Stantec

Final Report

Hamburg I-75 Crossing Feasibility Study

June 2021

Kentucky Transportation Cabinet
Central Office, Division of Planning
Highway District 7, Lexington

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EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) and the Lexington-Fayette Urban County Government (LFUCG) initiated the *Hamburg I-75 Crossing Feasibility Study* for the city of Lexington, Kentucky in Fayette County to evaluate potential options to increase connectivity over or under I-75 between Sir Barton Way and Polo Club Boulevard. The study examined conceptual connections which the KYTC and LFUCG can use for project programming purposes and to better inform future land use.

The study area includes the roadways in eastern Lexington near the I-75 interchanges with Winchester Road (US 60, Exit 110)) and Man O' War Boulevard (CS 4524/KY 1425, Exit 108). Within the larger study area, the project team focused the development of connector concepts to a more localized area between Sir Barton Way and Polo Club Boulevard where connections over or under I-75 were considered, as shown in **Figure ES-1**.

Sir Barton Way west of I-75

This part of Lexington, referred to locally as Hamburg, is one of the fastest growing areas in the region and is expected to continue growing as the land east of I-75 continues to develop. Sir Barton Way provides a parallel connection to the west of I-75 between Man O' War Boulevard and US 60. Polo Club Boulevard provides a similar parallel connection to the east. While most of the available land on Sir Barton Way has been developed, much of the currently vacant land along Polo Club is currently under some level of development.

STUDY GOALS

In eastern Lexington, there are few options for travelers to cross the barrier that is created by the I-75 corridor. The tremendous residential and commercial growth in the Hamburg area has significantly increased traffic and congestion on most study area roadways, especially US 60 and Man O' War Boulevard. As the area continues to develop, these traffic issues will only worsen. Additionally, there are no bicycle or pedestrian facilities on US 60 or Man O' War Boulevard crossing I-75. Providing a connector with multi-modal facilities across I-75 will allow pedestrians and bicycles to access the new developments on Polo Club Boulevard.

This feasibility study was initiated to examine the likely traffic impacts, anticipated costs, and other benefits that may be realized on the surrounding roadway network through the potential construction of a new roadway connector. This early planning effort is needed to not only assess the feasibility of a new connector, but to also establish a likely location before the area develops further.

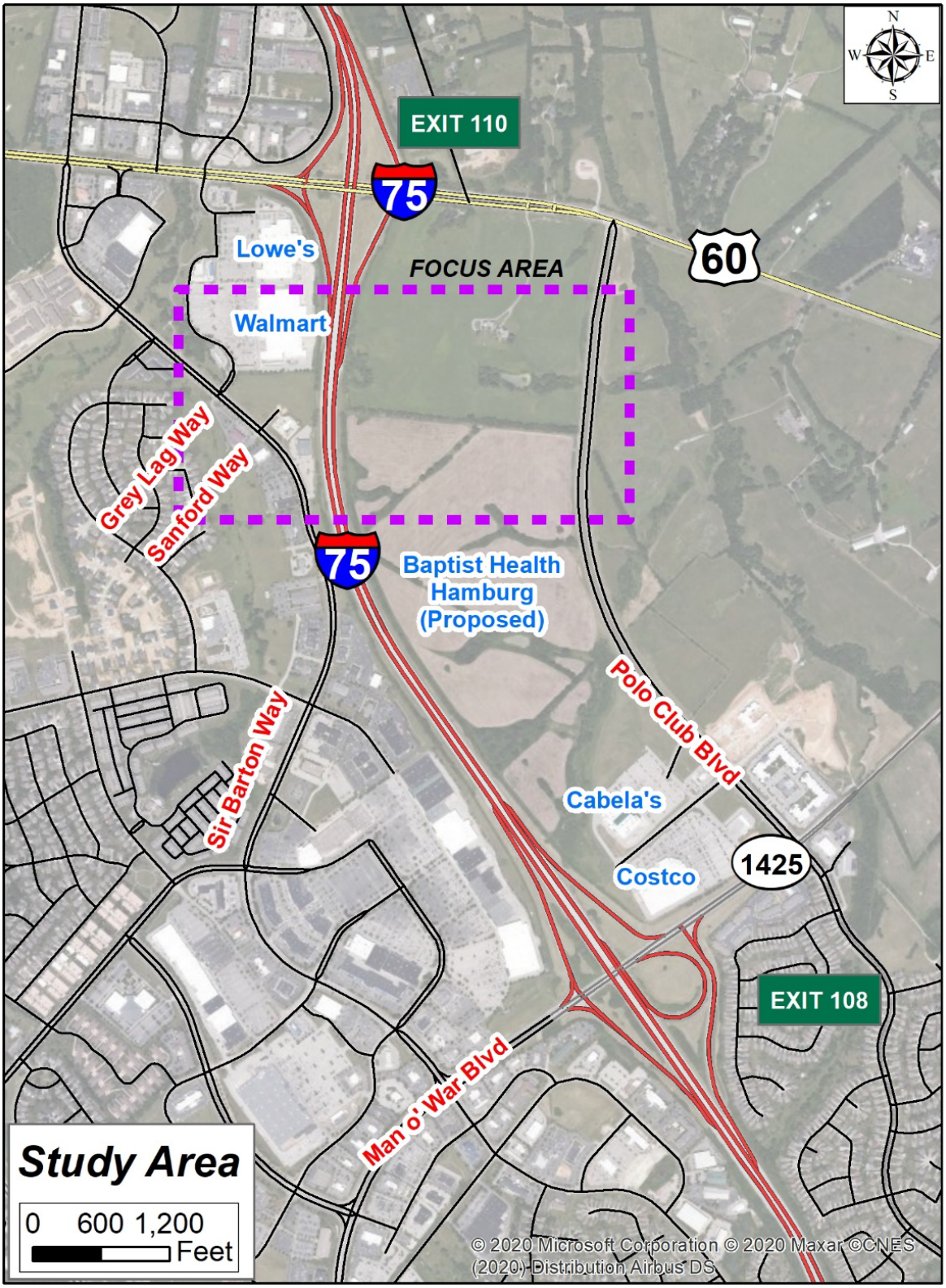


Figure ES-1: Study Area

TRAFFIC FORECASTS

The Lexington Area Metropolitan Planning Organization (LAMPO) Travel Demand Model was used to estimate future traffic demand along study area roadways as well on new connector road concepts. This step was necessary to assess the future traffic demand related to several developments expected along Polo Club Boulevard, including the Baptist Hamburg Healthcare Complex, the proposed Meadowcrest development, and two proposed public schools. The updated LAMPO model suggests the proposed developments will generate just over 50,000 new trips each day by 2045, many of which would use the existing I-75 interchanges at US 60 or Man O' War Boulevard to access the sites. A conceptual connector roadway providing a direct connection between Sir Barton and Polo Club would serve between 16,000 and 21,000 vehicles per day and could reduce future traffic demand along portions of US 60 and Man O' War Boulevard by as much as 20 percent.

CONNECTOR CONCEPTS

Concepts to connect Sir Barton Way and Polo Club Boulevard over or under I-75 were developed based on a combination of input from the project team, a review of existing conditions, travel demand model analyses, and field reconnaissance. Multiple horizontal and vertical alignment options were considered over the course of the study. Other important considerations included coordination with utility companies and the adjacent developments to reduce project costs and to ensure compatibility with other planned improvements.

Ultimately, the project team determined it is not feasible to construct an overpass above I-75 because of the steep roadway grades needed to get over the interstate. In addition, conventional tunnel concepts were eliminated due to the anticipated depth of bedrock in the vicinity of I-75. The recommended construction method for the underpass is to construct a bridge under the current interstate using part-width construction. This type of construction involves building the bridge in three sections and shifting traffic on I-75 while each individual portion of the bridge is excavated and constructed.

The project team has recommended two connector concepts for consideration in future project phases. As shown on **Figure ES-2**, the four-lane Sir Barton/Polo Club Connector includes constructing a new intersection between Sanford Way and Grey Lag Way with a connection under I-75 to Polo Club Boulevard. This concept was advanced because of the minimized impacts to Grey Lag Way and Walmart traffic, the reduced impacts of connecting to Polo Club Boulevard under I-75 rather than over I-75, and because gravity drainage can be constructed along the new connector, including through the underpass. The new intersection at Sir Barton Way would be a dual lane roundabout and the connector would be a four-lane typical section with multi-modal accommodations.

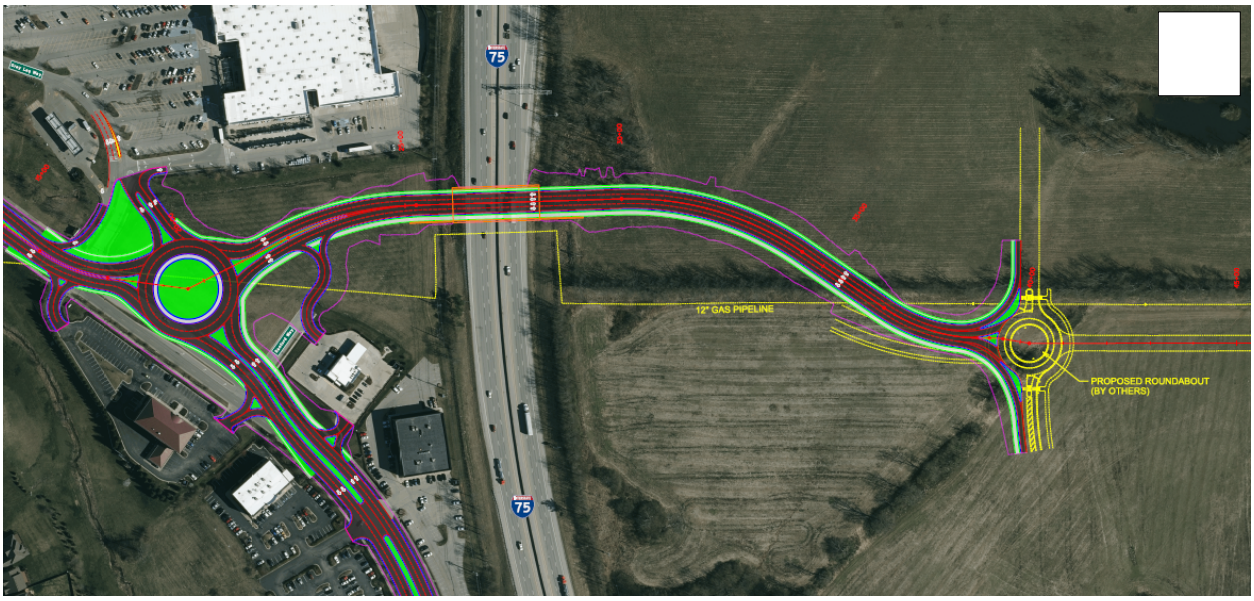


Figure ES-2: Conceptual Four-Lane Connector under I-75

A minimum-width typical section for this concept is shown in **Figure ES-3**. Given the high cost of constructing a bridge beneath the existing I-75 corridor, a concept with no median was advanced. However, the final typical section will be decided during subsequent project phases.

