



KY 9 Scoping Study

KYTC Item No. 6-448.00

FINAL EXECUTIVE SUMMARY

Campbell County, Kentucky

July 2022



Executive Summary

The KY 9 Scoping Study was initiated in 2021 by the Kentucky Transportation Cabinet (KYTC) to evaluate potential improvement options to address safety and operational performance in the vicinity of the KY 9 and I-275 interchange in Wilder, KY. As part of the study, improvement options were developed to address identified issues. They were further evaluated in terms of performance and cost to determine priority. The study was conducted in coordination with KYTC, the Ohio – Kentucky – Indiana Regional Council of Governments (OKI), and the Northern Kentucky Area Development District (NKADD).

Illustrated in **Figure ES-1**, the study area includes KY 9 from MP 16.5 (KY 1998/Pooles Creek Road) to MP 18.2 (Hampton Lane) and I-275 from MP 76.8 to 77.6. A total of eight intersections are included in the study area.

The objective of the KY 9 Scoping Study was to evaluate transportation needs related to safety and congestion in the vicinity of the I-275 interchange with KY 9 and to identify and prioritize any proposed improvement options. To accomplish this objective, study goals include the following:

- Identify Locations for Possible Projects Through Safety and Traffic Analysis
- Develop / Evaluate Improvement Options
- Prioritize a List of Short- and Long-Term Improvement Options

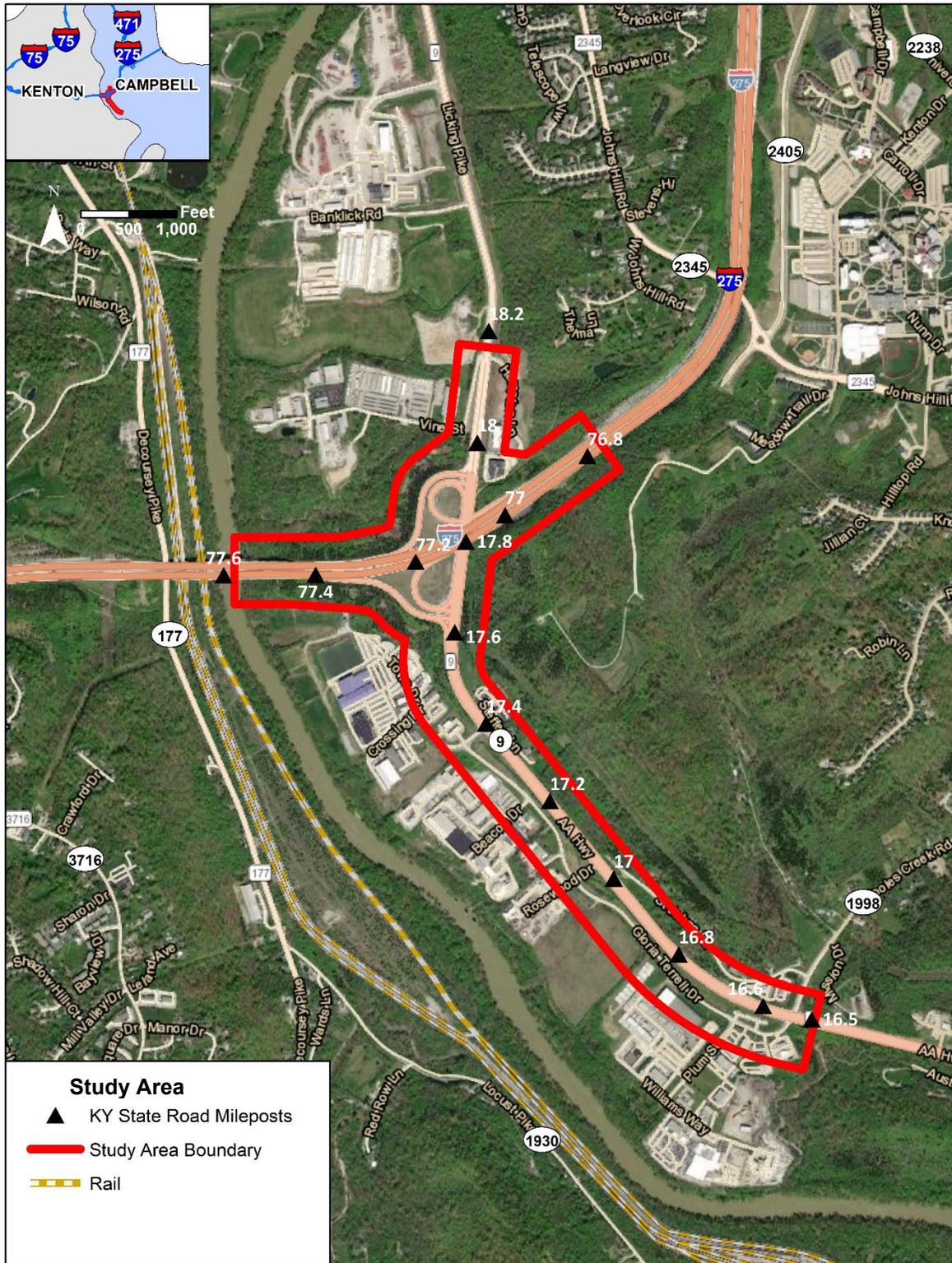
Based on the detailed traffic and crash analysis, roadway deficiencies, and consultation with the project team, a preliminary list of potential improvement options were developed and presented at Project Team Meeting #1 on May 26, 2021. Representatives included KYTC Division of Planning staff, KYTC District 6 staff, NKADD staff, OKI staff, and the consultant team. Study information was shared through use of an ArcGIS StoryMap including the study area, objective and goals, schedule, existing traffic conditions, crash analysis, environmental conditions, and high-level improvement options.

