Jackson City Wide Transportation Plan

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LOCHMUELLER GROUP
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1. Introduction

Since the last citywide transportation study was performed in 2003, the City of Jackson has made significant strides improving their transportation network. Most notable achievements during this period was partnering with the Missouri Department of Transportation (MoDOT) on Route 34/72 widening and US 61 improvements through Uptown Jackson, as well as various spot improvements along Jackson Boulevard, such as the restriping of the southbound approach on Shawnee Boulevard.

This study reviewed the 2003 plan, as well as transportation aspects of other documents providing guidance to the City's leadership, including the Comprehensive Plan and Parks Master Plan, with the intent of noting applicability, omissions, and any recommendations that are relevant over a decade later. The study not only documents achievements made since 2003, but also changes in the transportation system, updated evaluations, and considers additional short-term improvements the City could implement to address current traffic flow and safety issues.

In addition to addressing existing issues and concerns, the following plan also reviews the City's long-range transportation network planning in an effort to determine if the current vision for future roadways on the Major Street Plan still make sense based on recent and anticipated growth patterns. The Major Street Plan provides guidance to city officials to ensure future decisions result in appropriate expansion and preservation of the City's system.

Finally, the City's engineering guidelines were revisited with an eye towards including current best practices. Since the 2003 study, the transportation industry has progressed to a system wide approach that is suitable for ALL users, motorized as well as non-motorized. Consequently, the City's standards were evaluated with the following considerations:

- Including non-motorized modes of transportation in design and implementation of transportation improvements;
- Persons aged 8 to 80 years old and those with mobility issues are able to fully utilize the transportation network;
- Access management principles are recognized as a means of achieving better traffic flow and improved safety; and
- Roundabouts are given equal consideration as traffic signals when considering enhanced means of traffic control

Recommendations have been provided in this study that align the City's design guidance tools so the envisioned long range plan can be implemented for the mobility of the entire community.

2. Review of Previous & Current Plans

As an initial step in this process, the previous Jackson Comprehensive Traffic Study ("2003 Plan"), the current Comprehensive Plan, and the current Parks Master Plan ("Parks Plan") were all reviewed to establish a baseline for the City's guidance and governance pertaining to the transportation network. These documents also allowed us to identify those projects that have been completed since the study was last updated in 2003.

2.1. Previous Transportation Plan

The City of Jackson completed a significant number of short-term improvements since the adoption of the 2003 Plan. The status of short-term issues identified in the previous plan were reviewed and summarized in **Table 1**. Of the 26 issues, 12 were fully addressed; 2 were partially addressed; 7 were deemed to still be current issues; 3 will be revisited to determine if they are still relevant; and 2 were identified as issues for which no improvements were recommended.

Table 1: Progress Report - 2003 Short-Term Recommended Improvements

	Project Name	*Description*	*Status*	*Comment*
1)	Route 34/72 Widening	MoDOT Improvements	Complete	--
2)-4)	Courthouse Square - High/Washington, Washington/Hope, and Hope/Main	Recommended alternative was a roundabout at High/Washington; channelization at Washington/Hope; and signalization at Hope/Main with addition of a left-turn lane.	Complete	Final implementation included installation of barriers on Washington between High Street and Court Street to eliminate conflicts, and a roundabout at Hope/Main
5)	Near Immaculate Conception Church & school on Jefferson	Post 20-mph school zone on Jefferson and Ohio, relocate midblock crosswalk, add sidewalks	Complete	Ohio Street was vacated in 2004.
6)	High & Jefferson	Switch the stop control or change to all-way stop	Complete	Changed to all-way stop in 2004.
7)	Adams & Missouri	Change to all-way stop	Complete	Changed to all-way stop on 2004.
8)	Main St & Farmington Rd	Intersection has acceptable operating conditions, but slight offset and poor sight triangles on several corners. No improvements recommended because of nominal benefits and significant impacts.	--	Same business impacts would still prevail. No need to revisit this issue in the updated plan.
9)	Farmington Rd	Provide sidewalks along the corridor	Not complete	Still appropriate to implement; no need to revisit this issue in the updated plan
10)	Route D & Farmington Rd	Widen all approaches to provide a left-turn bay and shared thru/right-turn lane, add traffic signal	Complete	--
11)	Route D & US 61	Extend southbound right turn lane, widen east-west legs to provide separate left-turn lanes	Not complete	MoDOT plans to extend southbound right turn bay within next couple of years

12)	Francis & Douglas	Change to all-way stop	Not complete	With construction of Deerwood Drive connection to the north, there is no need to revisit this intersection
13)	Brookview Dr/Veterans Memorial with Goodson Dr	Provide no stop control, or provide stop control on Goodson	Not complete	Operates acceptably; no crashes in past 5 years so no need to revisit
14)	Greensferry Road Classification and Control	Upgrade to appropriate standards, including sidewalks, and revise speed limit; eliminate all-way stop at Clark	Not complete	Revisit with Plan update
15)	Georgia Street Classification and Control	Maintain at an appropriate standard for a collector, control intersections in a consistent manner; convert Georgia & Florence intersection to all-way stop.	Complete	All-way stop implemented in 2004.
16)	E. Main St & Georgia St	Review once Main & Hope is signalized	Not complete	Revisit issue with Plan update, evaluate a roundabout.
17)	Bainbridge Classification and Control	22' wide collector road with 30 mph speed limit, remain as-is until cross-section is improved	--	--
18)	Shawnee & E. Jackson/ Old Cape	Widen north approach at E. Jackson to accommodate two southbound lanes to the signal, remove stop control on north and south approaches to Old Cape intersection; pursue additional connections to E. Jackson (i.e. Lacey Street or Oak Hill Road)	Partially complete	Intersection improvements completed in 2003; Revisit north-south connector on east side of the City, possibly aligned with Lacey Street or Oak Hill Road
19)	E. Jackson Misc. Improvements – Michael Anna	Restrict Michael Anna to one-way northbound traffic between E. Jackson and Corinne Street	Not complete	Still appropriate to implement; no need to revisit this issue in the updated plan
20)	E. Jackson Misc. Improvements – Berm at Gloria Dr	Lower the elevation of a berm blocking sight distance	Complete	Resolved in 2005 with redevelopment of parcel.
21)	E. Jackson Misc. Improvements – Donna Dr	Restripe northbound and southbound approaches to two lanes approaching E. Jackson	Complete	Restriped in 2004.
22)	E. Jackson Misc. Improvements – Walton Dr	Widen and reconfigure Walton Drive	Not complete	No need to revisit this issue in the updated plan.
23)	Highland Drive	Further study to provide cut-through traffic control	Complete	Speed limit reduced to 25 mph in 2005.
24)	Jackson Trail & Route 25	Add left-turn lanes and shoulders, with potential street lighting augmentation	Complete	--
25)	West Lane Classification and Control	Add sidewalks, and add separate left turn lanes at Route 34/72 and West Lane	Partially complete	Vehicular improvements complete at Route 34/72, but no pedestrian accommodations in corridor
26)	Jackson R-2 School District	Widen Oak Street west of Broadridge, add sidewalks	Partially complete	Sidewalks added in 2008, revisit the widening issue with this Plan update.

In addition to the progress made on the short-term improvements, a few long-term improvements have also been completed since the adoption of the 2003 Plan. The originally recommended long-term improvements and their statuses are identified in **Table 2**.

Table 2: Progress Report - 2003 Long-Term Recommended Improvements

	Project Name	*Status*
1)	E. Main St Extension (Oak Hill Rd to Old Orchard Rd)	Complete
2)	Extension of Shawnee Blvd from Ridge Rd to Greensferry Rd	Revised [1]
3)	Extension of Jackson Trail from Lee Ave to Route PP	Revised [2]
4)	Deerwood Dr (new) from Greensferry Rd to Route 61	Complete
5)	Extension of West Lane from Alpine St to Independence St	Revised, see Major Street Plan
6)	Widen/upgrade Hope St from Jackson Blvd to Main St	Incorporate into 2018 Plan
7)	Extension of Jackson Trail from Route PP to West Lane	Revised [2]
8)	Widen/upgrade E. Main St from Goose Creek to Shawnee Blvd	Incorporate into 2018 Plan
9)	Oak Hill Rd from Bainbridge Rd to Jackson Blvd	Incorporate into 2018 Plan
10)	Deerwood Dr (new) from Route 61 to Farmington	Revised, see MSP
11)	Cooper Rd (new) from Independence St to Route 34/72	Revised [3]
12)	Deerwood Dr (new) from Farmington to Independence	Eliminated, see MSP
13)	Cooper Rd (new) from Route 34/72 to West Lane	Eliminated, see MSP
14)	Pine Road (new) from E. Jackson Blvd to Route 25	Eliminated, see MSP
15)	Widen/upgrade Route PP from W. Jackson Blvd to Jackson Trail Extension	Incorporate into 2018 Plan
16)	Pine Rd (new) from Route 25 to Jackson Trail	Eliminated, see MSP
17)	Old Orchard Rd from Route 34/61 to E. Main St	Complete
18)	Widen/upgrade Shawnee Blvd from E. Main St to Old Cape Rd	Eliminated, see MSP
19)	Lee Ave Connection(s) to Route 25 and Penzel Dr	Revised, see MSP
20)	Widen/upgrade High St from Washington St to Deerwood Rd	Incorporate into 2018 Plan
21)	Extension of West Lane from Old Toll Road to South Circumferential	Incorporate into 2018 Plan
22)	Widen/upgrade Greensferry Road from Georgia St through Deerwood Dr	Incorporate into 2018 Plan
23)	Widen/upgrade Bainbridge Rd from Oak Hill Rd through Old Orchard Rd	Incorporate into 2018 Plan

The completion of the E. Main Street Extension to I-55 has helped create economic development opportunities on the east side of the City. The Deerwood Drive connection provides a northern link

[1] Need diminished by Near North Connector (see Major Street Plan (MSP)); Shawnee Extension replaced by long-term recommendation for connecting Deerwood Dr to Donna Dr
[2] Replaced by recommendation for Southern Arterial (see MSP)
[3] Replaced by recommendation for Northern Arterial (see MSP)

between neighborhoods north of downtown to US-61, reducing travel time and relieving cut-through traffic on neighborhood streets. Other identified long-term improvements still have merit, though their prioritization will be revisited in this Plan update to reflect growth patterns since the 2003 Plan as well as anticipated future growth per the Comprehensive Plan.

