Downtown Ashland Transportation/Feasibility Study

Boyd County, KY

Final Report

Item No. 9-408

March 2021

In Partnership With

Palmer ENGINEERING

EXECUTIVE SUMMARY

The Downtown Ashland Transportation Feasibility Study (Item No. 9-408.00)was initiated by the Kentucky Transportation Cabinet (KYTC) and the Kentucky-Ohio-West Virginia Interstate Planning Commission (KYOVA) to review Winchester Avenue (US 60/ US 23X) and Greenup Avenue (US 23) in downtown Ashland (see **figure ES-1**). The study examined the feasibility of reducing the number of through lanes along Winchester Avenue between 13th Street and 18th Street. The reduction of lanes will provide additional width to convert the existing parallel parking configuration to angled parking spaces, improve safety at pedestrian crossings, and improve safety for left-turning vehicles. Additionally, the project would provide multi-modal facilities and enhance walkability through the project corridor.

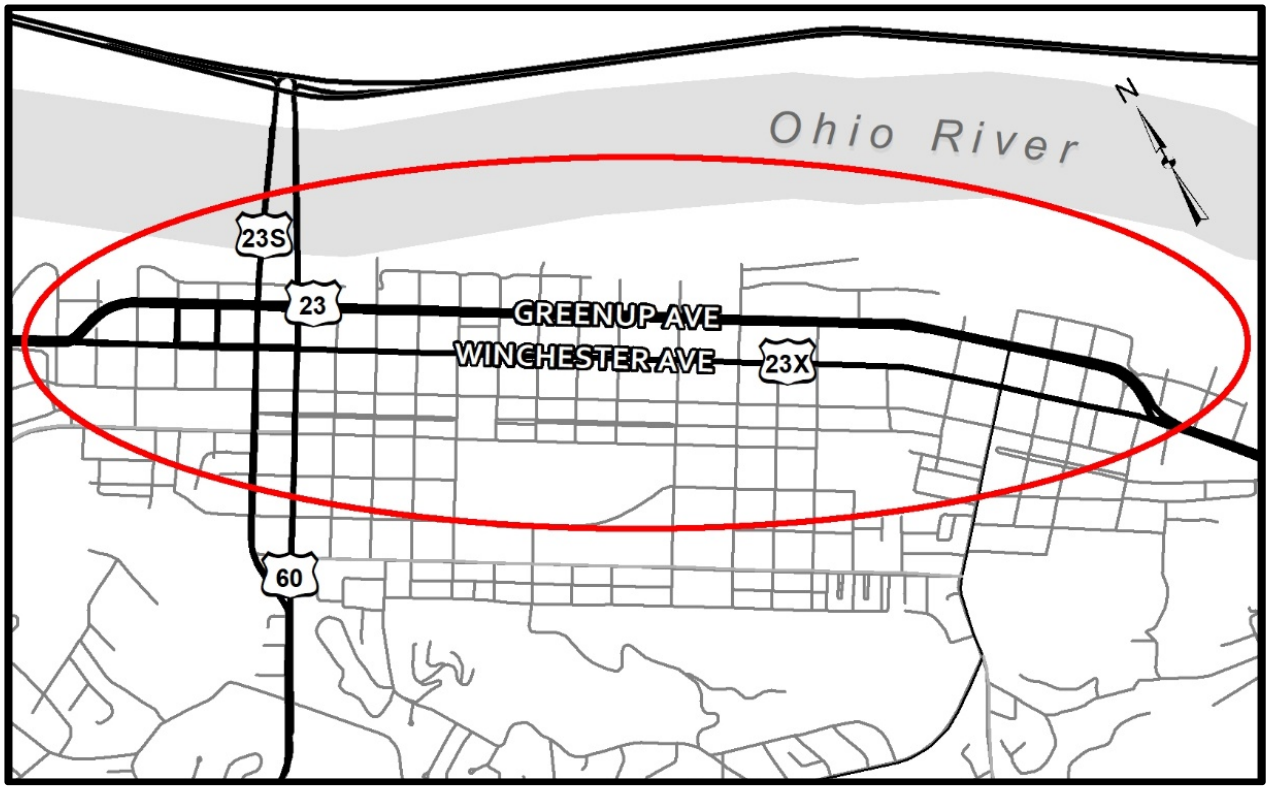

Figure ES-1: Downtown Ashland Study Area

PROJECT OBJECTIVES

During the initial phases of the study, the Project Team established the following tasks:

- Inventory existing conditions, including roadway geometrics, crash history, and traffic conditions in the study area

- Determine the diversion of traffic from Winchester Avenue to Greenup Avenue with the lane reduction
- Analyze traffic under existing and proposed conditions
- Generate microsimulation models to show the existing and proposed conditions in the study area; models will then be used to evaluate the developed alternative under the same conditions
- Perform a signal timing analysis for the signalized intersections within the study area.
- Hold virtual meetings to promote stakeholder and public involvement
- Develop alternatives that improve the existing conditions and meet the goals of the project team and the stakeholders
- Generate cost estimates for viable alternatives that include design, right of way, and construction
- Prepare a report that summarizes the outcomes of these tasks

Based on the existing conditions and feedback provided by Local Officials, Stakeholders, and Project Team the following goals were considered when developing alternatives:

- Provide a pedestrian-friendly facility
- Increase parking
- Improve aesthetics of the downtown Ashland area
- Decrease speeds through the improvement area
- Revitalize downtown Ashland, KY
- Improve downtown conditions to better accommodate activities and events
- Change the four-lane section of Winchester Avenue to a two-lane section in the improvement area

EXISTING CONDITIONS

As part of the study's initial objectives, the study area's existing conditions were inventoried to determine the roadway geometrics and geometric deficiencies, crash history data, traffic conditions, and existing parking data. More specifically, the following items were inventoried:

- Lanes, shoulder, and median widths
- Horizontal geometrics
- Vertical geometrics and grades
- Functional classifications and truck routes
- Access points and driveways
- Traffic volumes

- Travel times
- Crash history and analysis
- Number of parking spaces available and where the most used parking spaces are located

From the existing inventory it was determined that no geometric deficiencies occurred throughout the study corridor. Additionally, the traffic volumes show that the corridor operates below capacity. The findings showed that Winchester Avenue can handle the existing traffic volumes even if the roadway is reduced to only a single through lane in each direction. The traffic analyses along Winchester Avenue between 13th Street and 18th Street indicate that the existing level of service (LOS) of the intersections are an "A" or "B" for the AM and PM peak hours.

The crash analyses indicate that along Winchester Avenue between 13th Street and 18th Street, the critical crash rate factor is 1.67 and the critical injury rate factor is 1.39. These values indicate that this corridor suffers more crashes and has more injuries than expected when comparing the corridor with other roadways that share similar characteristics.

The parking inventory indicated available parking between 13th Street and 18th Street is underutilized, with 164 parking spaces of the available 380 parking spaces being utilized. The majority of the spaces being utilized were between 15th Street and 18th Street. Additional parking spaces could be added if the Community Trust Bank parking garage became accessible to the public. The inventory of spaces in the parking garage indicated that of the 419 parking spaces in the parking garage, 29 were being used.

IMPROVEMENT CONCEPTS

During the first meeting of Local Elected Officials and Stakeholders, the Project Team established goals for the project based on input from the Local Elected Officials and Stakeholders. The Project Team developed two alternatives that addressed the goals of the project to present at the second meeting of Local Officials and Stakeholders for consideration.

Alternative 1 proposed the following improvements:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Remove parallel parking, and replace it with pull-in angled parking
3. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distances for pedestrians
4. Add mid-block crossing between 15th Street and 16th Street

Alternative 2 proposed the following improvements:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Replace signalized intersections at 14th Street, 15th Street, 17th Street, and 18th Street with mini-roundabouts
3. Replace signalized intersection at 16th Street with a two-way stop-controlled intersection
4. Remove parallel parking and replace it with angled parking that vehicles will back into
5. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distance for pedestrians
6. Add five-foot-wide raised median through improvement area
7. Add mid-block crossing between 15th Street and 16th Street

Having discussed the first two alternatives at the second meeting of Local Officials and Stakeholders, a third alternative was designed to better capture the goals of the Local Elected Officials, Stakeholders, and Project Team. The third alternative proposed the following improvements:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Replace signalized intersections at 14th Street, 15th Street, 17th Street, and 18th Street with mini-roundabouts
3. Change 14th Street from one-way to two-way travel between Greenup Avenue and Carter Avenue
4. Add five-foot-wide raised median through improvement area
5. Replace signalized intersection at 16th Street with a two-way stop-controlled intersection.
6. At the intersection of Winchester Avenue and 16th Street, close the gap in the median and restrict southbound 16th street traffic to right turn only movement
7. Remove parallel parking, and replace with angled parking that vehicles will back into
8. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distance for pedestrians
9. Parallel Parking added on Winchester Ave between 13th and 14th Street.

ALTERNATIVE TRAFFIC ANALYSIS

The traffic analysis of the proposed alternatives indicates that the intersections continue to operate at acceptable levels of service (LOS). Although some individual movements degrade and have an increased delay time and queue length, they still operate within acceptable conditions.

Alternative 1 experiences a decrease in the PM peak hour's LOS at the 14th Street, 15th Street, and 17th Street intersections with Winchester Avenue. At these intersections, the LOS degrades to a "C", "D", and "C" respectively.

Alternative 2 shows that the intersection of 16th Street experiences a turning movement decrease in LOS. The left-turning movement from 16th Street onto Winchester Avenue decreases to LOS "C" during the PM peak hour.

Alternative 3 prevents the left-turning movements from 16th Street to Winchester Avenue. All intersections and turning movements operate at LOS "C" or better during both peak hours by removing this movement.

ALTERNATIVE COST ESTIMATES

Preliminary cost estimates of the three alternatives show that the costs range from approximately $2.9 million to $3.5 million. These costs include design, right of way, utility, and construction costs. Table ES-1 provides the breakdown of costs for each of the three alternatives.

ALTERNATIVE	DESIGN ($ million)	RIGHT-OF-WAY ($ million)	UTILITY ($ million)	CONSTRUCTION ($ million)	TOTAL ESTIMATE ($ million)
ALTERNATIVE 1	$0.3	$0.0	$0.1	$2.5	**$2.9**
ALTERNATIVE 2	$0.3	$0.0	$0.2	$3.0	**$3.5**
ALTERNATIVE 3	$0.3	$0.0	$0.2	$3.0	**$3.5**

Table ES-1: Alternative Cost Estimates

CONCLUSIONS

The Downtown Ashland Transportation/Feasibility Study identified multiple improvements that could be implemented to meet the downtown area's long-term uses. The local officials identify downtown revitalization as a primary focus to move the City of Ashland into the next decade. The alternatives focused on reducing Winchester Avenue from four-lanes to two-lanes and the implementation of angled parking along the route between 13th and 18th Street. The Project Team met multiple times and recommended proceeding forward with Alternative 3 (see **Figure ES-2**) and recommend further evaluation of the following before finalizing the preliminary design:

- Back-in vs Pull-in angle parking
- 16th Street and Winchester Avenue intersection design
- Converting 14th Street to two-way traffic
- Eliminating the mid-block crossing
- Parallel parking along Winchester Avenue between 13th Street and 14th Street

Cost Estimates were developed based on planning level quantities that include pavement, curbs, signals, earthwork, striping, and drainage. With the exception of lighting, the utilities in the area will remain in their existing locations with minor adjustments to valves and manholes. It is anticipated that no right of way will be necessary to complete this project. Based on these estimates, Alternative 3, the preferred alternative, would cost approximately $3.5 million to design and construct. Possible funding for this project could be acquired through a combination of the Highway Safety Improvement Program (HSIP), dedicated TAP funds provided by KYOVA, Surface Transportation grants provided by KYOVA, the KYTC road fund, KYTC discretionary funds, and city/local funding.