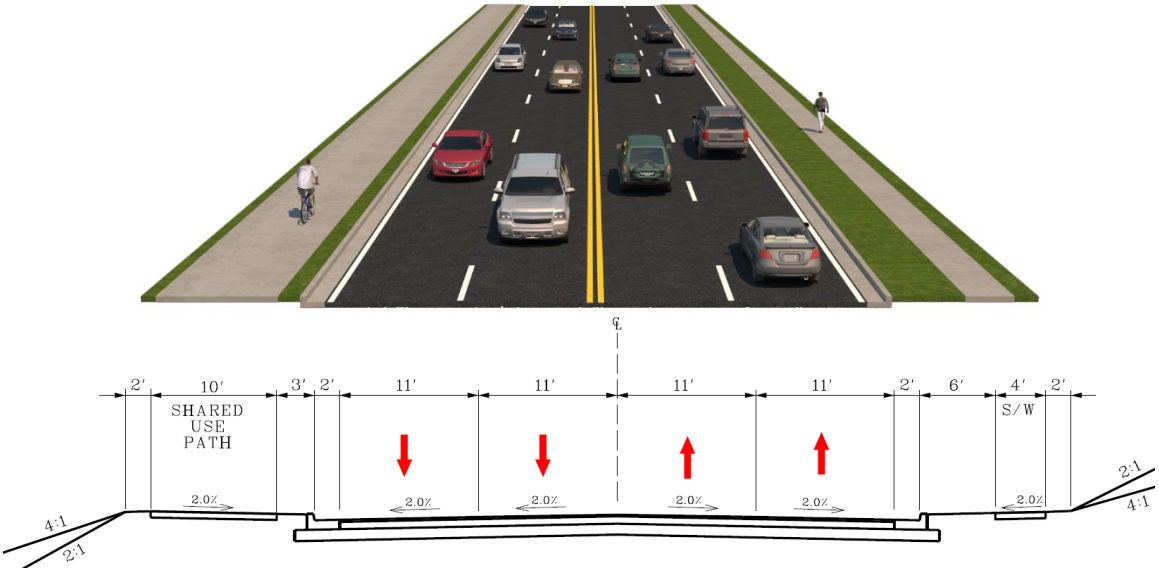


Figure ES-3: Minimum Typical Section for the Conceptual Four-Lane Connector

Because of the high cost of right-of-way, the project team also examined the feasibility of a performance-based flexible solution (PBFS) in the form of a two-lane connector. This concept would tie into Sir Barton Way at the existing Sanford Way intersection and provide a signalized, "3/4 intersection" that would allow southbound left turns from Sir Barton onto the connector and northbound right turns from the connector onto Sir Barton Way, as shown in **Figure ES-4**.

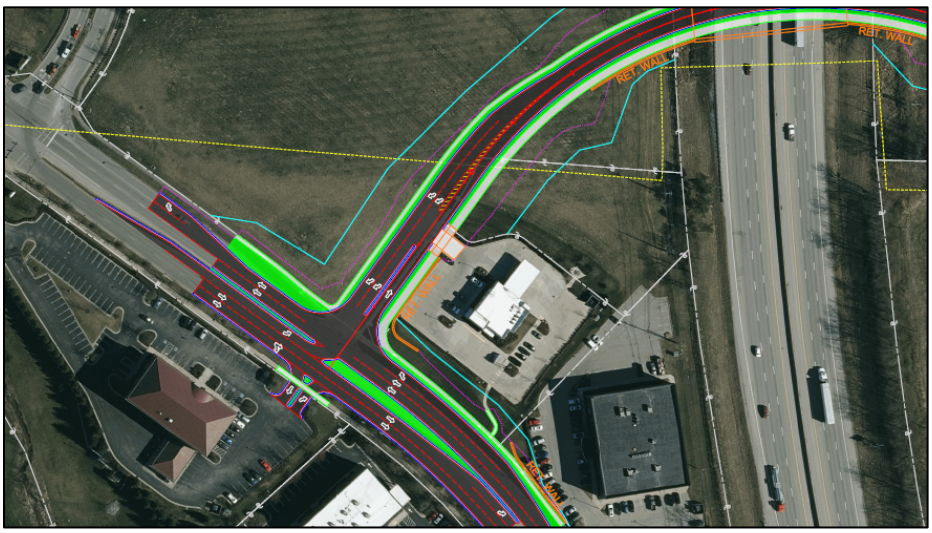


Figure ES-4: Two-Lane Connector Intersection with Sir Barton Way

The traffic signal requirement for this intersection would include only two signal phases because the right-in/right-out University of Kentucky Credit Union entrance would be stop-controlled and not included in the signal. Southbound through traffic on Sir Barton would have continuous green arrows and would not stop. This type of intersection would be necessary because of the proximity to the existing signal at the Grey Lag Way intersection, about 500 feet to the north.

Taking advantage of the proposed connector road bridge construction and the proposed maintenance of traffic plan that would be required for its construction, the project team also considered the possibility of constructing auxiliary lanes on I-75 to connect the entrance and exit ramps at US 60 and Man O' War Boulevard. These auxiliary lanes will provide a better local connection between US 60 and Man O' War Boulevard and will reduce congestion on Sir Barton Way. The southbound auxiliary lane is included in the LAMPO 2045 Metropolitan Transportation Plan (MTP)[1].

COST ESTIMATES

Planning level cost estimates were prepared for the conceptual improvements, shown in **Table ES-1**, based on current average KYTC unit costs. KYTC District 7 provided the right-of-way estimates. A combination of the conceptual connector roadway with the I-75 auxiliary lanes would cost between $22.47 and $30.38 million in 2021 dollars.

[1] http://lexareampo.org/studiesplans/2045-metropolitan-transportation-plan/

Table ES-1: Cost Estimates (2021 Dollars)

Project Phase	Sir Barton Connector (Two-Lane Concept)	Sir Barton Connector (Four-Lane Concept)	I-75 Auxiliary Lanes
Design	$1,410,000	$1,880,000	$700,000
Right-of-Way*	$5,460,000	$9,800,000	$0
Utilities	$600,000	$600,000	$0
Construction**	$9,600,000	$12,700,000	$4,700,000
Subtotal	$17,070,000	$24,980,000	$5,400,000
TOTAL***	**$22,470,000 to $30,380,000**		

*Right of Way Estimate for the Sir Barton Connector provided by KYTC District 7.
**Construction includes 20% Contingency
***Includes Sir Barton Connector concept plus I-75 Auxiliary Lanes.

CONCLUSIONS

While several options to cross I-75 were considered over the course of the study, the project team determined that constructing a bridge under the current interstate using part-width construction was the most cost-effective and feasible option. The study found a connector between Sir Barton Way and Polo Club Boulevard would be heavily used and would reduce traffic demand along portions of both US 60 and Man O' War Boulevard. However, a peak hour traffic operational analysis is necessary to determine how a connector would best operate within the existing network as well as what other improvements may be necessary to accommodate future traffic demand.

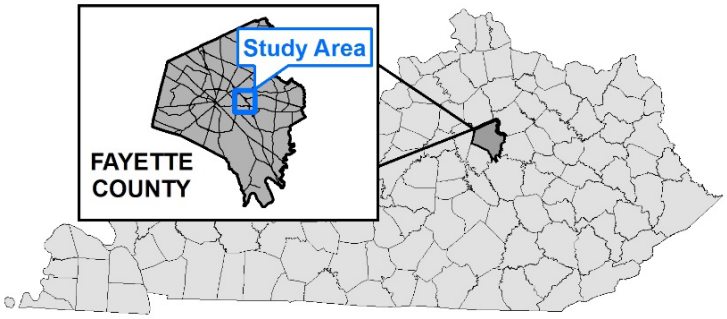
Two-lane and four-lane connector concepts were evaluated, and both should be considered in future project phases should this concept advance. Should a two-lane connector be ultimately recommended and carried forward into the design phase, consideration should be given to constructing a bridge wide enough to accommodate a four-lane corridor in the future.

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) and the Lexington-Fayette Urban County Government (LFUCG) initiated the *Hamburg I-75 Crossing Feasibility Study* for the city of Lexington, Kentucky in Fayette County to evaluate potential options to increase connectivity over or under I-75 between Sir Barton Way and Polo Club Boulevard. The study examined the traffic impacts and other benefits that may be realized on the surrounding roadway network, including Winchester Road (US 60) and Man O' War Boulevard (CS 4524/KY 1425).

This study is funded utilizing federal Statewide Planning and Research (SPR) funds. Future phases for this project are not listed in *Kentucky's FY 2020 – 2026 Highway Plan*.

1.1 STUDY AREA



The study area includes the roadways in eastern Lexington near the I-75 interchanges with Winchester Road (US 60) and Man O' War Boulevard (CS 4524/KY 1425). Within the study area, the focus area is 0.36 square miles between Sir Barton Way and Polo Club Boulevard where connections over or under I-75 were considered, as shown in **Figure 1**. This part of Lexington, referred to locally as Hamburg, is one of the fastest growing areas in the region and is expected to continue growing as the land east of I-75 continues to develop. Within Hamburg, the Hamburg Pavilion is one of the state's largest shopping centers, with over one million square feet of retail space. Sir Barton Way provides access to the Hamburg Pavilion and a connection between Man O' War Boulevard and US 60. Just east of I-75, Polo Club Boulevard provides a similar north-south connection between Man O' War Boulevard and US 60 through partially undeveloped land.