2.2. Comprehensive Plan Transportation Goals

The 2009 City of Jackson Comprehensive Plan's Transportation and Circulation Goals were reviewed to determine if any adjustments would be recommended. Much has been accomplished in the past few years towards the achievement of these goals, and they should continue to guide future development within the city.

Goal 1: Improve the safety and efficiency of vehicular movement within the City

Recent major improvements include the construction of a roundabout at Hope Street and Main Street in the Uptown area and implementation of a road closure on Washington Street to improve operations of US 61 through its "S"-curve of Hope Street, Washington Street, and High Street. In addition, the extension of Main Street to I-55 gives route options for those in the eastern portion of the City, relieves Jackson Boulevard and enhances economic development opportunities. Other improvements to safety and efficiency of the vehicular network have also been made, such as the completion of Deerwood Drive between US 61 and Greensferry Road and the improvements to the intersection of E. Jackson Boulevard and S. Shawnee Boulevard.

Goal 2: Improve the safety and efficiency of State Route 61 as it travels through the Uptown area.

This goal was achieved with the construction of the roundabout and Washington Street road closure west of High Street. This corridor should continue to be monitored, particularly for crashes, and a follow-up study should be performed a few years after the opening of the roundabout to document the impact on travel time and safety benefits the improvements had on the network, and determine whether the changes had a detrimental impact on nearby routes or intersections.

Goal 3: Provide a safe and coordinated pedestrian/bicycle transportation network that connects community residents to key amenities in the City.

The first step in achieving this goal is currently underway as part of the Southeast Missouri Metropolitan Planning Organization (SEMPO) Regional Bicycle & Pedestrian Plan.

It should be noted that there may be instances when a safe and connected pedestrian and bicycle network interfere with the efficiency of vehicular operations. These situations should be reviewed on a case-by-case basis, and should result in a safe multi-modal network.

Goal 4: Continue to establish a well-connected and planned transportation network within the City, especially within the new growth areas.

This is probably the most important of the four goals outlined in the Comprehensive Plan. One key aspect of a well-functioning network includes protecting arterial roadways by providing interconnectivity between land bays, having good access management, and a providing multi-modal options. Having a clear vision of future development and connected transportation network will prevent the arterial network of roads from prematurely reaching capacity.

Overall the goals outlined in the Comprehensive Plan are appropriate for guiding future improvements and development. While it is appropriate to have on-going goals (i.e. Goals 1, 3, and 4) as well as specific measurable goals (e.g. Goal 2), consideration should be given to revising Goal 2 to either be more general in nature and more inclusive of other arterial roads in the City, or perhaps changed entirely since the main "S"-curve concern has been addressed. One suggested replacement could address improved safety and operations near City schools, which will discussed later in this Plan.

2.3. Parks Master Plans

Similar to the Comprehensive Plan, the 2014 Parks Master Plan was reviewed to determine how that should be reflected in the update to the 2003 Plan. The main transportation topics in the Parks Plan are trail improvements within the parks, trail connectivity between all the parks in the system, and accessibility for pedestrians and cyclists. The trails can also connect parks to local schools and other community destinations, like the community center or the Uptown area.

The Parks Plan calls for consideration of additional parks within walking distance of new neighborhoods. This is in line with the Comprehensive Plan goals of providing a complete transportation network and a safe and coordinated pedestrian/bicycle network connecting community residents to key City amenities. Providing a well-connected multi-modal network will increase the City's livability and quality of life for its residents.

3. Evaluation of Existing Street System

3.1. Existing Traffic Volumes

In order to understand how traffic patterns have changed in the City since 2003, eight locations were selected for morning and afternoon peak period turning movement counts and another eight locations for 24-hour screenline counts using automatic traffic counters. The locations for video counts were chosen based on discussion with City staff as to where current traffic issues exist that should be examined further in this study. Turning movement counts were performed on Tuesday, May 9, 2017, which was a clear day while school was still in session, from 7:00-9:00AM and 2:00-6:00PM. This ensured that school arrival and dismissal periods were accounted for in determining the peak hours and any traffic analyses at these intersections. These counts were supplemented with peak period counts provided by MoDOT (locations 9-22). The locations selected for counts, the locations provided by MoDOT, and the morning and afternoon peak hours as presented in **Table 3**.

Table 3: Peak Period Count Locations

Turning Movement Count Locations	*AM/PM Peak Hour*	*Source*
1) West Ln & Oak St	7:00-8:00 AM / 3:00-4:00 PM	May 9 Video Count
2) East Ln & Oak St	7:00-8:00 AM / 3:00-4:00 PM	May 9 Video Count
3) Farmington Rd & Oak St	7:00-8:00 AM / 3:00-4:00 PM	May 9 Video Count
4) W Main St & Missouri St	7:15-8:15 AM / 3:00-4:00 PM	May 9 Video Count
5) US 61 & Deerwood Dr	7:00-8:00 AM / 4:30-5:30 PM	May 9 Video Count
6) Georgia Street & E Main St	7:15-8:15 AM / 4:30-5:30 PM	May 9 Video Count
7) W Main St & Farmington Rd	7:00-8:00 AM / 3:00-4:00 PM	May 9 Video Count
8) Broadridge & SR D	7:00-8:00 AM / 4:30-5:30 PM	May 9 Video Count
9) US 61 & SR D	7:30-8:30 AM / 5:00-6:00 PM	MoDOT (2014)
10) US 61/MO-34/72 & Donna Dr	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2015)
11) SR D & Farmington Rd	7:00-8:00 AM / 3:45-4:45 PM	MoDOT (2014)
12) MO-34/72 & East Ln	8:00-9:00 AM / 4:00-5:00 PM	MoDOT (2014)
13) MO-34/72 & Oklahoma St	7:00-8:00 AM / 3:45-4:45 PM	MoDOT (2014)
14) MO-34/72 & Farmington Rd	6:45-7:45 AM / 3:45-4:45 PM	MoDOT (2014)
15) MO-34/72 & West Ln	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2014)
16) MO-34/72 & W Main St	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2014)
17) SR 25 & School Ln	6:45-7:45 AM / 4:00-5:00 PM	MoDOT (2014)
18) US 61 & Main St	7:00-8:00 AM / 3:45-4:45 PM	MoDOT (2014)
19) US 61/SR 25 & MO-34/72	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2015)
20) US 61 & Old Orchard Rd	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2015)
21) US 61 & Shawnee Dr	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2015)
22) US 61 & Walton Dr	7:00-8:00 AM / 5:00-6:00 PM	MoDOT (2015)

Though there are a few intersections that vary by 15-minutes, the morning peak hour throughout most of the City is generally from 7:00-8:00AM. The afternoon peak hour, though, has a higher distinction between areas near the school that peak between 3:00-4:00PM and commuter corridors that have a later peak closer to 5:00-6:00PM.

Screenline counts were performed using mechanical counters attached to rubber tubes that extended across the road. They were also collected in May 2017 on a typical weekday (Tuesday, Wednesday, or Thursday) while school was in session. The locations and resulting count are provided in **Table 4**. The hourly turning movement counts and daily screenline counts are displayed in Figure 1A and 1B. The counts are in an appropriate range for two-lane roads, with no need for major expansion necessary due to traffic volume.

Table 4: 24-hour Mechanical Count Locations

Screenline Locations	*24-hour Count (vehicles per day)*
A) S Georgia St south of E Jefferson St	2,900
B) E Main St east of Lacey	8,400
C) N Farmington Rd north of W Main St	4,100
D) SR D west of US 61	6,250
E) High St south of Harmony Ln	10,600
F) Greensferry north of Eastview Ct	2,200
G) Broadridge north of Alpine Dr	3,100
H) Shawnee south of Vera Wagner	2,050

Those locations that had hourly or daily counts in both the 2003 Plan and the current effort were compared to determine annualized growth rates over the past 12-14 years. The results are presented in **Table 5**.