With feedback from the project team on the initial list of possible improvement options, the next step was to further refine the list. Sixteen improvement options were developed at varying levels of detail. The primary goal of this preliminary analysis was to analyze each option to determine overall feasibility and determine if more detailed analysis was warranted. Considerations included traffic analysis, geometric design, and environmental impacts.

The second Project Team meeting was held on September 29, 2021. The consultant team updated the ArcGIS StoryMap, which included updated traffic analysis and improvement options. KYTC provided valuable input on each of the improvement options and made suggestions for additional modifications. Utilizing the project team input, the number of improvement options was reduced from sixteen to eleven for detailed consideration. This process included modifying and consolidating multiple initial improvement options.

For each of the eleven improvement options, a conceptual design was completed, traffic analysis was conducted for the future year 2045, planning-level cost estimates were developed and refined, and a high-level benefit-cost analysis was completed.

Figure ES-1. Study Area



The emphasis for this study was improving safety and operational performance of the I-275 / KY 9 interchange. The benefit-cost analysis focused on identifying the traffic benefits and comparing to the investment cost to determine a benefit-cost ratio. To translate the traffic benefits associated with an improvement, travel time savings were calculated for each improvement option based on the 2045 No Build and Build VISSIM-derived average delay per vehicle. This was translated to a 20-year travel savings and compared to total capital cost yielding a benefit-cost ratio.

The KY 9 Scoping Study resulted in a range of conceptual improvements for future consideration. Improvement options primarily focused on addressing four areas where congestion and safety concerns were identified through examination of documented crash records and traffic analysis. Utilizing additional tools including operations analysis, traffic forecasting, and project team input, four improvement options were prioritized. Seven other improvement options were considered but not recommended at this time and more information can be found in Sections 4.4 and 4.5. The prioritization is broken down by the following categories:

- **Short-Term** projects include those that are relatively low-cost and have minimal impacts. Due to their cost, these projects may still need to go through the SHIFT process to be constructed.
- **Long-Term** projects are higher-cost and may have additional impacts. While they are anticipated to take longer to fund and construct, they will help to meet the future transportation needs of the KY 9 and I-275 corridors in terms of operations and safety. These projects would go through the SHIFT process to be constructed.

