



# US 25

## CORRIDOR STUDY ROCKCASTLE COUNTY, KY

MT. VERNON

## EXECUTIVE SUMMARY

prepared for:



in partnership with:



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## EXECUTIVE SUMMARY

### Study Background

The Kentucky Transportation Cabinet (KYTC) initiated a corridor study in the summer of 2021 for US 25 near the city of Mount Vernon in Rockcastle County. The study includes two distinct sections of US 25, surrounding its interchange with Interstate 75 (Exit 62). Combined, the study area is 2.3 miles in length, stretching between KY 461 approaching Mount Vernon to the south and Beiting Lane to the north.

**Figure ES-1** depicts the limits.

Both study sections of US 25 provide a critical link in the local and regional transportation network. Beyond connecting Mount Vernon with I-75, the corridor provides the most direct connection to Lake Cumberland to/from the north and provides access to event venues such as Renfro Valley Entertainment Center and the Kentucky Music Hall of Fame. US 25 also provides a detour route when an incident disrupts I-75 operations.

Immediately south of the study corridor, an ongoing KYTC project (Item No. 8-8952) is underway to widen KY 461 between US 150 and US 25 to four lanes, a distance of 2.4 miles. It should be noted the I-75 interchange was reconstructed during 2017–2019, concurrent with a larger interstate widening effort.

### Existing Geometry and Systems

**Table ES-1** summarizes existing conditions for US 25 in both sections of the study area. As a principal arterial and component of both the National Highway System and National Truck Network, US 25 through the southern study area provides a much higher level of mobility than

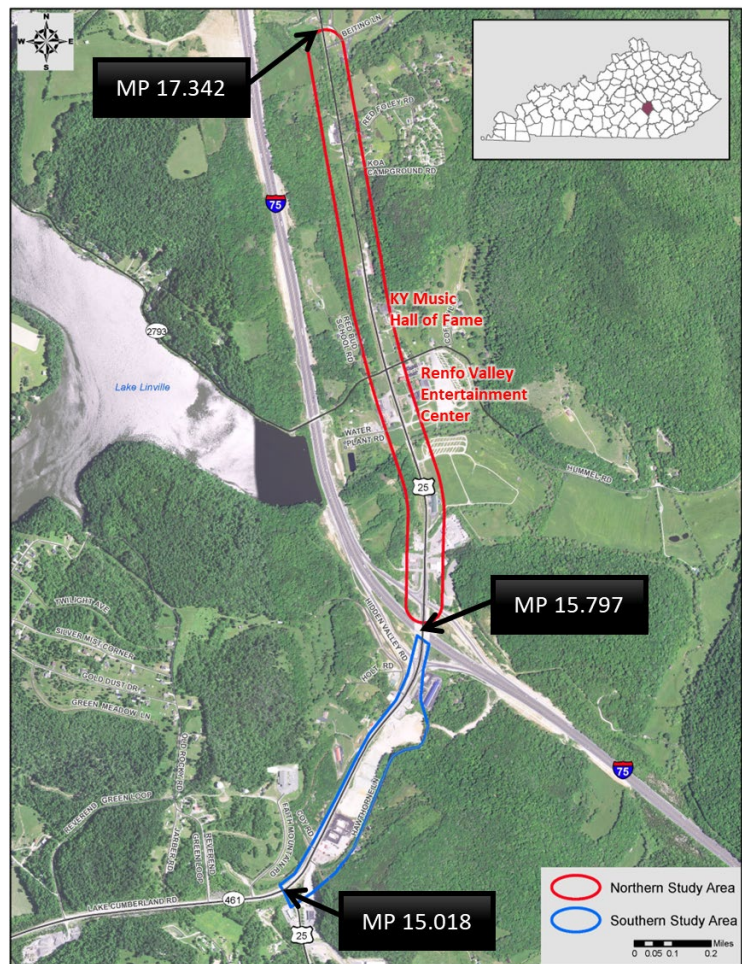


Figure ES-1: Study Area with Milepoints (MP)

through the northern study area. US Bike Route 21 (Daniel Boone Bike Tour) runs along the entirety of US 25 in the study area; however, no dedicated bike facilities exist.