Table 5: Annual Growth Rates

Intersection or Segment	*Annual Growth Rate*
Segment of E. Main St east of Lacey St	12.32%
Segment of SR D west of US 61	0.24%
Intersection of US 61 & SR D	-0.96%
Intersection of E. Main St & Georgia St	1.8%
Intersection of W. Jackson Blvd & SR PP	-0.53%
Intersection of US 61 & Jackson Blvd	-0.44%
Intersection of E. Jackson Blvd & Shawnee Blvd	0.20%
Intersection of E. Jackson Blvd & Walton Dr	-0.18%
Intersection of US 61 & Main St	-0.97%

The population of Jackson has grown approximately 1.44% per year since the 2003 Plan, yet several of the City roads have realized little or no growth (e.g. State Route D), with several seeing negative growth (e.g. US 61). Based on the data, it seems that once E. Main Street connected to Interstate 55, drivers rerouted to use this connection to destinations outside Jackson's borders, explaining the high growth along E. Main Street and stagnation in growth along Jackson Boulevard. Being mostly a two-lane road with limited opportunities for widening, E. Main Street could be expected to reach operational capacity in the coming years, while volumes on E. Jackson Boulevard will begin to increase again as drivers search for the fastest route to their destination.

Figure 1: Existing Vehicular Volume Counts

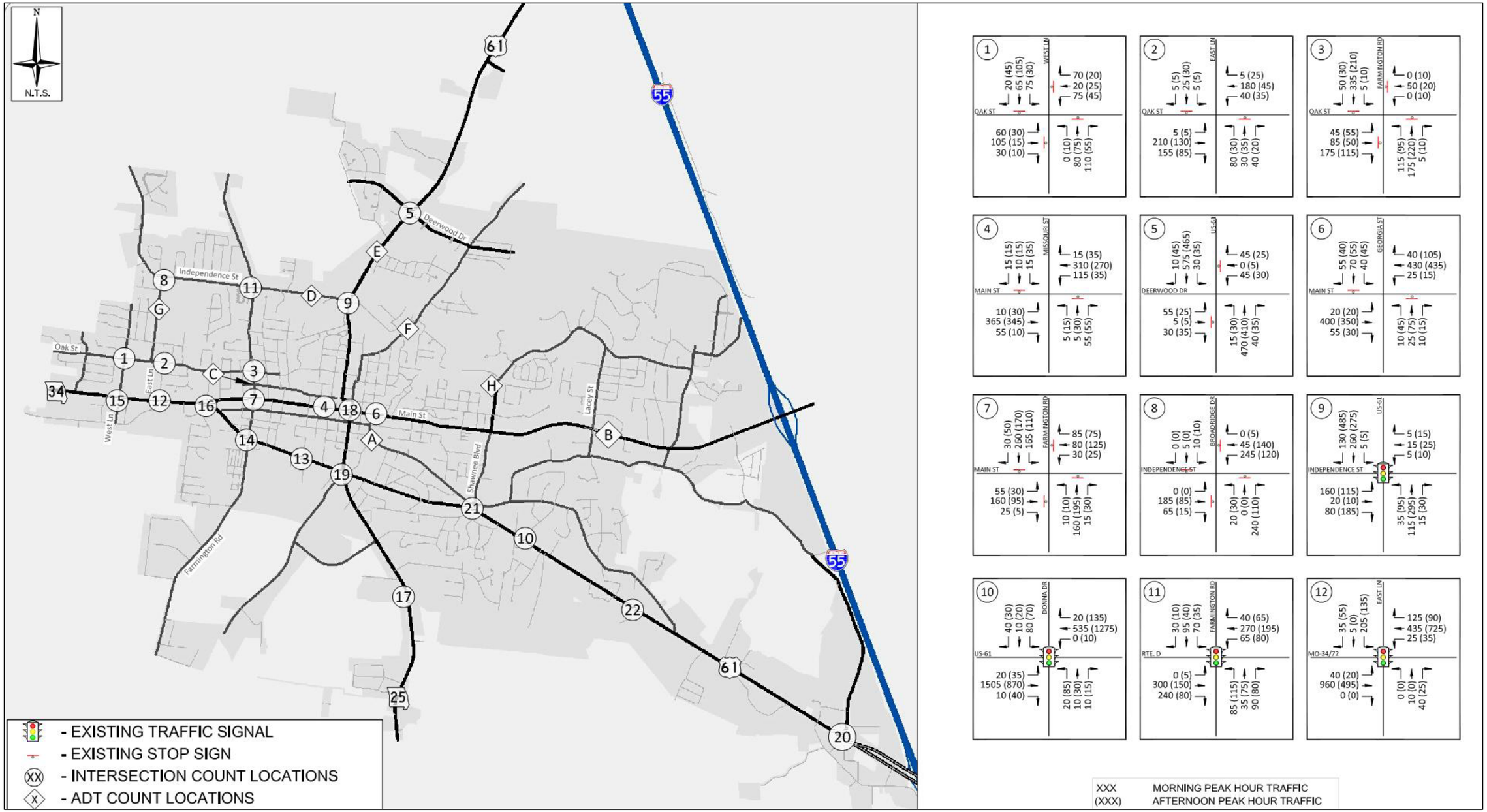
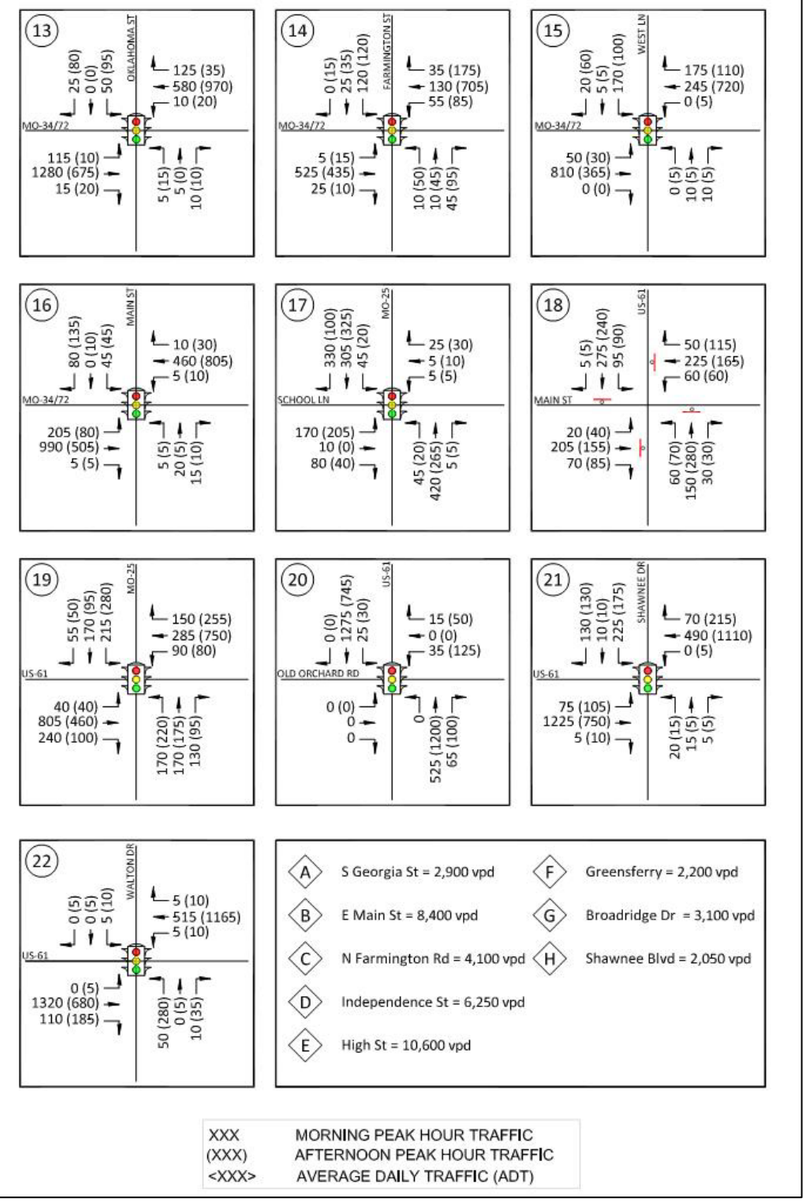


Figure 1B Existing Vehicular Volume Counts (cont.)



3.2. Existing Street Network

Functional Classification

As part of this process, the hierarchy of roads was reviewed to determine if the roads are properly classified. This hierarchy, referred to as Functional Classification, impacts the design of roads and development of land bays, as the Functional Classification is reflective of vehicular traffic volume levels and dictates the speed, vertical and horizontal geometry, and intersection/driveway spacing along the network. A higher functional classification (i.e. freeway, arterial) indicates higher vehicular volume, faster vehicle speeds, fewer intersections, and longer traveling distances, whereas a lower classification (i.e. local roads) provide access to individual parcels, have slower speeds, and have shorter traveling distances. The typical categories of Functional Classifications are:

- **Interstate/Freeways & Expressways** – principal arterials that have fully or partially controlled access with high volume, high speed, serving regional population and commercial centers.
- **Principal or Major Arterials** – major thoroughfares in the city that serve activity centers, carry a high proportion of all travel though lane-miles of such roads are limited, and have limited number of access points to the properties adjacent the thoroughfare to minimize conflicts.
- **Minor Arterials** – arterial routes that may not have as high of traffic volume as, and may have more access points than, a principal arterial.
- **Collectors** – roads that connect local streets to arterial roadways. They have fewer access points than local roads, but more access than arterials. Vehicular speed and traffic volumes vary.
- **Local roads** – all other roads not classified as one of the above categories. They have lower traffic volume, slower traffic, and provide localized access to properties.

