EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated a corridor study for KY 1747 (Hurstbourne Parkway) in Jefferson County, stretching from Stony Brook Drive near milepoint (MP) 10.500 to the I-64 westbound ramps near MP 12.000. The study area limits, shown in **Figure ES - 1**, included approximately 250 feet on either side of the existing highway centerline.

The goal of this study was to identify practical, implementable solutions to improve safety, vehicle throughput, and pedestrian connectivity along the congested KY 1747 corridor between Stony Brook Drive and I-64. While each spot improvement has its own Purpose and Need Statement, each focused on one or more of these three goals. In addition, each spot improvement was designed to minimize right-of-way and environmental impacts to the extent practicable.

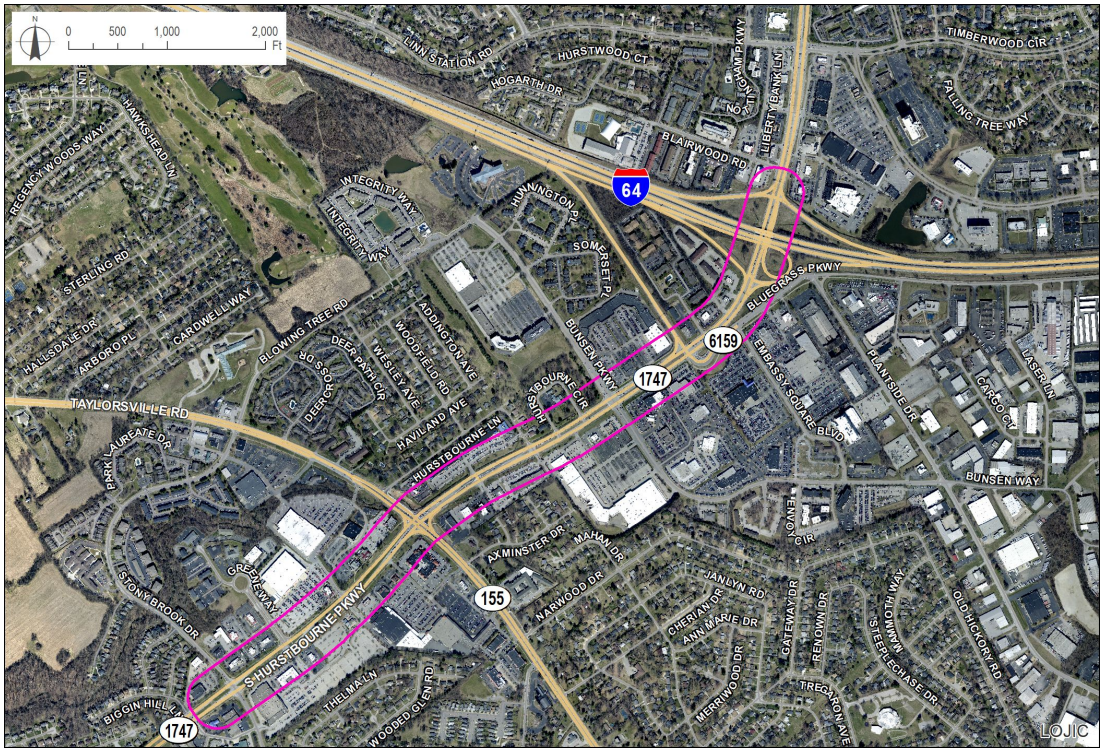

Figure ES - 1: Study Area Map

Study tasks included creating an inventory of existing conditions, defining goals for the study, forecasting existing and future traffic, identifying red flag environmental issues, developing build concepts with construction cost estimates, and documenting the study process and results. Coordination with the project team—KYTC District 5 and Central Office staff, Kentuckiana Regional Planning and Development Agency (KIPDA), and the consultant—occurred throughout the study process. In addition, two local officials/stakeholders' meetings and two rounds of public surveys were conducted to share information and gather community input.