Table ES-1 lists the recommended improvement options, total project costs, benefit-cost ratio, and priority as assigned by the project team.

At this time, no additional funding is programmed to further study this interchange or for future phases of specific improvement options presented in this study. Improvement Options 1 and 5C are proposed as short-term options. It should be noted that Improvement Option 5C includes all components of Option 5A; therefore, both are not required to be completed. Improvement Option 3A is recommended as a long-term option.

The next phase in the project development process is Preliminary Engineering and Environmental Analysis (commonly referred to as Phase I Design). If federal funds are used and/or permits will be required, additional environmental analyses will be needed to satisfy the National Environmental Policy Act (NEPA). Improvement options will need to be incorporated into OKI's Metropolitan Transportation Plan and Transportation Improvement Program (TIP), and KYTC's Statewide Transportation Improvement Plan (STIP). Furthermore, Improvement Option 3A would require an Interchange Modification Report (IMR) to analyze the impacts to the interstate in more detail. This would include analyzing each interchange east and west of the KY 9 interchange.

The Improvement Options recommended for further development are detailed in **Figures ES-2, ES-3, ES-4, and ES-5**.

Table ES-1. Recommended Improvement Options

Improvement Option	Description	Total Project Cost (DRUC*)	Priority
Option 1	Extend Left Turn Lane for I-275 Westbound Ramp from KY 9 Northbound.	\$ 3,070,000	Short-Term
Option 3A	Flyover Ramp with Separated Movement Starting North of I-275 Bridge over KY 9. Provide Dual Lane Entry Onto I-275.	\$ 46,260,000	Long-Term
Option 5A	Provide Three KY 9 Southbound Lanes between Eastbound Ramps and just south of Town Drive. No Lane Drop at I-275 Eastbound Exit Ramp for KY 9 Southbound, Additional Continuous Lane from I-275 Eastbound Exit Ramp to Town Drive and Extend the Extra Lane past Town Drive.	\$ 5,560,000	Short-Term
Option 5C	Improvement Option 5A Plus: Remove Town Drive Signal, Convert Town Drive and Steffen Lane to Right-In / Right-Out. Permit U-Turns south of Town Drive and at the I-275 Eastbound Ramp intersection. Realign Rosewood Drive and Gloria Terrell Drive Intersection and Provide Dual Lefts from Rosewood Drive onto KY 9.	\$ 6,440,000	Short-Term