Figure 2-1 from the 2003 Citywide Transportation Plan identified the various Functional Classification of the roads within the city. That diagram was compared to MoDOT's 2015 Functional Classification map to identify and resolve any discrepancies. For the purposes of this study, items from the MoDOT map labeled as "Principal Arterial" are identified in the table as "Major Arterial" in order to have consistent and comparable terminology across the sources, as these two labels have the same meaning and intention. Additionally, "major" and "minor" identifiers were removed in order to simplify the Collector category, as it was determined these had little value when applying them to the City's road network.

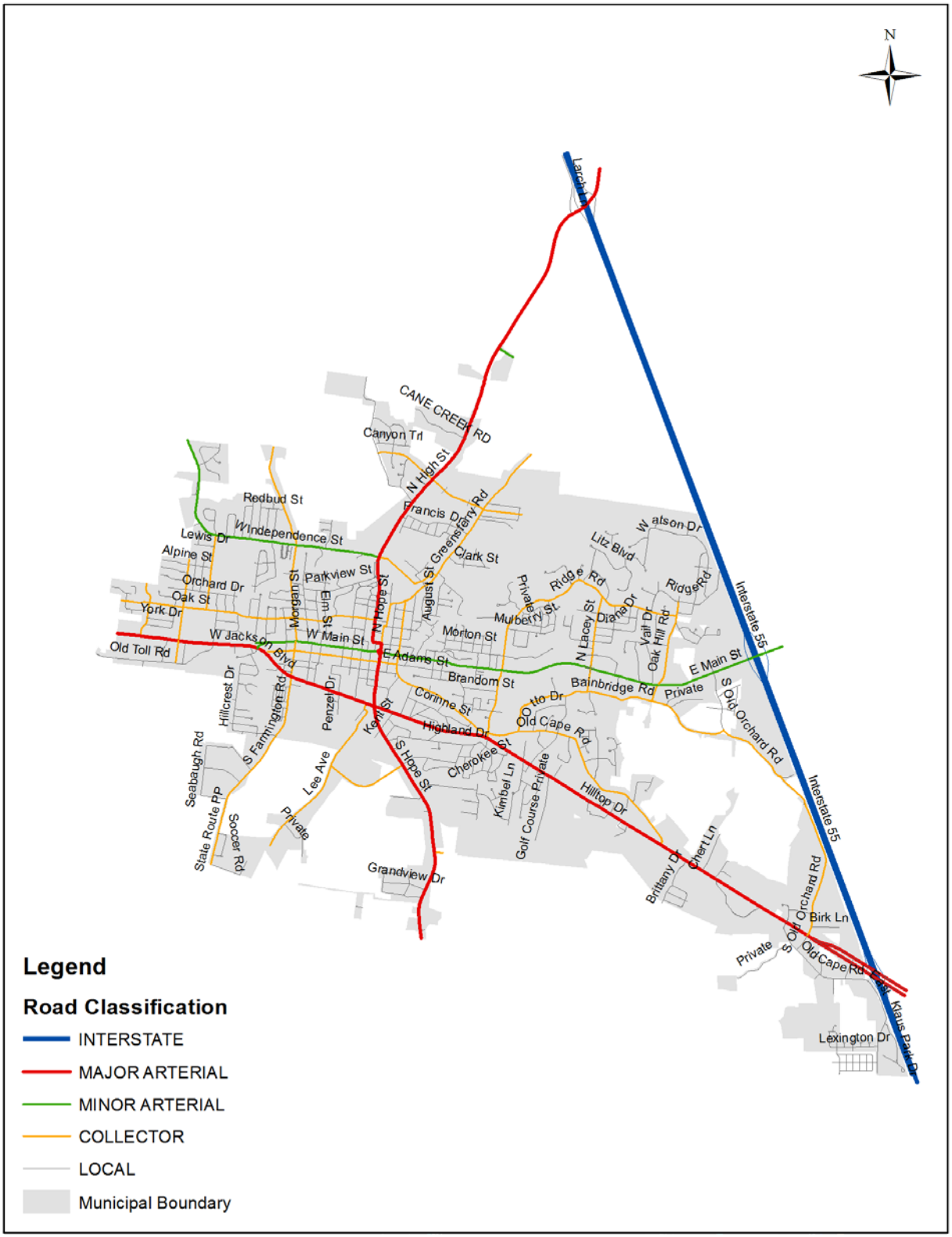
As an additional check, the classification currently reflected by the City's GIS files are reported in **Table 6**, as are the classifications from the City's current Major Street Plan. Changes to some functional classifications may be prudent based on traffic levels as well as the vision for a road's level of accessibility within the network. While there has generally been negligible changes in overall traffic volumes, some rerouting was noted, such as a higher use of Mary Street now that a barrier exists on Washington Street west of High Street. Recommended functional classification changes in **Table 6** are based on the desired level of access management and locations of identified volume change. The recommended functional classifications are presented in **Figure 2**.

Table 6: Functional Classification

Corridor Name	*Limits*	*2003 Classification*	*2015 Classification*	*2014 Major Street Plan**	*City GIS*	*Recommended Classification*
Interstate 55	North City limit to south City limit	Interstate	Interstate	Interstate	Interstate	Interstate
US 34/72 (Jackson Blvd)	West City limit to east City limit	Major Arterial	Major Arterial	MoDOT Route	Arterial	Major Arterial
US 61	North City limit to SR Y	N/A	Major Collector	MoDOT Route	Arterial	Major Arterial
US 61 (High St)	SR Y to US 34/72/25	Major Arterial	Minor Arterial	MoDOT Route	Arterial	Major Arterial
SR 25 (S Hope St)	US 34/72/25 to CR 318	Major Arterial	Minor Arterial	MoDOT Route	Arterial	Major Arterial
SR 25 (S Hope St)	CR 318 to south City limit	Major Arterial	Major Collector	MoDOT Route	Arterial	Major Arterial
W Main St	US 25/34/72 to US 61	Minor Arterial	Minor Arterial	None/"W Main St"	Arterial	Minor Arterial
E Main St	US 62 to east City limit	Minor Arterial	Minor Arterial	None/"E Main St"	Arterial	Minor Arterial
SR Y	US 61 to east City limit	N/A	Major Collector	Existing Arterial	Arterial	Minor Arterial
SR D (W Independence St)	West City limit to N Farmington Rd	Minor Arterial	Major Collector	MoDOT Route	Collector	Minor Arterial
SR D (Independence St)	N Farmington Rd to US 61	Minor Arterial	Minor Arterial	MoDOT Route	Collector	Minor Arterial
Deerwood Dr	Harmony Ln to Oakwood St	N/A	Local	Existing Collector	Arterial	Collector
N Shawnee Blvd	E Main St to Mulberry St	Major Collector	Major Collector	Existing Collector	Arterial	Collector
W Adams St	US 25/34/72 to High St	Minor Collector	Major Collector	Existing Collector	Collector	Collector
E Adams St	High St to Old Cape Rd	Minor Collector	Major Collector	Existing Collector	Collector	Collector
Bainbridge Rd	Old Cape Rd to S Old Orchard Rd	Major Collector	Local	Existing Collector	Collector	Collector
Broadridge Dr	SR D to W Oak St	Minor Collector	Major Collector	Existing Collector	Collector	Collector
N Farmington Rd	North City limit to SR D	Major Collector	Local	Existing Collector	Collector	Collector
N Farmington Rd	SR D to W Main St	Major Collector	Minor Arterial	Existing Collector	Collector	Collector
SR PP (S Farmington Rd)	W Main St to south City limit	Major Collector	Major Collector	MoDOT Route	Collector	Collector
N Georgia St	Greensferry Rd to E Adams St	Minor Collector	Local	Existing Collector	Local	Collector
S Georgia St	E Adams St to Jefferson St	Major Collector	Minor Arterial	Existing Collector	Collector	Collector
Greensferry Rd (CR 301)	North City limit to Hope St	Major Collector	Major Collector	Existing Collector	Collector	Collector
N Hope St (incl. Florence St)	Greensferry Rd to Washington St	Major Collector	Major Collector	Existing Collector	Collector	Collector
E Independence St	US 61 to Greensferry Rd	Minor Collector	Local	Existing Collector	Local	Collector