Table ES-1: Existing Systems and Geometry Summary

	Northern Study Area	Southern Study Area
<b>Highway Systems</b>	<ul style="list-style-type: none"> <li>• Rural Major Collector</li> <li>• Scenic Byway</li> <li>• US Bike Route 21</li> <li>• State Secondary System</li> </ul>	<ul style="list-style-type: none"> <li>• Rural Principal Arterial</li> <li>• National Highway System</li> <li>• State-designated truck route</li> <li>• Scenic Byway</li> <li>• US Bike Route 21</li> <li>• State Primary System</li> </ul>
<b>Geometry/ Design</b>	<ul style="list-style-type: none"> <li>• Two 11-ft-wide thru lanes + TWLTL</li> <li>• Curb/gutter or 1-ft paved shoulders</li> <li>• Some sidewalks, ped underpass</li> <li>• 45-55 mph</li> <li>• 5-6% grades</li> <li>• AAA (80,000 lb.) truck weight</li> <li>• Access by permit</li> </ul>	<ul style="list-style-type: none"> <li>• Three 12-ft-wide thru lanes + TWLTL</li> <li>• 10-ft-wide paved shoulders</li> <li>• No sidewalks</li> <li>• 45 mph</li> <li>• 5-7% grades</li> <li>• AAA (80,000 lb) truck weight</li> <li>• Access by permit</li> </ul>

\* TWLTL = two-way left-turn lane

## Traffic Flows

Three different rounds of existing traffic data were collected:

- Summer weekend volumes ranged from 15,300 to 19,200 vehicles per day (vpd), with peak flows southbound—towards Lake Cumberland—on Friday and northbound on Sunday. A steady stream of slow-moving lake traffic is common, with queues for miles along US 25 on summer weekends and holidays (**Figure ES-2**).



Figure ES-2: Northbound Queue along KY 461 (upstream from study area)

- Weekday average daily traffic is 4,700–7,800 vpd north of the I-75 interchange and up to 15,400 vpd to the south. While these are lower than weekend traffic, they better correlate to future year traffic projections. Operationally, most intersections operate at Level of

Service (LOS) C or better during both weekday peak hours—except left turns from the stop-controlled southbound off-ramp (LOS E) and the US 25/KY 461 signal (LOS D during PM peak). Between intersections, closely spaced commercial driveways introduce turbulent flow characteristics with numerous conflict points.

- To measure travel times, traffic data was also collected during a sold-out concert at Renfro Valley during February 2021. Arriving before the event, travel times were 3.5 to 5 minutes to travel 2,100 feet from the interchange to the entrance, equating to speeds of 5 to 7 mph with traffic queuing up along US 25. However, no officers helped direct traffic and attendants were not in the parking lot to manage on-site navigation/queuing.

Coordination with local officials occurred to define a reasonable future No-Build scenario, reflective of current local land use development projections. Among other regional growth plans, site work is ongoing for seven parcels immediately east of US 25 (approximate MP 15.3—15.5, herein referred to as the “Ditch” development) that will directly impact US 25 traffic flows/access. While tenants have yet to be identified, a series of highway-oriented businesses and a small grocery could be expected to locate on the site with construction beginning as early as 2023.

KYTC’s current statewide travel demand model, along with 2021 weekday turning movement counts and input from community leaders, formed the basis of future year 2045 traffic projections. An annual growth rate of 0.6% south of the interchange and 0.2% north was applied to the 2021 Existing weekday scenario to project future 2045 No-Build traffic. The corridor is expected to carry 8,400 (north) to 17,600 (south) vpd in the No-Build scenario. Most study intersections and stop-controlled approaches operate at LOS D or better during both peak hours with the southbound off-ramp and US 25/KY 461 signal at LOS E.