With a 2019 population of over 323,000, Fayette County is the second largest county in Kentucky and home to Lexington, the second largest city. Population projections from the Kentucky State Data Center indicate that Fayette County is expected to continue growing at a rate just over one percent per year to the year 2040.

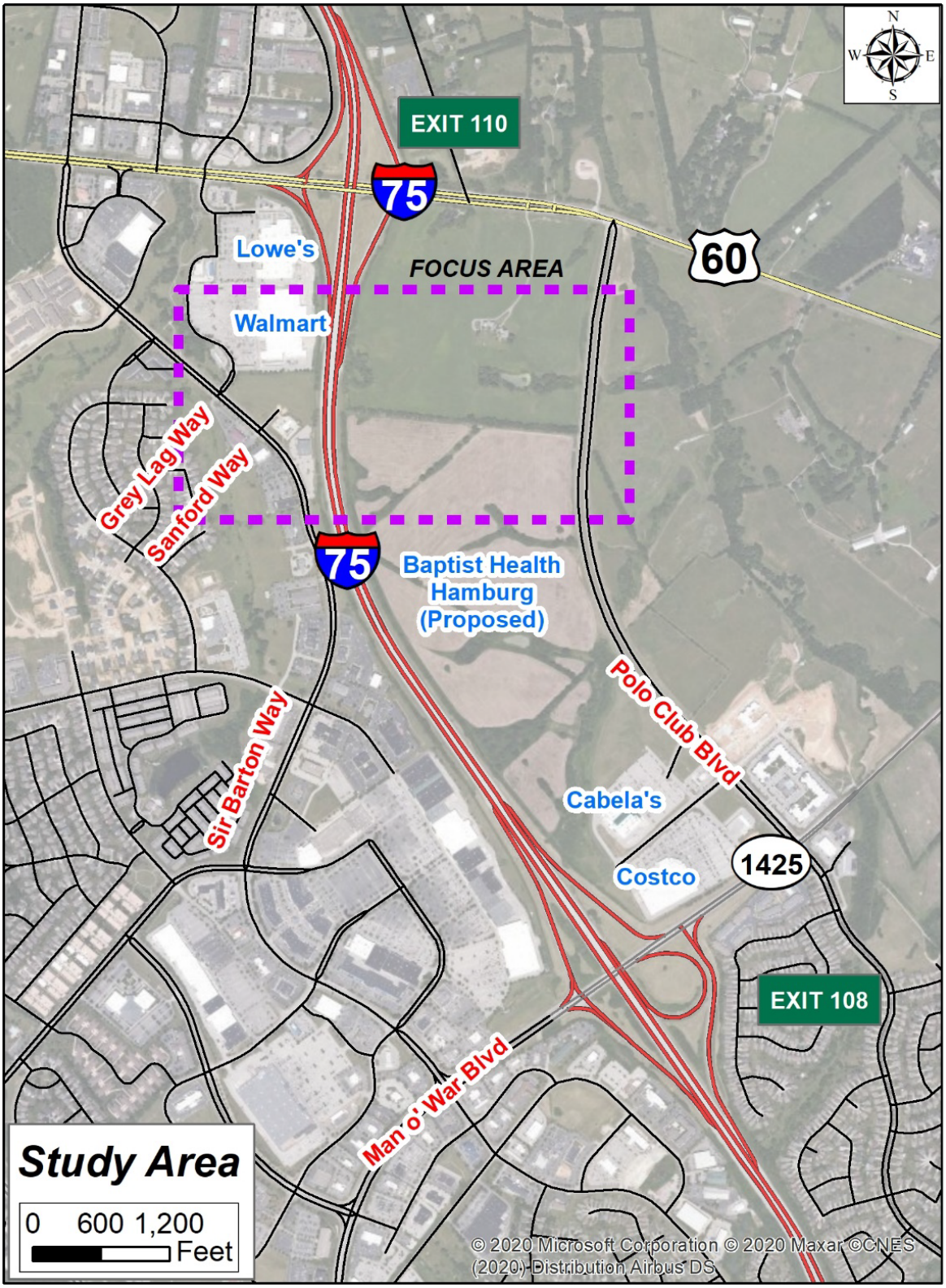


Figure 1: Study Area

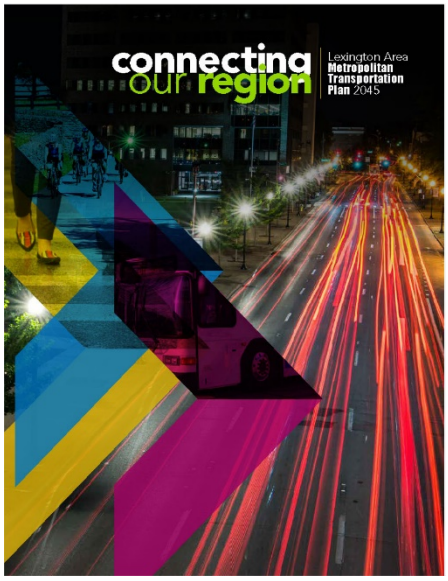
1.2 PROJECT HISTORY

In 2016, the *Man O' War Small Area Study*[1] recommended short- and long-term projects for the east side of Lexington in the vicinity of I-75. One of the recommendations of this study was a two-lane Sir Barton/Polo Club connector beneath I-75 with a sidewalk on one side. This connector is intended to relieve congestion from the other east-west connectors, US 60 and Man O' War Boulevard, and allow traffic to flow between Sir Barton Way and Polo Club Boulevard. The estimated 2016 total cost was $4,372,000.

1.3 PLANNED AND COMMITTED PROJECTS

This project is listed as a long-range priority in the Lexington Area Metropolitan Planning Organization (LAMPO) 2045 Metropolitan Transportation Plan (MTP)[2]. There is one other project within the study area listed in the MTP to construct an auxiliary lane on I-75:

- **Long-Range MTP ID 26**: Construct a new road under I-75 from Polo Club Boulevard to Sir Barton Way. Programmed cost = $4,880,000.
- **Long-Range MTP ID 37**: Add a southbound auxiliary lane on I-75 between Winchester Road and Man O' War Boulevard. Programmed cost = $1,387,000.



2045 Metropolitan Transportation Plan

There is one project within the study area listed in *Kentucky's FY 2020 – 2026 Highway Plan*[3]:

- **Item 7-20013:** Address Pavement Condition of I-75 from MP 107.453 to MP 110.213. The Highway Plan lists $540,000 in design funds for 2021 and $5,400,000 in construction funds for 2021. *Due to current funding constraints this project could be delayed.*

Kentucky Highway Plan

[1] https://lexareampo.org/wp-content/uploads/2016/08/Lexington-MOW-Small-Area-Study_FINAL_RED.pdf
[2] http://lexareampo.org/studiesplans/2045-metropolitan-transportation-plan/
[3] http://transportation.ky.gov/Program-Management/Highway Plan/2020HighwayPlanAll.pdf

1.4 STUDY GOALS

As highlighted on **Figure 2**, there are few options for travelers to cross the barrier that is created by the I-75 corridor. Within the vicinity of the study area, there are currently four service interchanges providing local access to and from I-75 and two state-maintained overpasses at Bryan Station Road and Todds Road.

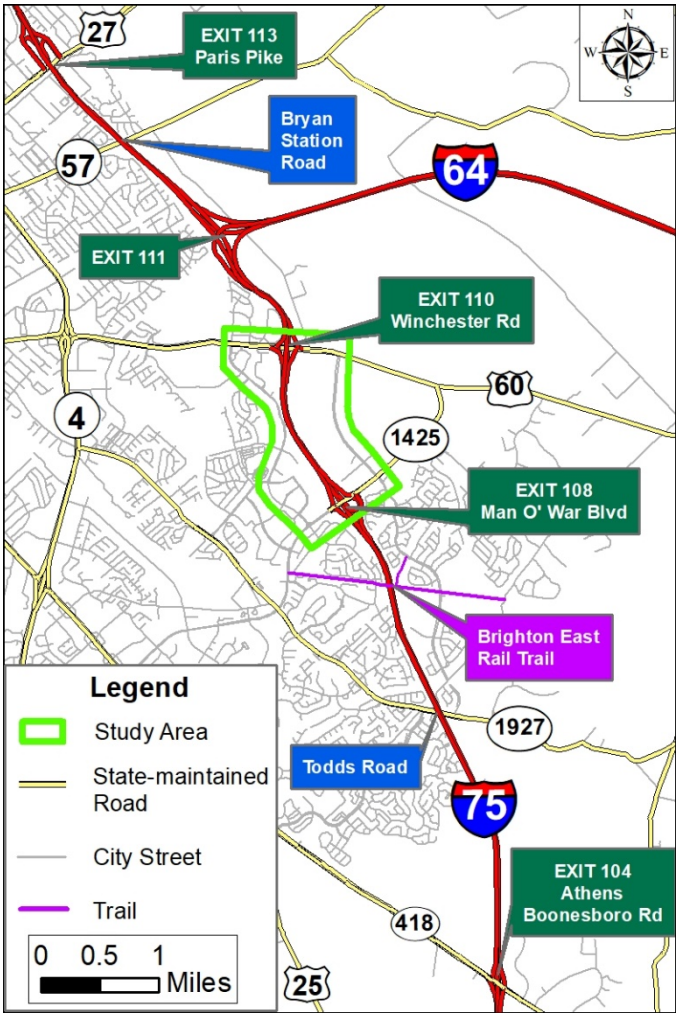


Figure 2: Local I-75 Crossings

The tremendous residential and commercial growth in the Hamburg area has significantly increased traffic and congestion on most study area roadways, especially US 60 and Man O' War Boulevard. As the area continues to develop, these traffic issues will only worsen. With several large developments expected along Polo Club Boulevard, an east-west connection over or under I-75 between Sir Barton Way and Polo Club Boulevard could improve connectivity and provide traffic relief for the other congested east-west connections.

Additionally, there are no bicycle or pedestrian facilities on US 60 or Man O' War Boulevard crossing I-75, and the nearest available dedicated bicycle or pedestrian accommodation is the Brighton East Rail Trail located about 0.8 miles south of the Man O' War Boulevard overpass[4]. Providing a connector with multi-modal facilities across I-75 will allow pedestrians and bicycles to access the new developments on Polo Club Boulevard.