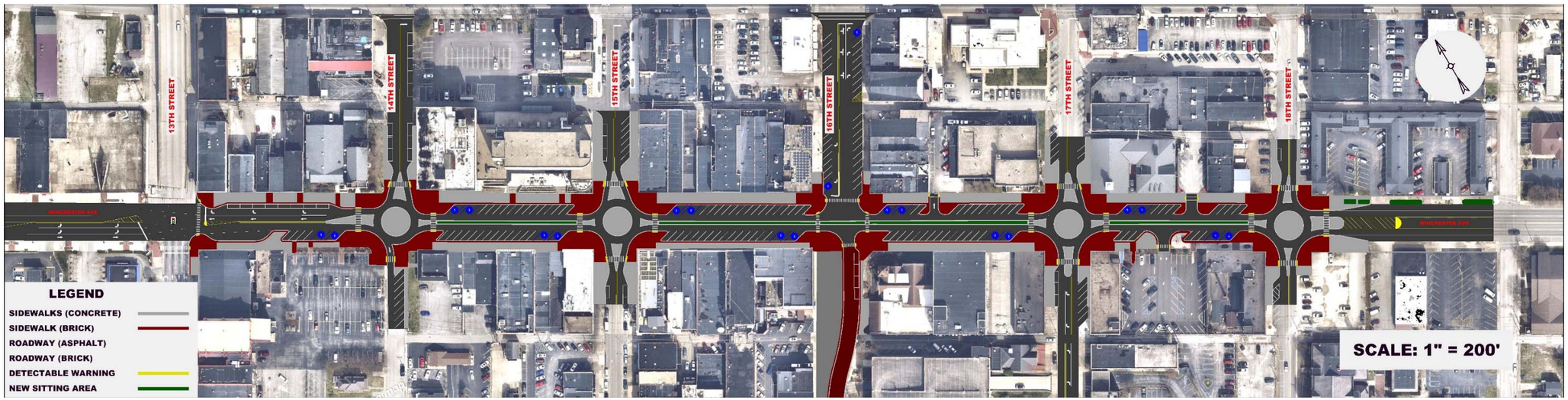

Figure ES-2: Alternative 3 Concept

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1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) and the Kentucky-Ohio-West Virginia Interstate Planning Commission (KYOVA), a metropolitan planning organization (MPO) that consists of the Kentucky, West Virginia, and Ohio tri-state area including Boyd County, initiated the Downtown Ashland Transportation Feasibility Study (Item No. 9-408.00) to review the existing conditions along Winchester Avenue (US 60/US 23X) and Greenup Avenue (US 23) in downtown Ashland and examine the feasibility of reducing the number of through lanes along Winchester Avenue between 13th Street and 18th Street to provide space for angle parking spaces. This study was funded through KYTC'S Metropolitan Planning funds in partnership with the KYOVA.

1.1 STUDY AREA

The Study Area is located in downtown Ashland, KY (See **Figures 1 and 2**) in northern Boyd County along the Ohio River. The study area includes the following limits:

- Winchester Avenue (US 60/US 23X) and Greenup Avenue (US 23) from the "northern split" to 18th Street
- Intersection of Greenup Avenue and 29th Street
- Southern intersection of Winchester Avenue and Greenup Avenue

The section of road being evaluated for lane reduction is Winchester Avenue from 13th Street to 18th Street. Winchester Avenue is currently a four-lane roadway running north to south that provides access to downtown Ashland, KY and access to two bridges connecting Kentucky and Ohio. Winchester Avenue is classified as a principal arterial north of US 60 and a minor arterial south of US 60 with a 25 mph speed limit throughout the study area. Greenup Avenue is a parallel route that serves as an alternate travel route for Winchester Avenue and is classified as a principal arterial with a speed limit of 35 mph in the study area.

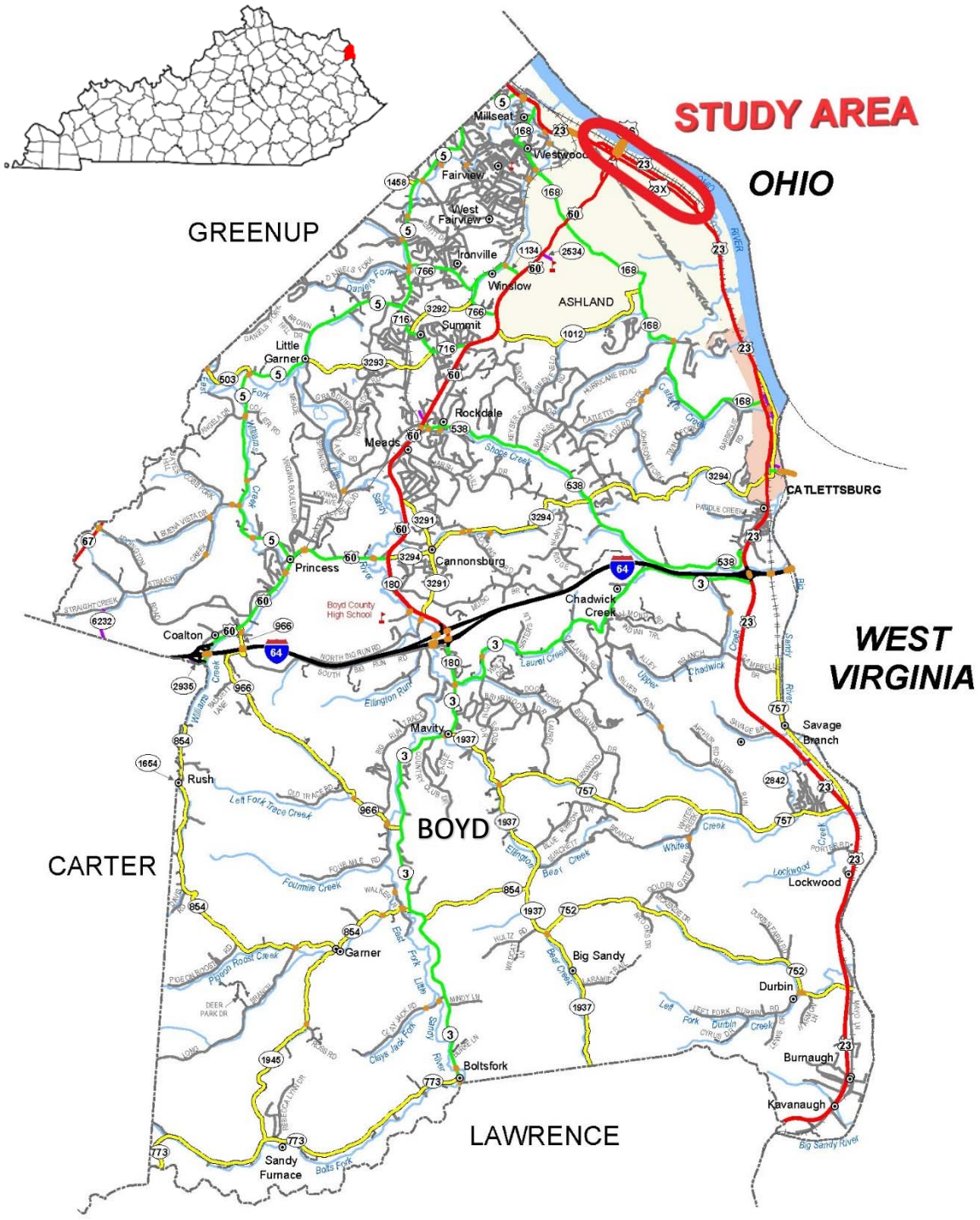

Figure 1: Vicinity Map

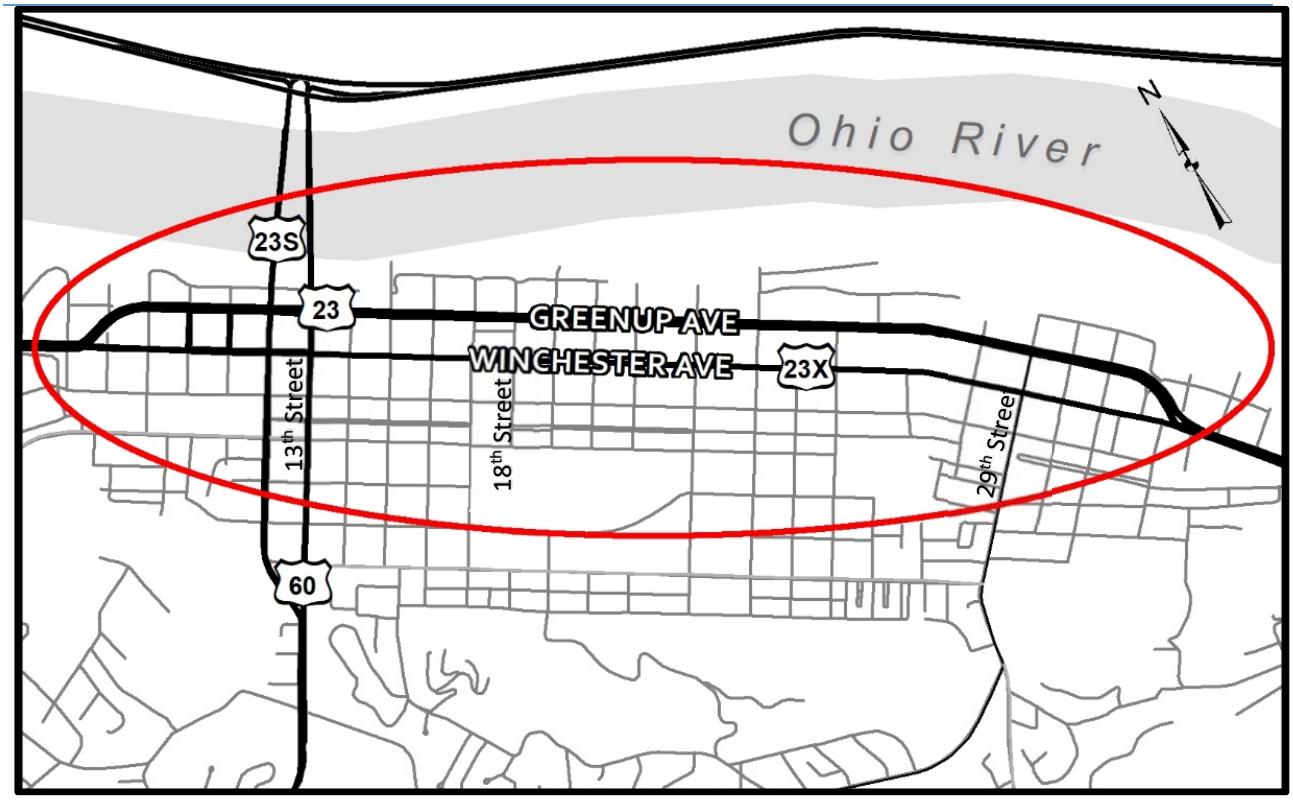

Figure 2: Downtown Ashland Study Area

1.2 STUDY GOALS

The Project Team established the following study tasks at the kickoff meeting:

- Inventory existing conditions including roadway geometrics, crash history, and traffic conditions in the study area
- Determine the diversion of traffic from Winchester Avenue to Greenup Avenue with the lane reduction
- Analyze traffic under existing and proposed conditions
- Generate microsimulation models to show the existing and proposed conditions in the study area. Those models will then be used to evaluate the developed alternative under the same conditions
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- Revitalize downtown Ashland, KY
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These goals were reaffirmed both the first and second meetings with Local Officials and Stakeholders. The Project Team continued to consider these goals when evaluating existing conditions and developing the alternatives.

1.3 PREVIOUS STUDIES AND COMMITTED PROJECTS

A review of transportation projects and reports in the area identified the following in Boyd County.

Previous Studies: KYOVA and KYTC have completed key planning studies on transit, pedestrian, and bicycle facilities in Boyd County. Recent studies include:

- "Non-Motorized Transportation Plan for Boyd and Greenup Counties" (KYOVA, June 2016)
- "Kentucky Freight" (KYTC/USDOT, September 2011)
- "Boyd-Greenup Small Urban Area Study" (KYTC, August 2020)
- "*Ashland Area Freight Study*" (KYOVA, In Progress)

Committed Projects: The Boyd-Greenup Small Urban Area Study identified project on Winchester Avenue (KYOVA Funding) and Greenup Avenue (KYTC CHAF).

- Kentucky's fiscal year 2020 – fiscal year 2026 enacted Highway Plan lists no specific projects in the downtown Ashland area.

2.0 EXISTING CONDITIONS

The existing transportation network, described in the following sections, includes information on the roadway geometrics, facility types, crash history, and traffic volumes. Data was collected from the KYTC's Highway Information System (HIS) database, traffic counts, and field reviews.

Figure 3: (1 of 2) Existing Downtown Ashland Streets

Figure 4: (2 of 2) Existing Downtown Ashland Streets

2.2 ROADWAY SYSTEMS AND CHARACTERISTICS

This information includes roadway facilities and geometrics, crash history, and traffic volumes within the study area.