W Jackson Trail	Lee Ave to S Hope St	Major Collector	Local	Existing Collector	Collector	Collector
N Lacey St	Ridge Rd to Bainbridge Rd	Minor Collector	Major Collector	Existing Collector	Collector	Collector
Lee Ave	US 25/34/72 to end	Major Collector	Local	Existing Collector	Collector	Collector
Oak Hill Rd (CR 305)	Ridge Rd to Bainbridge Rd	Major Collector	Local	Existing Collector	Collector	Collector
Oak Ridge Dr	Ridge Rd to Oak Hill Rd	Major Collector	Local	Existing Collector	Collector	Collector
Oak St	End to N West Ln	N/A	Local	Proposed Collector	Collector	Collector
Oak St	N West Ln to N Farmington Rd	Major Collector	Major Collector	Existing Collector	Collector	Collector
Oak St	N Farmington Rd to Elm St	Local	Local	Local	Collector	Collector
Oak St/Mary Street	Elm St to US 61	Local	Local	Local	Local	Collector
Old Cape Rd	E Jefferson St to S Shawnee Blvd	Major Collector	Minor Arterial	Existing Collector	Collector	Collector
Old Cape Rd (CR 308)	S Shawnee Blvd to US 34/61/72	Major Collector	Local	Existing Collector	Collector	Collector
S Old Orchard Rd (CR 307)	Bainbridge Rd to CR 306	Major Collector	Minor Arterial	Proposed Arterial	Collector	Collector
S Old Orchard Rd (CR 307)	CR 306 to US 34/72/61	Major Collector	Minor Arterial	Ex/Prop Arterial	Arterial	Collector
Pioneer Orchard Rd	End to US 25/34/72	N/A	Local	Proposed Collector	Collector	Collector
Ridge Rd	N Shawnee Blvd to N Lacey St	Major Collector	Major Collector	Existing Collector	Collector	Collector
Ridge Rd	N Lacey St to Oak Ridge Dr	Major Collector	Local	Existing Collector	Collector	Collector
S Shawnee Blvd	E Main St to Old Cape Rd	Major Collector	Major Collector	Existing Collector	Collector	Collector
S Shawnee Blvd	Old Cape Rd to US 34/61/72	Major Collector	Minor Arterial	Existing Collector	Collector	Collector
N West Lane	End (near Alpine) to Oak St	Major Collector	Local	Existing Collector	Collector	Collector
N West Lane	Oak St to US 25/34/72	Major Collector	Major Collector	Existing Collector	Collector	Collector
S West Lane	US 25/34/72 to Old Toll Rd	Local	Local	Existing Collector	Collector	Collector
County Rd 318 (Benton Rd)	SR 25 to east City limit	Major Collector	Local	Ex/Prop Arterial	N/A	Collector
Ridge Rd	Oak Hill Rd to end	Local	Local	Local	Collector	Local
Trevino Dr	Watson Dr to Ridge Rd	N/A	Local	Local	Collector	Local
W Washington St	N Bast St to Court St	Major Collector	Major Collector	Local	Collector	Local

Figure 2: Recommended Functional Classifications



3.3. Transportation System Inventory

3.3.1. Trails & Sidewalks

The City has been added several trails to the transportation network in recent years. These trails generally consist of four loops and two spurs. Per the Trails Plan, the goal of the trails network is to connect all parks in the city, and to improve the trails to be accessible for everyone. The desire is for the trails to also connect to schools and other community destinations, such as the community center or the Uptown area.

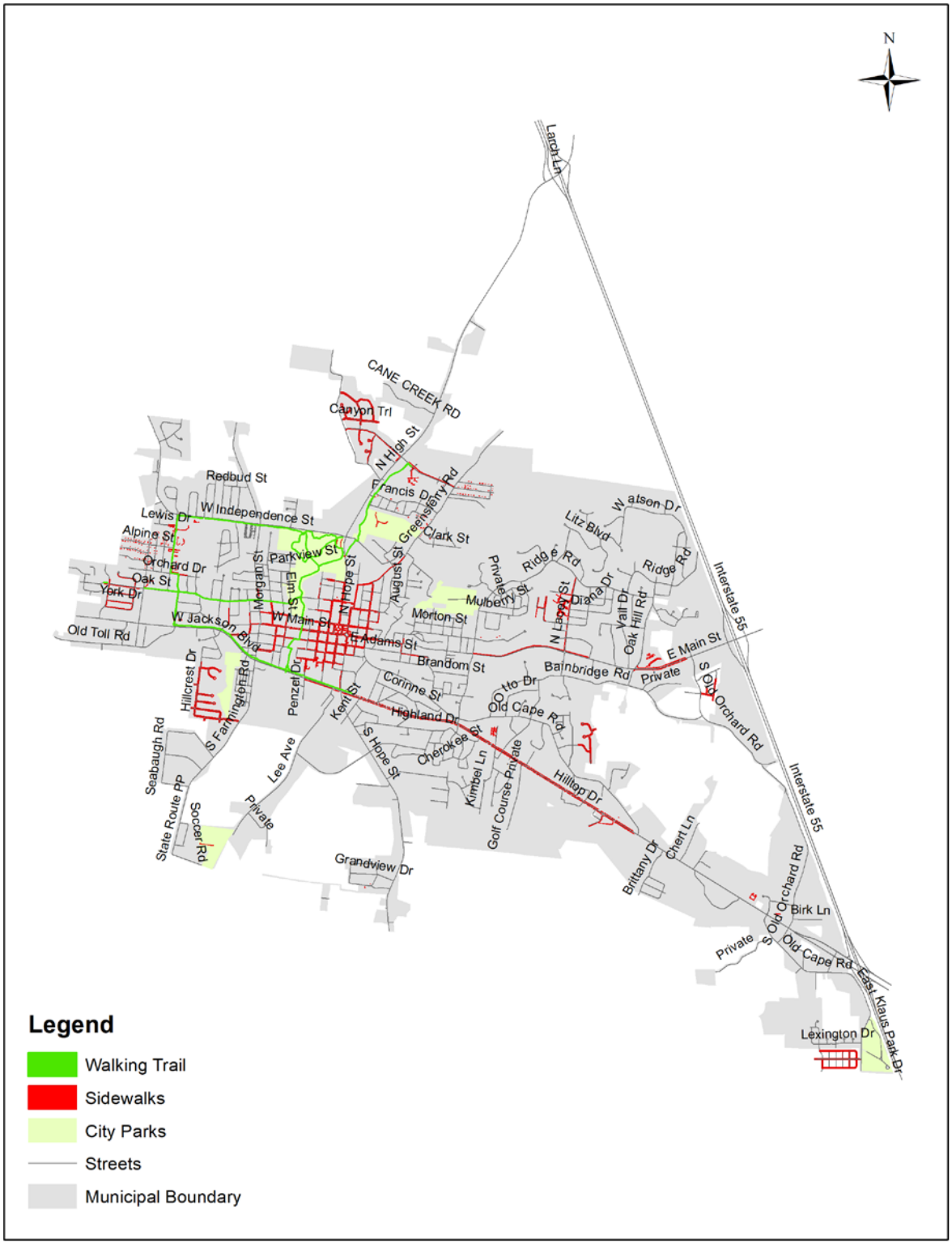
Sidewalks are lacking in many parts of the City. Uptown Jackson is rather walkable, but almost all areas of the City east of Goose Creek do not have pedestrian facilities available to residents. Another area where sidewalks are scarce is in the neighborhoods surrounded by W. Independence Street, Broadridge Drive, Oak Street, and US 61. Though these neighborhoods are the closest to the school campuses, the lack of sidewalks prevents children from having a safe and accessible route to school, which also exacerbates vehicular delays at the schools during drop off and dismissal times. It also means that citizens have a harder time accessing the trail network, so they may opt to drive to a trailhead at a park instead of starting their trip from home.

It should be noted that while sidewalk facilities have been constructed along Jackson Boulevard in recent years, there is only one opportunity to cross the major arterial, which is an unsignalized crosswalk located approximately 550' west of the Jackson Boulevard/Farmington Road signal. Traffic signals are not updated with pedestrian signals or crosswalks. This creates a major barrier for non-motorized modes of travel that divide the north and south portions of the City. All signals should be upgraded to include crosswalks on at least one north-south crossing of Jackson Boulevard and pedestrian signalization. Opportunities should also be reviewed along the corridor to provide crossings for pedestrians that are not located at traffic signals, since the spacing between traffic signals would be rather significant for pedestrians.

Similar issues exist along US 61, where pedestrians have no opportunity to cross a major vehicular barrier. Communities north and west of Independence Street and US 61 have particular issues, as no sidewalks exist on the north side of Independence Street or west side of US 61, preventing citizens from being able to walk to public parks, public trails, community center, and Uptown Jackson.

The existing trails and sidewalks within the City are presented in **Figure 3**.

Figure 3: Existing Trails & Sidewalks



3.3.2. Bicycle Routes

Currently, there are no marked bicycle routes in the City of Jackson, and bicyclists legally share the road with vehicular traffic and are allowed on trails. However, the City is a participating entity in the Regional Bicycle & Pedestrian Plan being prepared for the Southeast Metropolitan Planning Organization (SEMPO) that is currently underway.

3.3.3. Speed Limits

The speed limits within the City are generally appropriate for multi-modal traffic. Pedestrians and bicyclists tend to coexist acceptably when vehicular speeds are 30 mph or lower. Bicyclists begin to feel uncomfortable sharing a road when speed limits reach 35 mph or higher.