The goals of the *Hamburg I-75 Crossing Feasibility Study* are to:

- Determine the feasibility of implementing a direct connection between Sir Barton Way and Polo Club Boulevard.
- Examine impacts to traffic patterns on the surrounding roadway network.
- Identify other project benefits, constraints, impacts, and costs.

[4] http://www.lexingtonky.gov/brighton-east-rail-trail

2.0 EXISTING CONDITIONS

Conditions of the existing transportation network were examined and are shown in the following sections. The information compiled includes roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data for this section were collected from KYTC's Highway Information System (HIS) database, KYTC's Traffic Count Reporting System, aerial photography, and field inspection. An overall summary of the information gleaned from the HIS database is shown in **Table 1** and discussed below.

Table 1: Highway Information System (HIS) Data Summary

Roadway	Begin Milepoint	End Milepoint	Section Length (miles)	Functional Classification	AADT (Year) [1]	Truck % [1]	Median	Speed Limit	Lane Width	No. of Lanes	Shoulder Widths
Man O'War Blvd (CS 4524/KY 1425)	14.772	15.033	1.898	Urban Principal Arterial	40,500 (2019)	N/A	Raised Non-Mountable	45	12'	4	2' curb
	15.033	15.241								5	10' - 13' paved
	0.000	0.297		Urban Minor Arterial	9,000 (2018)	3.8%				4	10' paved
	0.297	0.476					None/Flush				
	0.476	1.429						55		2	3' (1' paved)
Polo Club Blvd (CS 2548)	0.000	1.175	1.175	Urban Major Collector	6,000 (2019)	N/A	Raised Non-Mountable	35	11'	4	2' curb
Sir Barton Way (CS 2636)	0.000	1.388	1.916	Urban Minor Arterial	21,000 (2019)						1' curb
	1.388	1.777					Flush				N/A
	1.777	1.916					Raised Non-Mountable				1' curb
Winchester Road (US 60)	11.196	11.966	2.986	Urban Principal Arterial	37,200 (2009)	16.10%	Flush/Raised Non-Mountable	55	12'	5	10' paved
	11.966	13.271		Urban Minor Arterial	16,400 (2019)	N/A	None/Flush			4	10' - 6' (10' - 2' paved)
	13.271	14.182			13,400 (2018)	6.10%			11'	2	6' (2' paved)

[1] KYTC Traffic Count Reporting System

2.1 FUNCTIONAL CLASSIFICATION

Figure 3 shows the functional classification of roadways within the study area. Principal arterials, shown in red, serve major centers of metropolitan areas and provide a high level of mobility for substantial statewide travel. Minor arterials (shown in blue) serve trips of moderate length to smaller geographic areas and provide connections between principal arterials. Major collectors (shown in green) facilitate trips between local roads and the arterial network[5].

US 60 and Man O' War Boulevard are classified as urban principal arterials west of I-75 and urban minor arterials east. Sir Barton Way is classified as an urban minor arterial and Polo Club Boulevard is an urban major collector.

[5] *Highway Functional Classification Concepts, Criteria and Procedures*. U.S. Department of Transportation/Federal Highway Administration. https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section03.cfm#Toc336872985

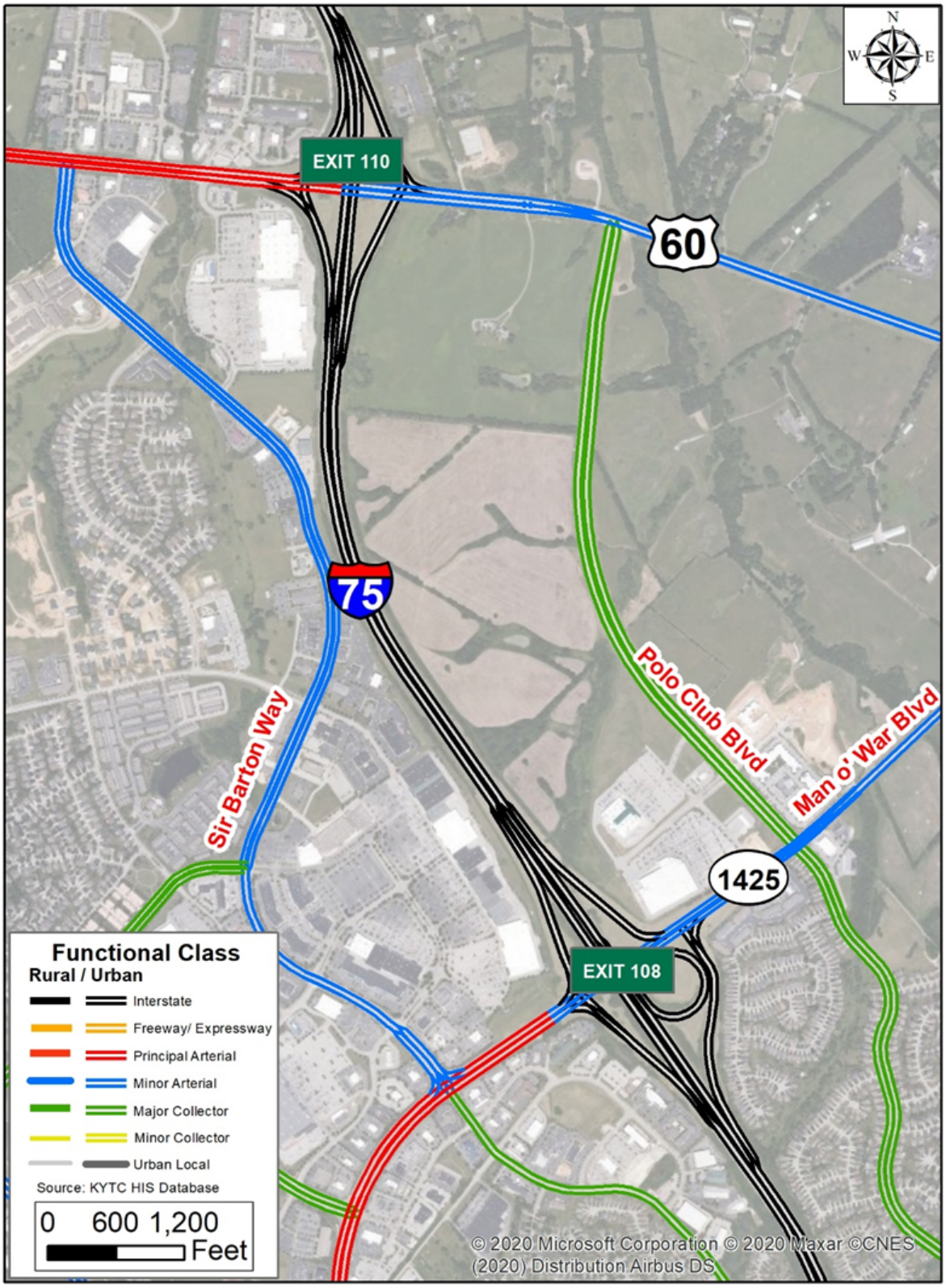


Figure 3: Functional Classification

2.2 ROADWAY GEOMETRY

KYTC's HIS database was used to identify roadway geometry. The current number of lanes and estimated lane widths along study area roadways are shown on **Figure 4**. All study area roadways have at least 11-foot-wide lanes.

Marked Gas Line West of I-75 Within the Focus Area

2.3 UTILITIES

Within the focus area, a sewer line, overhead electric line, and a water line run parallel to I-75 and a 12-inch gas transmission line runs under I-75. The project team coordinated with TC Energy throughout the improvement concept development phase to avoid relocating the gas line.

2.4 EXISTING TRAFFIC ANALYSIS

The most current average daily traffic (ADT) volumes from KYTC's traffic count stations are shown on **Figure 5**. I-75 has the highest traffic volumes in the study area with 73,700 vehicles per day (VPD) between Man O' War Boulevard and US 60. Traffic volumes on US 60 range from 14,700 VPD east of the I-75 interchange to 37,200 VPD to the west. Man O' War Boulevard holds 43,900 VPD west of the I-75 interchange and 9,100 VPD to the east. Other significant traffic volumes in the study area include Sir Barton Way with 18,600 VPD and Polo Club Boulevard with 5,600 VPD.

2.5 CRASH HISTORY

Crash data were collected along existing roadways within the study area for a three-year period between January 1, 2017 and December 31, 2019. Over the course of the three-year period, there were 1,293 collisions on study area roadways, as shown in **Figure 6**. The crash records and locations are included in **Appendix A**.

Excess expected crashes (EEC) were calculated for study area roadways using the Crash Data Access Tool (CDAT). EEC is a measure of crash frequency at a given site compared to what is expected based on current conditions (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. Most study area portions of Sir Barton, Polo Club Boulevard, Winchester Road, and Man O' War Boulevard have positive EECs, as shown in **Figure 7**.

