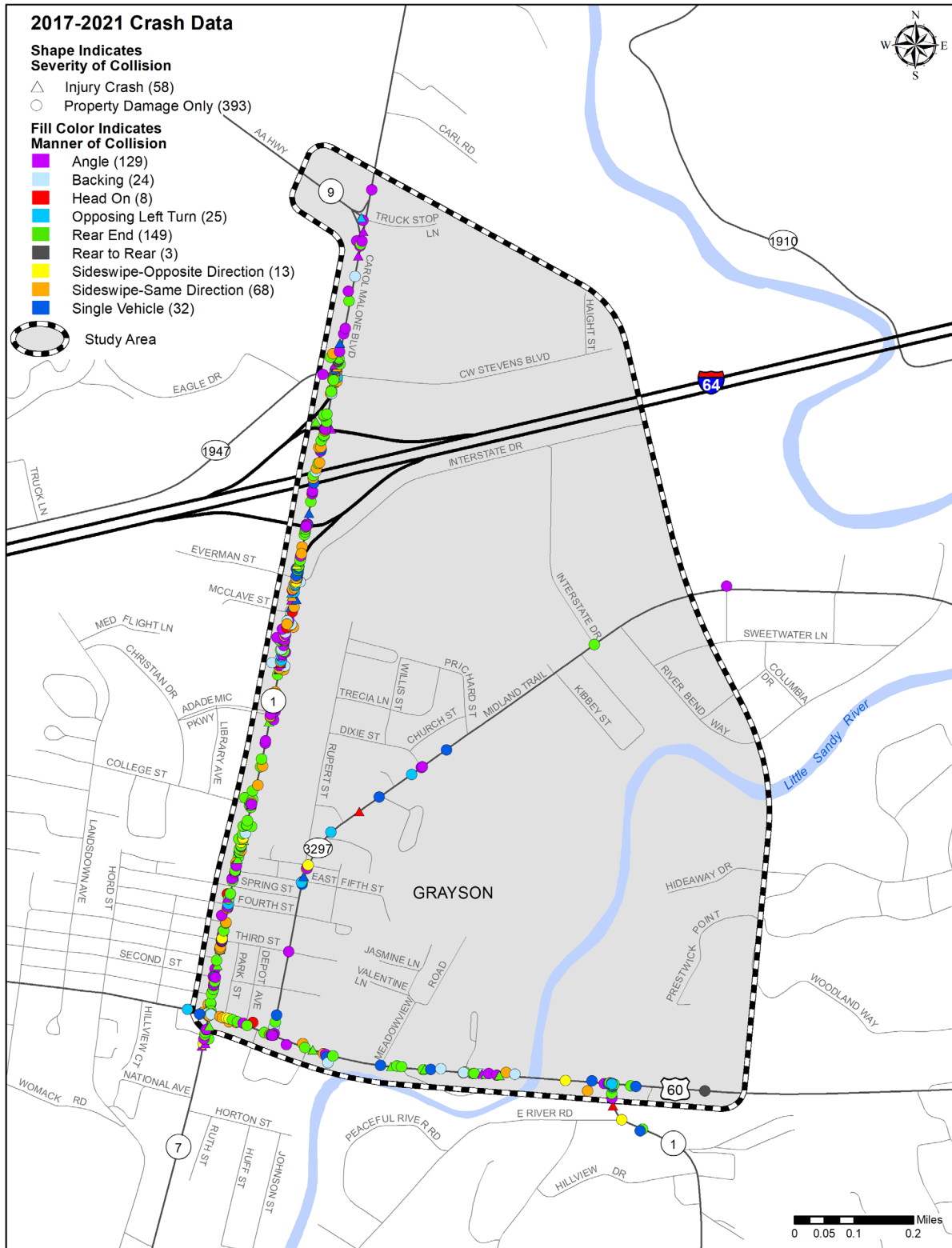


Figure 13: Crashes by Severity and Manner of Collision

2.5.1 Level of Service of Safety

Level of Service of Safety (LOSS) is a refined statistical methodology in the *Highway Safety Manual* and used to evaluate safety needs. It replaces the former critical rate factor analyses. Excess Expected Crashes (EEC) is based on a crash prediction model estimating the number of crashes expected at an intersection or on a roadway segment of a given type and length. It represents the number of excess crashes a segment is experiencing compared to other roadways of its type, adjusting for 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 grouped into one of four categories, identified as the LOSS. Summarized graphically in **Figure 14**, LOSS categories I and II represent sites with fewer than anticipated crashes, while categories III and IV represent sites with more than anticipated crashes. As the figure illustrates, LOSS-IV has above 1.5 standard deviations more crashes than expected. Because LOSS-IV sites experience such elevated crash rates, there is a higher probability that safety countermeasures at these locations will result in larger improvements.

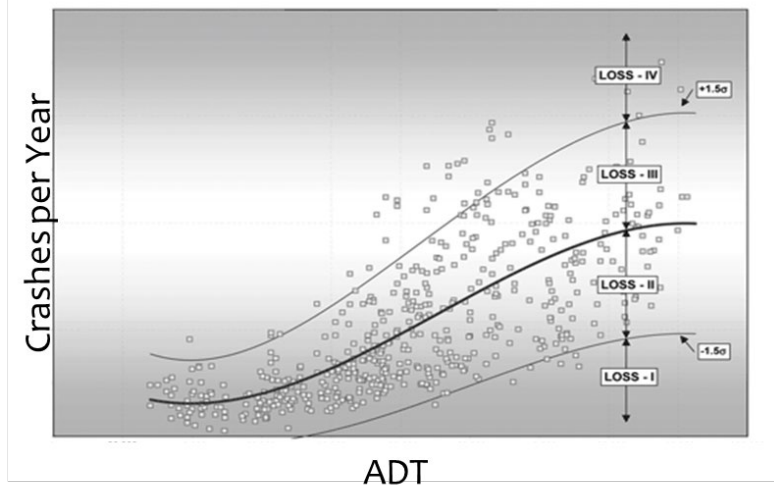


Figure 14: LOSS Categorical Thresholds

The entire KY 1/7 study corridor lies in the LOSS-IV category when considering all crash severities. However, it is LOSS-II (less than expected crashes) considering only fatality and severe injury crashes.

3.0 INITIAL COORDINATION EFFORTS

Collaborative project team and local official/stakeholder (LO/S) meetings were held through the course of the study. The project team included KYTC District 9 and Central Office staff from various disciplines, FIVCO staff, and consultant personnel. Coordination efforts were essential for identifying areas of concern and potential improvement opportunities. Summaries of all meetings are in **Appendix C**.

3.1 Project Team Meeting No.1

The project team met October 12, 2022, to review existing conditions information and prepare for the upcoming LO/S outreach. Initially, the study focused on the potential bypass corridor recommended in the 2018 Grayson SUA. The team reviewed existing conditions including roadway geometry, traffic flow, and high crash locations. The team discussed actual versus perceived congestion: regardless of destination, almost all traffic through the city is funneled through the US 60/KY 1/KY 7 intersection. Input from LO/S will be important to understanding the current priorities for the city.

3.2 Initial Local Official and Stakeholder Meetings

The project team met with local officials and other stakeholders on October 14, 2022, at the Grayson City Building. Following a presentation on existing conditions within the study area, attendees shared specific concerns regarding Grayson’s highway network:

- Crashes are common at the KY 1/7/KY 1947/C.W. Stevens Boulevard intersection.
- Heavy truck traffic accessing the Love’s gas station and Interstate Drive just south of the interchange, where traffic back-ups in the center lane and limited visibility create a safety hazard.
- Grayson Sports Park currently generates weekend traffic volumes between 1,500 and 2,000 vpd with higher volumes expected in the future. Out-of-town park users need a designated route to reach the sports complex; all options currently require a left turn without a protected signal phase.
- Downtown business owners have invested in revitalizing storefronts along US 60 (Main Street). Owners feel strongly that bypassing KY 1/7 would devastate their livelihoods; many rely on pass-by traffic. The potential southernmost bypass section (Item No. 9-80202, KY 3297 to US 60) was most opposed, whereas either of the northern two sections could open new areas for development, particularly along Interstate Drive, which contains some of the more developable open space in the city.