Further study should be performed to determine whether speed limits along MoDOT routes should be reduced at gateway points into the city. For example, it may be prudent to lower the speed limit along SR 25 near Jackson Trail, so traffic begins slowing down prior to approaching the Jackson Boulevard intersection and Uptown Jackson. Another recommended location for further study is US 61 between Independence Street and Mary Street, as Independence Street and City Park is a gateway into the urban area of Jackson. Finally, with the functional classification change for W. Washington Street, consideration should be given to making this street more pedestrian friendly with a lower speed limit. The City's existing speed limits are provided graphically in **Figure 4**.

3.3.4. Truck Routes

Truck routes through the City tend to stay on State maintained routes, such as US 61 and Highway D. Other identified truck routes serve more industrial portions of the City, such as uses along Lee Avenue, Jackson Trail, and the area north of E. Main Street surrounded by LaPierre Road, Eastview Court, Kate Street, Maryland Street, and Georgia Street.

Main Street is also designated a truck route between LaPierre Road and MO 34/72. It does not, nor is it recommended to, extend east of LaPierre Road on E. Main Street to Old Orchard Road. As of the end of 2015, the E. Main Street bridge over Goose Creek was identified to be Functionally Obsolete, meaning the bridge is no longer by design functionally adequate for its task. This does not communicate anything of a structural nature, and may be perfectly safe and structurally sound, but may be the source of traffic jams. According to the 2016 evaluation provided by the State to the FHWA, the bridge railings, transitions, approach guardrail, and approach guardrail ends do not meet current acceptable standards. However it was deemed to meet minimum tolerable limits to be left in place as is. Due to this, and with E. Main Street having numerous direct access points from individual properties, E. Main Street between LaPierre Road and Old Orchard Road should not be designated as a truck route. With Old Orchard Road designated as a truck route, it is recommended that E. Main Street between Old Orchard Road and I-55 be designated as a truck route to have an alternate non-interstate connection between E. Main Street and Jackson Boulevard interchanges. All of the existing truck routes are shown in **Figure 5**.

Figure 4: Speed Limits

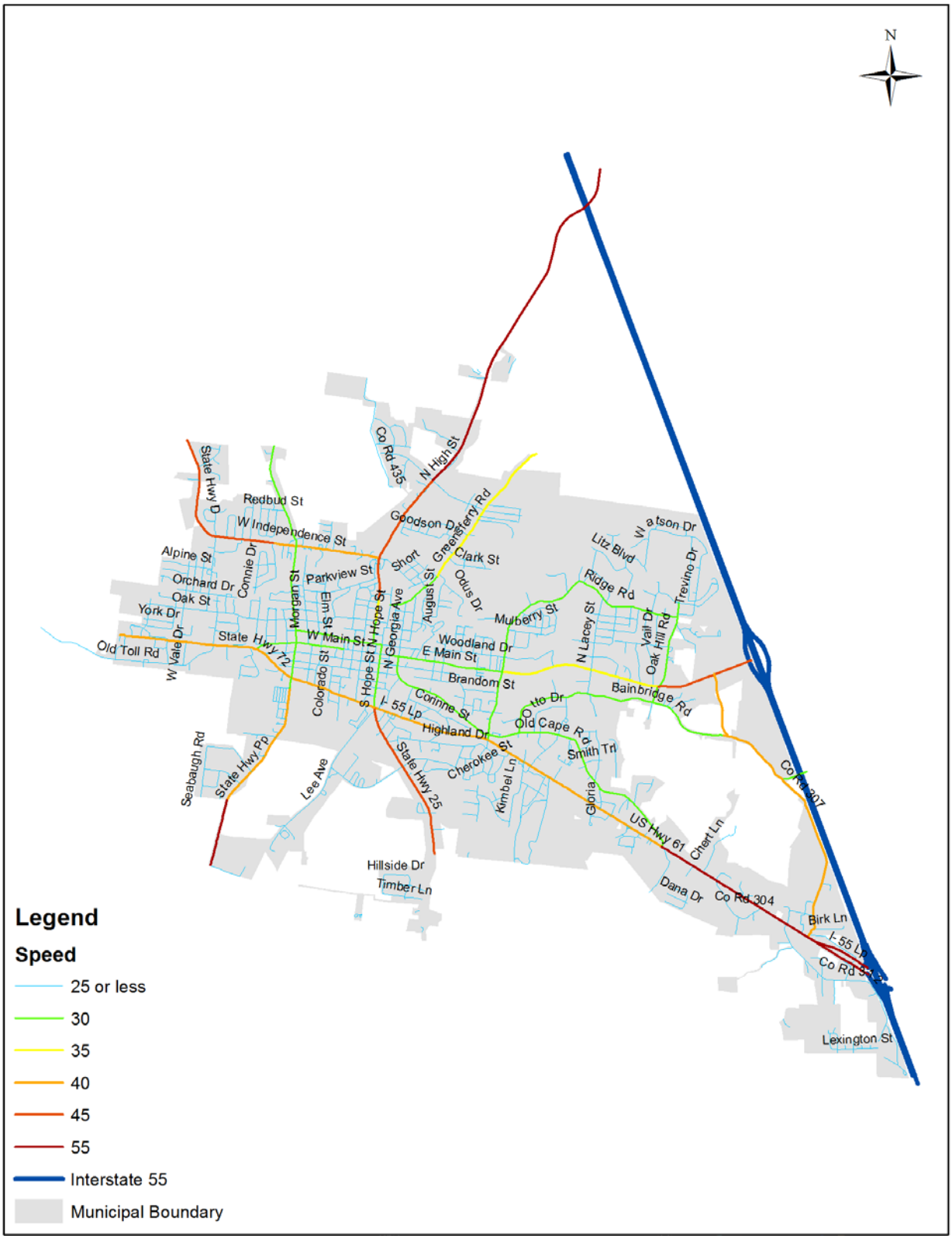
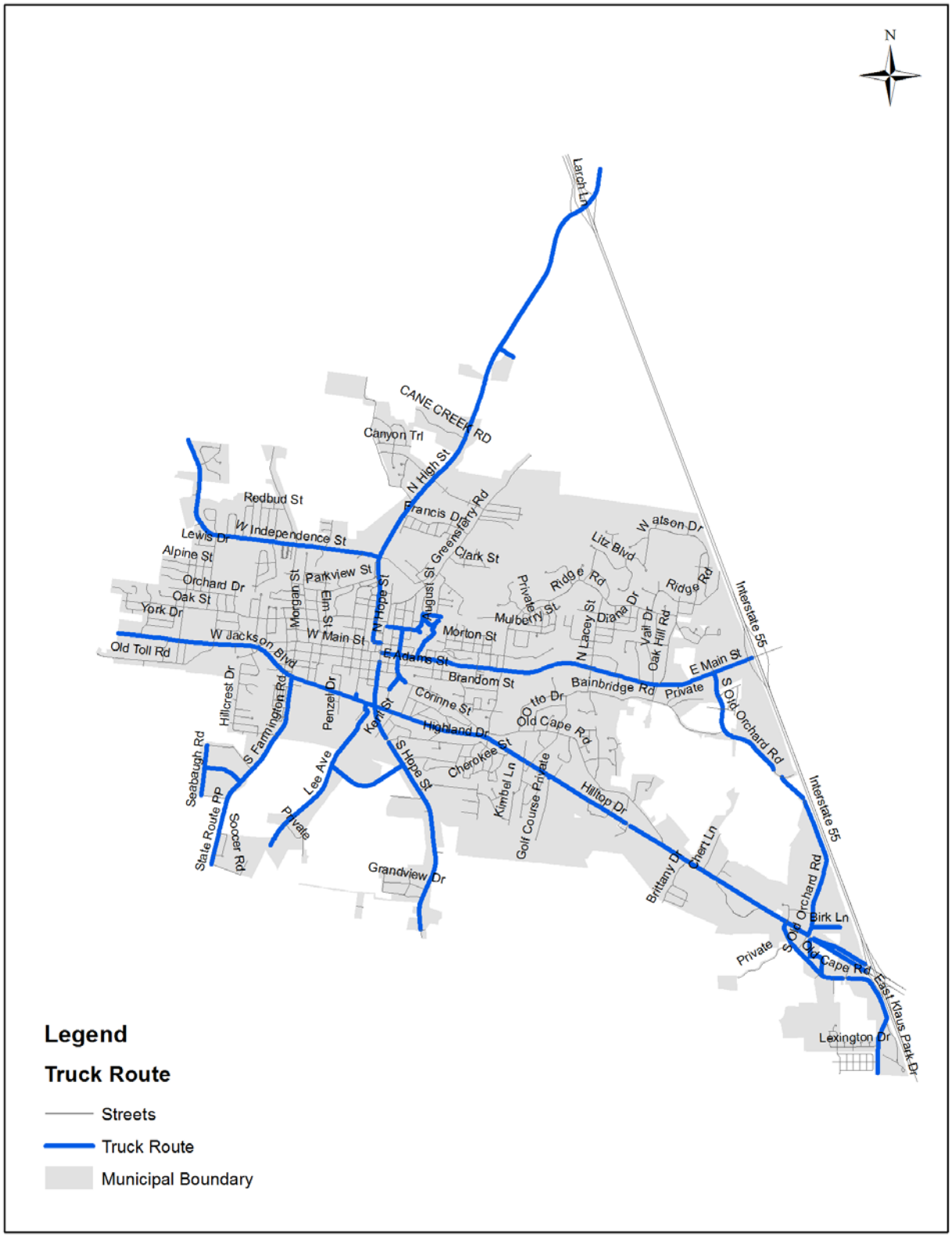


Figure 5: Truck Routes



3.4. Existing Operating Conditions

Traffic operating conditions at the study intersections were evaluated using Synchro 9, which is a commonly used traffic analysis tool based on methodologies outlined in the "Highway Capacity Manual" (HCM), published in 2010 by the Transportation Research Board. The performance of the transportation system is quantified by Levels of Service (LOS), which are measures of traffic flow that consider factors such as speed, delay, interruptions, safety, and driver comfort and convenience. There are six levels of service ranging from LOS A ("free flow") to LOS F ("oversaturated"). LOS C is commonly used for design purposes and represents a roadway with volumes utilizing 70 to 80 percent of its capacity. LOS E is considered acceptable for peak period conditions in urban and suburban areas, while acceptable conditions in rural areas vary between LOS C and D.