Figure 4: Number of Lanes and Lane Width

Figure 5: Average Daily Traffic (ADT) Volumes from KYTC's Traffic Count Stations

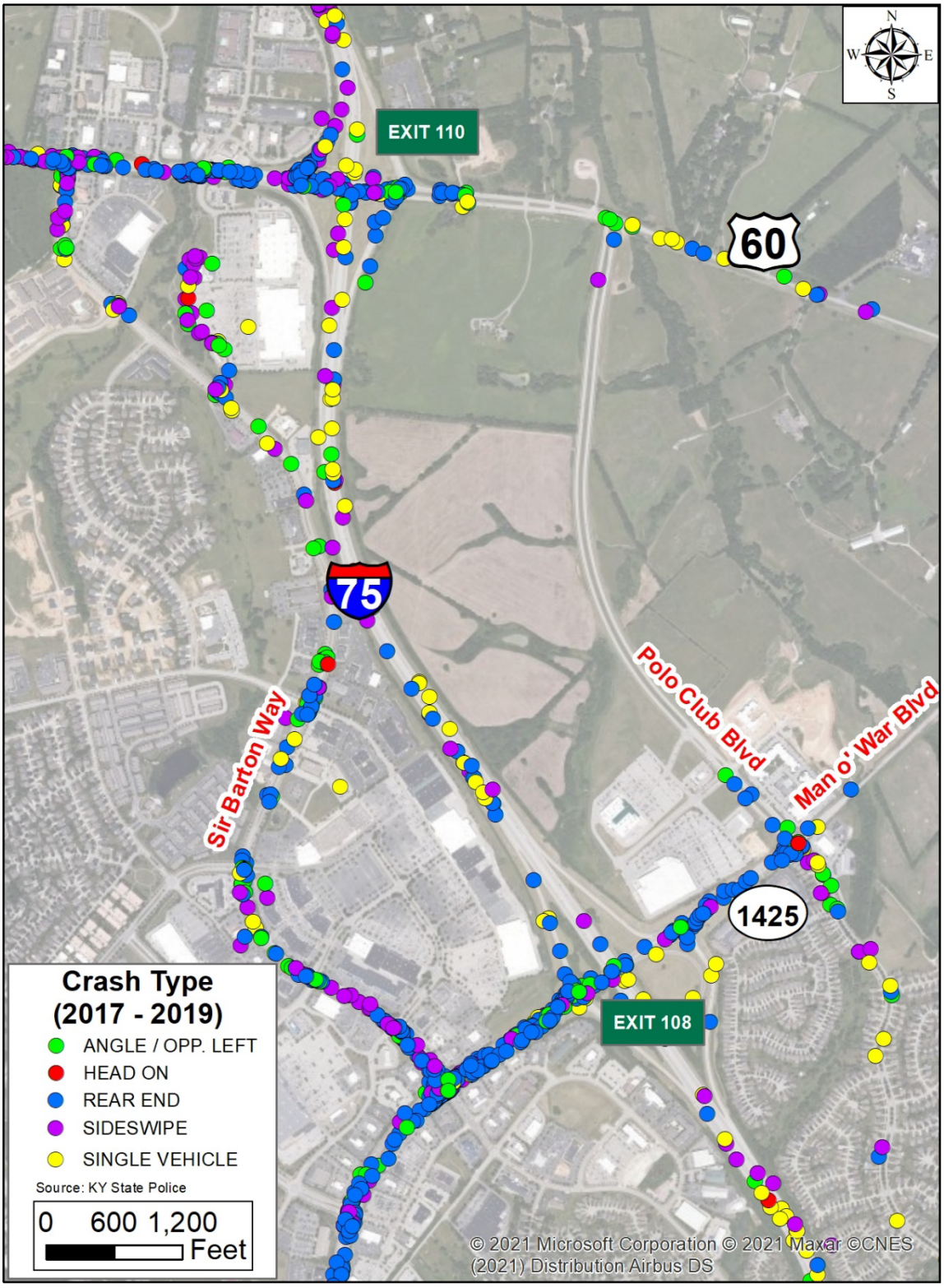


Figure 6: Crash History

Figure 7: Study Area Excess Expected Crashes (EEC)

2.6 SOCIOECONOMIC STUDY

The Bluegrass Area Development District (BGADD) conducted a socioeconomic study for the study area. A complete copy of the report is found in **Appendix B**. The information in this report outlines 2015-2019 American Community Survey (ACS) statistics in and near the study area using tables, charts, and maps. The data presented in this document is intended to highlight areas of concern that will require additional analysis should any project be advanced to future phases. Statistics are provided for minority, elderly, poverty status, limited English proficiency (LEP), and disabled populations for the nation, state, region, county, and census block groups located within the study area.

This information is intended to aid in making informed and prudent transportation decisions, especially regarding the requirements of *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Poverty status, Populations* (signed February 11, 1994).

The analysis uses the socioeconomic percentages by population for the Bluegrass ADD as the reference threshold for identifying target populations. The following are key findings related to the socioeconomic characteristics of the study area:

- The study area overall displays a much higher percentage of racial minorities, at 23.30%, than that of the Bluegrass ADD, at 15.29%.
- The study area overall displays a lower percentage of Adults over 65 years old, at 13.23%, than that of the Bluegrass ADD, at 14.73%. However, three of the seven census block groups in the study are above the percentage of the BGADD.
- The study area displays a drastically lower percentage of adult individuals with a disability, at 6.81%, than that of the Bluegrass ADD, at 18.35%.
- The study area overall displays a drastically lower percentage of residents under the poverty line, at 5.82%, than that of the Bluegrass ADD, at 16.52%.
- The study area overall displays a higher percentage of persons over 5 years old with limited English proficiency, at 9.63%, than that of the Bluegrass ADD at 7.43%.

During future phases of project development, a more detailed and robust analysis would be required for the National Environmental Policy Act (NEPA) documentation when assessing the potential for adverse and disproportionate impacts to those with disabilities, poverty status, and minority populations.

3.0 FUTURE CONDITIONS

To determine the need for and purpose of potential transportation improvement options, it is necessary to estimate future conditions. This chapter summarizes the anticipated future conditions within the study area. The complete Model Update and Traffic Forecasting Memorandum can be found in **Appendix C**.

3.1 LAMPO TRAVEL DEMAND MODEL

The LAMPO Travel Demand Model, which is maintained with the support of the KYTC Division of Planning, was used to develop future traffic forecasts. As part of this effort, the model was updated and several Traffic Analysis Zones (TAZs) were split to reflect current and proposed land use changes. A full discussion of the LAMPO model updates and traffic forecasts can be found in **Appendix C**.

3.2 EXPECTED DEVELOPMENTS

Along with the steady background traffic growth in the Hamburg area, several developments are expected along Polo Club Boulevard. The Baptist Hamburg Healthcare Complex is being developed on the west side of Polo Club Boulevard, as shown in **Figure 8**. Phase 1 construction began in the Spring of 2021. This includes a 279,000 square-foot hospital and 64,000 square feet of medical offices. A date for Phase 2 construction has not been set but is expected to include a 1.16-million square-foot hospital, 967,000 square feet for medical offices, two pharmacies, three restaurants, additional office space, and a hotel. The LAMPO model's socioeconomic data were updated to include all of Phase 1, and because of the uncertainties related to schedule and the magnitude of the development, 70 percent of the proposed Phase 2 Baptist Hamburg Healthcare Complex.

At the southeast corner of the I-75 interchange with US 60, the Meadowcrest property is expected to be developed and will have a full access point on US 60 between the interchange and the Polo Club intersection. Phase 1 of the

Figure 8: Expected Study Area Developments

Meadowcrest facility includes a 20-acre continuing care facility. Phase 2 includes an office building, a hotel, a bank, a pharmacy, restaurants, and a multi-family residential living area. Once again, the model was updated to include all of Phase 1 and 70 percent of Phase 2.

In addition to the Baptist and proposed Meadowcrest developments, two new Fayette County Public Schools (FCPS) facilities – an elementary school and middle school - are also expected along Polo Club Boulevard and were included in the 2045 model.[6]

3.3 TRAFFIC FORECASTS

Traffic forecasts were developed for the year 2045 based on results from the updated LAMPO model. These "No-Build" forecasts include the expected developments on Polo Club Boulevard as well as general growth in the area. "Build" forecasts were also developed to determine the traffic impacts of a four-lane connector between Sir Barton Way and Polo Club Boulevard. Based on results from the model, a new, four-lane connector could expect as much as 21,000 VPD in 2045, as shown in **Figure 9**.

Daily traffic on the existing east-west roadways, US 60 and Man O' War Boulevard, would decrease from 15 to 20 percent if a connector is built, but would still operate over capacity in 2045. This is demonstrated on **Figure 10** where volume to capacity (V/C) ratios, a comparison of each roadway's traffic demand compared to its theoretical capacity, show that most segments of both US 60 and Man O' War would operate well over capacity in 2045 even if the conceptual connector were to be constructed. Peak hour traffic analyses are needed to further estimate the benefits and impacts of traffic on the connector, which would be limited by the capacity at the intersections along Sir Barton Way and Polo Club Boulevard.

[6] https://www.wkyt.com/content/news/Fayette-County-votes-to-buy-land-for-elementary-middle-schools-in-Hamburg-area-569611871.html