2.2.1 LANES, SHOULDERS, AND MEDIAN WIDTHS

Data for this section was collected from KYTC's Highway Information System (HIS) database, aerial photography, as-built plans, the Kentucky State Police, and field review. A summary of the information contained within the KYTC HIS database is included in **Table 1**.

Table 1: Existing Lanes, Shoulders, and Median Width Summary

SEGMENT	BEGIN MILEPOINT	END MILEPOINT	LENGTH (miles)	Annual Average Daily Traffic (AADT)	NUMBER OF LANES -- LANE WIDTHS	SHLDR WIDTH	MEDIAN WIDTH	GRADE	SPEED LIMIT (MPH)
WINCHESTER AVE 23X – 13th to 18th	1.100	1.551	0.451	7,598	4-12'	8' (C&G)	0'	0.4%	25
WINCHESTER AVE 23X – 13th to US 23	1.551	18.980	0.416	16,022	5-12' (LTL)	0' (C&G)	14'	0.4%	25
GREENUP AVE 23 – 15th to 17th	18.240	18.460	0.220	13,079	5-12' (TWLTL)	12' (C&G)	0'	0.15%	35
GREENUP AVE US 23 @ US 23X N	18.900	19.100	0.200	23,367	4-12'	0' (C&G)	4' – 16'	3.05%	35
GREENUP AVE US 23 @ US 23X S	16.900	17.000	0.100	17,942	4-12'	0' (C&G)	16'	1.94%	35
GREENUP AVE US 23 @ 29th	17.200	17.350	0.150	13,079	4-12'	8' (C&G)	4'	0.50%	35
US 60	12.200	12.400	0.200	16,022	5-12' (LTL)	0' (C&G)	14'	0.4%	25

Existing US 23 (Greenup Avenue) and US 23X (Winchester Avenue) have two 12 foot through lanes in each direction. Winchester Avenue currently has over 70 feet of pavement, with the additional pavement used for parking and turn lanes throughout the corridor. Winchester Avenue has a posted speed limit of 25 mph. Greenup Avenue currently has over 80 feet of pavement that includes four through lanes and a center lane that serves as a dedicated left-turn lane or a two-way left-turn lane. Where more than 60 feet of width is available, curb-side parallel parking lanes are provided. Greenup Avenue (US 23) has a posted speed limit of 35 mph.

2.2.2 HORIZONTAL GEOMETRICS AND DEFICIENCIES

In downtown Ashland, the roadway network is laid out in a grid pattern, with the streets aligned southwest to northeast and the avenues aligned northwest to southeast. The roads run in a straight horizontal alignment except for Greenup Avenue, which has curves with a radii of 572.96 feet and superelevation of 5.4 % at both ends where Greenup Avenue intersects Winchester Avenue. These geometrics correspond to an AASHTO recommended design speed of 35 mph, which is the same as the posted speed. No horizontal curve deficiencies appear within the study corridor.

Figure 5: Curve, North End of Greenup Avenue (US 23)

2.2.3 VERTICAL GEOMETRICS, GRADES, AND DEFICIENCIES

Figure 6: 5% Grade on 13th Street Bridge Approach (US 23S)

The roads in downtown Ashland have minimal grades, ranging from 0% to 0.4 %, on the surface roads. The 13th Street approach to the southeast Ohio River Bridge has a maximum grade of 5 % and a Stopping Sight Distance (SSD) of 537 feet. The 12th Street approach to the northwest Ohio River Bridge has a maximum grade of 6.4 %. These two bridges cross over Greenup Avenue, Front Street, a railroad, and then the Ohio River. The maximum grades are below the AASHTO recommended maximum of 7%. Minimum sight distances are greater than the AASHTO recommended minimum of 250 feet for 35 mph, which is the maximum posted speed on any of the downtown roads. No vertical curve deficiencies appear within the study corridor.

2.2.4 FUNCTIONAL CLASSIFICATION AND TRUCK ROUTES

Functional classification is the grouping of roads, streets, and highways into systems or classes according to the character of service they are intended to serve. This classification system recognizes that travel involves movement through a hierarchical system of facilities that progress from lower classifications handling short, locally oriented trips to higher classifications serving longer distance travel at higher mobility levels. This grouping acknowledges that roads serve multiple functions and provides a basis for comparing roads.

Roads within the area of this study fall into the following functional classes:

- **Urban Principal Arterials** serve the major centers of activity with the highest traffic volumes and the longest trips. They carry traffic into and out of an area.
- **Urban Minor Arterials** include all arterials not classified as principal and generally have somewhat lower traffic volumes and moderate trip lengths. They distribute traffic through an area.
- **Urban Collectors** provide both land access and traffic circulation in an area.
- **Urban Locals** primarily provide access to properties that touch the roads and connect them to the higher class roads.

Table 2 lists the functional classifications of the roads and whether they are recognized as truck routes.

Table 2: Functional Classification and Truck Route Summary

SEGMENT	BEGIN MP	END MP	LENGTH (miles)	Annual Average Daily Traffic (AADT)	FUNCTIONAL CLASSIFICATION	TRUCK ROUTE	NATIONAL HIGHWAY SYSTEM	SPEED LIMIT (MPH)
WINCHESTER AVE 23X – 13th to 18th	1.100	1.551	0.451	7,598	Minor Arterial	No	No	25
WINCHESTER AVE 23X – 13th to US 23	1.551	18.980	0.416	16,022	Principal Arterial	Yes (From 10th-11th)	Yes	25
GREENUP AVE 23 – 15th to 17th	18.240	18.460	0.220	13,079	Principal Arterial	Yes	Yes	35
GREENUP AVE US 23 @ US 23X N	18.900	19.100	0.200	23,367	Principal Arterial	Yes	Yes	35
GREENUP AVE US 23 @ US 23X S	16.900	17.000	0.100	17,942	Principal Arterial	Yes	Yes	35
GREENUP AVE US 23 @ 29th	17.200	17.350	0.150	13,079	Principal Arterial	Yes	Yes	35
US 60	12.200	12.400	0.200	16,022	Principal Arterial	Yes	Yes	25

As part of the Surface Transportation Assistance Act of 1982 (STAA), KYTC designated a network of highways that commercial vehicles with increased dimensions may use. These STAA routes allow single-unit trucks with a total length of 45 feet and semi-trailer combinations with 53-foot-long trailers. The National Highway System is made up of roads considered essential to the nation's economy, defense, and mobility. Being part of the National Highway System brings increased levels of federal cost-sharing. The Principal Arterials of US 23 (Greenup Avenue) and US 60 (12th and 13th Streets southwest of Winchester Avenue, 10th and 11th Streets between Winchester Avenue and Greenup Avenue, Greenup Avenue from 10th Street to the southeast, and Winchester Avenue from 10th Street to 13th Street) are both designated parts of the National Truck Network and National Highway System.

Figure 7: Large truck on Winchester Avenue (US 23X)

2.2.5 ACCESS POINTS / DRIVEWAYS

Control of access to all roads within the downtown study area is by permit, and most of the road intersections are at grade with a mix of stop control for minor side roads and signals for major intersections. 12th and 13th Streets cross Greenup Avenue with bridges that continue across the Ohio River. 13th Street has single lanes at grade on either side of the bridge for local access. Along Greenup Avenue the entrances are well defined with curb cuts, though the largest is 46 feet wide in the study area and 128 feet wide in one instance close to 23rd Street. On Winchester Avenue, the entrances in the central business district between 12th and 18th Streets are well defined with curb cuts. Outside the central area on either end of Winchester Avenue, are a mix of properties whose entrances are well-defined with curb cuts and other properties whose parking lots seem to blend into the roadway.

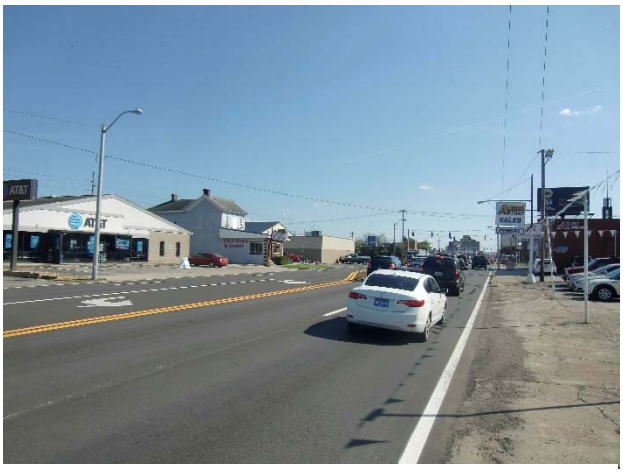


Figure 8: Blended Access on Winchester Avenue (US 23X)

2.2.6 ACCOMMODATIONS FOR BICYCLES / PEDESTRIANS

Figure 9: Downtown Sidewalk on Winchester Avenue (US 23X)

All existing surface roads in the downtown study area have sidewalks. Most sidewalks are adjacent to the pavement; however, they occasionally alternate with sidewalks separated from the pavement by a grass strip. While all of the shorter side roads also have sidewalks, a few of the sidewalks have been covered over by the paving of adjoining parking lots. The 12th Street Bridge also has a sidewalk on one side. Currently no marked bicycle lanes are located within the downtown study area; however, a designated bicycle lane runs almost the length of the study area along Mayo Plaza--a road that runs parallel to Winchester Avenue. The City of Ashland plans to establish bike lanes on both Winchester and Greenup Avenues in the future according to KYOVA's "*Non-Motorized Transportation Plan for Boyd and Greenup Counties*" (June 2016).

2.3 EXISTING TRAFFIC CONDITIONS

2.3.1 TRAFFIC VOLUMES

Traffic turning movement counts were collected at the following 17 intersections along Winchester Avenue and Greenup Avenue in August of 2020:

- Northern split of Winchester Avenue and Greenup Avenue
- Winchester Avenue at 8th Street
- Winchester Avenue at 9th Street
- Winchester Avenue at 10th Street
- Winchester Avenue at 11th Street
- Winchester Avenue at 12th Street
- Winchester Avenue at 13th Street
- Winchester Avenue at 14th Street
- Winchester Avenue at 15th Street
- Winchester Avenue at 16th Street
- Winchester Avenue at 17th Street
- Winchester Avenue at 18th Street
- Greenup Avenue at 15th Street
- Greenup Avenue at 16th Street
- Greenup Avenue at 17th Street
- Greenup Avenue at 29th Street
- Southern split of Winchester Avenue and Greenup Avenue

Both AM and PM peak hours were counted at each intersection. With turning movement counts being completed during the COVID-19 pandemic, traffic tubers were used to determine the average daily traffic along Winchester Avenue and Greenup Avenue to compare with pre-pandemic volumes. The peak hours were 8:00 AM to 9:00 AM and 4:15 PM to 5:15 PM. Traffic count data can be found in **Appendix A** of this report. The following observations were determined:

- PM peak hour traffic had higher volumes than AM peak hour traffic.
- Higher traffic volumes occurred along Winchester north of 13th Street compared to south of 13th Street. The majority of southbound traffic turned off Winchester Avenue at or before 13th Street.
- During the PM peak hour, a high volume of vehicles traveled northbound through the study area and turned right onto 13th Street to cross the bridge into Ohio. It appears that drivers prefer to avoid the additional turning movements required when using Greenup Avenue to access the bridge on 13th Street.

Figures 10, 11, and 12 provide graphics of the AM and PM Peak hour traffic counts for all of the intersections.