## Crash Trends

During the 2016-2020 analysis period, 127 crashes occurred along the US 25 corridor: 81 south of the I-75/US 25 interchange and 46 to the north. Of these crashes, there were no fatalities and 16 injury collisions. Most crashes are clustered near the I-75 interchange: 92 crashes (11 injuries) occurred in the half-mile stretch surrounding the interchange. It should be noted that crash patterns may not be representative of typical patterns, as both the I-75 widening project and the Covid pandemic influenced traffic patterns during the analysis period.

Statistical analysis shows most of the study area exhibits an elevated crash pattern and poor Level of Service of Safety (LOSS), with higher concentrations in the busier southern section.

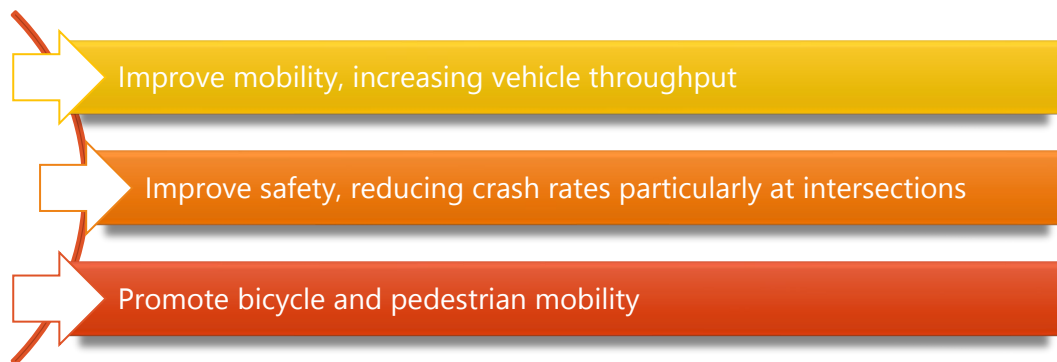




Figure ES-3: Closely Spaced Driveways in Southern Study Area

## Study Goals and Objectives

Finding an appropriate balance of mobility and access is one of the core challenges facing the US 25 corridor in the southern study area. Between KY 461 and the I-75 interchange, the goals of the proposed study are:



As secondary objectives, all concepts should also preserve reasonable, safe access to adjoining businesses and minimize right-of-way impacts.

The goals and objectives for improvements considered in the northern study area focus on enhanced bicycle and pedestrian mobility.

## Build Concepts

Improvement concepts in the southern study area focus on access management strategies to streamline traffic flow and improve safety. Much of the discussion centers around the "Ditch" development (**Figure ES-4**) that extends along the eastern edge of US 25. While any internal roadway connections would be the responsibility of the developer, representative access options were presented to the project team and key stakeholders to facilitate discussions. The property's connection to US 25 is complicated by numerous factors: proximity to the interchange, nearby

clusters of closely spaced driveways, steep grades climbing to the south, steep terrain features parallel to US 25 and the development site, and the US 25/KY 461 signal.



Figure ES-4: Design Challenges in Southern Study Area

Improvement concepts were developed based on a combination of input from the project team, a review of existing conditions, stakeholder feedback, and field reconnaissance. The typical section south of the interchange is intended to match with the adjacent Item No. 8-8952 widening project: two 12-foot-wide thru lanes per direction, a 14-foot flush median, and 10-foot-wide paved shoulders.

