

EXECUTIVE SUMMARY



US 41 Traffic and Access
Management Study
Henderson County
KYTC Item No. N/A

Prepared for:



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Executive Summary

The Kentucky Transportation Cabinet (KYTC) initiated the US 41 Traffic and Access Management Study in Henderson County with funding from the Evansville Metropolitan Planning Organization (MPO). The study examines the need for and types of improvements necessary along the US 41 corridor, from north of the US 60 interchange to the intersection with Wolf Hills Road. The study serves as the first step in establishing the purpose and goals of the project, identifying potential concerns, and evaluating preliminary alternatives.

Purpose and Need

The purpose of this project is to relieve congestion and improve safety along the US 41 corridor from north of the US 60 interchange (MP 16.386) to the intersection with Wolf Hills Road (MP 18.538). Safety is the primary concern along US 41, along with alleviating isolated pockets of congestion, as exhibited at Watson Lane.

This portion of US 41 carries a heavy mix of local and regional traffic as it connects Henderson, KY with Evansville, IN via twin bridges over the Ohio River. It not only serves as a connection between these interdependent cities, but also provides access to numerous businesses, industries, governmental organizations, and homes. The US 41 bridges provide the only river crossing in the area, resulting in traffic volumes on US 41 between 38,000 and 40,000 vehicles per day. The most congested segment is US 41 between Marywood Drive and Watson Lane with a volume-to-capacity (V/C) ratio of 0.96. All signals are operating at acceptable levels of service (LOS) except the signal at Watson Lane, which operates at a LOS E in the AM and LOS F in the PM. This signal fails due to delays from vehicles turning off of and onto Watson Lane.

Over the three-year period between January 2012 and December 2014, there were 433 crashes reported along the US 41 corridor, which includes 86 injury collisions. The percentage of injury collisions is higher along US 41 than on similar roads in Kentucky. Rear-end collisions made up 41 percent of the crashes, angle collisions made up 24 percent of the crashes, and opposing-left-turn collisions made up five percent of the crashes. These collisions total 70 percent of all the crashes along the study area portion of US 41 and are likely related to access management and congestion.

Alternatives Development

Community outreach helped guide the study, particularly in identifying potential issues and developing alternatives. Over the course of the study, the project team held three in-person project team meetings and two stakeholders/local officials meetings.

Based on early input from stakeholders and local officials, the project team decided the focus of the study would be to identify short-term, "quick-win" improvements that can be implemented quickly and independently as well as a long-term improvement plan that can be implemented as funding becomes available. Improvement concepts were developed to improve operational and safety deficiencies that result from the combination of heavy traffic volumes, signalized and unsignalized intersections, and access concerns.

US 41 is functionally classified as an urban principal arterial, yet it provides a significant level of access to adjacent properties. Along the 2.152-mile study area portion of US 41 there are approximately 119 access points (55 per mile). Most of those access points are south of Watson Lane (70 access points per mile). An effective access management program can reduce crashes by as much as 50 percent, increase roadway capacity by 23 to 45 percent, and reduce travel time and delay by as much as 40 to 60 percent¹.

Following the development of the initial improvement concepts, shown in **Figure ES-1**, the project team met with stakeholders and local officials in August 2015. Improvement concepts were presented and attendees were asked to complete a questionnaire to help the project team understand priorities from a local perspective. The first question asked respondents to rank the importance of seven transportation goals in order from 1 to 7 where 1 is the highest importance. Improving safety (1.5) and reducing congestion (2.0) were the highest ranked goals. The second question asked the respondents to rate the importance of the conceptual improvement projects on a scale from 1 to 5, where 1 indicates the project is not important and 5 indicates very important. Improvements to Watson Lane scored the highest (4.6) followed by the construction of an Eastern Backage Road (3.9). Relocating the traffic signal at Audubon Village Shopping Center to Barker Road and improvements to Elm Street both were also rated high (3.7).