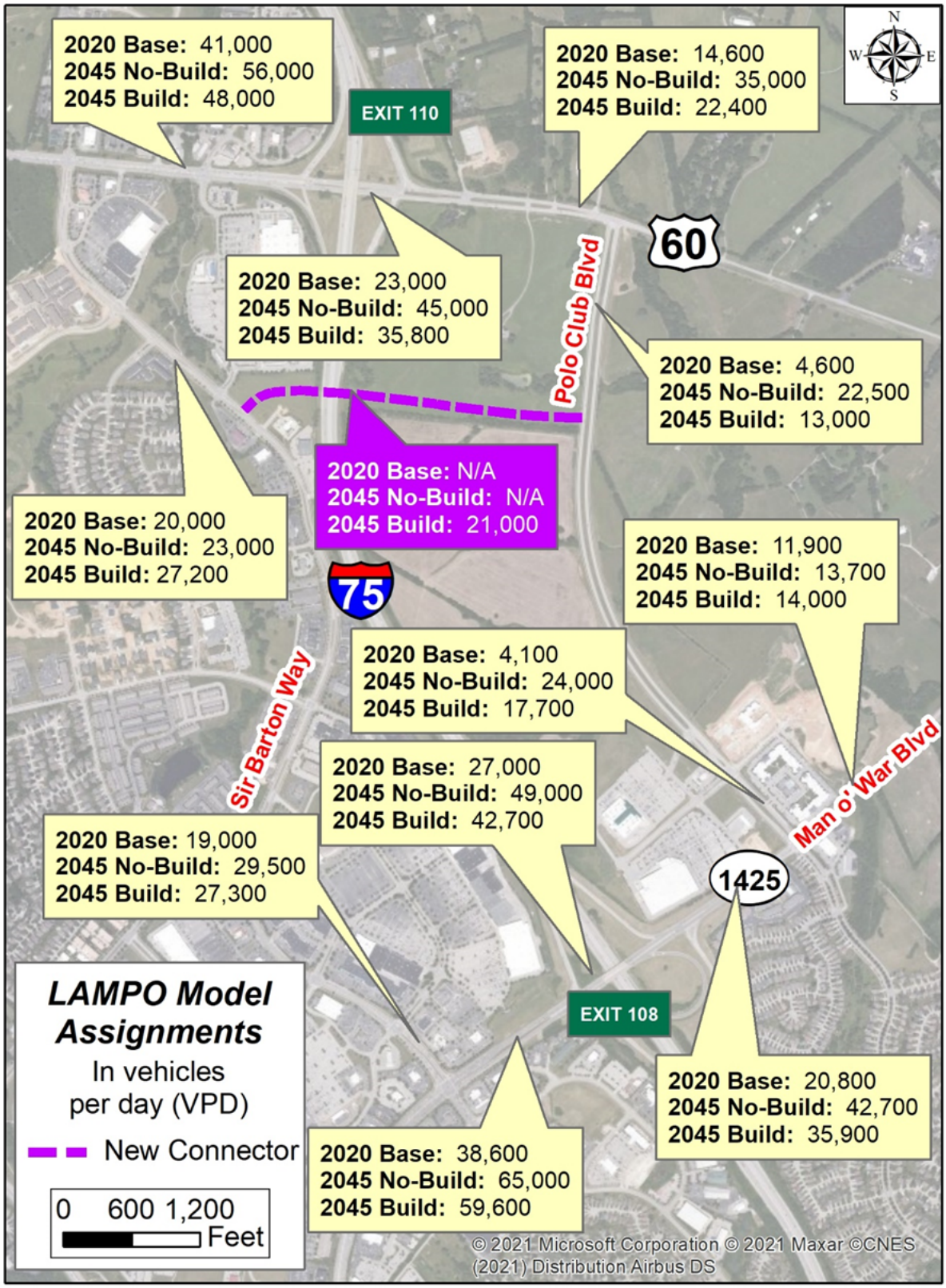


Figure 9: LAMPO Model Assignments (Four-Lane Connector)

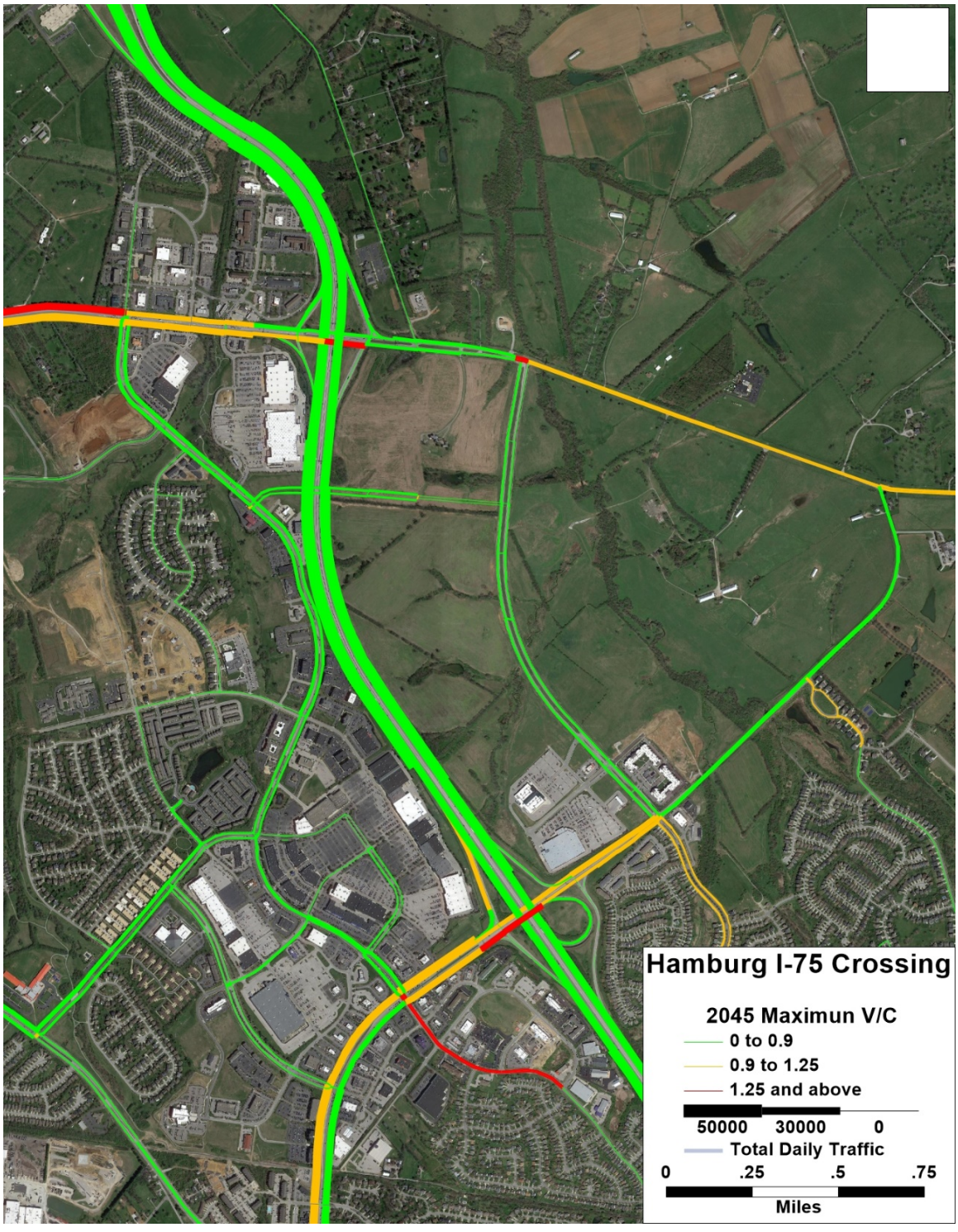


Figure 10: 2045 Volume to Capacity (V/C) Ratios
(Source: LAMPO Travel Demand Model)

4.0 INITIAL IMPROVEMENT CONCEPTS

Improvement concepts to connect Sir Barton Way and Polo Club Boulevard over or under I-75 were developed based on a combination of input from the project team, a review of existing conditions, travel demand model analyses, and field reconnaissance. Over the course of the study, the project team worked to determine which improvement concepts proved to be feasible, provide the most traffic relief for surrounding roadways, and limit impacts to the focus area. Along with the No-Build concept, this study examined several other improvements discussed below.

Concept 1a: Extend Grey Lag Way under I-75 to Polo Club Boulevard. The vertical grade going under I-75 would be approximately 2.5 percent.

Concept 1b: Extend Grey Lag Way over I-75 to Polo Club Boulevard. The vertical grade going over I-75 would be approximately 7.5 percent.

Concept 2a: Construct a new intersection between Sanford Way and Grey Lag Way with a connection to Polo Club Boulevard under I-75. A dual lane roundabout is proposed at the new intersection to maintain access to Grey Lag Way and Sandford Way, maintain access to the adjacent businesses, keep traffic flowing on Sir Barton Way, and provide multimodal accommodations. The vertical grade going under I-75 would be approximately 2.5 percent.

Concept 2b: Construct a new intersection between Sanford Way and Grey Lag Way with a connection to Polo Club Boulevard over I-75. A dual lane roundabout is proposed at the new intersection to maintain access to Grey Lag Way and Sandford Way, maintain access to the adjacent businesses, keep traffic flowing on Sir Barton Way, and provide multimodal accommodations. The vertical grade going over I-75 would be approximately 7.5 percent.

Concept 3a: Extend Sanford Way under I-75 to Polo Club Boulevard and construct a backage road from Grey Lag Way to Sanford Way. The signal at Grey Lag Way and Sir Barton Way would be removed and the intersection would be converted to a right-in/right-out. A new signal would then be added at the Sanford Way / Sir Barton Way intersection. The vertical grade going under I-75 would be approximately 6.3 percent.

Concept 3b: Extend Sanford Way over I-75 to Polo Club Boulevard and construct a backage road from Grey Lag Way to Sanford Way. The signal at Grey Lag Way and Sir Barton Way would be removed and the intersection would be converted to a right-in/right-out. A new signal would then be added at the Sanford Way / Sir Barton Way intersection. The vertical grade going over I-75 would be approximately 8.0 percent.

5.0 PROJECT TEAM COORDINATION

Over the course of the study, the project team held two meetings to coordinate on key issues. The project team included representatives from KYTC Central Office, KYTC District 7, LFUCG, LAMPO, and the consultant, Stantec. Detailed summaries of each meeting are presented in **Appendix D**.

5.1 PROJECT TEAM MEETING NO. 1

The first project team meeting was held via Microsoft Teams on October 27, 2020 at 1:00 PM EDT. The purpose of the meeting was to discuss the existing/future conditions analyses and get feedback from the project team on initial improvement concepts. The following was noted/discussed:

- Bicycle and pedestrian accommodation will be an important consideration for all concepts.
- A variety of possible typical sections were discussed to accommodate all travel modes, and it was ultimately decided a shared use path would be provided on one side of the connector and a sidewalk on the other.
- A conventional tunnel under I-75 is not feasible due to the depth of rock.
- The LFUCG Planning Commission approved a full access point for the Meadowcrest development on US 60.
- Based on traffic forecasts from the LAMPO model, additional transportation improvements will be needed even if a new connector is constructed.
- Six preliminary improvement concepts were presented. Constructing a bridge over I-75 is not feasible due to the required grades. Therefore, all overpass concepts (Concept 1b, 2b, and 3b) were eliminated from further consideration.
- Concept 1a would focus traffic to Grey Lag Road near the entrance road in front of Walmart. There is not adequate distance from the existing signalized intersection at Sir Barton to provide an additional traffic signal for Walmart. Given the current levels of traffic congestion in this area and the concern over the potential need for another traffic signal, Concept 1a was not carried forward for further development.
- Drainage is a concern for any connector that goes under I-75.

Additional coordination with utility companies and the adjacent developments continued after the first project team meeting. Concept 2A was subsequently shared with TC Energy, the developers of the Baptist Hamburg Healthcare Complex (CMW Architects and Engineers), and the Meadow Crest development (Cowgill) to solicit input on its feasibility. Their input helped guide refinements to the concepts that were advanced from the initial meeting.