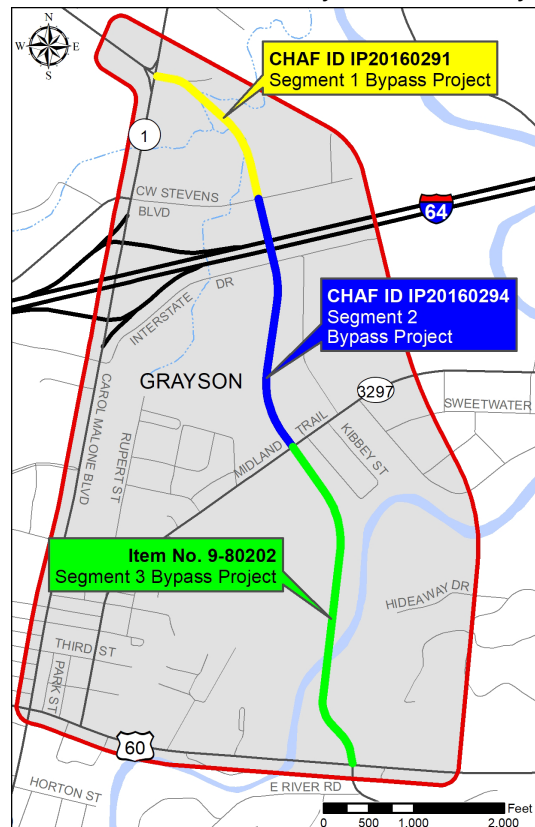


Figure 15: 2018 Bypass Concept

- The current unsignalized intersection of KY 1/7 with Interstate Drive is seen as a major impediment to development.
- There is strong local interest in a new I-64 interchange west of the city.

The LO/S met again November 15, following a break for locals to coordinate internally regarding their transportation priorities. Three main Build concepts were identified as beneficial for further study during this meeting:

- A new I-64 interchange west of Grayson, near the current US 60 overpass.
- A new I-64 overpass east of the existing KY 1/7 interchange, to provide increased connectivity to developable areas, similar to portions of the SUA bypass concept.
- An improved linkage between KY 1/7 and KY 3297, paired with a protected left signal phase to provide more direct access to Grayson Sports Park.

4.0 2045 TRAFFIC FORECAST AND NO-BUILD OPERATIONS

The KYTC District 9 Area Travel Demand Model, along with recent mainline and turning movement counts, formed the basis of future year 2045 traffic projections. The complete *Traffic Forecast Report* is in **Appendix A**.

4.1 Future Year Traffic Assumptions

The regional model estimated future year growth for all study area roadway segments. The model simulates a 24-hour period, relying on hourly and directional factors to derive design hourly volumes (DHV). At a high level, the model overlays the roadway network over anticipated changes in household and employment levels for geographic zones to project changes in traffic flows.

Socioeconomic assumptions were reviewed and adjusted to reflect current background growth assumptions, including conversations with LO/S during October 2022. Zones immediately east of KY 1 and immediately south of US 60 show positive employment growth while many of the more rural zones show predicted declines. Conversely, households show moderate growth concentrated in more outlying rural zones. Per conversations with LO/S, employment projections were increased for the zone surrounding Interstate Drive—28 employees in the 2019 base year are projected to increase to 178 employees by 2045.

4.2 2045 No-Build Traffic

Overall, the 2045 No-Build model projects a 0.65% annual growth rate. Along KY 1/7, this increases traffic to 8,100 to 22,100 vpd, compared to 7,000 to 19,200 vpd in the Existing scenario. Peak hour LOS at the seven study intersections is shown in **Figure 16**, with two more intersections exhibiting poor LOS during the PM peak hour.

- The stop-controlled eastbound Everman Street approach to KY 1/7 (opposite Interstate Drive) operates at LOS F during the PM peak hour.
- The stop-controlled eastbound Academic Parkway approach to KY 1/7 operates at LOS F during the PM peak hour. The driveway opposite is also at LOS E.

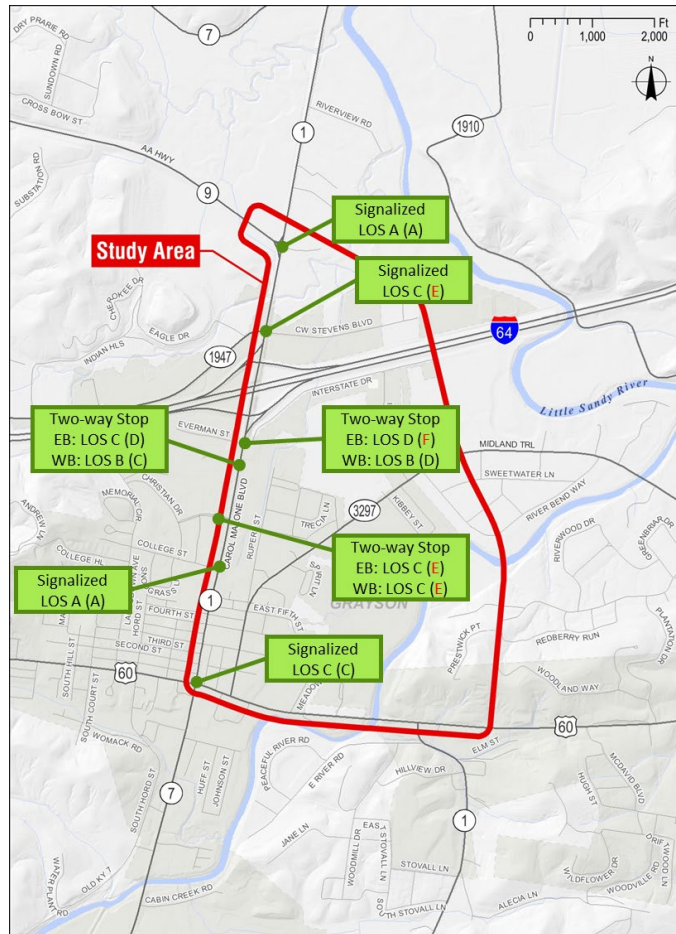


Figure 16: 2045 No-Build Study Intersection LOS

5.0 CONCEPT DEVELOPMENT

Improvement concepts were developed based on a combination of input from the project team, a review of previous planning efforts, traffic projections, stakeholder feedback, and field reconnaissance. Each was discussed in depth at the second project team meeting, which was held January 27, 2023, at the KYTC District 9 office in Flemingsburg.

Concept types (**Figure 17**) were organized into three basic categories, based on geography: a partial KY 1/7 bypass, an improved east-west linkage, and a new western interchange. Each is discussed further in the following subsections.

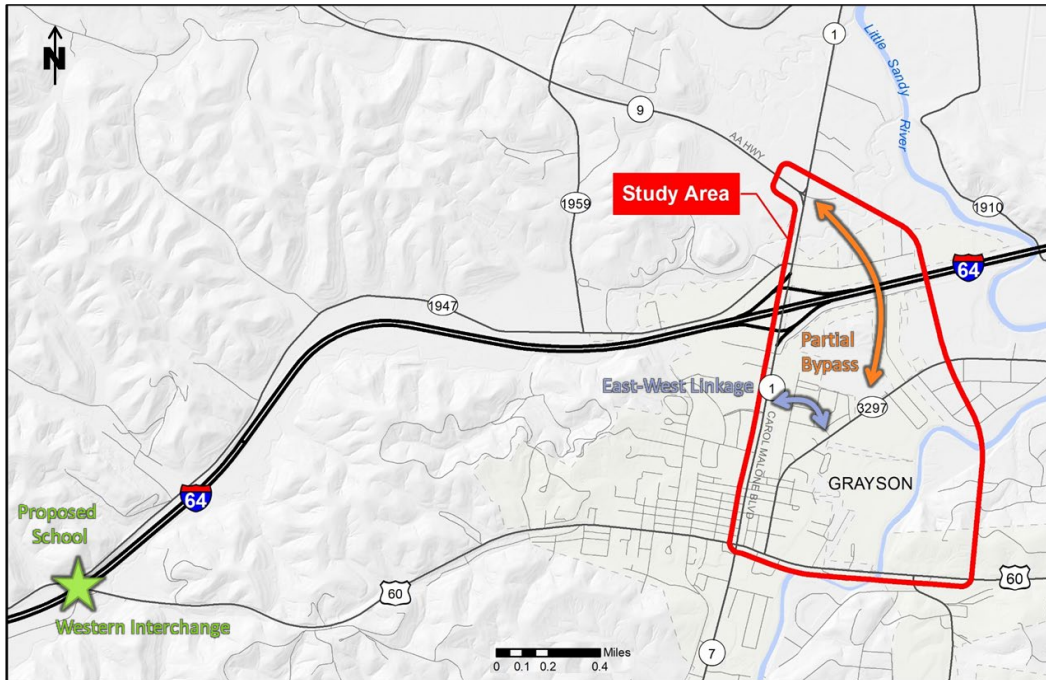


Figure 17: Build Concept Types

5.1 KY 1/7 Carol Malone Bypass

Initial concept development efforts examined the Grayson bypass concept identified in the 2018 SUA. The proposed bypass stretched from the KY 1/7/KY 9 (AA Highway) intersection to the US 60/KY 1 intersection east of town (**Figure 18**) and was divided into three distinct sections:

- Project J, KY 1 to C.W. Stevens Boulevard, 0.36 miles in length
- Project BB, C.W. Stevens Boulevard to KY 3297 (Midland Trail), 0.54 miles in length
- Project BB1, KY 3297 (Midland Trail) to US 60, 0.72 miles in length



Figure 18: 2018 SUA Bypass Concept with Environmental Resources

Each section assumed two 12-foot lanes, 4-foot paved shoulders, and a 45-mph design speed. The bypass was intended to reduce congestion along KY 1/7. Each was identified as a long-term, high priority project at that time.

However, economic and transportation changes around Grayson altered the city’s vision and priorities:

- With Item No. 9-144, KY 1/7 is being reconstructed to extend the center two-way left-turn lane and add dedicated turn lanes, addressing some of the mobility and safety needs cited in the 2018 study.

- Economic growth has occurred along Industrial Drive, with new health care facilities and businesses opening and others planned for the near future.
- The city constructed a new Grayson Sports Park east of East Carter Middle School. The facility features ball fields, soccer/football fields, a splash pad, playground, and picnic shelter, with plans to add a nature trail, amphitheater, tennis courts, basketball courts, and more.



Figure 19: Grayson Sports Park

Based on 2018 conditions, the bypass concept required a new crossing of the Little Sandy River, with impacts to associated floodplains and wetlands. A few businesses would also be relocated to accommodate the proposed corridor. However, changes since—including the new park, protected by federal Section 4(f) laws—have increased costs and impacts associated with the SUA bypass concept compared to the initial concept.

For these reasons, this planning study takes a fresh look at the needs for and feasibility of the bypass concept.

5.1.1 2045 Bypass Traffic

Various bypass configurations were coded into the 2045 No-Build model to predict how one or more sections of the SUA bypass would impact traffic flows.

- Assuming all three segments were in place, the bypass would carry an estimated 3,300 – 5,000 vpd in 2045, reducing KY 1/7 traffic by around 4,300 vpd. The highest volumes are associated with the southernmost segment between KY 3297 and US 60.

- Assuming the northern two segments (KY 9 to KY 3297) were in place, the bypass would carry an estimated 2,900 vpd in 2045, reducing KY 1/7 traffic by around 2,300 vpd.
- Assuming only the middle segment (C.W. Stevens Boulevard to KY 3297) was in place, the bypass would carry an estimated 2,700 vpd in 2045, reducing KY 1/7 traffic by around 2,300 vpd.

5.1.2 Bypass Alignment Options

In light of geographic constraints and feedback from LO/S during fall 2022, the project team focused concept development efforts on the northern two segments. Shown in **Figure 21**, a range of Build concepts were developed to illustrate the level of costs and impacts associated with a new cross-I-64 connection.

Each assumes two 12-foot-wide travel lanes with 4-foot-wide paved shoulders and the option to add a 5-foot-wide sidewalk on one side. Grades pose a challenge (**Figure 20**) as I-64 is higher in elevation than the roads paralleling it, with limited distance between to provide vertical clearance and tie back to ground level. For consistency, 16.5 feet of vertical clearance over I-64 is assumed for each build option, although this height requirement may be adjusted during future design stages if any concept is advanced for further project development.

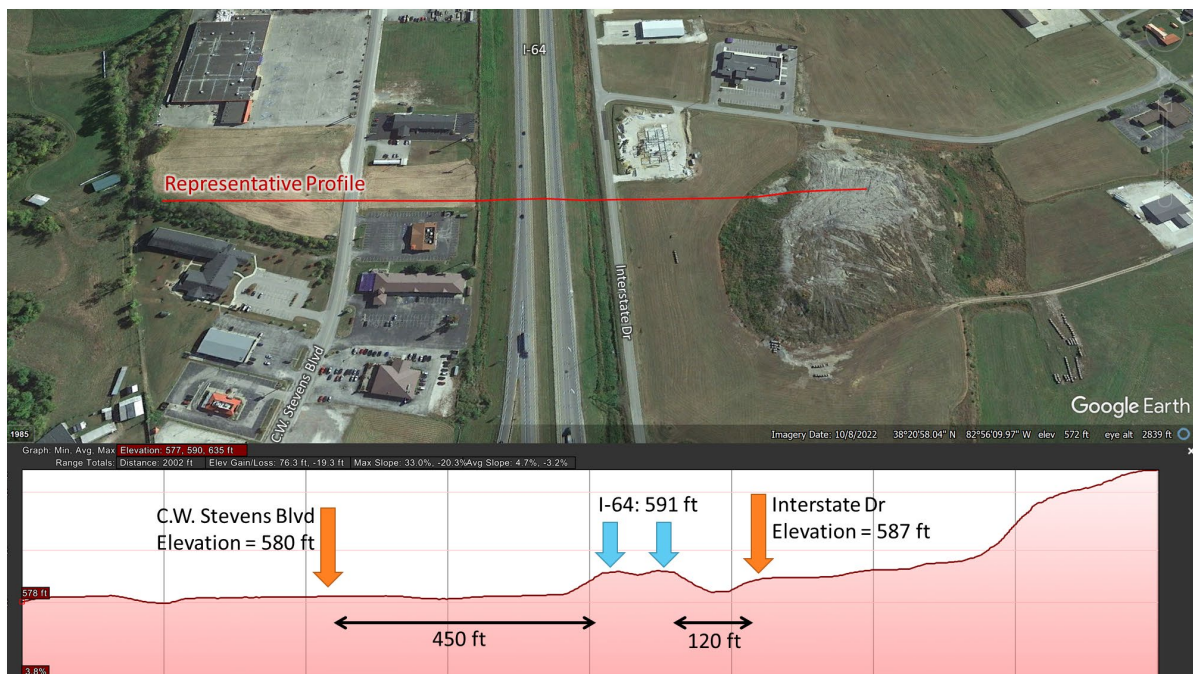


Figure 20: Representative Profile for Cross-I-64 Concepts

Disturb limits, shown in dark pink in **Figure 22** to **Figure 27**, are conservatively based on embankments. Alternatively, retaining walls could narrow footprints but increase project costs.