*DRUC – Design, Right-of-Way, Utilities, Construction in 2021 Dollars

Figure ES-2. Improvement Option 1 – Extend Northbound Left Turn Lane on KY 9

LOCATION INFORMATION											
<p><i>Location</i> County: Campbell Route: KY 9 (MP:17.6 to 18.0)</p> <p>Northbound KY 9 to I-275 Westbound</p>	 <div style="background-color: white; border-radius: 20px; width: 100px; height: 100px; display: flex; align-items: center; justify-content: center; margin: 20px auto; font-size: 48px; font-weight: bold;">1</div>										
EXISTING CONDITIONS											
<p><i>Existing Features</i></p> <ul style="list-style-type: none"> • 170' of storage for existing left turn lane • 12' lane widths and outside paved shoulder width of 10' along KY 9 • I-275 - 65 mph; KY 9 - 45 mph to the south, 55 mph to the north <p><i>Issues</i></p> <p>The left turn from KY 9 to the on-ramp for westbound I-275 is a heavy turning movement. Currently, there is a large concentration of rear end crashes between the ramp intersections on KY 9 in the northbound direction where queue spillover occurs. There were 107 northbound crashes between the ramp intersections and 91% were rear end crashes, while 6% were sideswipes.</p>	<p><u>TRAFFIC DATA</u></p> <p>KY 9 No Build (AADT): 2021: 24,400 2045: 31,000</p> <p><u>CRASH DATA</u></p> <p>KY 9 NB Crashes: Total: 107 Rear End: 97 Serious Injury: 1</p>										
IMPROVEMENT CONCEPT											
<p><i>Description</i></p> <p>Improve left turn onto I-275 westbound on-ramp by converting left most thru lane to a left turn lane. Existing two thru lanes will be maintained by developing another lane right of the existing lanes. In the short-term, extending the left turn storage should reduce queue spillback into the KY 9 northbound thru lanes and provide a safety benefit. Possible constraints with this option are the utilities below the northbound shoulder on KY 9 and future capacity constraints.</p> <p><i>Systemwide Operations Results</i></p> <ul style="list-style-type: none"> • AM Peak: 54 sec/veh delay reduction / 5.5 mph speed increase • PM Peak: 17 sec/veh delay reduction / 0.9 mph speed increase 	<p><u>COST ESTIMATE</u></p> <p>2021 Dollars</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Design:</td> <td style="padding: 2px; text-align: right;">\$230,000</td> </tr> <tr> <td style="padding: 2px;">ROW:</td> <td style="padding: 2px; text-align: right;">\$100,000</td> </tr> <tr> <td style="padding: 2px;">Utilities:</td> <td style="padding: 2px; text-align: right;">\$500,000</td> </tr> <tr> <td style="padding: 2px;">Const.:</td> <td style="padding: 2px; text-align: right;">\$2,240,000</td> </tr> <tr> <td style="padding: 2px;">Total:</td> <td style="padding: 2px; text-align: right;">\$3,070,000</td> </tr> </table> <p><u>BENEFIT-COST RATIO</u></p> <p style="font-size: 24px;">2.9</p> <p><u>PROJECT PRIORITY</u></p> <p>Short-Term</p>	Design:	\$230,000	ROW:	\$100,000	Utilities:	\$500,000	Const.:	\$2,240,000	Total:	\$3,070,000
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Figure ES-2. Improvement Option 1 – Extend Northbound Left Turn Lane on KY 9 (continued)



Figure ES-3. Improvement Option 3A – Flyover Ramp to I-275 WB On-Ramp (Dual Lane Entry)

LOCATION INFORMATION	
<p>Location County: Campbell Route: I-275 (MP 77.2 to 77.9); I-275 Ramp (MP: 0.0 to 0.3); KY 9: (MP 17.4 to 18.0) Northbound KY 9 to I-275 Westbound</p>	
EXISTING CONDITIONS	
<p>Existing Features</p> <ul style="list-style-type: none"> • 170' of storage for existing left turn lane • 12' lane widths and outside paved shoulder width of 10' along KY 9 • I-275 - 65 mph; KY 9 - 45 mph to the south, 55 mph to the north <p>Issues</p> <p>The left turn from KY 9 to the on-ramp for westbound I-275 is a heavy turning movement. Currently, there is a large concentration of rear end crashes between the ramp intersections on KY 9 in the northbound direction where queue spillover occurs. There were 107 crashes between the ramp intersections and 91% were rear end crashes, while 6% were sideswipes. 39 crashes occurred at I-275 ramp merge with mainline with 21% being sideswipes.</p>	<p style="text-align: center;"><u>TRAFFIC DATA</u></p> <p>KY 9 No Build (AADT): 2021: 24,400 2045: 31,000</p> <p style="text-align: center;"><u>CRASH DATA</u></p> <p>KY 9 NB Crashes: Total: 107 Rear End: 97 KY 9/I-275 WB Ramp: 2 Fatalities</p>
IMPROVEMENT CONCEPT	
<p>Description</p> <p>Relocate left turn for I-275 westbound on-ramp by separating movement at the KY 9 and I-275 eastbound ramps intersection and bridging over KY 9 to tie into the existing I-275 westbound on-ramp. A dual lane entry to I-275 would be provided which will address the short ramp acceleration length. Removing the left turn traffic from KY 9 would provide a safety benefit at the intersection. Constraints with this option are the utilities under the northbound KY 9 shoulder and the impact to the Licking River Bridge due to the dual lane entry. A design exception would be required for the entry curve for the flyover bridge which has a 30 mph design speed. The entry curve to the interstate is a 50 mph curve. The new ramp will require significant fill increasing overall cost.</p> <p>Systemwide Operations Results</p> <ul style="list-style-type: none"> • AM Peak: 83 sec/veh delay reduction / 11.5 mph speed increase • PM Peak: 67 sec/veh delay reduction / 7.0 mph speed increase 	<p style="text-align: center;"><u>COST ESTIMATE</u></p> <p>2021 Dollars</p> <p>Design: \$4,050,000 ROW: \$250,000 Utilities: \$1,500,000 Const.: \$40,460,000 Total: \$46,260,000</p> <p style="text-align: center;"><u>BENEFIT-COST RATIO</u></p> <p>0.4</p> <p style="text-align: center;"><u>PROJECT PRIORITY</u></p> <p>Long-Term</p>