5.2 PROJECT TEAM MEETING NO. 2

The second project team meeting was held via Microsoft Teams on March 15, 2021 at 10:30 AM EDT. Representatives from KYTC Central Office, KYTC District 7, LAMPO, Bluegrass Area Development District and Stantec were in attendance. The purpose of the meeting was to discuss the revised improvement concepts. The following was noted/discussed:

- Traffic forecasts were revised to include the Meadowcrest full access point on US 60.
- The actual amount of traffic on the connector would be limited to the capacity at the intersections at Sir Barton Way and Polo Club Boulevard. A peak hour traffic analysis is needed to fully examine the traffic impacts associated with this new connector and the significant growth anticipated in this area. This would better inform the need for improvements to other existing routes, particularly the I-75 interchanges with US 60 and Man O' War Boulevard.
- A conventional gravity drainage layout was developed to ensure feasibility.
- As part of the Sir Barton Connector, the new bridge beneath I-75 should be wide enough to accommodate auxiliary lanes between the ramps at US 60 and Man O' War Boulevard.

6.0 REVISED IMPROVEMENT CONCEPTS

After the second project team Meeting, improvement concepts were revised based on feedback received. The revised concepts satisfy the study goals by providing a direct multimodal connection between Sir Barton Way and Polo Club Boulevard, decreasing traffic on the surrounding roadway network, and minimizing impacts to the focus area.

6.1 SIR BARTON/POLO CLUB CONNECTOR

Several options to cross I-75 were considered over the course of the study. Because of the proximity of Sir Barton Way to I-75 within the focus area, constructing a bridge over I-75 would require the connector to have a seven to eight percent grade. These grades were determined to be too steep and bridging over I-75 was therefore considered not feasible.

Options to tunnel under I-75 were also analyzed. Geotechnical borings from the Baptist Hamburg Healthcare Complex were examined and showed that building a conventional tunnel under I-75 would not be feasible due to the depth of rock. The tunnel would have to be too deep before having enough bedrock cover over the tunnel.

Instead of tunneling under I-75, another option is to construct a bridge under the current interstate to carry I-75 traffic over the proposed connector. This type of construction involves

building the bridge in three sections using part-width construction and shifting traffic on I-75 while each individual portion of the bridge is constructed.

Multiple horizontal and vertical alignment options were considered for the connector. Coordination with TC Energy, Baptist Health / CMW Architects and Engineers, and Cowgill provided insight on the constraints. Avoiding impacts to the TC Energy 12-inch gas line that passes through the study area was an important issue as the cost for relocating that line would adversely affect the feasibility of the connector. Working with TC Energy, a horizontal alignment that provides a minimum 8 feet of vertical cover over the line was developed, and preliminary feedback from the utility suggests the concept is constructible with no gas line relocation required.

The Baptist Hamburg Healthcare Complex includes a proposed roundabout just south of the TC Energy gas line and the Meadowcrest property line. All connector concepts are assumed to connect the west approach to that roundabout.

6.1.1 Four-Lane Connector

As shown on **Figure 11**, the Four-Lane Sir Barton/Polo Club Connector includes constructing a new intersection between Sanford Way and Grey Lag Way with a connection under I-75 to Polo Club Boulevard. This concept was moved forward because of the minimized impacts to Grey Lag Way and Walmart traffic, the reduced impacts of connecting to Polo Club Boulevard under I-75 rather than over I-75, and because gravity drainage can be constructed along the new connector, including through the underpass. The new intersection at Sir Barton Way would be a dual lane roundabout and the connector would be a four-lane typical section with multi-modal accommodations. A minimum-width typical section for this concept is shown in **Figure 12**.

Based on results from the LAMPO model, a four-lane connection between Sir Barton Way and Polo Club Boulevard could expect up to 21,000 VPD in 2045. The proposed typical section includes four 11-foot lanes, a four-foot sidewalk, and a 10-foot shared use path. Options with and without a non-traversable median were discussed with the project team. Given the high cost of constructing a bridge beneath the existing I-75 corridor, a concept with no median was advanced. However, the final typical section will be decided during Phase 1 design should this concept advance.

6.1.2 Performance-Based Flexible Solution

After the second project team meeting, there was discussion of the feasibility of a performance-based flexible solution (PBFS) that would be more cost-effective than a four-lane connector. A two-lane connector concept would tie into Sir Barton Way at the existing Sanford Way intersection, following a similar alignment as the original Concept 3A. This signalized, "3/4 intersection" would allow southbound left turns from Sir Barton onto the connector and northbound right turns from the connector onto Sir Barton Way, as shown in **Figure 13**.