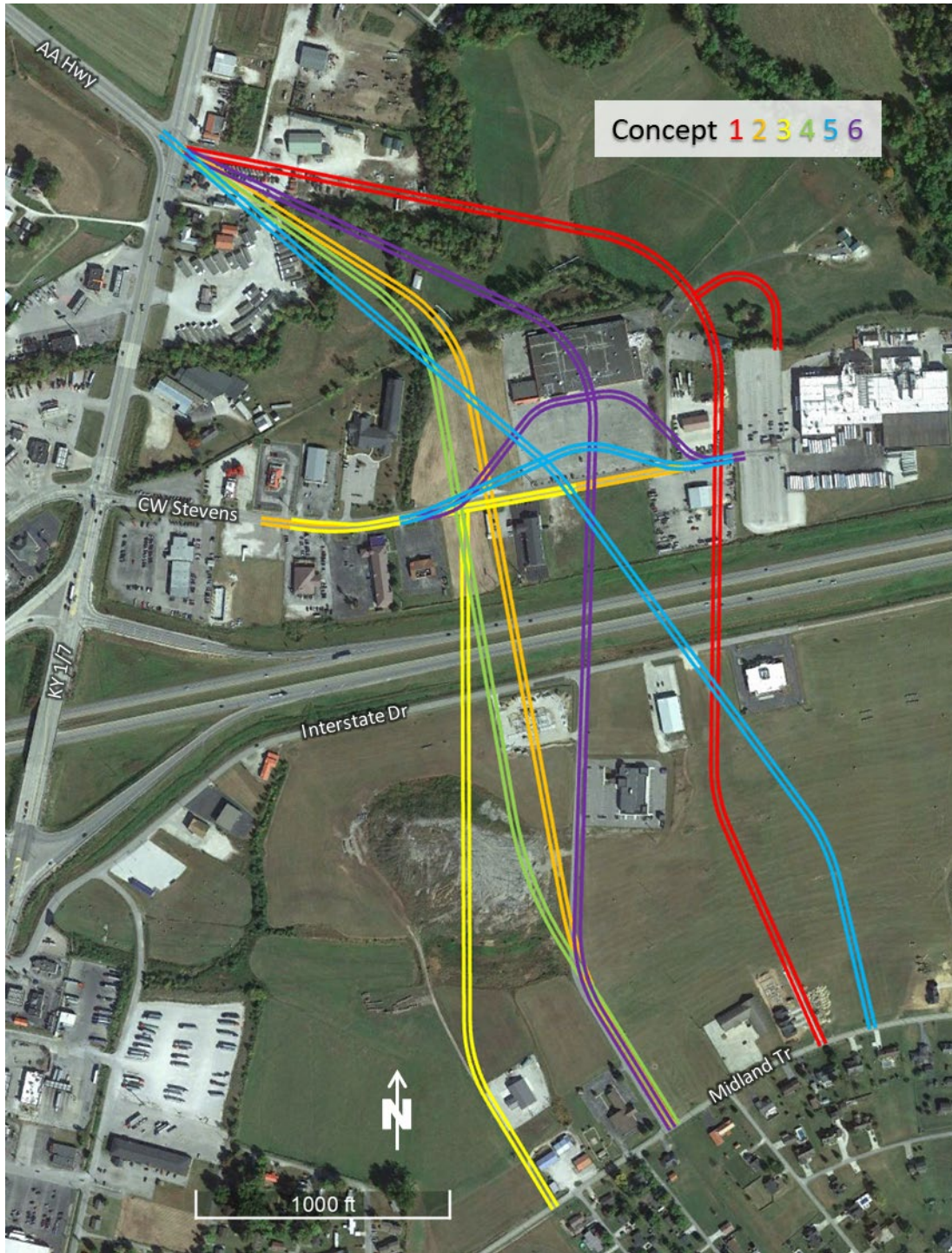


Figure 21: Range of Cross-I-64 Build Concepts

Concept 1 (Red) stretches from KY 9 (AA Highway) to KY 3297 (Midland Trail) and is shown in **Figure 23**. The steepest grade is 6%, similar to KY 1 between Emrid and Sawgrass lanes, climbing the hill towards the high school. However, the new connector blocks the eastern end of C.W. Stevens Boulevard, shifting access for the Smithfield Plant onto a new driveway from the new

connector. The route does not intersect C.W. Stevens Boulevard or Interstate Drive. An estimated three to four businesses would be relocated.

Shown in **Figure 22, Concept 2 (Orange)** stretches from KY 9 (AA Highway) to KY 3297. The steepest grade is 4% but this concept raises a portion of C.W. Stevens Boulevard up to 20 feet to intersect the new connector. This would lead to impacts for adjacent business driveways. South of I-64, the connector does not intersect Interstate Drive. Increasing traffic at the KY 1/7/C.W. Stevens Boulevard intersection will require additional improvements, such as a second left turn lane. An estimated three to four businesses would be relocated.

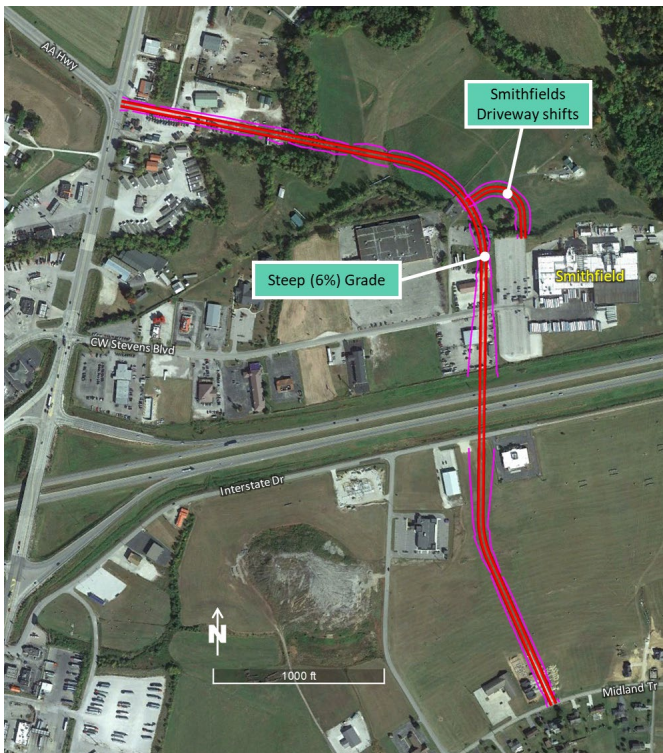


Figure 23: Concept 1 (Red)

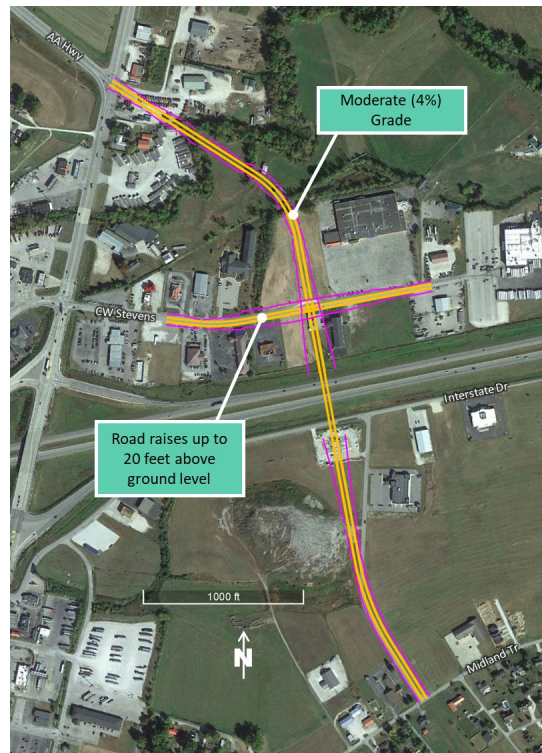


Figure 22: Concept 2 (Orange)

Concept 3 (Yellow) begins at C.W. Stevens Boulevard, stretching south to KY 3297. The steepest grade is 7.5%, coming downhill from the bridge over the interstate, then stopping at the intersection with C.W. Stevens Boulevard. This grade-to-stop condition could be challenging for trucks or in wet weather. For comparison, the hill east of Grayson along US 60 approaching Chestnut Lane has a 7.5% grade. In addition, C.W. Stevens Boulevard is raised up to 12 feet to meet the new connector, impacting adjacent business driveways with up to five business relocations. South of I-64, the connector does not intersect Interstate Drive. As in Concept 2,

increasing traffic at the KY 1/7/C.W. Stevens Boulevard intersection will require additional improvements. The concept is shown in **Figure 25**.

Concept 4 (Green) stretches from KY 9 (AA Highway) to KY 3297 as shown in **Figure 24**. The steepest grade is 4% but this concept includes a longer bridge that spans above C.W. Stevens Boulevard, I-64, and Interstate Drive. An estimated two to three businesses would be relocated.