KY 1747 is classified as an urban principal arterial and provides 12-foot lane widths throughout the study area with four travel lanes south of the KY 155 (Taylorsville Road) intersection and six lanes to the north. A grassy median separates travel directions south of the interchange and most

of the corridor has curb/gutter for drainage. Between KY 155 and Hurstbourne Circle, large drainage ditches behind curbs carry the South Fork of Beargrass Creek and its tributaries, creating a gap in sidewalk connections for pedestrians. Nine of ten intersections along the study corridor are signalized. Despite a 45-mph posted speed limit, travel speeds during the PM peak average 22 mph southbound and 25 mph northbound.

Traffic Flows

Year 2020 daily traffic volumes (prior to the pandemic) range from 26,900 to 58,800 vehicles with strong directional flows during peak hours. KY 1747 carries 2,200 to 4,600 vehicles during the AM peak hour and 2,700 to 4,800 vehicles during the PM peak hour. To measure performance, a Level of Service (LOS) analysis was performed. LOS rates traffic conditions A (best case, free flow) through F (worst, gridlock) based on speed, density, and driver comfort. Currently, the Hurstbourne Parkway intersections with KY 155, Bunsen Parkway, and Bluegrass Parkway/I-64 eastbound off-ramps (Exit 15A) operate at LOS E or F during peak hours. Most intersections along the study corridor have individual turn movements operating at LOS F.

Defective signal detectors at a series of intersections adjacent to the interchange compromise safety and throughput; Item No. 5-9019 is designed to correct the issue.

KIPDA's current regional travel demand model generated future year forecasts using 2040 as the future analysis year. Because the corridor is already approaching available capacity, model runs showed minor traffic growth. Year 2040 daily traffic volumes range from 32,100 to 62,900 vehicles. This equates to 3,300 to 5,300 vehicles during the AM peak hour and 3,600 to 5,500 vehicles during the PM peak hour.

Forecast volumes were input into a VISSIM microsimulation model to analyze future traffic operations. As the existing system is near capacity, the relatively small increase in No-Build traffic pushes the system over capacity and into gridlock: almost every intersection operates at LOS E or F during the PM peak. With few parallel route options and limited I-64 access points in the vicinity, the study corridor is a critical link in the regional network.

Crash Patterns

From July 2016 through June 2019, 811 crashes were reported within the study area including one fatality (an early morning pedestrian strike near Stony Brook Drive) and 81 injury collisions. Most crashes were rear end collisions (56%)—typical for a congested urban highway—followed by same-direction sideswipes (21%) and angle collisions (18%). Four reported pedestrian strikes (1 fatality and 2 injuries) were distributed along the corridor.

Two methodologies were applied to analyze crash concentrations:

- A Critical Crash Rate Factor (CCRF) greater than 1.0 indicates crashes may be occurring more often than can be attributed to random occurrence. High CCRF spots 0.1-mile long cover over two thirds of the study corridor length—shown in **Figure ES - 2**. The highest CCRF spot is located at the KY 1747 intersection with Bunsen Parkway.
- Excess Expected Crashes (EEC), a newer methodology defined in the *Highway Safety Manual*, represents the number of excess crashes a segment or intersection is experiencing compared to other roadways of its type, adjusting for facility type and statistical corrections. Most of the corridor has a positive EEC—indicating more crashes are occurring than projected. Intersections in the study corridor with the highest EEC are the westbound ramps (215.5), Bunsen Parkway (82.6), and KY 155 (78.8).