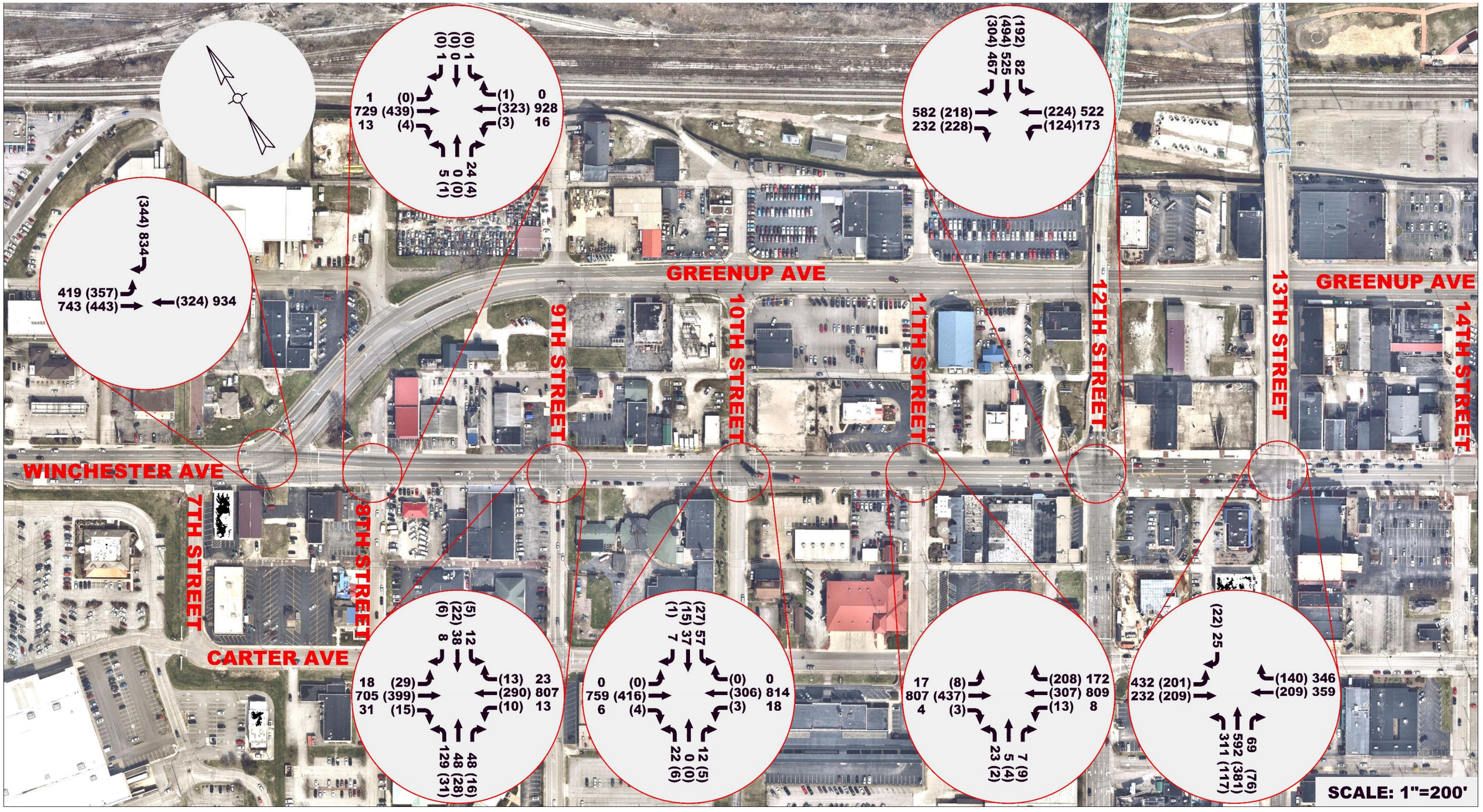


Figure 10: (1 of 3) Turning Movements (AM) PM

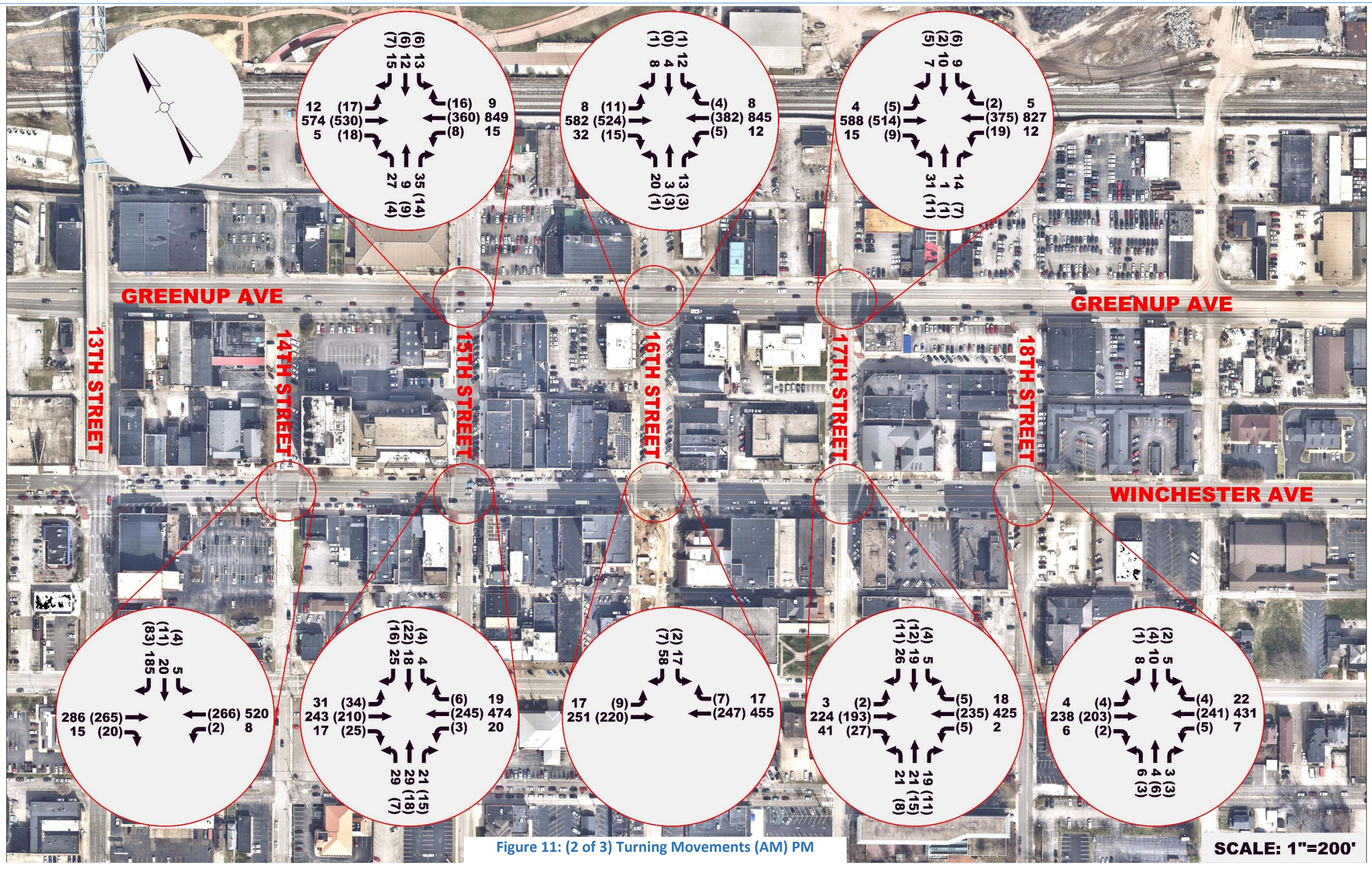


Figure 11: (2 of 3) Turning Movements (AM) PM

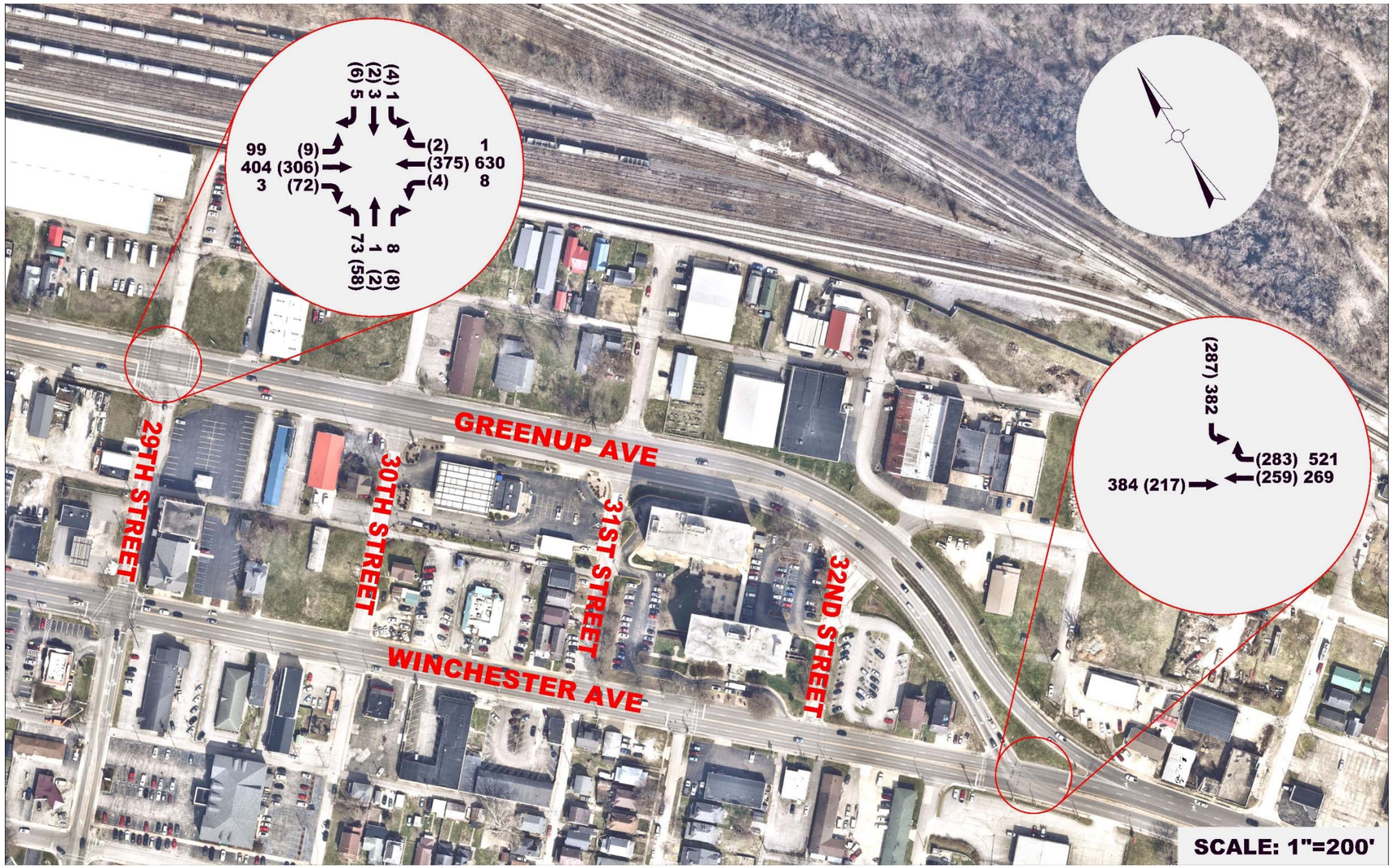


Figure 12: (3 of 3) Turning Movements (AM) PM

2.3.2 LEVEL OF SERVICE ANALYSIS

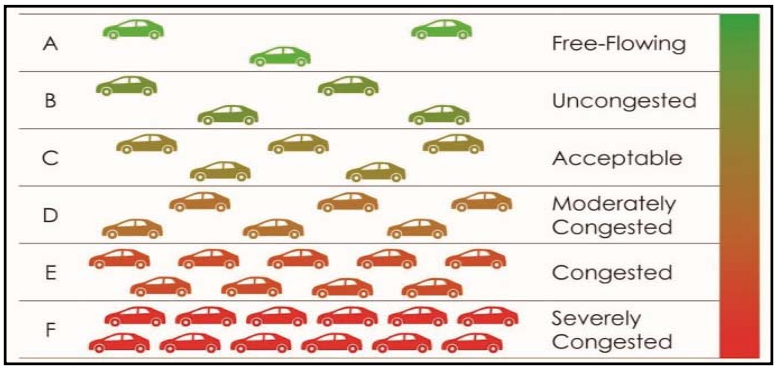


Figure 13: Level of Service Comparison

Using the traffic counts, signal timing data, and existing lane configurations, an analysis of existing traffic was performed using the SYNCHRO 11 program. SYCNCHRO 11 is a computer program that allows the user to input the existing or proposed parameters (volumes, roadway geometrics, speeds, etc) and analyzes how that roadway behaves based on the inputs. The SYNCHRO analysis indicated that most intersections within the study area operate at a Level of Service (LOS) "C" or better during both AM and PM peak hours. Level of Service is a measure of delay and congestion at intersections or along corridors. Level of Service is given as a letter grade ranging from "A" to "F," "A" being no congestion or delay and "F" being heavy congestion and long delay times. **Figure 13** provides an example of the different Level of Service grades for comparison. The intersections that are being considered for changes (Winchester Avenue at 14th Street, 15th Street, 16th Street, 17th Street, and 18th Street) currently operate at LOS "B" or better during AM and PM peak hours. The SYNCHRO output for each intersection can be found in **Appendix D** of this report. **Figure 14** and **Figure 15** provide a summary of the LOS of each intersection in the study area.