Figure ES-3. Improvement Option 3A – Flyover Ramp to I-275 WB On-Ramp (Dual Lane Entry)
(continued)

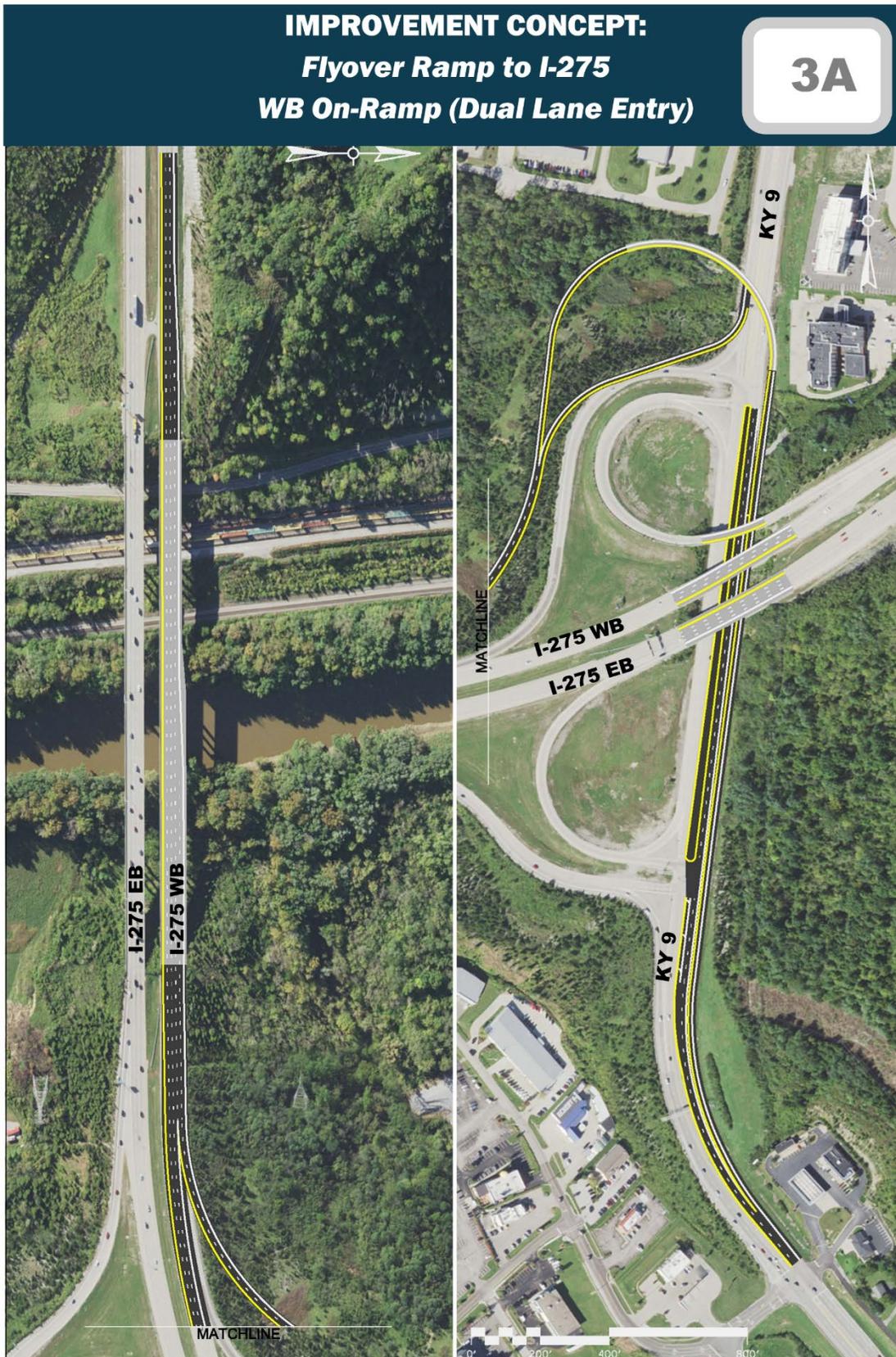


Figure ES-4. Improvement Option 5A – Third Southbound Lane on KY 9

LOCATION INFORMATION	
<p>Location County: Campbell Route: KY 9 (MP: 17.1 to 17.6)</p> <p>KY 9 Southbound at I-275 Eastbound Off-Ramp</p>	 <div style="border: 2px solid white; border-radius: 15px; width: 100px; height: 100px; display: flex; align-items: center; justify-content: center; margin: 0 auto;"> 5A </div>
EXISTING CONDITIONS	
<p>KY 9 Existing Features</p> <ul style="list-style-type: none"> • Two lanes each direction with mountable median • 12' lane width; 10' outside paved shoulder width • 45 mph Posted Speed Limit <p>Issues</p> <p>At the I-275 EB off-ramp, KY 9 drops to a single lane while the channelized right turn from the ramp merges with KY 9 reforming two southbound lanes. This lane drop results in a lane imbalance for the southbound direction and is observable at both the eastbound and westbound ramp intersections. 16 southbound crashes occur at the ramp merge with KY 9 and 12 are sideswipe crashes. Existing LOS during the PM Peak is D, F, and E at the KY 9 intersections with Town Drive, I-275 Eastbound Ramps, and I-275 Westbound Ramps, respectively.</p>	<p>TRAFFIC DATA</p> <p>KY 9 No Build (AADT): 2021: 24,400 2045: 31,000</p> <p>CRASH DATA</p> <p>KY 9 SB Crashes at Ramp Merge: Total: 16 Sideswipe: 12 Fatality: 1</p>
IMPROVEMENT CONCEPT	