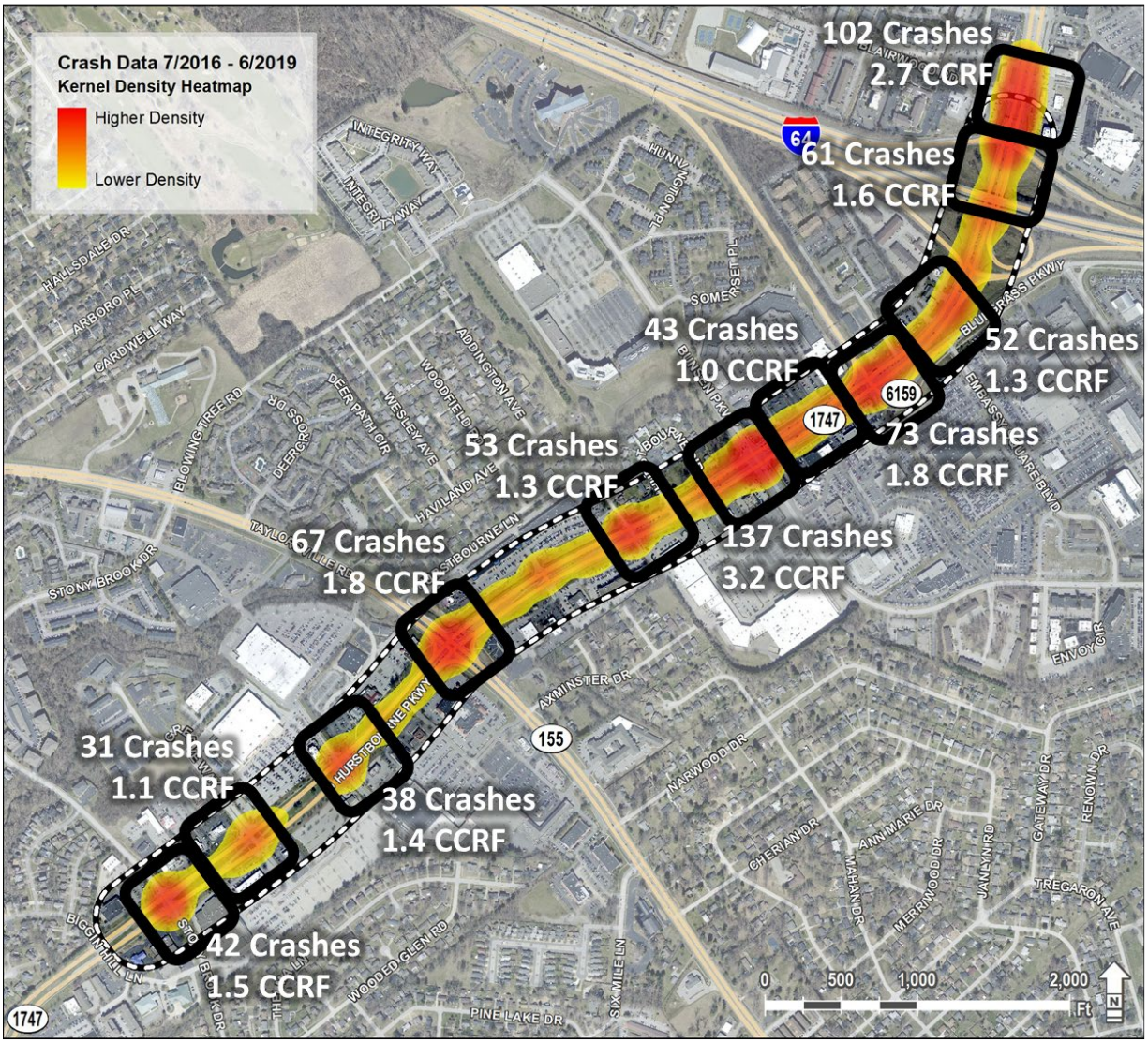

Figure ES - 2: High CCRF Spots by Crash Density

Environmental Overview

As a densely developed urban corridor, there are limited natural environmental elements remaining within the study area: South Fork of Beargrass Creek and two feeder springs. The study area includes narrow strips of the following Jefferson County municipalities: Jeffersontown, Hurstbourne, Hurstbourne Acres, Forest Hills, and Louisville. The entire corridor is zoned commercial/industrial, excluding the pocket of residential area accessed from Hurstbourne Circle. Bluegrass Parkway provides the primary access for Bluegrass Commerce Park in Jeffersontown. Available hazmat monitoring records range from short-term construction permits to commercial automotive properties with underground storage tanks (USTs) lining the route. Noise-sensitive receptors along the study corridor include residential areas and commercial uses with outdoor uses (e.g., sidewalk cafes or outdoor event venues). An assessment of demographic trends identified potential sensitive population concentrations—low-income, minority, elderly, disabled, or limited English proficiency persons—however, properties within the study area limits are almost entirely commercial properties.

Spot Improvements

Potential improvement concepts were developed based on a review of existing traffic and safety needs, field reconnaissance, and community input. These are divided into short-term and mid-term improvements, divided based on the scale of anticipated costs and impacts.