2.3.3 EXISTING TRAVEL TIMES

Travel times were measured in both directions during AM and PM peak periods along Winchester Avenue and Greenup Avenue from the northern split to 18th Street. On average, the travel time was approximately four minutes along Winchester Avenue and two and a half minutes along Greenup Avenue. Greenup Avenue takes less time to travel because it has fewer signals, a higher speed limit, and less congestion. Results of the travel time study are as follows:

- To travel southbound along Winchester Avenue from the northern split to 18th Street required on average 3.7 minutes during the AM peak hour and 4.1 minutes during the PM peak hour.
- To travel northbound along Winchester Avenue from 19th Street to the northern split with Greenup Avenue required on average 3.7 minutes during the AM peak hour and 3.7 minutes during the PM peak hour.
- To travel southbound along Greenup Avenue from the northern split with Winchester Avenue to 17th Street took on average 1.8 minutes during the AM peak hour and 1.7 minutes during the PM peak hour.

- To travel northbound along Greenup Avenue from 18th Street to the northern split with Winchester Avenue required on average 2.2 minutes during the AM peak hour and 2.6 minutes during the PM peak hour.

Figure 16 provides the travel time paths for each of the compared routes.

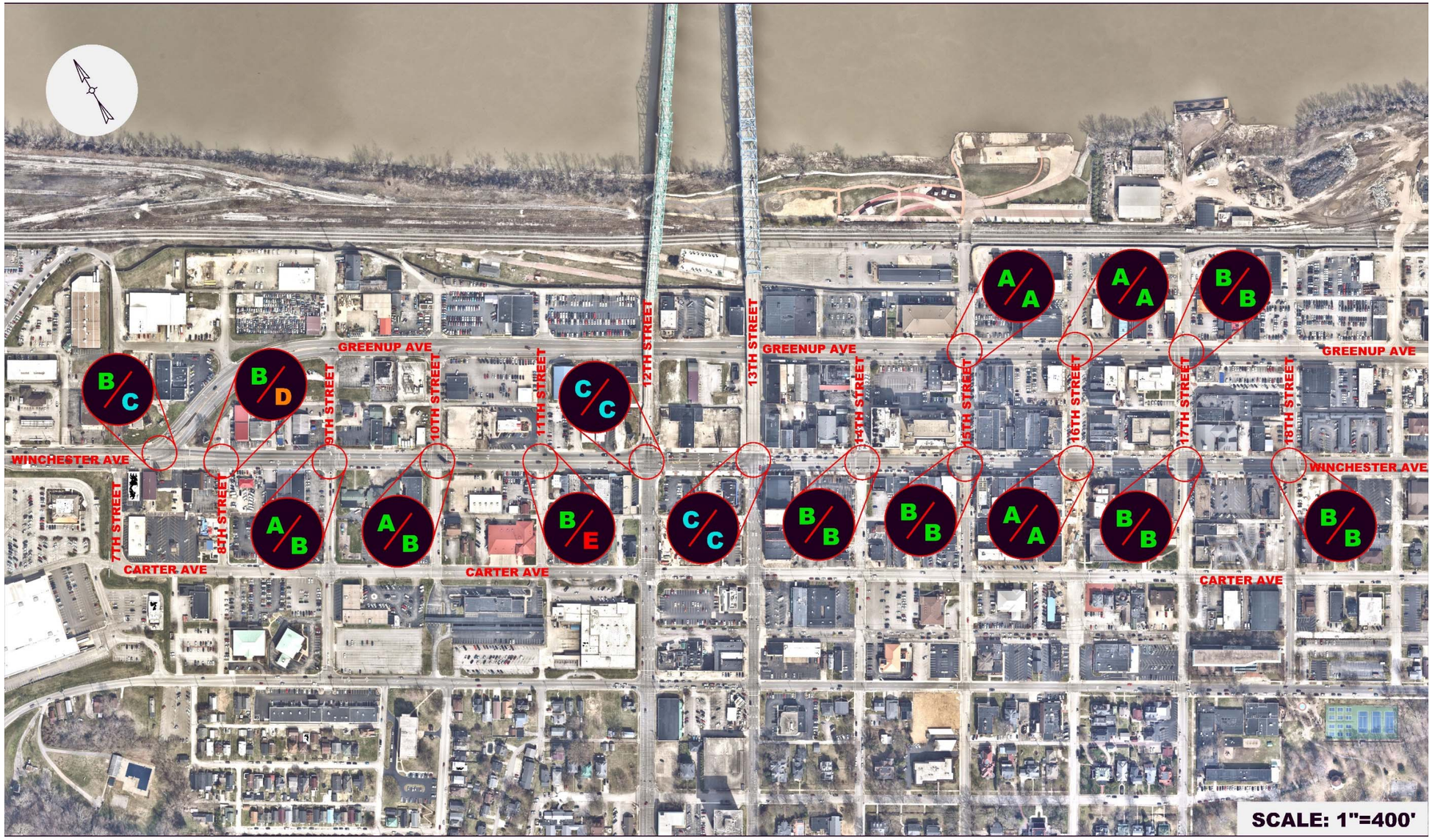


Figure 14: (1 of 2) Existing 2020 Level of Service Summary (AM/PM)

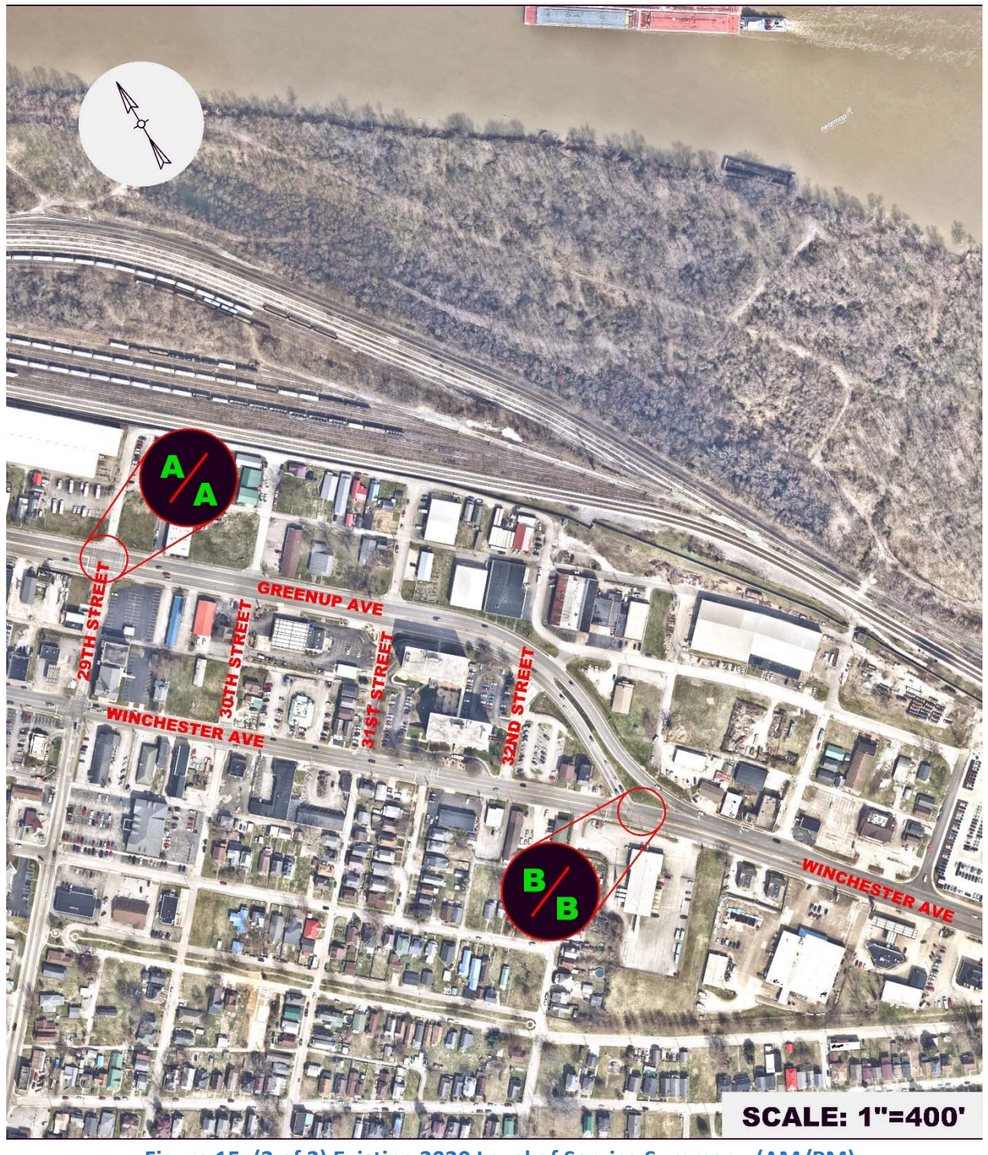


Figure 15: (2 of 2) Existing 2020 Level of Service Summary (AM/PM)

Figure 16: Travel Time End Points

2.4 TRAFFIC FORECAST

The traffic data collected by the tube counts on Winchester Avenue and Greenup Avenue was compared to historic counts in the area and indicated that the average daily traffic was similar to pre-COVID conditions. Therefore, existing traffic volumes were not increased for the base year.

The KYTC count stations along Winchester Avenue and Greenup Avenue showed the traffic volumes have been decreasing over the last 20 years in the project vicinity. No growth was applied for the existing traffic volumes when developing the future build traffic forecast based on this data.

Greenup Avenue = 16,000 ADT
between 17th and 18th Streets

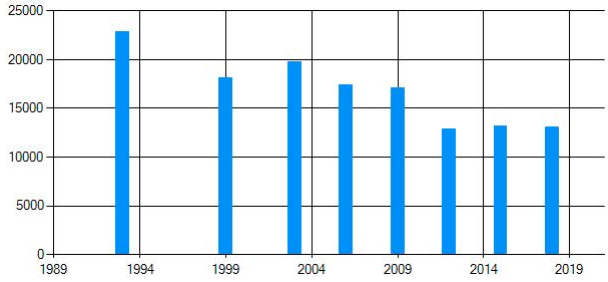


Figure 17: KYTC Count Station 010B09

Winchester Avenue = 7,000 ADT
between 16th and 17th Streets

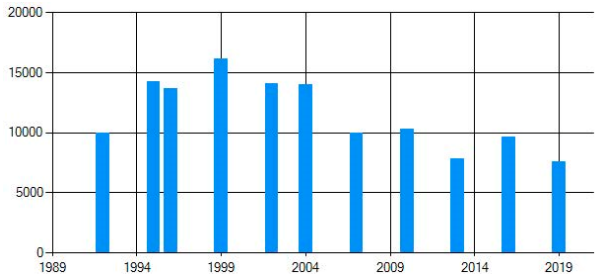


Figure 18: KYTC Count Station Station 010B10

To determine if vehicles would divert with the reduction of total lanes along Winchester Avenue, the KYOVA traffic model was used with two scenarios. The first scenario used existing conditions with Winchester Avenue with four lanes. The second scenario reduced the number of lanes along Winchester Avenue from four lanes to two lanes between 13th Street and 18th Street. The model showed that a negligible volume of traffic diverted onto Greenup Avenue from Winchester Avenue. The project team determined that the negligible diversion was due to Winchester Avenue already operating significantly under capacity and the reduction of lanes did not reduce the capacity enough to impact traffic flow along Winchester Avenue.

The project team does not expect the traffic volumes in this area to significantly increase but wanted to determine if the proposed alternatives were a long-term solution that could meet the traffic demand if an unexpected generator came to the downtown area. A sensitivity analysis was performed using the proposed condition's simulation model to determine if the developed alternatives could accommodate a 100% increase in traffic along Winchester Avenue and Greenup Avenue. The sensitivity analysis indicated that traffic congestion increases significantly at the 13th Street bridge with the additional traffic. However, Winchester Avenue and Greenup Avenue within the study area still operate acceptably with minor queuing along 14th Street.

2.5 CRASH HISTORY AND ANALYSIS

Using information available from Kentucky State Police records, historical crash data from January 1, 2015, to December 31, 2019, was collected for the fifteen intersections analyzed in this report.