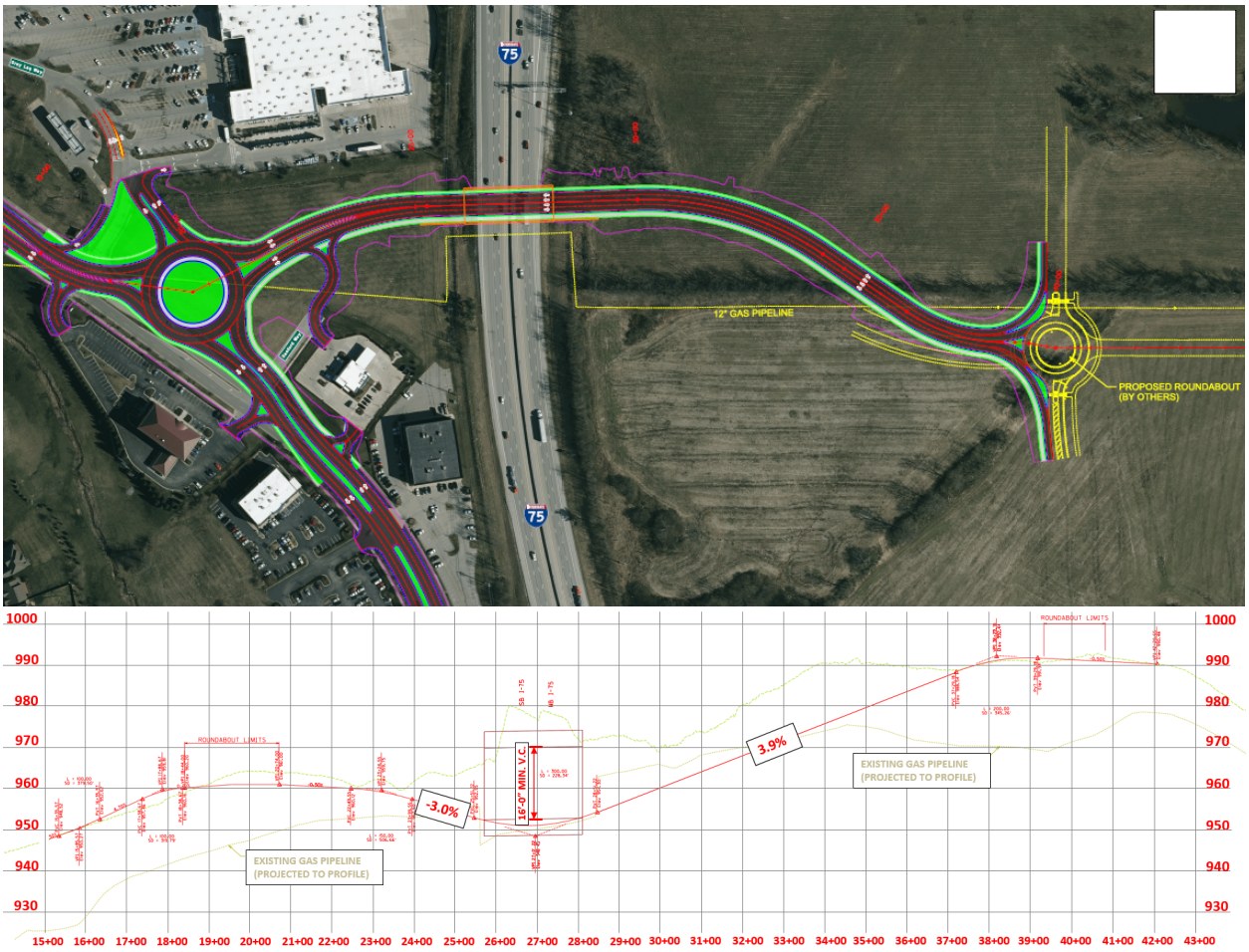


Figure 11: Conceptual Four-Lane Connector under I-75

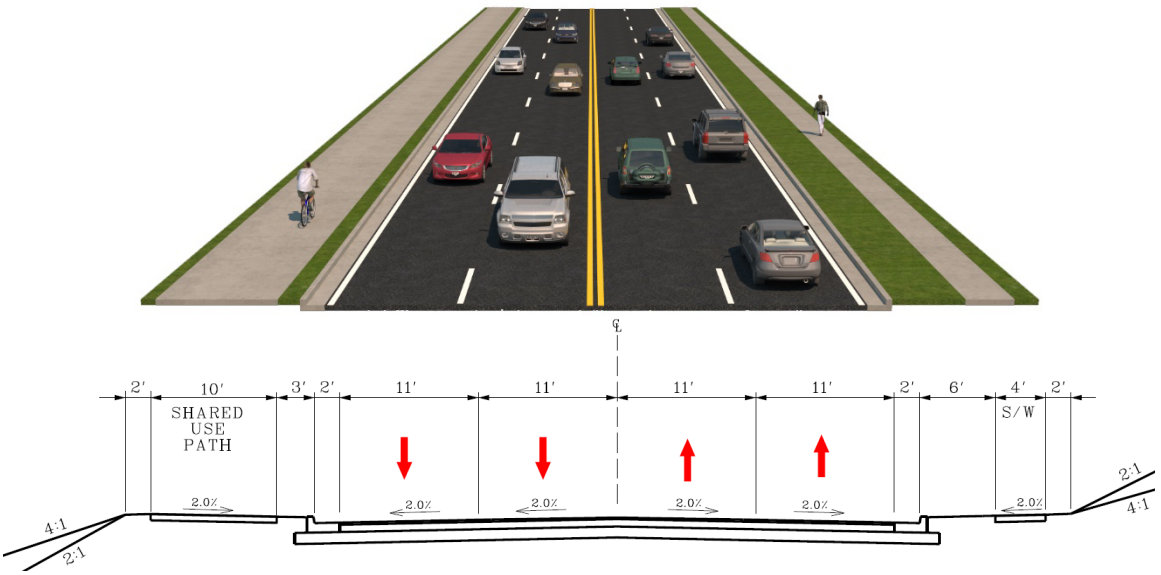


Figure 12: Minimum Typical Section for the Conceptual Four-Lane Connector

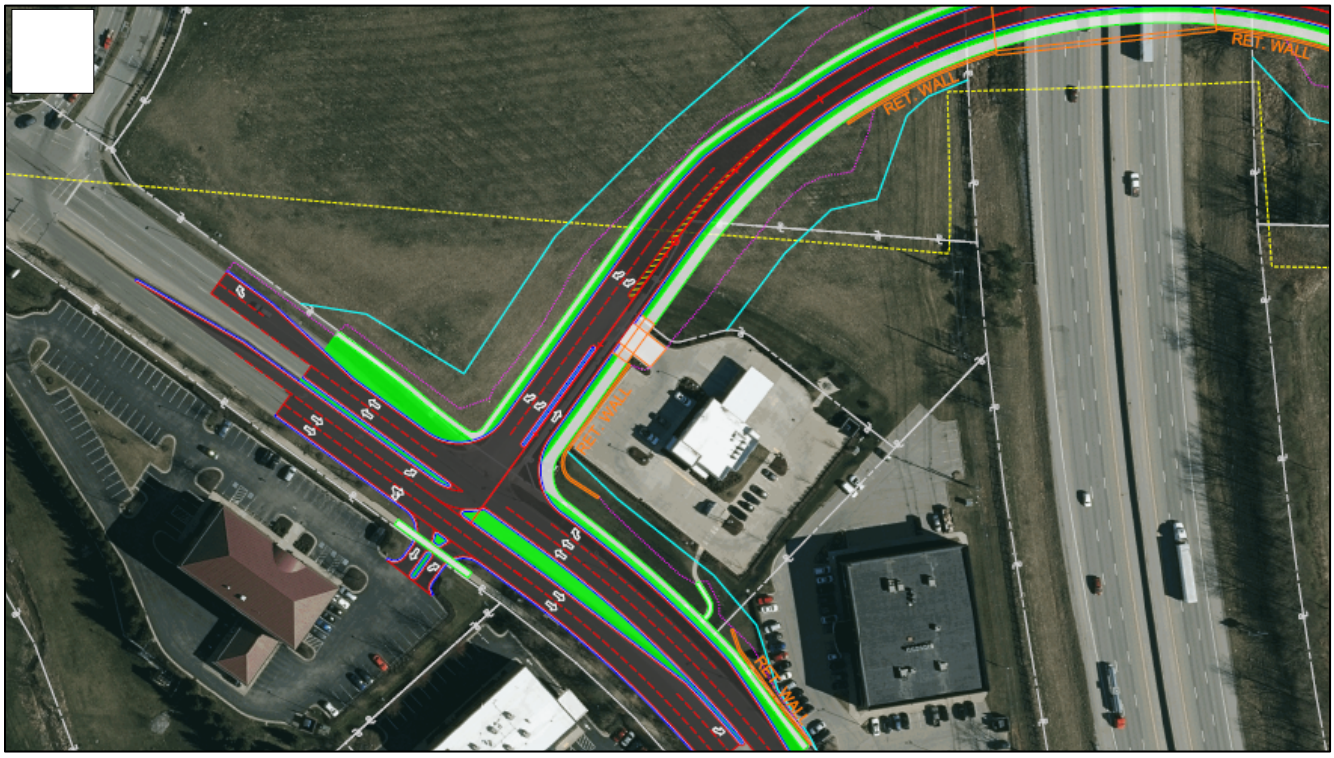


Figure 13: Two-Lane Connector Intersection with Sir Barton Way

The traffic signal would require only two phases because the right-in/right-out University of Kentucky Credit Union entrance would be stop-controlled and not included in the signal. Southbound through traffic on Sir Barton would have continuous green arrows and would not stop. This type of intersection would be necessary because of the proximity to the existing signal at the Grey Lag Way intersection.

Although access to and from the two-lane concept would be restricted and it would not provide as much traffic relief as the four-lane concept, it would still provide a viable connection across I-75 with multi-modal accommodations and reduced right-of-way impacts and construction costs. U-turn opportunities on Sir Barton Way should be examined during preliminary engineering should this concept be advanced. The I-75 crossing could be constructed with sufficient width to accommodate an ultimate four-lane underpass.

Based on results from the LAMPO model, a two-lane connector with a 3/4 intersection at Sir Barton Way could expect 15,000 to 16,000 VPD in 2045. This is only slightly lower than the forecasts for a two-lane connector with full access at Sir Barton Way, which could expect up to 19,000 VPD in 2045.

6.2 I-75 AUXILIARY LANES

At the second project team meeting, there was discussion of the proposed bridge for the Sir Barton/Polo Club connector. Taking advantage of the proposed maintenance of traffic required for the bridge construction (discussed below), full auxiliary lanes could be constructed between the US 60 and Man O' War Boulevard interchange ramps, as shown in **Figure 14**. The LAMPO MTP includes a recommended project to construct a southbound auxiliary lane:

- **Long-Range MTP ID 37**: Add Southbound Auxiliary Lane, Winchester Road to Man O' War. Programmed cost = $1,387,000.

Constructing these auxiliary lanes will provide a better local connection between US 60 and Man O' War Boulevard and will reduce congestion on Sir Barton Way. Each auxiliary lane will be approximately 4,200 feet in length.

Figure 14: Proposed Auxiliary Lanes on I-75

6.2.1 Maintenance of Traffic

Due to the depth of rock in the focus area, a bridge for I-75 traffic will be constructed under the current interstate using part-width construction. This would require three major maintenance of traffic (MOT) phases on I-75 which could also facilitate the construction of the proposed auxiliary lanes. The first phase involves shifting traffic to the east and constructing the first portion of the bridge under the southbound lanes, as shown in **Figure 15**.

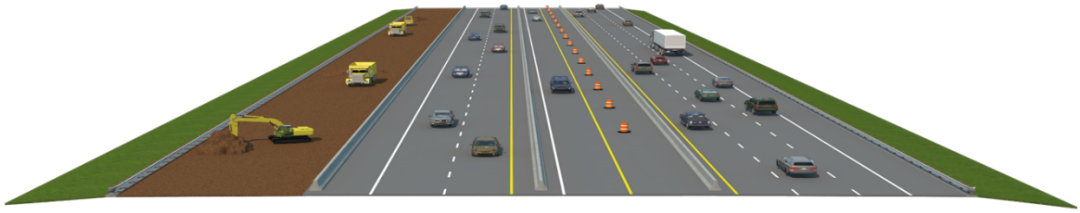


Figure 15: Phase 1 - Shift Traffic Lanes East

The second phase involves shifting traffic to the outside and constructing the middle portion of the bridge under the existing median, as shown in **Figure 16**.

Figure 16: Phase 2 - Shift Traffic Lanes Outside

The third phase involves shifting traffic to the west and constructing the final portion of the bridge under the northbound lanes, as shown in **Figure 17**.

Figure 17: Phase 3 - Shift Traffic Lanes West

6.3 COST ESTIMATES

Planning level cost estimates were prepared for the conceptual improvements, shown in **Table 2**, based on current average KYTC unit costs. KYTC District 7 assisted in this effort by providing approximate right-of-way estimates.

Table 2: Cost Estimates (2021 Dollars)

Project Phase	Sir Barton Connector (Two-Lane Concept)	Sir Barton Connector (Four-Lane Concept)	I-75 Auxiliary Lanes
Design	$1,410,000	$1,880,000	$700,000
Right-of-Way*	$5,460,000	$9,800,000	$0
Utilities	$600,000	$600,000	$0
Construction**	$9,600,000	$12,700,000	$4,700,000
Subtotal	$17,070,000	$24,980,000	$5,400,000
TOTAL***	**$22,470,000 to $30,380,000**		

*Right of Way Estimate for the Sir Barton Connector provided by KYTC District 7.
**Construction includes 20% Contingency
***Includes Sir Barton Connector concept plus I-75 Auxiliary Lanes.

7.0 CONCLUSIONS

The goals of the *Hamburg I-75 Crossing Feasibility Study* were to determine the feasibility of implementing a direct connection between Sir Barton Way and Polo Club Boulevard, examine impacts to traffic patterns on the surrounding roadway network, and identify other project benefits, constraints, impacts, and costs. Several options to cross I-75 were considered over the course of the study. It was determined that constructing a bridge under the current interstate using part-width construction was the most cost-effective and feasible option. Both two-lane and four-lane connector concepts were evaluated, and both should be considered in future project phases. Should a two-lane connector be ultimately recommended and carried forward into the design phase, some consideration should be given to constructing a bridge wide enough to accommodate a four-lane corridor in the future.

A route that avoids impacting the 12-inch TC Energy gas line has been developed and has received preliminary approval from the utility company. Future coordination with TC Energy will be necessary to avoid the need for costly gas line relocation.

Traffic demand was analyzed using the LAMPO travel demand model. A connector between Sir Barton Way and Polo Club Boulevard would be heavily used regardless of the typical section. It will also provide some traffic relief for the existing roadway network. However, additional transportation improvements will be needed in the area to accommodate the future traffic demand. Peak hour traffic operational analyses are needed during Phase 1 design to determine how a connector would best operate within the existing network.

Constructing auxiliary lanes on I-75 between US 60 and Man O' War Boulevard was identified as an opportunity facilitated by a new bridge under I-75 for the Sir Barton/Polo Club Connector. This concept is consistent with recommendations included in the LAMPO MTP.

7.1 NEXT STEPS

The next step following this study for any potential improvements would be Phase 1 Design (Preliminary Engineering and Environmental Analysis). Further funding will be necessary to advance an improvement to the design phase as additional phases of this project are not funded in *Kentucky's FY 2020 – FY 2026 Highway Plan*. A traffic operations analysis is recommended to determine the peak hour impacts of improvement concepts.

CONTACTS/ADDITIONAL INFORMATION

Written requests for additional information should be sent to Mikael Pelfrey, Director, KYTC Division of Planning, 200 Mero Street, Frankfort, KY 40622. Additional information regarding this study can also be obtained from the KYTC District 7 Project Manager, Rob Sprague, at (859) 246-2355 (email at Robin.Sprague@ky.gov).