Short-term spot improvements represent small-scale actions within existing right-of-way that can be implemented more quickly than larger projects. Potentially, some could be addressed through maintenance actions, independent of more traditional funding options. Four short-term spot improvements are recommended:

A. Corridor-level Wayfinding/Signage. This concept includes placing "pavement tattoos" near the I-64 interchange and KY 155, restriping the dual left turns onto KY 1747 southbound from the I-64 westbound off-ramp, and updating the "Do Not Block Intersection" box at the southern Hurstbourne Circle intersection. Also included, signage is proposed to shift eastbound Bunsen Parkway traffic to the local access ramp (Exit 15B), providing a longer opportunity for left-turning vehicles to merge across the three southbound travel lanes. The existing versus proposed routing concepts are shown in **Figure ES - 3**.

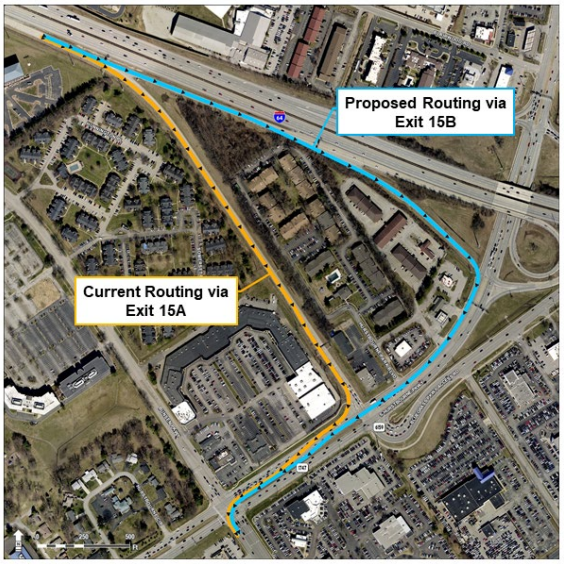

Figure ES - 3: Spot A Routing

B. Signal Optimization. The ongoing 5-9019 project will replace existing puck detectors with loops at signalized intersections from Bunsen Parkway to Linn Station Road, which should noticeably improve corridor throughput. Once hardware is in place Louisville Metro plans to optimize the KY 1747 corridor signals between US 60 and KY 155. This concept (Spot B) extends coordination efforts to the southern three study intersections: Shane Drive, Greene Way, and Stony Brook Drive. At these intersections, permitting off-peak left turns from KY 1747 (with flashing yellow lights) may improve operations.

C. Greene Way Medians. The Greene Way intersection provides raised islands intended to channelize movements to prevent thru movements between cross-streets. This concept (Spot C) proposes to cut back the islands within the intersection to allow thru movements.

D. Sidewalk Maintenance. This spot improvement is a catch-all for maintenance level actions along existing pedestrian facilities lining the corridor: drainage, crosswalks, lighting, Americans with Disabilities Act (ADA) compliance, etc.

The remaining spot improvements are larger in scale and have somewhat longer implementation timelines due to higher costs or greater impacts (e.g., right-of-way acquisition or stream impacts). However, they are intended for implementation within a reasonably foreseeable timeline. Five "mid-term" spot improvements are recommended:

E. Displaced Left Turns. Left turns from northbound KY 1747 onto the I-64 westbound on-ramp represent a high-volume movement. An unscheduled future project (Item No. 5-52) will reconstruct the interchange to convert these turns to a free-flow movement. A less costly alternative, Spot E shifts the left turn movement upstream one intersection to create dual displaced left turn lanes functionally similar to half a diverging diamond interchange (DDI). As shown in **Figure ES - 4**, northbound motorists accessing the

westbound I-64 on-ramp will turn left at the eastbound ramps intersection, then continue onto I-64 as a free-flow movement. Beneath the overpasses, a vertical wall replaces the west embankment to accommodate the dual left turn lanes outside the pier. The existing sidewalk shifts inside the pier, separated from southbound traffic by a barrier.