2.5.1 CRASH ANALYSIS

Following are the methodologies and findings of the crash analysis:

- The following methodologies developed by the Kentucky Transportation Center (KTC) were used to analyze the crash results:
  - CCRF[1]
  - CIRF[2]
  - EEC[3]
- An HSIP (Highway Safety Improvement Program) project was recently completed along Winchester Avenue from 8th Street to 12th Street to add left-turn lanes and improve safety along this corridor.
- When traveling north to south along Winchester Avenue, the number of sideswipes at each intersection increased when approaching 13th Street.
- The intersection of Winchester Avenue and 13th Street was split into two different intersections in the EEC database. These values were combined in the analysis for improved accuracy. The EEC analysis can be found in **Appendix B**.
- Crashes in study area:
  - 647 Total Crashes
  - 76 Injury Crashes
  - 1 Fatality Crash
  - 8 Pedestrian Crashes
  - 1 Bicycle Crash

Figure 19: Winchester Avenue (US 23X) Looking Southeast at 14th Street Intersection

[1] Critical Crash Rate Factor-any value above one signifies more crashes may be occurring in the analyzed segment than can be attributed to random occurrence.

[2] Critical Injury Rate Factor-any value above one signifies more crashes resulting in an injury may be occurring in the analyzed segment than can be attributed to random occurrence.

[3] Excess Expected Crashes-This value compared the number of crashes reported at a location with the number that are statistically predicted based on the location's volume, geometric features, and traffic control.

Table 3: Critical Crash Rate Factor Summary

Segment	Begin MP	End MP	Annual Average Daily Traffic (AADT)	Critical Crash Rate Factor (CCRF)	Critical Injury Rate Factor (CIRF)
Winchester Ave (13th St. to 18th St.)	1.100	1.551	9,686	**1.67**	**1.39**
Winchester Ave (13th St. to US 23)	1.551	5.226	13,912 to 18,608	**6.18**	**4.41**
Greenup Ave (15th St. to 17th St.)	18.260	18.430	13,079	0.93	0.66

Maps of the crashes (2015-2019) for each intersection by types are included in **Appendix B**

2.6 INVENTORY OF EXISTING PARKING

Field data were collected on the number of existing parking spaces within the study area and the total parking spots occupied during the weekday. The on-street parking data were collected on September 23, 2020, between 10:00 AM and 12:00 PM. The parking garage and surface lot near 14th Street were counted later after construction on 16th Street was completed. Following are the results of the parking inventory:

- 799 spaces were counted; 419 of these spaces were inside the parking garage, which is not currently open to the public. The parking garage located along Carter Avenue between 16th Street and 17th Street is privately owned; however, these parking spaces were included in the data collected to evaluate this location being a viable alternative for public parking. The amount does not include a proposed parking garage that is planned to be constructed at the corner of 14th Street and Winchester Avenue.
- 193 of the total spaces were being utilized; 29 of which were inside the parking garage.
- Most of the parking spaces being utilized were between 15th and 18th Streets.

Figure 20 indicates the existing number of parking spaces and those that were occupied on the day counted.

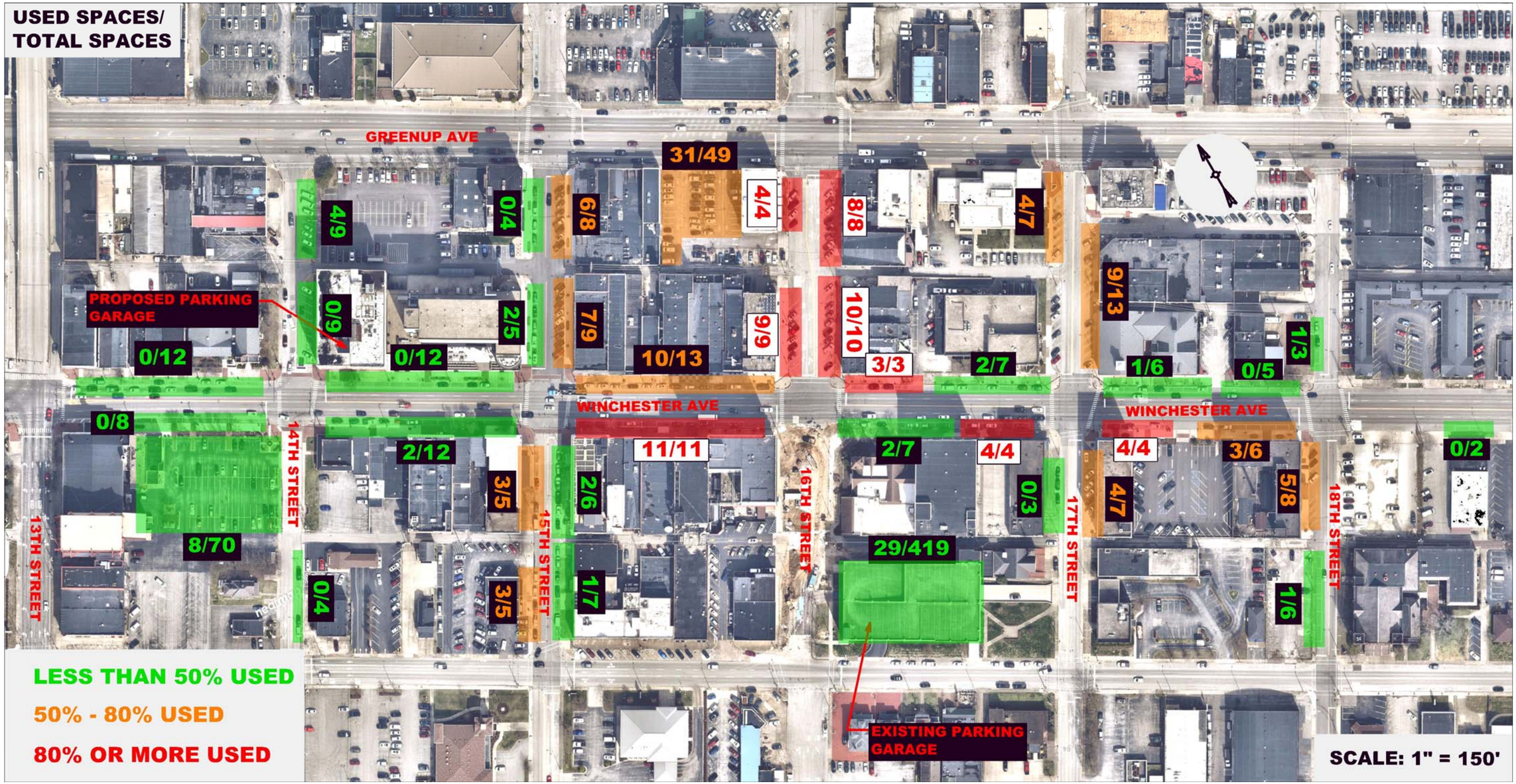


Figure 20: Existing Parking Spaces and Occupancy

3.0 INITIAL PROJECT TEAM AND COORDINATION

During the study, the project team held five coordination meetings to discuss key issues and provide an update on the study. The project team consisted of representatives from the KYTC Central Office, KYTC District 9, KYOVA, the City of Ashland, and consultants from Palmer Engineering. The project team also reached out to key stakeholders and local officials from the study area to ensure their concerns and goals were addressed in the feasibility study. Detailed summaries of these meetings can be found in **Appendix C**.

3.1 MODEL COORDINATION MEETING

A virtual meeting was held via Zoom Meetings on October 6, 2020, with members from Palmer Engineering, KYTC Division of Traffic, and KYTC Division of Planning to present the VISSIM traffic simulation models developed to replicate current conditions along the study corridors. The team discussed the adjustments that were made to the base model to determine if they were sufficient to make the model representative of existing conditions compared to data measured in the field. Following the presentation of the simulation models and discussions about the calibration process, it was determined that the models adequately represented existing conditions and that proposed models could be developed based on these existing models.

3.2 PROJECT TEAM MEETING NO. 1

A virtual meeting was held via Zoom Meetings on November 4, 2020, with members from Palmer Engineering, KYTC Division of Planning, and KYTC District 9 to discuss the existing conditions and findings of the project team and receive feedback regarding the materials that will be presented to the stakeholders. The following were key discussion items:

- The study area includes Winchester Avenue and Greenup Avenue from the northern split of these two routes to 18th Street
- The area of proposed improvements includes Winchester Avenue from 13th Street to 18th Street
- Existing conditions analyzed:
    - Crash history at intersections along Winchester Avenue and Greenup Avenue
    - Traffic counts at the intersections studied
    - Traffic analysis of existing conditions including level of service (LOS), travel times and traffic microsimulations
- The project team asked if travel times for emergency vehicles could be modeled using the existing and proposed traffic models.

3.3 STAKEHOLDERS AND LOCAL ELECTED OFFICIALS MEETING NO. 1

A virtual meeting was held via Zoom Meetings on November 5, 2020. The meeting's purpose was to present the existing conditions and findings to the local elected officials and stakeholders and receive feedback regarding concerns and goals relating to the feasibility study. The following were key discussion items:

- The existing conditions were collected analyzed for the project
- Traffic analysis of existing conditions
- Existing parking conditions and utilization (it was determined to be underutilized. The parking most utilized is located between 15th Street and 18th Street)
- The goals that the stakeholders and local officials have for this project:
    - Revitalization of the downtown Ashland area
    - A more pedestrian-friendly environment
    - An area that accommodates downtown events and activities
    - Speed reduction to slow down traffic for safety purposes and to draw attention to downtown attractions
- Questions regarding the potential increase in traffic along Greenup Avenue and if that might increase the number of crashes at the intersections along Greenup Avenue
- A mid-block crossing to be constructed between 15th Street and 16th Street along Winchester Avenue (suggested by City of Ashland representatives)
- An alternative that incorporates mini-roundabouts in the proposed improvements (Interest expressed by project team, stakeholders, and local elected officials)

4.0 CONCEPT DEVELOPMENT

4.1 IMPROVEMENT STRATEGIES

During the first Local Elected Officials and Stakeholders Meeting, potential improvement options were discussed and input was provided for strategies. The Project Team developed improvement strategies based on the goals and concerns discussed during Stakeholder Meeting 1. When developing alternatives, the main considerations were improving vehicle's and pedestrians' safety and reducing congestion at the intersections. No geometric deficiencies were identified during the existing conditions analysis that required design modifications. Additional considerations included parking changes, utility impacts, lane widths, and driving behavior. Two alternatives were developed that provide a pedestrian-friendly environment while providing angled parking conditions without hindering the traffic flow. A third alternative was added after the second Local Officials and Stakeholders meeting.

4.2.1 ALTERNATIVE 1

Alternative 1 was developed using the original concepts discussed at the scoping meeting. This alternative is the lower-cost alternative that reduces the number of lanes to two, provides pull-in angle parking, and maintains signalized intersections in the study area. **Figure 21** provides the typical section for Alternative 1 between signalized intersections, while **Figure 22** provides an aerial viewpoint of the proposed updates to the corridor.