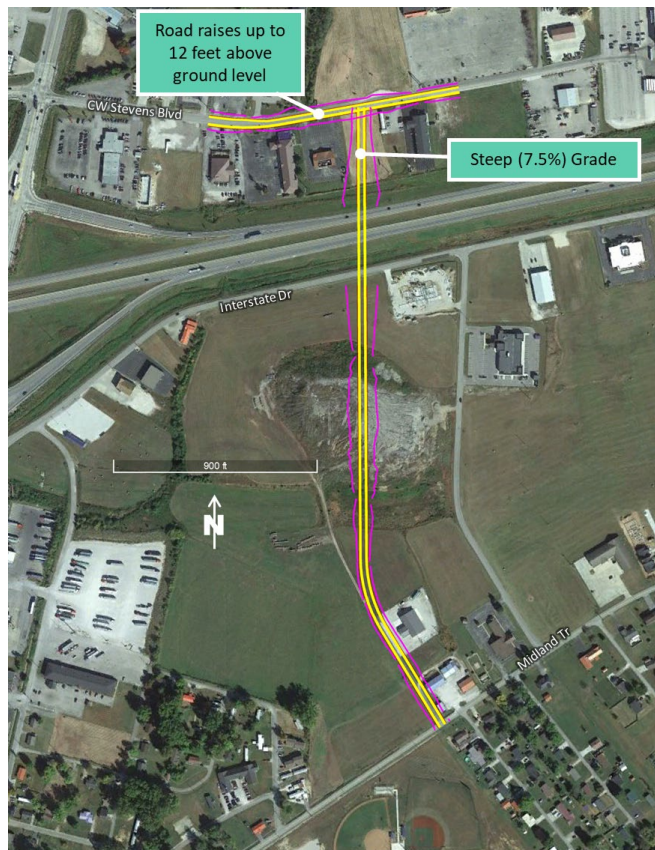


Figure 25: Concept 3 (Yellow)

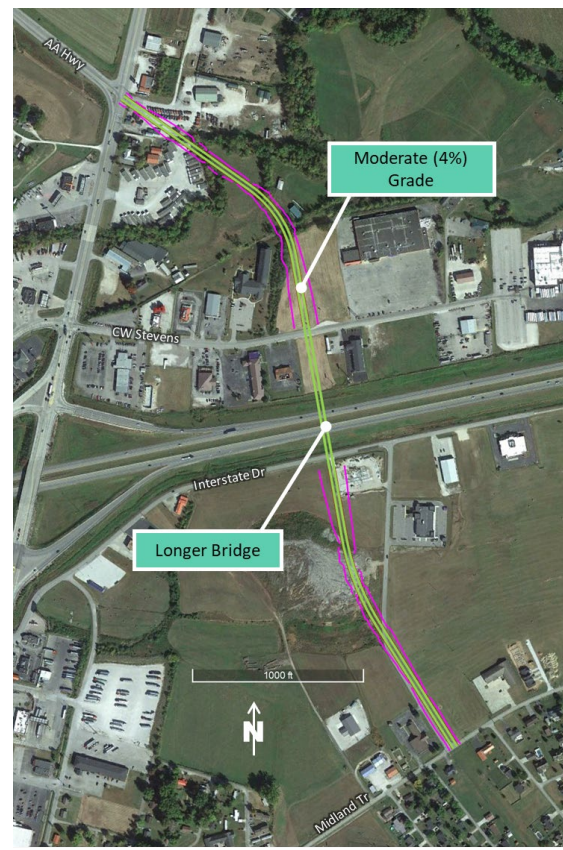


Figure 24: Concept 4 (Green)

Concept 5 (Blue) stretches from KY 9 (AA Highway) to KY 3297. The steepest grade is 4.5% but this concept shifts a portion of C.W. Stevens Boulevard to intersect the new connector. To minimize overall length, the connector crosses I-64 at a skew angle, leading to a longer bridge. South of I-64, the connector does not intersect Interstate Drive. As in Concept 2, increasing traffic at the KY 1/7/C.W. Stevens Boulevard intersection will require additional improvements. An estimated three to five businesses would be relocated. The concept is shown in **Figure 27**.

Concept 6 (Purple) is similar to Concept 5 but eliminates the skewed crossing and shifts C.W. Stevens Boulevard further from its existing location. It stretches from KY 9 (AA Highway) to

KY 3297; the steepest grade is 6%. The connector does not intersect Interstate Drive. Additional improvements at the KY 1/7/C.W. Stevens Boulevard intersection are needed to handle increasing traffic. An estimated four to five businesses would be relocated. Concept 6 is shown in **Figure 26**.

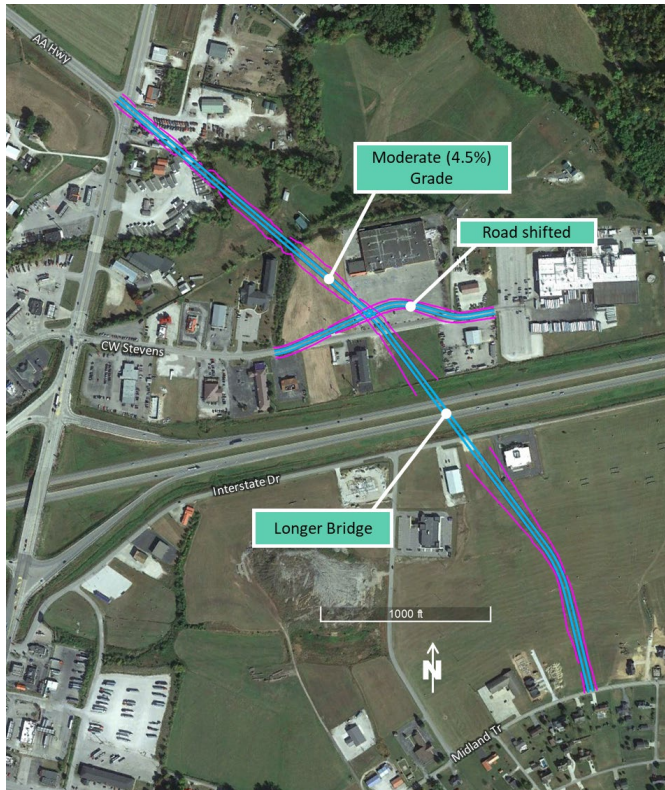


Figure 27: Concept 5 (Blue)

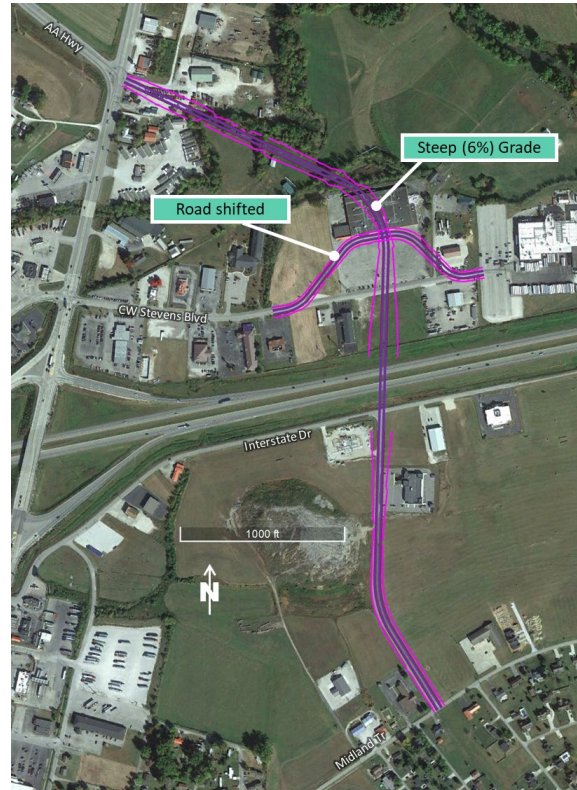


Figure 26: Concept 6 (Purple)

Initially, LO/S also expressed interest in a more eastern bypass corridor, crossing below I-64 at the KY 1910 underpass. A connector at this location nearly doubles travel times compared to other build options, increases costs, and results in greater environmental impacts for water resources. The existing I-64 crossing has a low vertical clearance (15.4 feet), is between sharp horizontal curves, and would necessitate reconstruction of the narrow KY 1910 corridor.

Therefore, a more eastern bypass concept was eliminated.



Figure 28: I-64 over KY 1910 east of Grayson

5.1.3 Bypass 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 9 average unit bid prices. KYTC District 9 provided right-of-way and utility cost estimates based on conceptual model disturb limits, aerial imagery, approximate locations of existing right-of-way, and utility records. Planning-level cost estimates by phase are presented in **Table 5**—including a 5-foot sidewalk on one side along the proposed connector—with costs shown in 2022 dollars. Each construction phase estimate includes an additional 30% for contingencies.