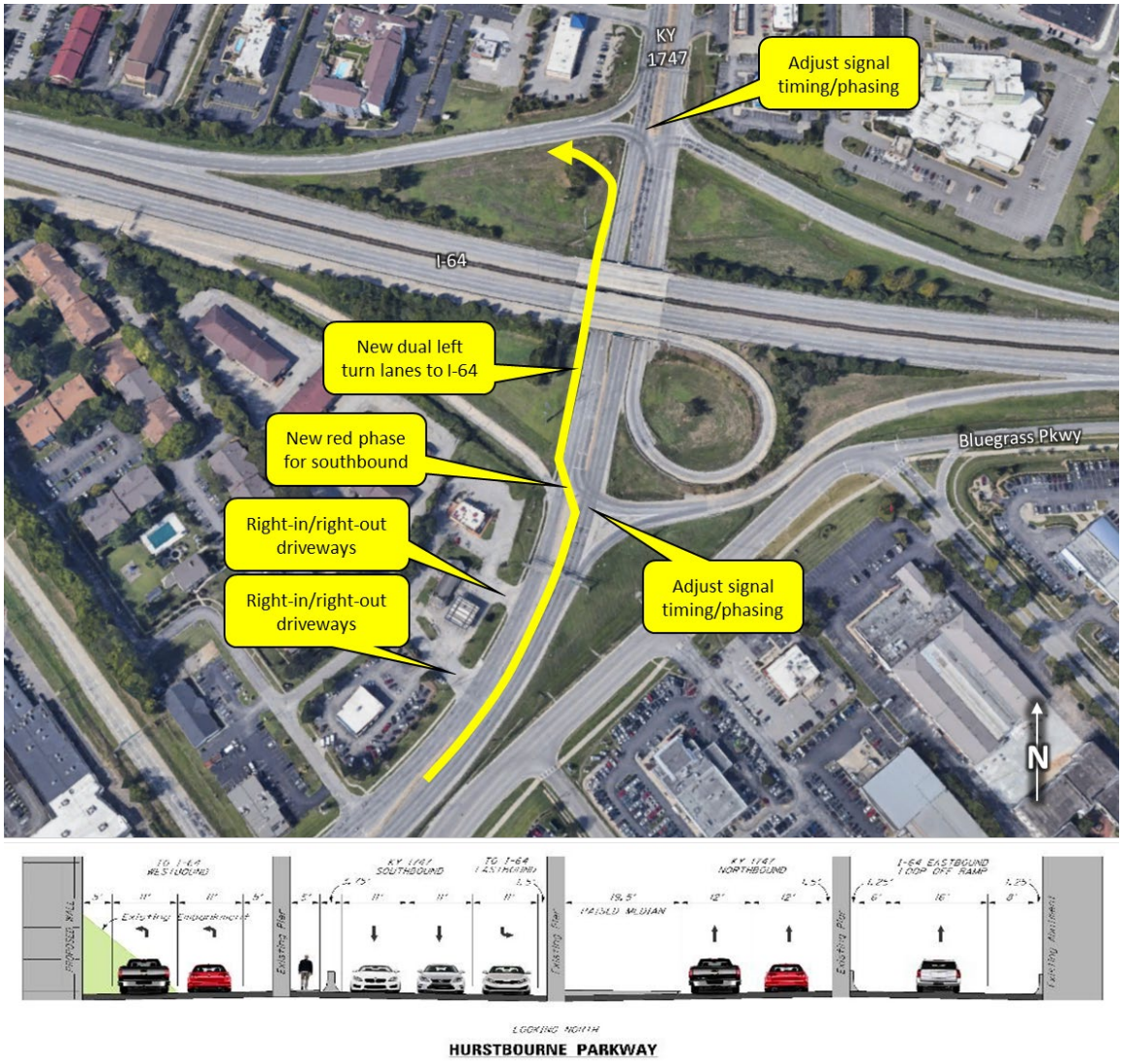

Figure ES - 4: Spot E Northbound Displaced Left to I-64

F/G. Southbound Thru Lane plus Sidewalk. To accommodate heavy, southbound peak hour traffic flows during the PM peak, a fourth southbound lane is proposed within the median south of Hurstbourne Circle to reduce impacts. An extra right turn lane onto Bunsen Parkway is added so four thru lanes continue south, tying to recently constructed improvements approaching KY 155. The northern Hurstbourne Circle intersection is converted to a right-in/right-out configuration to reduce conflict points. In addition, a 5-foot-wide sidewalk is proposed along the west side of KY 1747, between Hurstbourne Circle and KY 155, which will fill the missing gap in pedestrian connectivity.