- **Concept 1 (Figure ES-5)** widens US 25 south of the interchange, providing two 12-foot-wide thru lanes per direction, curb/gutter, a flush center median, and 10-foot-wide shared-use path on the east side. It creates a signalized "Green-T" intersection at US 25/KY 461 with a bulb out or "looon" for southbound U-turn traffic. A backage road connection provides access between approximate MP 15.12 and 15.55 with right-in/right-out (RI/RO) connections at either end and a Green-T.
- **Concept 2 (Figure ES-6)** widens US 25 south of the interchange, providing two 12-foot-wide thru lanes per direction, curb/gutter, a raised center median, and 10-foot-wide shared use path on the east side. It assumes a signalized Green-T intersection at US 25/KY 461 and adds a raised median to prevent cross-median traffic except at designated locations. The stop-controlled intersection with the I-75 southbound ramps is reconstructed as a roundabout with two northbound thru lanes.
- **Concept 2+ (Figure ES-7)** matches Concept 2 plus reconstructs the US 25 intersection with the I-75 northbound ramps as a single lane roundabout. With this improvement, northbound US 25 traffic to the northbound I-75 on-ramp is free-flow with no opposing movements after entering the southern roundabout.



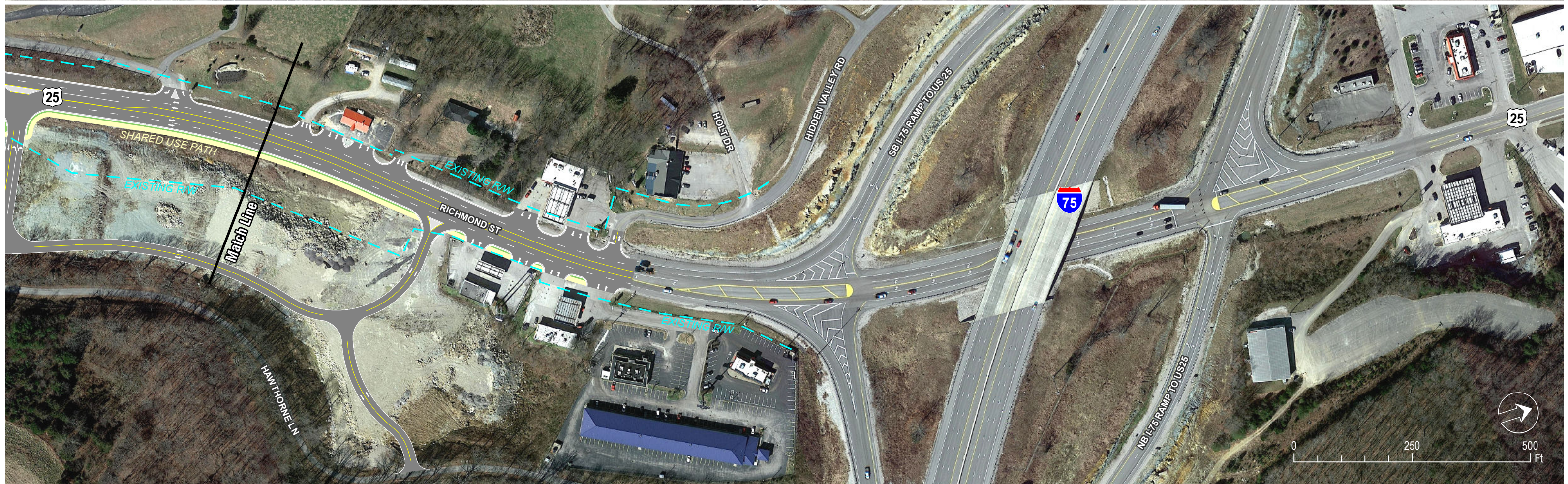


Figure ES-5: Access Management Concept 1



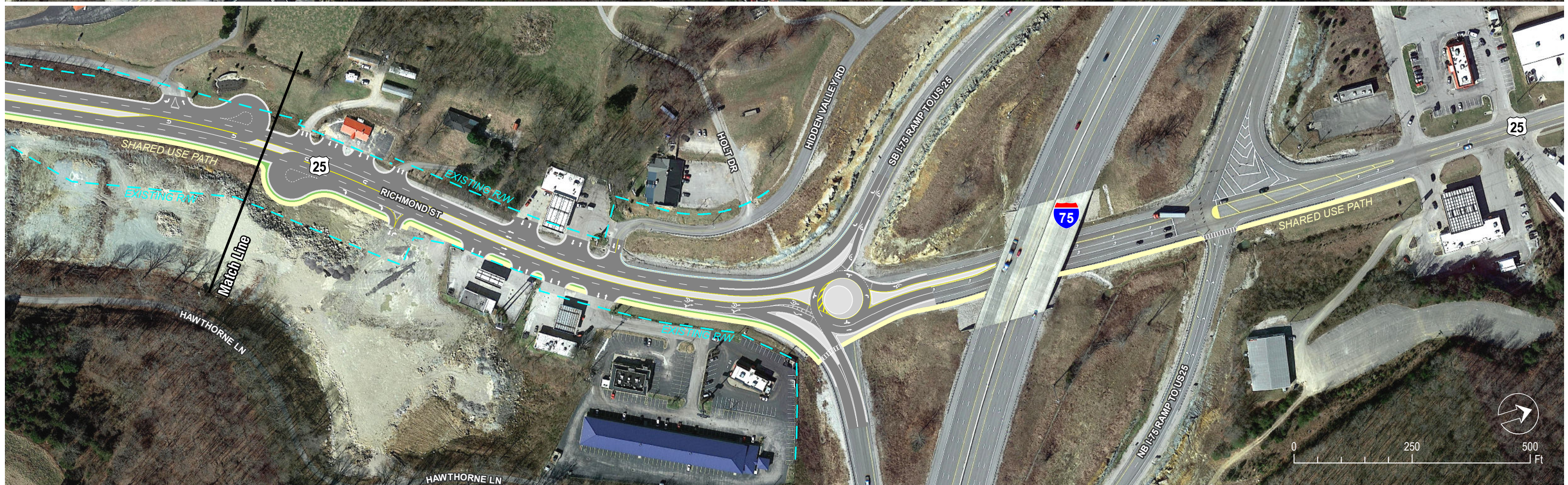


Figure ES-6: Access Management Concept 2



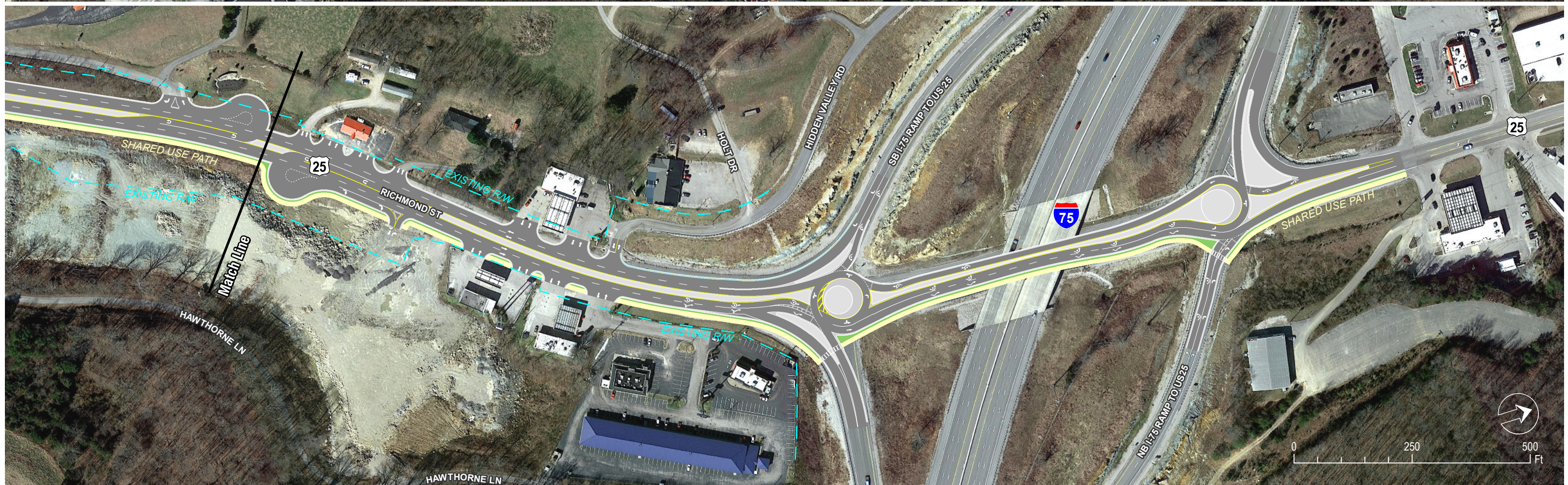


Figure ES-7: Access Management Concept 2+