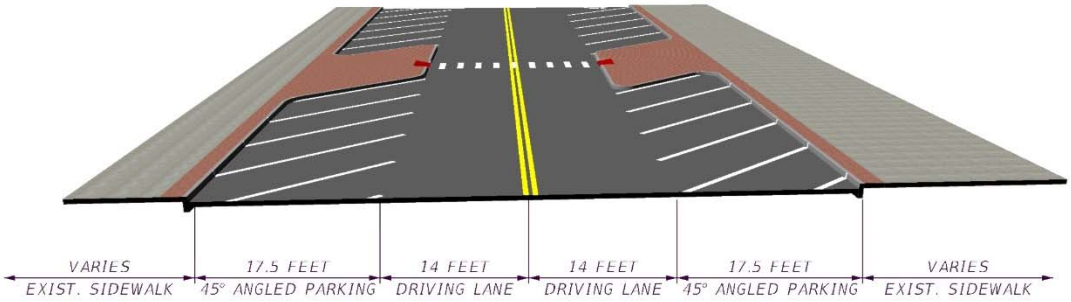


Figure 21: Alternative 1 Typical Section

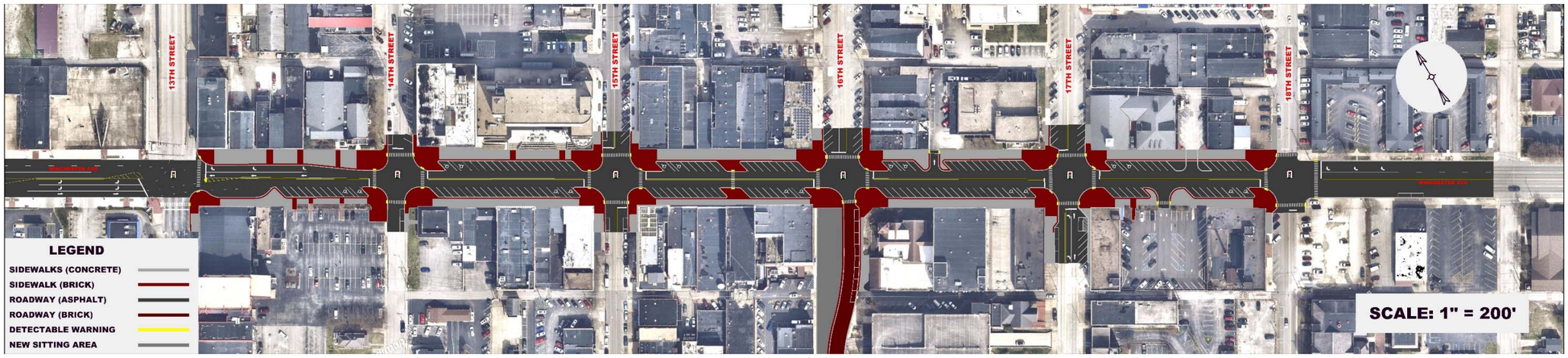


Figure 22: Alternative 1 Concept

The following improvements are included in Alternative 1:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Remove parallel parking and replace it with pull-in angled parking
3. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distances for pedestrians
4. Add mid-block crossing between 15th Street and 16th Street

4.2.2 ALTERNATIVE 2

Alternative 2 was developed using the concepts discussed at Local Elected Officials and Stakeholder Meeting 1. This alternative provides innovative design strategies by implementing mini-roundabouts along the corridor to improve traffic flow and safety. Mini-roundabouts will provide a mountable center island and splitter islands for larger traffic and EMS to be able to navigate over the islands. **Figure 23** and **Figure 24** provide renderings of the typical sections for Alternative 2, while **Figure 25** provides an aerial viewpoint of the proposed updates to the corridor.

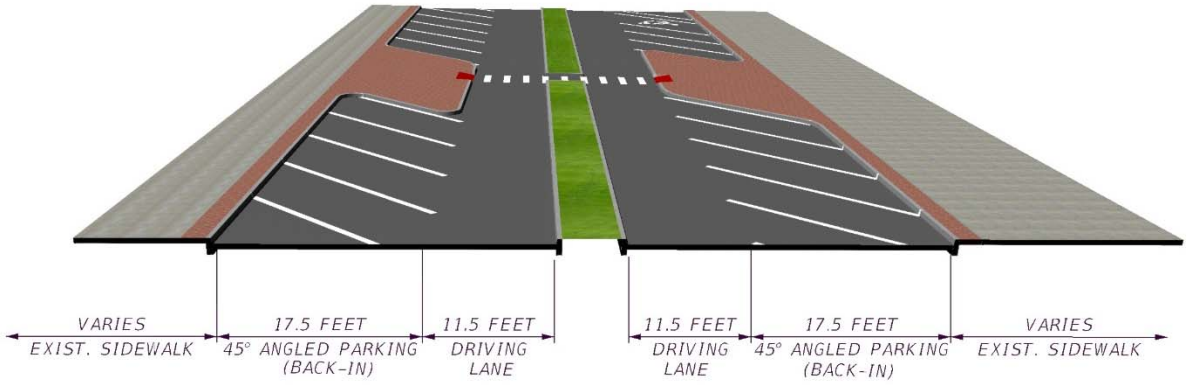


Figure 23: Alternative 2 Typical Between Intersections

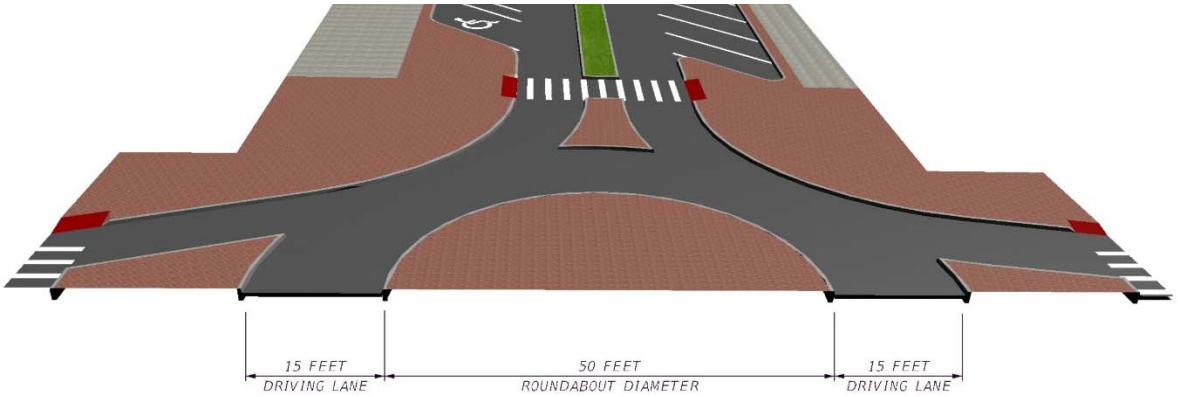


Figure 24: Alternative 2 Typical Center of Intersection

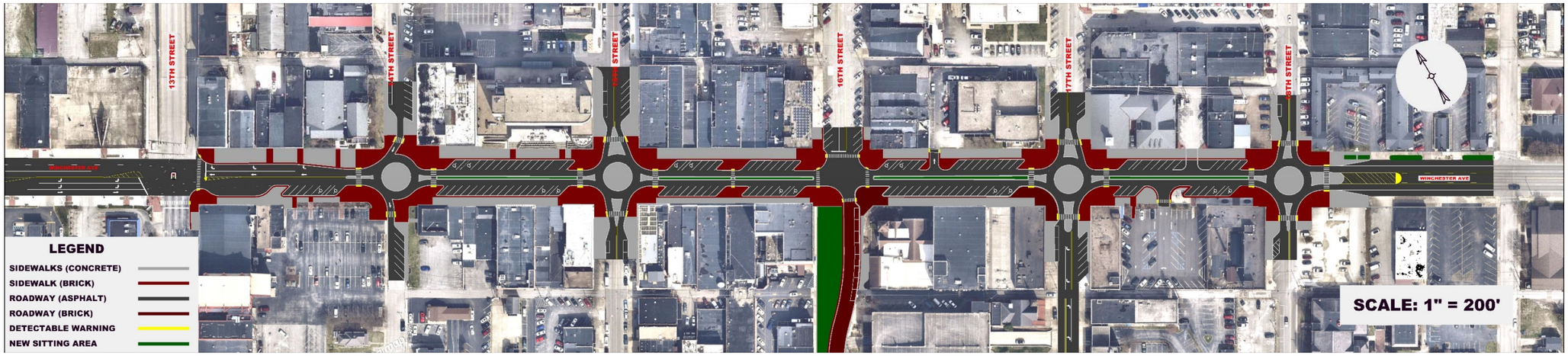


Figure 25: Alternative 2 Concept

The following improvements are included in Alternative 2:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Replace signalized intersections at 14th Street, 15th Street, 17th Street, and 18th Street with mini-roundabouts.
3. Replace signalized intersection at 16th Street with a two-way stop-controlled intersection.
4. Remove parallel parking and replace it with angled parking that vehicles will back into.
5. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distance for pedestrians.
6. Add five-foot-wide raised median through improvement area.
7. Add mid-block crossing between 15th Street and 16th Street

4.2.3 ALTERNATIVE 3

Alternative 3 was developed based on comments discussed at Local Elected Officials and Stakeholder Meeting 2. This alternative consist of same mini-roundabouts as Alternative 2. **Figure 26** provides an aerial viewpoint of the proposed updates to the corridor.

The following improvements are included on Alternative 3:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Replace signalized intersections at 14th Street, 15th Street, 17th Street, and 18th Street with mini-roundabouts.
3. Change 14th Street to be two-way from Carter Avenue to Greenup Avenue.
4. Replace signalized intersection at 16th Street with a two-way stop-controlled intersection.
5. Close opening at 16th Street so that it becomes right-in, right-out. Traffic wishing to travel across Winchester Avenue or turn left onto Winchester Avenue would turn right and traverse a mini-roundabout and travel back towards 16th Street.
6. Remove parallel parking and replace it with angled parking that vehicles will back into.
7. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distance for pedestrians.
8. Add five-foot-wide raised median through improvement area.
9. Parallel Parking added on Winchester Ave between 13th and 14th Street.

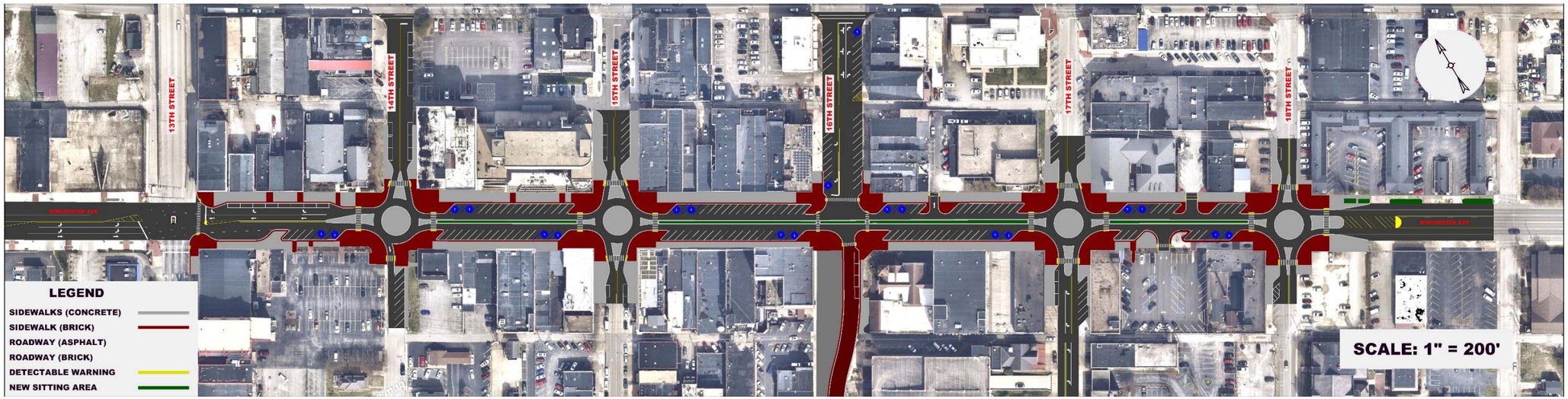


Figure 26: Alternative 3 Concept

4.3 ALTERNATIVE TRAFFIC ANALYSIS

The traffic analysis for the proposed alternatives indicates that all intersections operate at an acceptable Level of Service (LOS) with some minor degrading due to the reduction in lanes. Alternative 1 has a maximum LOS "C" for all intersections except 15th Street and Winchester Avenue. This LOS is attributed to 15th Street having a high delay, but a low volume of vehicles are impacted. Alternative 2 has an intersection LOS of "B" or better except for all but the 16th Street approach, which is a LOS "C" due to the removal of the signal. The LOS will improve if left turns are prohibited at this intersection, as shown on Alternative 3. **Figure 27** summarizes of the LOS of each intersection in the study area for Alternatives 1 and 2. Alternative 3 will have a LOS similar to Alternative 2. **Appendix D** includes all LOS analyses.

Figure 27: Alternative Level of Service

4.4 ALTERNATIVE COST ESTIMATE

The preliminary cost estimate for each of the alternatives is shown in **Table 4**. The cost estimates used planning level quantities for each alternative, including pavement, curbs, signals, earthwork, striping, and drainage. The project is not anticipated to need any right-of-way acquisition, and only minimal utility impacts are anticipated.

Table 4: Alternative Cost Estimate

ALTERNATIVE	DESIGN ($ million)	RIGHT-OF-WAY ($ million)	UTILITY ($ million)	CONSTRUCTION ($ million)	TOTAL ESTIMATE ($ million)
ALTERNATIVE 1	$0.3	$0.0	$0.1	$2.5	**$2.9**
ALTERNATIVE 2	$0.3	$0.0	$0.2	$3.0	**$3.5**
ALTERNATIVE 3	$0.3	$0.0	$0.2	$3.0	**$3.5**

5.0 SECOND PROJECT TEAM AND STAKEHOLDERS COORDINATION

Following the development of the initial alternatives, the project team met with the local officials and stakeholders again to discuss the developed alternatives. During the meeting the local officials and stakeholders discussed the aspects they liked and disliked about the initial alternatives. The feedback provided led to the development of the third (preferred) alternative. Detailed summaries of these meetings can be found in **Appendix C**.