H. Shared Use Path. A 10-foot-wide shared use path along the east side of KY 1747 is proposed to connect to the existing shared use path along Bluegrass Avenue at its north limit and to the existing sidewalk/crosswalk/bike lane at KY 155 on its south end.

I. Shane Drive Turn Lanes. Spot I proposes to add a southbound right turn lane on Hurstbourne Parkway at Shane Drive. The mainline left turn lanes are proposed to be offset across the median to improve visibility for permitted (flashing yellow) left turns during off-peak periods. A proposed refuge in either median will improve safety for pedestrians and reduces the signal phasing for motorists.

J. Northbound Right Turn Lane onto KY 155. The existing KY 1747 northbound right turn lane onto KY 155 is proposed to be extended back to the right-in/right-out driveway by Starbucks/PNC to increase storage length for right turning vehicles. Northbound thru queues block turning vehicles from accessing the short turn lane today.

Figure ES - 5 and **Figure ES - 6** on the following pages show planning-level concept sketch of Spot E and Spots F, G, and H. Project sheets beginning on Page 60 of this report present each concept in additional detail. Cost estimates are summarized in **Table ES - 1**, including planning-level estimates for design, right-of-way, utility, and construction phases plus a 30% contingency.

Table ES - 1: Planning-Level Cost Estimates (2020 Dollars)

Spot	Total Cost
A – Wayfinding	$90,000
B – Signal Optimization	$50,000
C – Greene Way	$340,000
D – Ped Maintenance	$260,000
E – Displaced Lefts	$5.3 M
F/G – Southbound Thru Lane plus West Sidewalk	$2.3 M to $6.9 M
H – East Shared Use	$3.0 M
I – Shane Drive	$1.3 M
J – Right onto KY 155	$360,000

The proposed improvements were supported by local officials and stakeholders, representing affordable solutions that could be implemented before larger, more expensive solutions like full reconstruction of the I-64 interchange (Item No. 5-52). Affected municipalities identified spots G and H (pedestrian connections) as priorities. Safe turns to/from Hurstbourne Circle were also a concern. Public priorities based on 321 survey responses identified Spot B (signal optimization) as the highest short-term priority; Spot E (displaced lefts at interchange) was the highest mid-term priority, followed closely by Spot F (extra southbound lane).

To the extent practical, improvements are contained within the existing right-of-way to minimize property impacts. Because the corridor is fully developed, few environmental impacts are anticipated. A thorough geotechnical exploration of proposed improvement sites is recommended to identify conditions that may warrant special consideration during design and construction.