Other spot improvements add/extend a lighted, 10-foot-wide **Shared Use Path** between US 25/KY 461 and the KOA Campground and replace asphalt pavement with concrete within the interchange where heavy trucks have begun to rut turn lanes.

Two other concepts were considered but dismissed:

- Reversible lanes to manage event traffic within existing pavement are more impactful and costly than assigning traffic control personnel at the venue.
- Safety concerns at the US 25/Holt Road intersection should be monitored to determine if recent improvements at the interchange addressed crash concerns.

Costs for each component are presented in **Table ES-2**.

Table ES-2: Cost Estimates by Phase (2022 Dollars)

Build	Total Cost	Design	Right-of-Way	Utilities	Construction
Shared-use Path to KOA	<b>\$2.9M</b>	\$250,000	--	\$400,000	\$2.2M
Widen existing sidewalk	<b>\$700,000</b>	\$50,000	--	\$200,000	\$450,000
Shared-use Path at Interchange*	<b>\$3.2M</b>	\$250,000	--	\$380,000	\$2.6M
Shared-use Path to KY 461**	<b>\$4.0M</b>	\$250,000	--	\$350,000	\$3.4M
Replace dual left pavement	<b>\$1.3M</b>	\$120,000	--	--	\$1.2M
Concept 1					
US 25/shared-use path	<b>\$9.3M</b>	\$1.0M	\$150,000	\$700,000	\$7.4M
Backage Road	<b>\$3.6M</b>	\$250,000	\$900,000	\$300,000	\$2.1M
Concept 2	<b>\$18.0M</b>	\$1.6M	\$170,000	\$700,000	\$15.5M
Concept 2+	<b>\$20.1M</b>	\$1.7M	\$170,000	\$950,000	\$17.3M

\* Included in Concept 2+ costs shown but presented for reference as standalone element

\*\* Included in Concepts 1, 2, and 2+ costs shown but presented for reference as standalone element