Table 5: Bypass Concept Cost Estimates (2022 Dollars)

Bypass Concept	Design	Right-of-Way	Utilities	Construction	Total
Concept 1 (Red)	\$4.5 M	\$7.0 M	\$7.1M	\$44.8 M	\$63.4 M
Concept 2 (Orange)	\$4.8 M	\$24.5 M	\$5.0 M	\$48.0 M	\$82.3 M
Concept 3 (Yellow)	\$3.3 M	\$17.9 M	\$7.8 M	\$33.4 M	\$62.4 M
Concept 4 (Green)	\$5.9 M	\$9.1 M	\$6.0 M	\$59.2 M	\$80.2 M
Concept 5 (Blue)	\$4.5 M	\$15.5 M	\$7.3 M	\$44.5 M	\$71.8 M
Concept 6 (Purple)	\$4.6 M	\$21.8 M	\$5.1 M	\$46.1 M	\$77.6 M

5.2 Midland Trail East-West Linkage

Another group of concepts explored an improved connection between KY 1 and Midland Trail, driven by two transportation objectives:

- Provide safe, efficient routing (ideally with protected left turn signal phase) from the I-64 interchange to the new sports park.
- Improve accessibility to developable areas east of KY 1, along Interstate Drive and Midland Trail.

5.2.1 East-West Alignment Options

Shown in **Figure 29**, a range of Build concepts was developed to illustrate the level of costs and impacts associated with a new east-west linkage between KY 1/7 and KY 3297. Unless otherwise noted, each assumes two 11-foot-wide travel lanes with curb/gutter and a 5-foot-wide sidewalk on one side.



Figure 29: Range of Build Concepts for Midland Trail Links

Concept A (McClave) is opposite McClave Street, passing between a gas station and truck service center and bisecting a truck parking lot before stretching through an open field to KY 3297. Due to the expected truck use, 4-foot-wide paved shoulders are assumed rather than curb/gutter. A link north would be improved to facilitate connectivity to Interstate Drive.

Of the five Build options, Concept A has the longest length of new alignment at 2,200 feet—plus 800 feet to improve the link to Interstate Drive. There are no residential relocations; however,

additional truck parking areas would be required to mitigate for anticipated losses. No home or business relocations are anticipated. The concept is shown in **Figure 30**.



Figure 30: Concept A (McClave)

Access management along KY 1/7 between the new linkage and I-64 interchange is incorporated into the Build concept, though specifics would be worked out during future project development phases. This may include converting driveways to right-in/right-out configurations, constructing a median barrier or installing Qwick Kurb to prohibit lefts, and/or closing a portion of Interstate Drive.

Concept B (Super 8) runs along the private street north of the grocery then curves through an adjacent neighborhood to reach KY 3297. Rupert Lane and the private drive to the north is improved to facilitate connectivity to Interstate Drive. The east-west link is 1,800 feet long, plus 1,300 feet to reconstruct the private road to extend Rupert Lane to Interstate Drive. The concept is shown in **Figure 31**.

There are several environmental considerations associated with this concept. The private street north of the grocery was the subject of a recent lawsuit and is likely to be contentious if the project is advanced. An estimated four residential relocations are anticipated; the impacted neighborhood represents a likely environmental justice (EJ) concern. The alignment also displaces an ancillary structure on the Dixie Park Freewill Baptist Church property to avoid impacts within the adjacent Grayson City Park.

As with Concept A, access management along KY 1/7 is part of the Build concept, though specifics would be worked out during future project development phases.

Concept C (Academic) is south of the grocery store, opposite but offset from Academic Parkway. The 1,400-foot alignment stretches from KY 1/7 to KY 3297, generally following Dixie Street through a residential neighborhood.

Multiple alignments at this location were considered; other variations would displace the grocery or introduce sharp curves. Likely, existing Academic Parkway would be reconstructed if this concept advances, shifted south to avoid creating an offset intersection along KY 1/7.

The concept shown relocates one business (Dairy Queen) and two to four residences within a likely EJ neighborhood. The concept is shown in **Figure 32**.



Figure 31: Concept B (Super 8)



Figure 32: Concept C (Academic)

Concept D (Urgent Care) stretches between KY 1/7 opposite the urgent treatment center and KY 3297 opposite the northern middle school driveway. The connection is 1,100 feet long and crosses through the former Pizza Hut parking lot. The concept shown relocates one business (currently vacant) and three to five residences within a likely EJ neighborhood. The concept is shown in **Figure 33**.



Figure 33: Concept D (Urgent Care)

Concept E (College) is opposite College Street, meeting KY 1/7 at an existing signalized intersection. Shown in **Figure 34**, this link is the shortest option considered (700 feet) but results in the longest distance to reach the new Grayson Sports Park from I-64. There are no residential relocations but one business would be relocated and up to three others would lose some parking.



Figure 34: Concept E (College)

Though not specifically included in the build concepts, improved access management measures along KY 1/7 could be incorporated with Concepts C, D, and E as well, focusing on the KY 1/7/Interstate Drive intersection.

5.2.2 East-West Cost Estimates

Using the same methodology discussed in **Section 5.1.3**, planning-level cost estimates by phase are presented in **Table 6** with costs shown in 2022 dollars.

Table 6: East-West Concept Cost Estimates (2022 Dollars)

East-West Concept	Design	Right-of-Way	Utilities	Construction	Total
Concept A (McClave)	\$0.5 M	\$5.2 M	\$4.7 M	\$5.1 M	\$15.5 M
Concept B (Super 8)	\$0.5 M	\$3.0 M	\$2.1 M	\$5.0 M	\$10.6 M
Concept C (Academic)	\$0.3 M	\$3.3 M	\$1.6 M	\$2.8 M	\$8.0 M
Concept D (UTC)	\$0.2 M	\$3.1 M	\$0.5 M	\$2.3 M	\$6.1 M
Concept E (College)	\$0.2 M	\$4.3 M	\$0.5 M	\$1.6 M	\$6.6 M

5.3 New Western Interchange

While no Build concepts were developed for a new interchange, potential traffic impacts were modeled to help local leaders determine whether future project development activities are warranted. The new interchange location was identified during LO/S meetings as part of the 2018 SUA study, which noted congestion and safety issues but did not develop prioritized project concepts for the site.

Starting with the No-Build model assumptions discussed in **Chapter 4.0**, a separate Build model scenario was developed to reflect growth assumptions should a new interchange be built near MP 168.5 where US 60 currently crosses over I-64. The model assumes a new 1,300-student school is constructed off US 60 nearby, without deducting corresponding trips from existing school zones in Grayson to create a conservative “worst case” scenario with these facilities adapted for reuse.

Even with the new school drawing additional trips to the vicinity, all four ramps combined are projected to carry an estimated 2,800 vpd in 2045. The model also projected traffic increases along sections of US 60 and KY 1/7 as well. US 60 has two 12-foot-wide lanes and 4-foot-wide paved shoulders from its I-64 crossing back towards town.

6.0 FINAL COORDINATION MEETINGS

Following concept development efforts described in **Chapter 5.0**, the project team engaged with other stakeholders to present and discuss options. Meeting summaries for each coordination point are included in **Appendix C**, arranged chronologically.

6.1 Final Local Official and Stakeholder Meeting

A final meeting with local officials and stakeholders was held March 14, 2023, in Grayson. The purpose of the meeting was to present proposed improvement concepts and facilitate discussion. The project team reviewed the Build concepts, describing costs, traffic benefits, engineering considerations, and resulting property impacts. Key discussion items included:

- While there is no numeric threshold to justify an interchange, benefits (e.g., crash reductions, travel time savings, congestion reduction) would not outweigh costs for a new western interchange based on the projected 2045 volumes.
- Land use and transportation influence each other; traffic could be reassessed in the future if there is still local interest in an interchange.
- Considering costs and property impacts, four of five participants polled agreed the No-Build option was preferred over any of the cross-I-64 concepts presented. However, each bypass segment has an existing CHAF form and could be sponsored in future SHIFT cycles if they were to become a local priority.
- Build concepts for an east-west linkage were favored over No-Build, with more northern options preferred. Of six poll participants, **Concept A (McClave)** was ranked highest, followed by **Concept C (Academic)**.
- There is interest in a signal at KY 1/7/Academic Parkway, independent of this project.

7.0 RECOMMENDATIONS

In light of anticipated 2045 traffic volumes, benefits (e.g., crash reductions, travel time savings, congestion reductions) would not outweigh costs for either the western interchange or cross-I-64 connector (i.e., the northern two sections of the SUA bypass concept). Neither Build concept is recommended to advance at this time; however, each concept is included within the CHAF database should conditions or priorities change over time.

Likewise, the southernmost bypass segment (Item No. 9-80202) is not recommended to advance at this time. This is consistent with local officials' input expressed during fall 2022 coordination meetings, which noted concerns with impacts to area businesses and the newly constructed Grayson Sports Park.