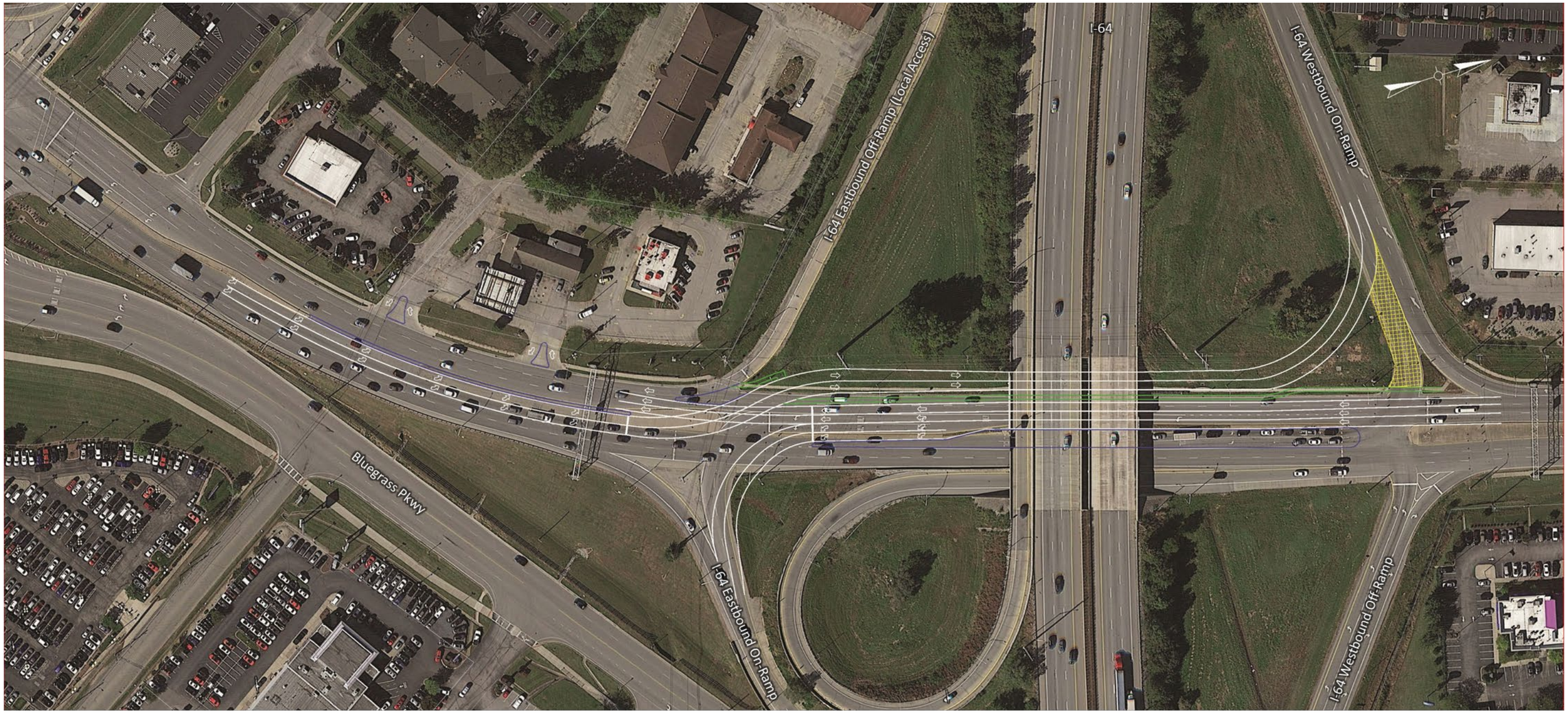

Figure ES - 5: Spot E Concept Sketch of Displaced Lefts

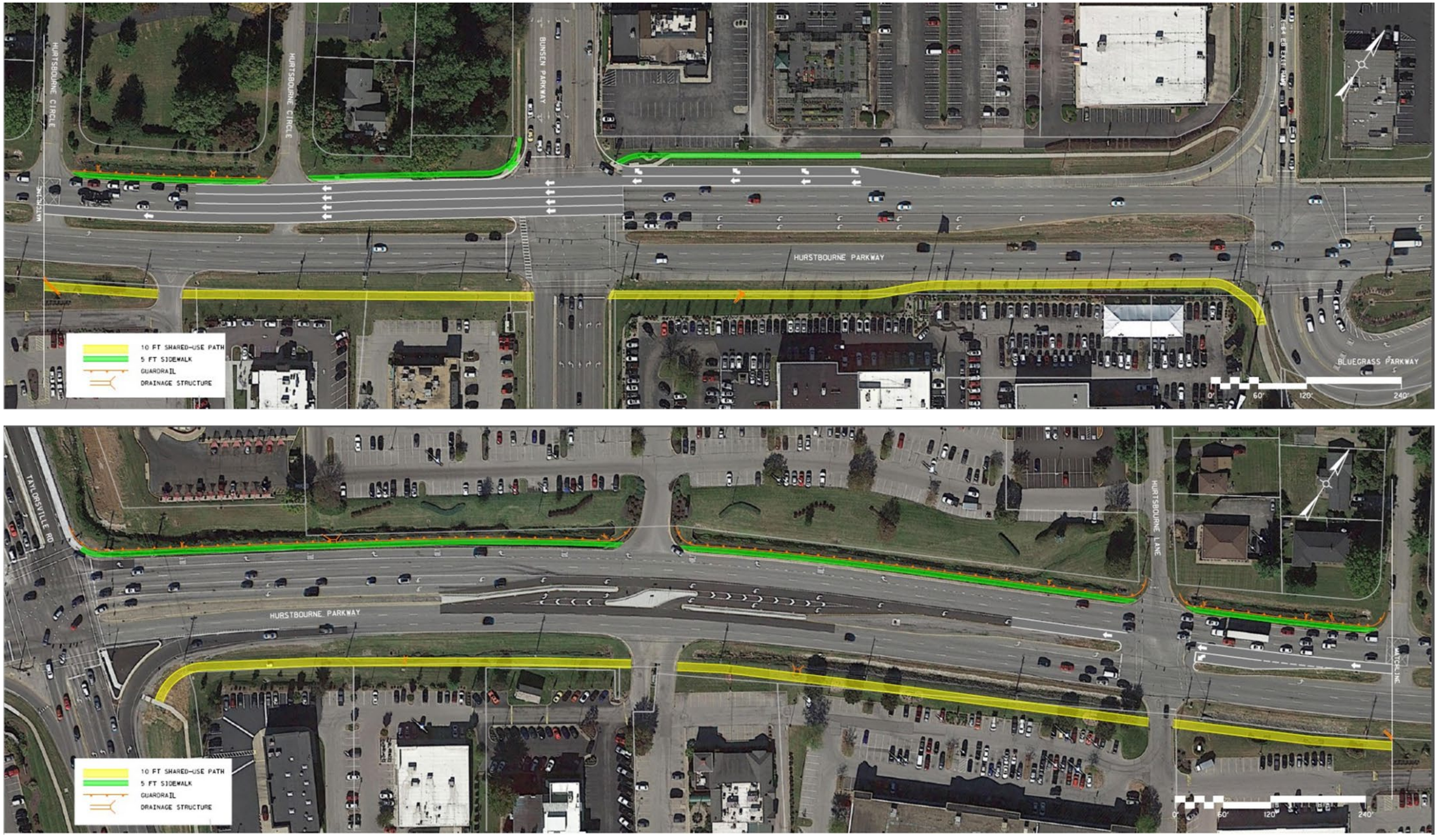

Figure ES - 6: Spots F, G, and H Concept Sketch

Finding an appropriate balance between mobility and access is one of the core challenges facing those planning the corridor's future. Long-term, the ultimate vision for the corridor is estimated to cost $75–136 million for construction alone, excluding design, right-of-way, or utility costs. Impacts to surrounding properties and their access would be substantial. A comprehensive regional planning analysis is recommended to determine whether investing in other cross-I-64 corridors might provide more benefit than direct investment in KY 1747 beyond recommended Spots A—J.

Build Traffic Operations

The future No-Build microsimulation model was adjusted to calculate performance for the larger scale spot improvements discussed above. Travel times along the entire study corridor are summarized in **Table ES - 2** for each peak period, direction, and improvement scenario.

The greatest operational benefits were associated with Spot E (displaced lefts), which improves PM peak LOS at the two signalized ramp termini from LOS F in the No-Build to LOS D in the Build. Queue lengths were