Recommendations

The recommendations for the US 41 Traffic and Access Management Study are based on their ability to meet the purpose and need, the input received, and the alternative development process. The completion of the I-69 corridor between Kentucky and Indiana will affect future demand along US 41 (i.e., the six-lane widening concept would not be warranted if a new I-69 bridge is built between Evansville and Henderson). Therefore, the costs of proposed improvements were evaluated against future needs. In light of the technical data, comments from stakeholders, and results of the survey, the project team worked together to prioritize each of the improvements.

- **High Priority (in order)**
 - **Improvement 4 – Watson Lane Intersection:** Watson Lane is by far the most congested intersection in the study area. Based on the traffic analyses, southbound dual left turn lanes are needed on US 41. This will require widening Watson Lane east of US 41 to accommodate dual receiving lanes. There are also heavy delays during peak hours for westbound vehicles turning right from Watson Lane to northbound US 41. To help reduce this delay, the existing right-turn bay can be extended and a right-turn overlap phase can be implemented within the signal timing to increase capacity. Dual right turn lanes may also be considered during future phases of the project.

¹ Transportation Research Board (TRB) Access Management Manual

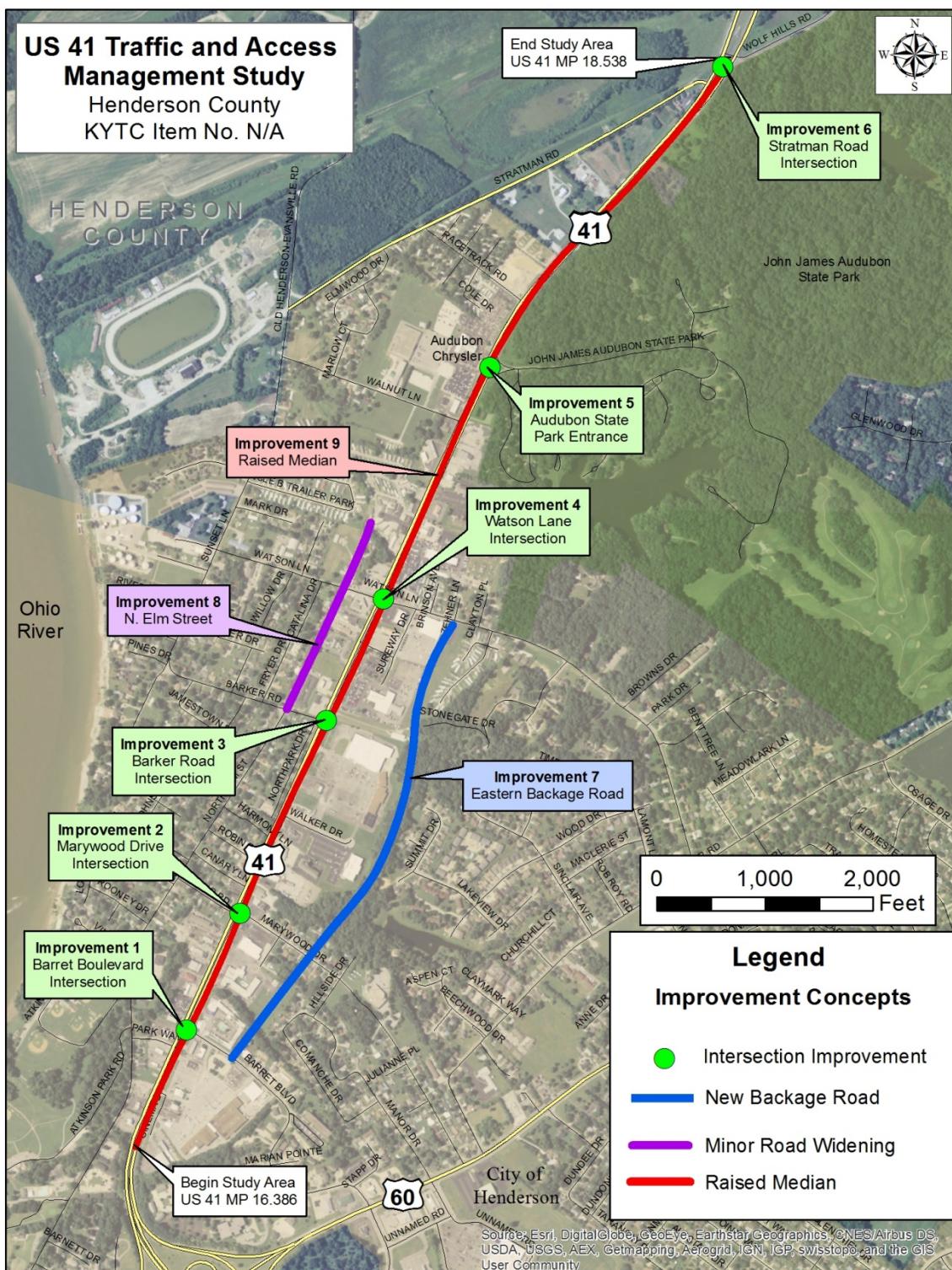


Figure ES-1: Improvement Concepts

- **Improvement 3 – Barker Road Intersection:** Move the signalized entrance at the Audubon Village Shopping Center north to Barker Road. Elm Street functions as backage road to most of the businesses on the west side of US 41. This would relieve congestion at Watson Lane by providing another signalized location for vehicles to turn left onto US 41. Widen the new Audubon Village Shopping Center entrance and Barker Road to accommodate additional turn lanes and improve capacity at the signal. Allow passenger vehicle U-turns at the signal.