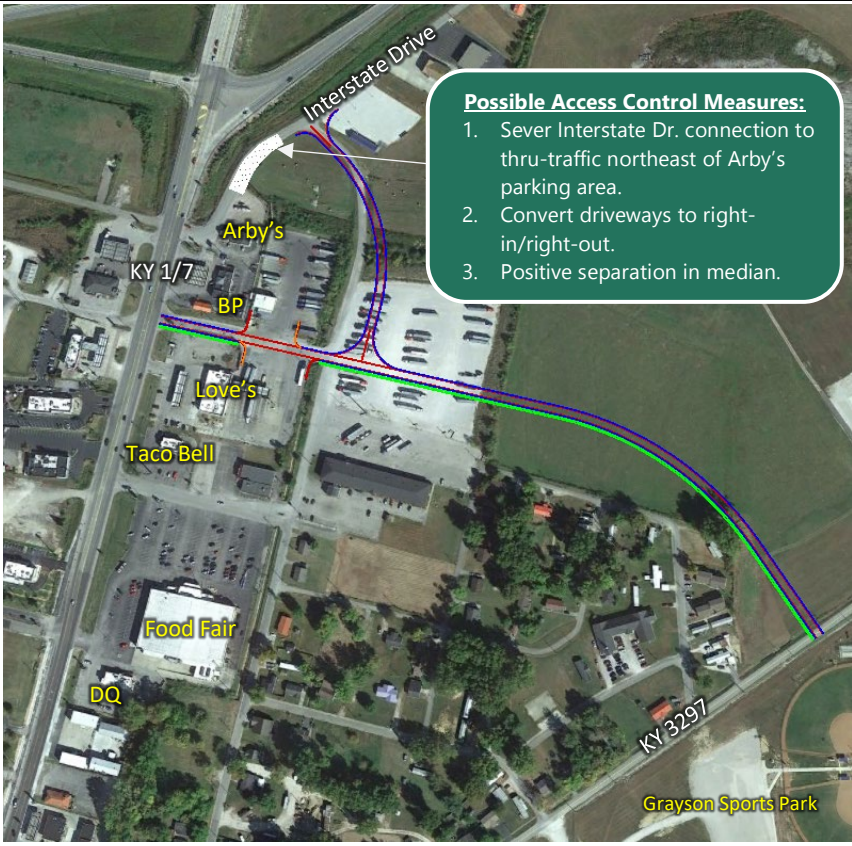
A new East-West Linkage between KY 1/7 and Midland Trail is recommended to advance for additional project development efforts. Each concept would provide the following benefits and address identified transportation needs:

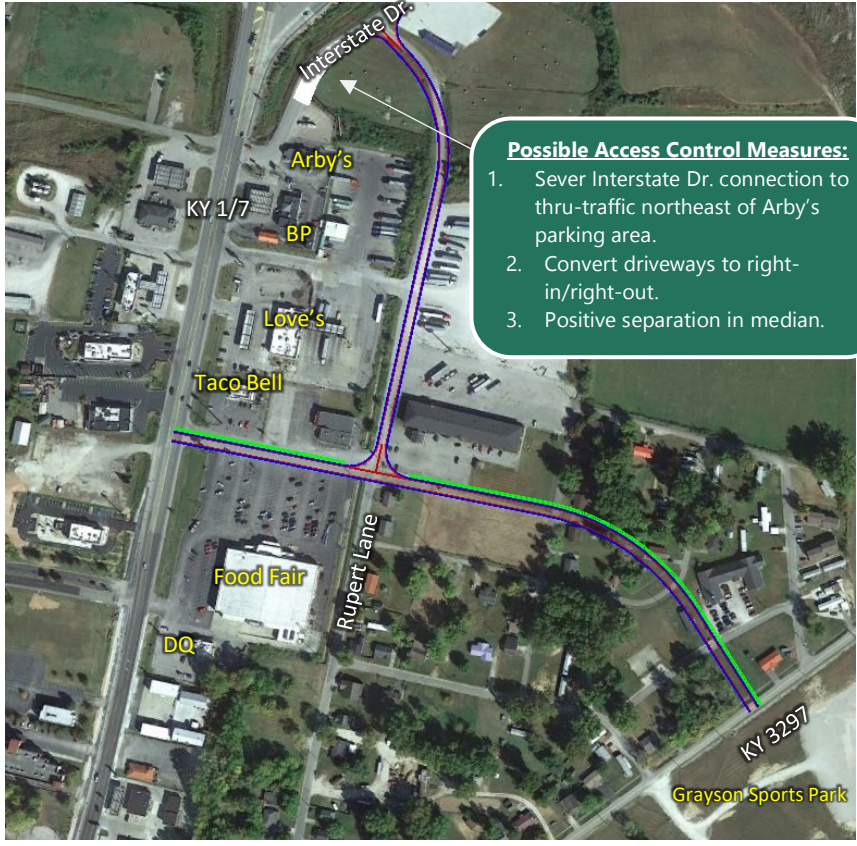
- Provide safe, efficient routing (ideally with protected left turn signal phase) from the I-64/KY 1/7 interchange to the new park.
- Improve accessibility to developable areas east of KY 1/7, along Interstate Drive and Midland Trail.

Concept A (McClave) was preferred by LO/S and provides an opportunity to reduce conflict points near the interchange by incorporating more stringent access control measures in the vicinity. However, any of the five Build concepts serves a similar purpose and should be evaluated during preliminary engineering phases.

Individual information sheets for improvement concepts A through E are presented on the following pages.



CARTER		KY 1/7 to KY 3297 Connector: McClave Street (Between BP and Love's Truck Stop)		A			
IMPROVEMENT DESCRIPTION:			PHASE	2022 \$			
Beginning on KY 1/7 (MP 11.39), 520 ft. south of the EB on-ramp, construct two 11-foot lanes with 4-foot paved shoulders between the BP Station and Love's Truck Stop, ending at KY 3297 opposite the Grayson Sports Park. Sidewalk along one side could be provided. Extend link north for improved connection to Interstate Drive. Access control measures will be included in this construction. Mitigation for truck parking losses likely needed.			D	\$ 0.5 M			
			R	\$ 5.2 M			
			U	\$ 4.7 M			
			C	\$ 5.1 M			
			TOTAL	\$ 15.5 M			
TRAFFIC OPERATIONS AND SAFETY:							
2022 Traffic:	Interstate Drive carries 330 vehicles per hour (vph) during PM peak hour.						
2045 No-Build Traffic:	Interstate Drive is projected to carry 390 vph during PM peak hour.						
2018-2022 Crashes:	37 crashes occurred along KY 1/7 within 150 feet of Interstate Drive. Access management measures along KY 1/7 are expected to improve safety at and near this intersection.						
WORK TYPE:		New Route					
			↑ North				
			<input type="checkbox"/> Railroad				
			<input checked="" type="checkbox"/> R/W Required		<input type="checkbox"/> Relocations		
			<input type="checkbox"/> Shared Use Path				
			<input type="checkbox"/> Bike Facility				
			<input checked="" type="checkbox"/> Ped Facility			New Sidewalk	
			<input checked="" type="checkbox"/> Increased Connectivity			Schools	
						Public Lands	
			<input checked="" type="checkbox"/> Socioeconomic Impacts			Travel Patterns	
<input type="checkbox"/> Environmental Impacts							
<input checked="" type="checkbox"/> Utilities Affected			Gas				
			Power				
			Sewer				
			Water				
Notes: <ul style="list-style-type: none"> • Signalization at KY 1/7 is assumed. • Access management between interchange and new connector to be determined during future design phase. • Mainline length: 2,200 ft.; Spur to Interstate Drive length: 800 ft. 							