5.1 PROJECT TEAM MEETING NO. 2

A virtual meeting was held via Zoom Meetings on December 9, 2020, with members from Palmer Engineering, KYTC Division of Planning, KYOVA, and KYTC District 9 to discuss the proposed alternatives and findings with the project team and receive feedback regarding the materials that will be presented to the stakeholders. The following were key discussion items:

- Proposed Alternatives 1 and 2 discussion
  - The team discussed that both options meet the feasibility of reducing lanes without negatively impacting Greenup Avenue traffic operations
- Traffic Analysis
  - Winchester Avenue intersections operate at Level of Service C or better except for the signalized intersection of 15th Street in Alternative 1
- Traffic simulations
  - Viewed by project team for both alternatives
- Cost Estimates
  - The team wanted to add design funding to the cost breakdown
- Next Steps discussion
  - Funding options and encroachment permits/approvals

5.2 STAKEHOLDERS AND LOCAL ELECTED OFFICIALS MEETING NO. 2

A virtual meeting was held via Zoom Meetings on December 18, 2020. The meeting's purpose was to present the proposed alternatives and analyses to the local elected officials and stakeholders and receive feedback regarding the recommended alternatives. The following were key discussion items:

- Parking update to add additional parking lot at 14th Street and Winchester Avenue
- Proposed Alternatives presentation
    - The local elected officials preferred Alternative 2
    - The City of Ashland Officials would like to have additional internal discussions regarding back-in parking. KYTC discussed the safety benefits of back-in parking over pull-in parking. Back-in parking improves visibility of pedestrians, bicycles, and vehicles when exiting the parking space and entering moving traffic.
    - Unsignalized intersection at 16th Street was a safety concern among local officials
- Traffic Analysis indicates all intersections operate at an acceptable Level of Service
- The team discussed making 14th Street two-way between Winchester Avenue and Greenup Avenue
- The team discussed that EMS response time impacts would be minimal since most use routes other than Winchester Avenue
- Alternative 3 will need to add parallel parking between 13th Street and 14th Street
- The team preferred to have an increase in parking spaces when transitioning to diagonal parking spots. There is concern about public backlash if no additional spaces are added with the transition.
- The feasibility study can include multiple recommendations for further study in the next phase. The team developed an Alternative 3 that had options that need further study
- The team discussed the next steps and submittal of a draft and final report

5.3 PROJECT TEAM MEETING NO. 3

A virtual meeting was held via Zoom Meetings on December 21, 2020. KYTC District 9, KYTC Central Office Division of Planning, and Palmer Engineering Company were in attendance. The purpose of the meeting was to discuss the report preparation, recommendations, and the next steps. The following were key discussion items:

- An encroachment permit is the preferred route of approval for the plan development, but other options could be used depending on funding
- The feasibility study has demonstrated that all options presented are functional and can be implemented with refinements in the next phase of the project

6.0 PREFERRED ALTERNATIVE

Alternative 3 was developed from the concepts discussed at second meeting of Local Officials and Stakeholder. Alternative 3 provides minor modifications to Alternative 2 by eliminating the mid-block crossing, closing the median at 16th Street and Winchester Avenue so that vehicles have to make a right turn, converting 14th Street to two-way traffic, and adding parallel parking between 13th Street and 14th Street. This alternative provides mini-roundabouts with a raised median and back-in parking along the corridor. A full summary of Alterative 3 is:

1. Remove one through lane in each direction along Winchester Avenue between 13th Street and 18th Street
2. Replace signalized intersections at 14th Street, 15th Street, 17th Street, and 18th Street with mini-roundabouts.
3. Change 14th Street to be two-way from Carter Avenue to Greenup Avenue.
4. Replace signalized intersection at 16th Street with a two-way stop-controlled intersection.
5. Close opening at 16th Street so that it becomes right-in, right-out. Traffic wishing to travel across Winchester Avenue or turn left onto Winchester Avenue would turn right and traverse a mini-roundabout and travel back towards 16th Street.
6. Remove parallel parking and replace it with angled parking that vehicles will back into.
7. Add curb bulb-outs at each intersection to protect parked cars and reduce the crossing distance for pedestrians.
8. Add five-foot-wide raised median through improvement area.
9. Parallel Parking added on Winchester Ave between 13th and 14th Street.

Figure 28 provides a plan view of Alternative 3 that is intended to be continued into preliminary design with Alternatives 1 and 2.

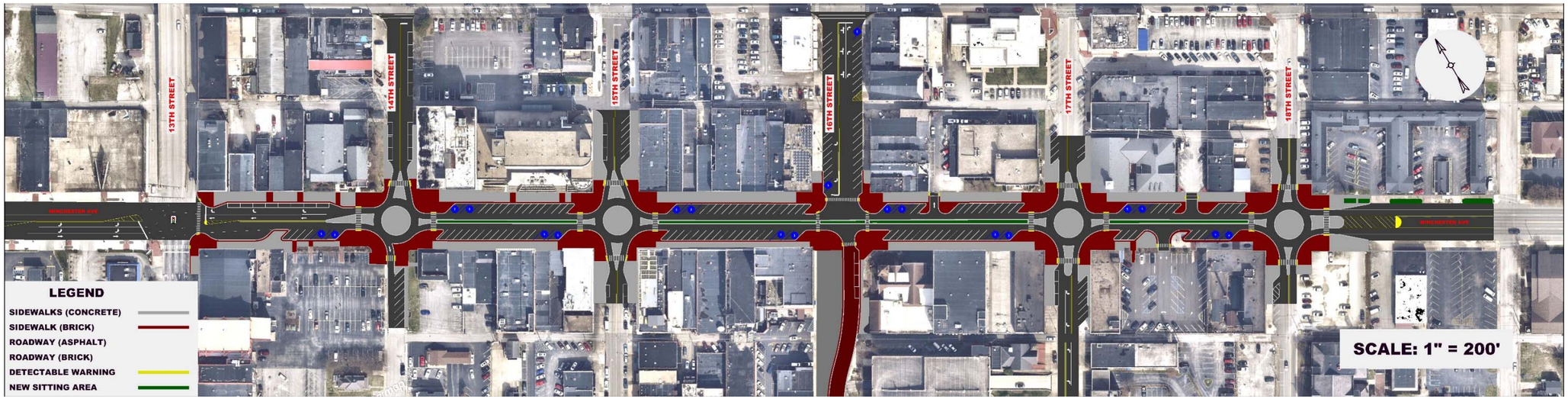


Figure 28: Alternative 3 Concept

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Downtown Ashland Transportation/ Feasibility Study (Item No. 9-408.00) began with the purpose of identifying what effects on traffic and safety the reduction of lanes along Winchester Avenue between 13th Street and 18th Street and the addition of angled parking would generate; however, the project developed into also analyzing the improvements produced by replacing the signals with mini-roundabouts.

The local officials expressed downtown revitalization as a primary focus to move the City of Ashland into the next decade. Alternatives were developed with this and the other goals of the project in mind. The alternatives focused on the original scope of the project to reduce Winchester Avenue from four-lanes to two-lanes and the implement angled parking along the route between 13th and 18th Street; however, after the Project Team met multiple times interest in changing the geometry of the intersections grew and an analysis of implementing mini-roundabouts was added to the project scope. After presenting an alternative that focused on the original scope of the project (Alternative 1) and an alternative that involved the implementation of mini-roundabouts (Alternative 2); a preferred alternative that included new concepts and concepts from both the original two alternatives was formed (Alternative 3).

After having discussed the design of Alternative 3, the Project Team decided that more input on the following items should be gathered before finalizing the preliminary design:

- Back-in vs Pull-in angle parking
- 16th Street and Winchester Avenue intersection design
- Converting 14th Street to two-way traffic
- Eliminating the mid-block crossing
- Parallel parking along Winchester Avenue between 13th Street and 14th Street

Cost Estimates were developed based on planning-level quantities that include pavement, curbs, signals, earthwork, striping, and drainage. With the exception of lighting, the utilities in the area will remain in their existing locations with minor adjustments to valves and manholes. It is anticipated that no right of way purchase will be necessary to complete this project.

8.0 NEXT STEPS

After completing the Downtown Ashland Transportation/Feasibility Study (Item No. 9-408.00), the next steps towards completing the project would be to acquire funding for the project, complete an environmental document with public input, generate a final design for the project, and construct the project.

8.1 FUNDING OPTIONS

After the third Project Team meeting a separate meeting to discuss possible options for funding the project was held virtually on Tuesday, January 26th, 2021. In attendance was KYTC Central Office, KYTC District 9, KYOVA, the City of Ashland, and Palmer Engineering. A detailed summary of this meeting can be found in **Appendix C**. in the meeting five sources of funding were identified:

- The Highway Safety Improvement Program (HSIP) with KYTC
- The KYTC Road Fund
- KYTC Discretionary Funds
- Funding through KYOVA
- City / Local Funding

HSIP funding is anticipated to be a viable option for this project. Although a $3.5 million project is generally on the more expensive side for an HSIP project, it would still be possible to fund the project through the program. In order to be eligible for the HSIP program, the project would need to be added to the Transportation Improvement Program (TIP) and Statewide Transportation Improvement Program (STIP). The Highway Safety Improvement Program (HSIP) program requires that a match be provided to receive funding; however, since this route is a state owned route the district would likely provide the match for funding.

The vast majority of capital roadway projects are funded in the Biennial Kentucky Six-Year Highway Plan which is enacted by the Kentucky Legislature. KYTC uses a data-driven process, known as Strategic Highway Investment Formula for Tomorrow (SHIFT), to prioritize projects for inclusion in the Governor's Recommended Highway Plan to the legislature. Consistent District and local/legislative support is critical for projects to be considered in the Highway Plan. This funding option would require more time to acquire funding due to the next KYTC Road Plan not being scheduled till the 2022 legislative session.

The KYTC discretionary funds are less likely to be available due to tight budgeting at KYTC. These funds could potentially be utilized if there are additional costs later in the projects that are not covered by other forms of funding.

Funding through KYOVA could be available in the form of dedicated Transportation Alternatives Program (TAP) funds or a Surface Transportation Block Grant. The dedicated TAP funds are often small increments of money that would need to be saved over several cycles in order to build the project.

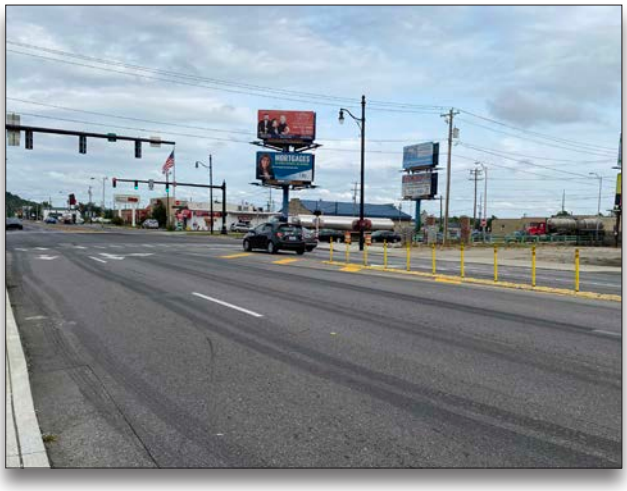
City and Local funding would be determined after the city analyzes how much they can afford to contribute to the project.

8.2 ENVIRONMENTAL DOCUMENT, DESIGN, AND CONSTRUCTION

After funding is secured for the project, a survey can be done for the project followed by a preliminary and final design. During the design process, an environmental document will be completed and additional public opinion and involvement will be obtained. Based on the outcome of the environmental document and the public's opinion alterations may be made to the current design of the project.

Once the design of the project is completed, utility changes and construction of the project can commence. It is anticipated that the project could be completed within a single calendar year if funding does not require the project to be completed in phases. Right of way acquisition is not expected to be required for the construction of this project.

Written requests for additional information should be sent to Mikael Pelfrey, P.E., Director, KYTC Division of Planning, 200 Mero Street, Frankfort, KY 40622. Additional information regarding this study can also be obtained from the KYTC District 9 Project Manager, Darrin Eldridge, P.E., at (606) 845-2551.



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