- **Improvement 7 – Eastern Backage Road:** Construct a new backage road on the east side of US 41 between Barret Boulevard and Watson Lane. Provide connections to the existing shopping centers along US 41 and the new signal at Barker Road. The Eastern Backage Road can be designed all at once but built in segments as funding becomes available. Based on input from the final local officials and stakeholders meeting, the construction of sidewalks, bicycle lanes, and/or a shared use path should be considered during future design phases. Currently, there are few facilities for pedestrians and bicyclists on the east side of US 41. Also consider having the Eastern Backage Road line up with the Audubon State Park parcel off Watson Lane, where a new park entrance is under consideration.
- **Medium Priority (in no particular order)**
 - **Improvement 1- Barret Boulevard Intersection:** Add a signal and extend Barret Boulevard to N. Elm Street west of US 41. Widen Barret Boulevard to accommodate additional turn lanes and improve capacity at the signal. Some safety concerns were expressed at the project team meeting about adding a traffic signal at Barret Boulevard because of its proximity to the US 60 interchange. As a result, two concepts were developed for the Barret Boulevard intersection:
 - **Option 1 – Full Signal:** Add an outside lane on northbound US 41 for the interchange ramp. Terminate the extra lane at Barret Boulevard and remove the mainline lane drop on northbound US 41.
 - **Option 2 – “3/4 Signal”:** The new Elm Street Connector will become a left-in, right-in/right-out with a signal and Barret Boulevard will be converted to a right-in/right-out. This would allow northbound traffic to flow freely through the intersection. This configuration is similar to the “Green T” intersection concept². This appears to be the preferred alternative of the project team and stakeholders but should be evaluated further during future design phases.
 - **Improvement 2 – Rettig Road / Marywood Drive Intersection:** Provide a better alignment for Rettig Road and Marywood Drive. Widen each road to accommodate dedicated left-turn lanes and improve capacity at the signal. Allow passenger vehicle U-turns at the signal.
 - **Improvement 5 – Audubon State Park Entrance:** Reconfigure the skewed “Y” shape entrance to a single point entrance perpendicular to US 41. In the event a raised median is constructed along US 41, consider aligning the new Audubon State Park entrance with the Audubon Chrysler entrance.

² <http://safety.fhwa.dot.gov/intersection/resources/casestudies/fhwasa09016/fhwasa09016.pdf>