Operationally, Concepts 1, 2, and 2+ reduce delay south of the interchange compared to the 2045 No-Build scenario. Microsimulation of the proposed roundabouts indicates both Concepts 2 and 2+ would provide adequate capacity for anticipated 2045 PM peak hour traffic, reducing delay compared to the existing configuration and supplying adequate queue storage lengths between ramp termini.

Safety analyses demonstrate that Concepts 1, 2, and 2+ reduce conflict points compared to a five-lane typical section with no access management measures implemented. Converting a signal to a Green-T, restricting left turns, and constructing roundabout(s) can be expected to reduce US 25 crash rates through and south of the interchange.



## Recommendations

Build concepts were developed to minimize right-of-way requirements and match the proposed typical section for the committed KY 461 widening project to the south. This could potentially allow the subject project to advance on an accelerated schedule, streamlining construction costs and impacts for the larger corridor by coordinating adjacent projects.

Study recommendations include constructing a lighted, 10-foot-wide shared use path along the east side of US 25 from KY 461 to the KOA campground and widening US 25 from KY 461 to the I-75 interchange, incorporating access management measures. While no single Build concept is recommended, Concept 2+ is generally preferred as it best meets the study's objectives and goals. Concept 1 would require right-of-way for the backage road, impacting the project development timeline. Dual roundabouts in Concept 2+ provide a smoother flow through the interchange with fewer conflict points and improved safety for pedestrians. However, other concepts may be explored in future design phases.