<p>Description</p> <p>Keep both southbound lanes on KY 9 at the I-275 eastbound of-ramp and add another lane for ramp traffic. Tie in the channelized right turn from the I-275 ramp as a third lane. All three lanes will extend past Town Drive and be dropped before Rosewood Drive. Significant fill is needed along KY 9. It is recommended to be rock rill in order to achieve a 2:1 slope and minimize ROW impacts to businesses along Town Drive. Removing the lane drop at the intersection would improve the lane utilization and improve safety, specifically the high percentage of sideswipe crashes.</p> <p>Systemwide Operations Results</p> <ul style="list-style-type: none"> • AM Peak: 8 sec/veh delay increase / 0.6 mph speed reduction • PM Peak: 121 sec/veh delay reduction / 8.9 mph delay increase 	<p>COST ESTIMATE</p> <p>2021 Dollars</p> <p>Design: \$350,000 ROW: \$250,000 Utilities: \$1,500,000 Const.: \$3,460,000 Total: \$5,560,000</p> <p>BENEFIT-COST RATIO</p> <p>3.3</p> <p>PROJECT PRIORITY</p> <p>Short Term</p>

Figure ES-4. Improvement Option 5A – Third Southbound Lane on KY 9 (continued)



Figure ES-5. Improvement Option 5C – Widen KY 9 and Convert Town Drive and Steffen Lane to a Right-In/Right-Out



Figure ES-5. Improvement Option 5C – Widen KY 9 and Convert Town Drive and Steffen Lane to a Right-In/Right-Out (continued)



Figure ES-5. Improvement Option 5C – Widen KY 9 and Convert Town Drive and Steffen Lane to a Right-In/Right-Out (continued)