examined: introducing a new signal for the southbound thru movement at the eastbound ramps could affect operations within the interchange's area of influence because the movement is free-flow today. The average southbound queue lengths approaching the eastbound ramps are 450 feet. Although this is within the 700-foot available storage capacity, the 800-foot maximum queues exceed this length. During peak periods, westbound right turning traffic from Bluegrass Parkway may struggle to merge across thru lanes to reach the displaced lefts providing access to westbound I-64.

While less dramatic benefits are associated with Spot F (extra southbound thru lane), overall delay at the Bunsen Parkway intersection is reduced by 17 seconds during the PM peak.

Table ES - 2: Comparison of 2040 Corridor Travel Times

Direction	No-Build	Build 1 Spots E & A	Build 2 Spot F	Build 3 Spots C & I
AM Peak				
Northbound	569 sec	523 sec *46 sec savings*	564 sec *5 sec savings*	560 sec *9 sec savings*
Southbound	392 sec	361 sec *31 sec savings*	383 sec *9 sec savings*	387 sec *5 sec savings*
PM Peak				
Northbound	684 sec	659 sec *25 sec savings*	682 sec *2 sec savings*	682 sec *2 sec savings*
Southbound	860 sec	820 sec *40 sec savings*	815 sec *45 sec savings*	855 sec *5 sec savings*