CARTER		KY 1/7 to KY 3297 Connector: Super 8 Lane (Between Taco Bell and Food Fair Parking Lot)		B			
IMPROVEMENT DESCRIPTION:			PHASE	2022 \$			
Beginning on KY 1/7 at MP 11.24, construct two 11-foot lanes with curb and gutter and a 5-foot-wide sidewalk between Taco Bell and Food Fair parking lot, ending at KY 3297 opposite the Grayson Sports Park. Reconstruct private road/Rupert Lane as improved connection to Interstate Drive. Access control measures will be included in this construction.			D	\$ 0.5 M			
			R	\$ 3.0 M			
			U	\$ 2.1 M			
			C	\$ 5.0 M			
			TOTAL	\$ 10.6 M			
TRAFFIC OPERATIONS AND SAFETY:							
2022 Traffic:	Interstate Drive carries 330 vehicles per hour (vph) during PM peak hour.						
2045 No-Build Traffic:	Interstate Drive is projected to carry 390 vph during PM peak hour.						
2018-2022 Crashes:	33 crashes occurred along KY 1 within 150 feet of Super 8 Lane and 37 within 150 feet of Interstate Drive. Access management measures along KY 1 are expected to improve safety at both intersections.						
WORK TYPE:	New Route						
			↑ North				
			<input type="checkbox"/> Railroad			<input checked="" type="checkbox"/> R/W Required <input checked="" type="checkbox"/> Relocations	
			<input type="checkbox"/> Shared Use Path			<input type="checkbox"/> Bike Facility	
			<input checked="" type="checkbox"/> Ped Facility			New Sidewalk	
			<input checked="" type="checkbox"/> Increased Connectivity			Schools Public Lands	
<input checked="" type="checkbox"/> Socioeconomic Impacts			Travel Patterns Low-Income HH Relocations Disabled				
<input checked="" type="checkbox"/> Environmental Impacts			Churches Parks				
<input checked="" type="checkbox"/> Utilities Affected			Gas Power Sewer Water				
Notes: <ul style="list-style-type: none"> • Signalization at KY 1/7 is assumed. • Access management between interchange and new connector to be determined during future design phase. • Mainline length: 1,800 ft.; Spur to Interstate Drive length: 1,300 ft. • Potential impacts to environmental justice community. 							

CARTER		KY 1/7 to KY 3297 Connector: Academic Parkway (Between Food Fair and Dairy Queen)		C				
IMPROVEMENT DESCRIPTION:			PHASE	2022 \$				
Beginning on KY 1/7 at MP 11.15, construct two 11-foot lanes with curb and gutter and a 5-foot-wide sidewalk between Food Fair and Dairy Queen, following Dixie Street, and ending at KY 3297 opposite the Grayson Sports Park entrance. Relocation of Academic Parkway would eliminate offset intersection but is not included in costs/impacts. Additional access management measures along KY 1/7 may be evaluated during future design phase.			D	\$ 0.3 M				
			R	\$ 3.3 M				
			U	\$ 1.6 M				
			C	\$ 2.8 M				
			TOTAL	\$ 8.0 M				
TRAFFIC OPERATIONS AND SAFETY:								
2022 Traffic:	Academic Parkway carries 290 vehicles per hour (vph) during PM peak hour.							
2045 No-Build Traffic:	Academic Parkway is projected to carry 340 vph during PM peak hour.							
2018-2022 Crashes:	9 crashes occurred along KY 1/7 within 150 feet of Academic Parkway.							
WORK TYPE:	New Route							
			↑ North					
			<input type="checkbox"/> Railroad			<input checked="" type="checkbox"/> R/W Required		
			<input type="checkbox"/> Shared Use Path			<input checked="" type="checkbox"/> Relocations		
			<input type="checkbox"/> Bike Facility			<input type="checkbox"/> Ped Facility		
			<input checked="" type="checkbox"/> Increased Connectivity			New Sidewalk		
			<input checked="" type="checkbox"/> Socioeconomic Impacts			Schools		
						Public Lands		
						Travel Patterns		
			<input type="checkbox"/> Environmental Impacts			Low-Income		
			<input checked="" type="checkbox"/> Utilities Affected			HH Relocations		
Disabled								
<input checked="" type="checkbox"/> Utilities Affected			Gas					
			Power					
			Sewer					
			Water					
Notes: <ul style="list-style-type: none"> • Signalization at KY 1/7 is assumed. • Mainline length: 1,400 ft. • Potential impacts to environmental justice community. 								

CARTER		KY 1/7 to KY 3297 Connector: Urgent Care (Between Tint Wizard and former Pizza Hut)		D				
IMPROVEMENT DESCRIPTION:			PHASE	2022 \$				
Beginning on KY 1/7 at MP 11.08, construct two 11-foot lanes with curb and gutter and a 5-foot-wide sidewalk between Tint Wizard and the former Pizza Hut, ending at KY 3297 opposite the East Carter Middle School entrance. Additional access management measures along KY 1/7 may be evaluated during future design phase.			D	\$ 0.2 M				
			R	\$ 3.1 M				
			U	\$ 0.5 M				
			C	\$ 2.3 M				
			TOTAL	\$ 6.1 M				
TRAFFIC OPERATIONS AND SAFETY:								
2022 Traffic:	N/A							
2045 No-Build Traffic:	N/A							
2018-2022 Crashes:	7 crashes occurred along KY 1/7 within 150 feet the Urgent Care entrance.							
WORK TYPE:	New Route							
			↑ North					
			<input type="checkbox"/> Railroad					
			<input checked="" type="checkbox"/> R/W Required		<input checked="" type="checkbox"/> Relocations			
			<input type="checkbox"/> Shared Use Path					
			<input type="checkbox"/> Bike Facility					
			<input checked="" type="checkbox"/> Ped Facility			New Sidewalk		
			<input checked="" type="checkbox"/> Increased Connectivity			Schools		
						Public Lands		
			<input checked="" type="checkbox"/> Socioeconomic Impacts			Travel Patterns		
						Low-Income		
HH Relocations								
Disabled								
<input type="checkbox"/> Environmental Impacts								
<input checked="" type="checkbox"/> Utilities Affected			Gas					
			Power					
			Sewer					
			Water					
Notes: <ul style="list-style-type: none"> • Signalization at KY 1/7 is assumed. • Mainline length: 1,100 ft. • Potential impacts to environmental justice community. 								

CARTER		KY 1/7 to KY 3297 Connector: College Street (Between Antiques Store and T-Mobile)		E				
IMPROVEMENT DESCRIPTION:			PHASE	2022 \$				
Beginning on KY 1/7 at the signalized College Street intersection (MP 11.00), construct two 11-foot lanes with curb and gutter and a 5-foot-wide sidewalk between the Antiques Store and T-Mobile, through the Bowling Alley parking lot, ending at KY 3297. Additional access management measures along KY 1/7 may be evaluated during future design phase.			D	\$ 0.2 M				
			R	\$ 4.3 M				
			U	\$ 0.5 M				
			C	\$ 1.6 M				
			TOTAL	\$ 6.6 M				
TRAFFIC OPERATIONS AND SAFETY:								
2022 Traffic:	College Street carries 210 vehicles per hour (vph) during PM peak hour. Bowling alley entrance carries 70 vph in PM peak.							
2045 No-Build Traffic:	College Street is projected to carry 250 vph during PM peak hour; Bowling alley entrance, 80 vph in PM peak.							
2018-2022 Crashes:	22 crashes occurred along KY 1/7 within 150 feet of College Street.							
WORK TYPE:	New Route							
			↑ North					
			<input type="checkbox"/> Railroad					
			<input checked="" type="checkbox"/> R/W Required		<input checked="" type="checkbox"/> Relocations			
			<input type="checkbox"/> Shared Use Path					
			<input type="checkbox"/> Bike Facility					
			<input checked="" type="checkbox"/> Ped Facility			New Sidewalk		
			<input checked="" type="checkbox"/> Increased Connectivity			Schools		
						Public Lands		
			<input type="checkbox"/> Socioeconomic Impacts					
			<input type="checkbox"/> Environmental Impacts					
<input checked="" type="checkbox"/> Utilities Affected			Gas					
			Power					
			Sewer					
			Water					
Notes: <ul style="list-style-type: none"> College Street intersection is signalized. Mainline length: 700ft. 								

8.0 NEXT STEPS

For the recommended east-west linkage, an entry should be added to KYTC's CHAF database to be considered alongside other projects in the next SHIFT prioritization cycle(s). Once funding is identified, the next phase in the project development process is Phase I Design (Preliminary Engineering), likely including environmental analyses to be eligible for federal funding. Likewise, KYTC's *Statewide Transportation Improvement Program* should be amended to reflect any future project development phases.

Further funding will be necessary to advance any Build concept to the design phase. Continuing coordination with local officials, key stakeholders, and the public will be critical considering the potential for impacts to nearby community resources.

9.0 ADDITIONAL INFORMATION

Written requests for additional information should be sent to:

KYTC Division of Planning
ATTN: Director
200 Mero Street, 4th Floor West
Frankfort, KY 40622
Phone: 502.564.7183