Levels of service criteria vary depending upon the roadway component being evaluated. Intersections are most commonly evaluated, since roadway capacity is typically dictated by the number of vehicles that can be served at critical intersections. For intersections, the criteria are based on delay and the type of control (i.e., whether it is signalized or unsignalized). For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement, then aggregated for each approach and the intersection as a whole. For intersections with partial (side-street) stop control, delay is calculated for the minor movements only (side-street approaches and major road left-turns), since through traffic on multi-lane major roads are not required to stop.

The levels of service criteria also differ depending on the type of intersection control. Signalized intersections reflect higher delay tolerances as compared to unsignalized locations because motorists are accustomed to and accept longer delays at signals. The thresholds for intersection levels of service are summarized in **Table 7**.

Table 7: Intersection Level of Service Thresholds

Level of Service	*Control Delay per Vehicle (sec/veh)*	
	Signalized	*Unsignalized*
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

Existing operating conditions for study locations 1-8 are summarized in **Table 8**, and presented in terms of level of service, delay, and 95th percentile queue. Levels of service that fall below acceptable conditions are noted in red. LOS D was considered acceptable for an approach, but LOS C was considered the lowest acceptable rating for an overall intersection grade.

Table 8: Existing Operating Conditions			
Int. #	***Intersection/Approach***	***Level of Service (delay in Seconds)***	
		AM Peak Hour	*PM Peak Hour*
1	***Oak Street at West Lane (All-Way Stop Control)***		
	Eastbound Approach	B (14.8)	A (9.7)
	Westbound Approach	B (14.5)	B (11.4)
	Northbound Approach	C (17.1)	B (10.7)
	Southbound Approach	B (13.9)	B (12.4)
	Overall Intersection	**C (15.3)**	**B (11.5)**
2	***Oak Street at East Lane (Side-Street Stop Control)***		
	Eastbound Approach	A (0.2)	A (0.2)
	Westbound Approach	A (2.0)	A (3.0)
	Northbound Approach	E (35.2)	C (15.8)
	Southbound Approach	C (20.5)	B (14.5)
	Overall Intersection	**A (8.1)**	**A (5.1)**
3	***Oak Street at Farmington Road (All-Way Stop Control)***		
	Eastbound Approach	E (37.9)	C (17.1)
	Westbound Approach	B (14.4)	B (10.6)
	Northbound Approach	D (34.1)	C (18.1)
	Southbound Approach	F (52.5)	C (15.6)
	Overall Intersection	**C (15.3)**	**C (16.7)**
4	***Main Street at Missouri Street (Side Street Stop Control)***		
	Eastbound Approach	A (0.3)	A (0.9)
	Westbound Approach	A (3.6)	A (1.2)
	Northbound Approach	C (17.4)	D (25.3)
	Southbound Approach	E (35.1)	D (34.3)
	Overall Intersection	**A (4.4)**	**A (7.1)**
5	***US 61 at Deerwood Drive (Side Street Stop Control)***		
	Eastbound Approach	F (247.3)	D (30.0)
	Westbound Approach	F (163.7)	D (34.1)
	Northbound Approach	A (0.3)	A (0.5)
	Southbound Approach	A (0.4)	A (0.6)
	Overall Intersection	**D (33.0)**	**A (4.4)**
6	***Main Street at Georgia Street (Side Street Stop Control)***		
	Eastbound Approach	A (0.8)	A (0.7)
	Westbound Approach	A (1.0)	A (0.4)
	Northbound Approach	F (80.5)	F (85.5)
	Southbound Approach	F (237.7)	F (74.9)
	Overall Intersection	**D (32.8)**	**C (17.0)**
7	***Main Street at Farmington Road (All-Way Stop Control)***		

	Eastbound Approach	C (24.9)	B (12.7)
	Westbound Approach	C (17.5)	B (14.1)
	Northbound Approach	C (19.1)	C (15.4)
	Southbound Approach	F (68.6)	C (23.3)
	Overall Intersection	**E (39.4)**	**C (17.8)**
8	***Hwy D at Broadridge (Side Street Stop Control)***		
	Eastbound Approach	A (0.0)	A (0.1)
	Westbound Approach	A (7.4)	A (3.5)
	Northbound Approach	C (16.1)	B (11.0)
	Southbound Approach	F (66.8)	B (13.7)
	Overall Intersection	**B (10.2)**	**A (5.2)**

The results of the capacity analysis show that at the studied intersections, the morning peak hour operates worse than the afternoon peak hour. This is atypical for many urban environments, but in this case it is indicative of lower-than-normal peak hour factors throughout the city.

Peak hour factor is a number that reflects the temporal distribution of traffic during the peak hour. A low value would suggest that a disproportionate amount of the traffic arrives during a given 15-minute interval, such as what happens during shift changes at a factory, or immediately before or after a school arrival or dismissal period. Higher values suggest evenly distributed traffic throughout the peak hour, which is more common along major arterials like Jackson Boulevard. Most of the intersections cited above have abnormally low peak hour factors with 15-30 minute traffic surges.

The most concerning intersections include Oak Street at Farmington Road, US 61 at Deerwood Drive, Main Street at Georgia Street, and Main Street at Farmington Road. Improvements for most of those intersections are recommended in the Existing Traffic Issues and Concerns section of this report, but brief overviews of intersections not specifically addressed later in this report are provided as follows:

- Conditions at Main Street and Georgia Street could be addressed by the creation of a new southbound left-turn bay. Signalization could resolve delay issues on the minor street, but it would cause increased delay to the mainline. Improvements in the form of turn bays should be installed where feasible before a signal is considered as a mitigation measure.
- The level of vehicular delays at Oak Street's intersection with East Lane is not particularly concerning, but observations during school dismissal periods for the West Lane Elementary School and Jackson Junior High School revealed that motorists are not stopping for pedestrians, resulting in children trying to gauge traffic gaps before running across Oak Street. It is recommended that a four-way stop be installed at this intersection for pedestrian safety, which also resolves vehicular delays on the northbound approach.

3.5. Traffic Safety

Traffic safety is a very important issue as each year more than 30,000 people are killed and thousands more are injured on American streets. The 'Vision Zero' strategy was first introduced in Sweden in 1993 to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for

all. Now, this strategy is gaining momentum in major American cities like Austin, Boston, Chicago, Fort Lauderdale, Los Angeles, New York, Portland, San Francisco, Seattle, Washington DC. The strategy can easily be adopted by smaller communities as well, as the premise recognizes that safe modes of transportation should be provided for all of society. A Vision Zero City meets the following criteria (http://visionzeronetwork.org/resources/vision-zero-cities/):

- A clear goal of eliminating traffic fatalities and severe injuries has been set.
- The Mayor has publicly, officially committed to Vision Zero.
- A Vision Zero plan or strategy is in place, or the Mayor has committed to doing so in clear time frame.
- Key city departments (including police, transportation and public health) are engaged.

Despite safety improvement over the years, the recent trend shows that the number of fatalities is going up. In 2015, 35,092 people were killed due to traffic crashes, which is a 7.2% increase from 2014. There was also a rise in the numbers of traffic deaths all over the country in 2015 (U.S. Department of Transportation's National Highway Safety Administration, 2016).

An inquiry was made to MoDOT and City of Jackson staff, including the police department, regarding whether there were any high crash locations that were of particular concern that should be addressed as part of this study. MoDOT reviewed their high severity crash list, and confirmed that there are no intersections within the city that have a crash rate higher than the statewide average. Similarly, City staff did not identify any particularly crash-prone roadway segments or intersections.

The Missouri Statewide Traffic Accident Records System (STARS), which is managed by the Missouri State Highway Patrol, was consulted for crash history within the City of Jackson for the five-year period between 2012 and 2016. All Missouri law enforcement agencies are required by law to report crashes to STARS if a crash involves a fatality, injury, or has property damage exceeding $500 in value. The record system may include crashes with less than $500 in damage if the law enforcement agency chose to submit the record. A summary of the crashes by severity and year are presented in **Table 9**.