- **Improvement 6 – Stratman Road / Wolf Hills Road Intersection:** Reconstruct the Stratman Road and Wolf Hills Road offset approaches to a single intersection to accommodate U-turns and potentially add a signal. Widen each road to accommodate additional turn lanes and improve capacity at the signal. In the event a raised median is constructed along US 41, provide a jughandle off Stratman Road to accommodate U-turns for northbound semi-trucks.
- **Improvement 8 – N. Elm Street:** Add shoulders on N. Elm Street between Barker Road and Watson Lane. Add turn lanes at the Barker Road and Watson Lane intersections to increase capacity. In the event a raised median is constructed along US 41, consider extending N. Elm Street north of Watson Lane to provide a connection to the mobile home park.
- **Improvement 9 – Raised Median:** The raised median concept is shown extending the entire length of the corridor with median openings at the signalized intersections and the Audubon State Park entrance. The proposed typical section would not require additional right-of-way along US 41 except at intersections where additional turn lanes are required. The raised median can be implemented in phases, or the ultimate limits may be shortened as needed. The limits of the raised median and the typical section will ultimately be determined during future phases of the project.
- **No Priority**
 - **Safety and Mobility Improvement Plan:** In addition to short-term, “quick-win” improvements that can be implemented quickly and independently, the project team was also tasked with developing a long-term improvement plan that can be implemented as funding becomes available. The Safety and Mobility Improvement Plan combines improvements 1 through 9, as described above. Future design, right-of-way, utility and construction phases for this project are not included in the current Six Year Highway Plan. The project team has estimated the Safety and Mobility Improvement Plan to cost \$30.86 million, which will likely make such an undertaking infeasible as a single project.
 - **Improvement 10 – Six-Lane Widening:** Widen US 41 to three through lanes in each direction. Construct a raised median, which is currently proposed extending the entire length of the corridor with median openings at the signalized intersections and the Audubon State Park entrance. The proposed typical section would require 12 feet of additional right-of-way along US 41. Drainage requirements and turn lanes at intersections will likely require additional right-of-way. The limits of the raised median and the typical section will ultimately be determined during future phases of the project. The six-lane widening concept would not be warranted if a new I-69 bridge is built crossing the Ohio River between Evansville and Henderson.

Planning level cost estimates were prepared for each improvement concept, shown in **Table ES-1**, based on unit costs plus additional costs for special features (i.e., culverts and traffic signals). KYTC District 2 assisted in this effort by providing right-of-way and utility cost estimates.

Improvement	Description	Design	Right-of-Way	Utilities	Construction	TOTAL
1	Barret Boulevard Intersection (Option 1)	\$ 290,000	\$ 1,000,000	\$ 600,000	\$ 2,900,000	\$ 4,790,000
1	Barret Boulevard Intersection (Option 2)	\$ 240,000	\$ 1,000,000	\$ 600,000	\$ 2,400,000	\$ 4,240,000
2	Marywood Drive Intersection	\$ 120,000	\$ 350,000	\$ 850,000	\$ 800,000	\$ 2,120,000
3	Barker Road Intersection	\$ 170,000	\$ 350,000	\$ 300,000	\$ 1,100,000	\$ 1,920,000
4	Watson Lane Intersection	\$ 350,000	\$ 1,000,000	\$ 1,200,000	\$ 3,500,000	\$ 6,050,000
5	Audubon State Park Entrance	\$ 110,000	\$ 250,000	\$ 200,000	\$ 700,000	\$ 1,260,000
6	Stratman Road Intersection (Option 1)	\$ 380,000	\$ 300,000	\$ 400,000	\$ 3,800,000	\$ 4,880,000
6	Stratman Road Intersection (Option 2)	\$ 430,000	\$ 400,000	\$ 400,000	\$ 4,300,000	\$ 5,530,000
7	Eastern Backage Road	\$ 330,000	\$ 4,000,000	\$ 750,000	\$ 3,800,000	\$ 8,880,000
8	N. Elm Street	\$ 150,000	\$ 750,000	\$ 750,000	\$ 1,000,000	\$ 2,650,000
9	Raised Median	\$ 1,060,000	\$ 3,350,000	\$ 3,550,000	\$ 10,300,000	\$ 18,260,000
--	Safety & Mobility Improvement Plan	\$ 1,460,000	\$ 8,050,000	\$ 5,050,000	\$ 16,300,000	\$ 30,860,000
10	Six-Lane Widening	\$ 1,740,000	\$ 6,500,000	\$ 4,500,000	\$ 19,100,000	\$ 31,840,000

Table ES-1: 2015 Cost Estimates