Table 9: Severity of Crashes in Jackson (2012-2016)

Year / Crash Type	*Fatal*	*Personal Injury*	*Property Damage Only*	*Total*
2012	1	54	313	*368*
2013	1	58	339	*398*
2014	0	46	333	*379*
2015	1	68	298	*367*
2016	2	58	332	*392*
5-Year Total	***5***	***284***	***1,615***	***1,904***

The number of crashes and their severity has remained rather constant over the past five years. Of the 1,904 total crashes, 15% involved fatalities and injuries, and 85% involved property damage only. Two of the fatal crashes occurred on Jackson Boulevard in the vicinity of Old Orchard Road, one on Jackson Boulevard at Walton Drive, while the remaining two were on SR 25 in the general vicinity of CR 318.

Of the 284 injury related crashes over the five year period, 76% occurred on MoDOT routes. This can be expected considering the heavy traffic burden these roads carry and high speeds occurring on these routes compared to city-owned streets. Intersections on MO 34 were responsible for 29.6% of all crashes occurring in Jackson. The crash data was examined to find intersections that had 5 or more crashes per year for at least 3 of the past 5 years (2012-2016). These intersections are shown in **Figure 8** and their respective numbers are listed in **Table 10**.

Figure 6: Fatal Crash Locations (2012-2016)

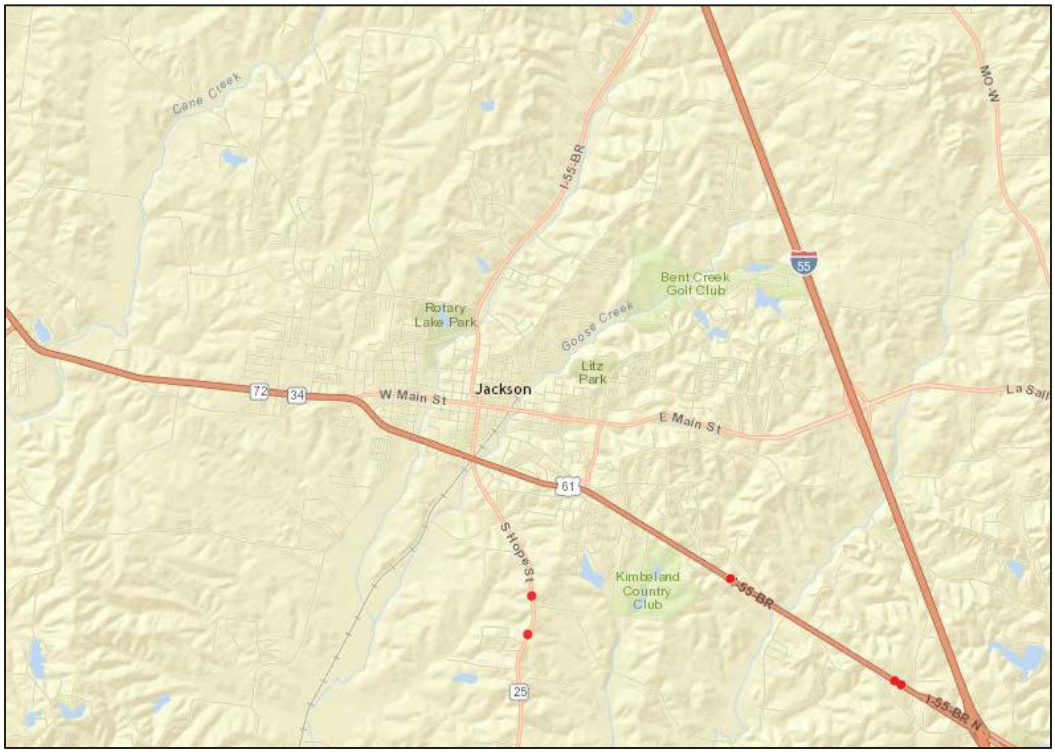


Figure 7: Injury Crash Locations (2012-2016)

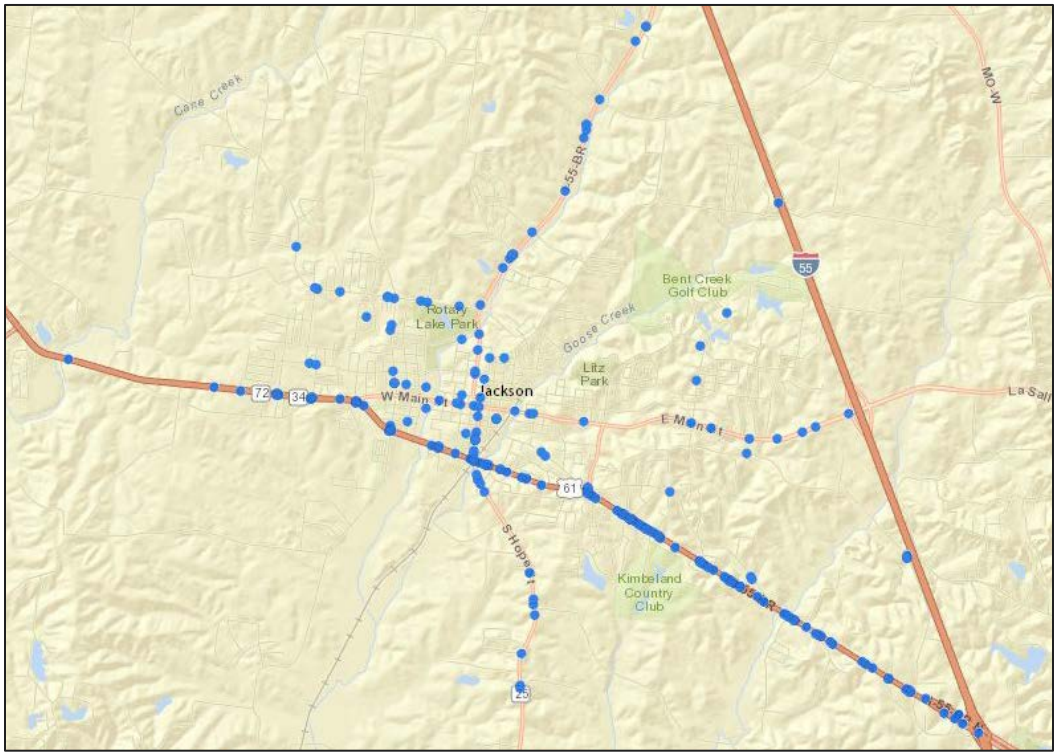


Figure 8: Jackson Boulevard Intersections with 5 or More Crashes per Year for 3 Years (2012-2016)

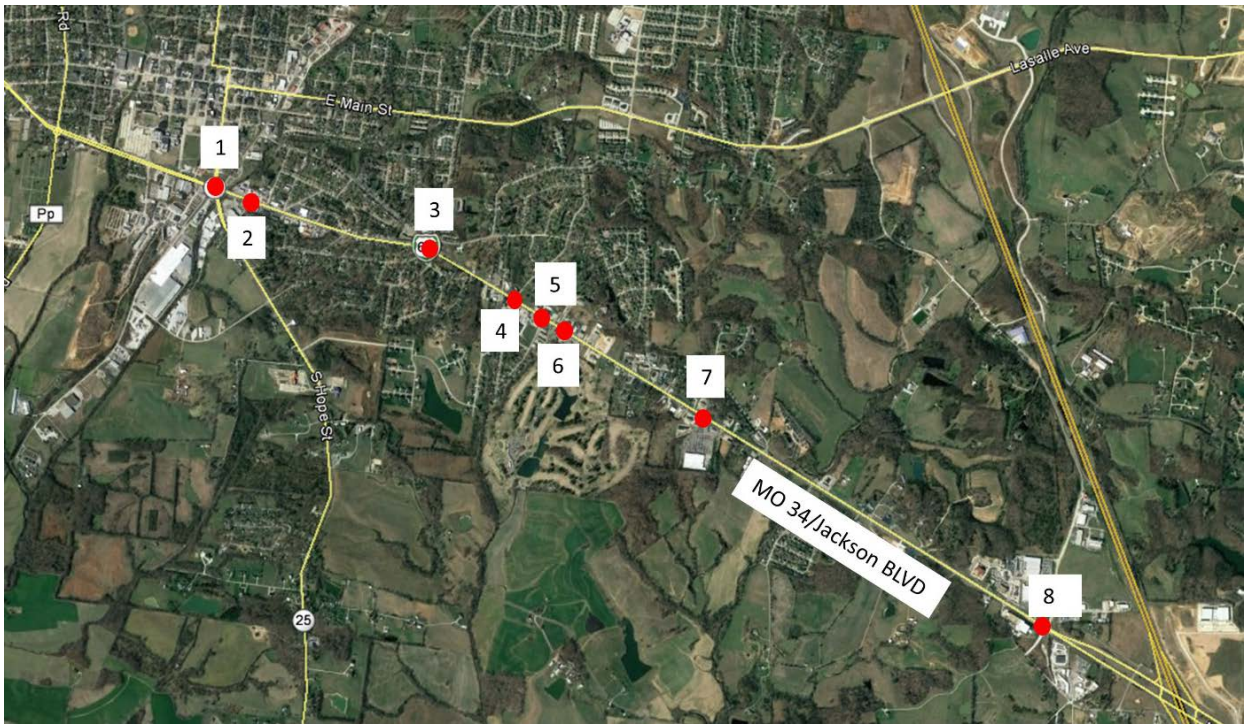


Table 10: Multi-year Occurrences of Five or More Crashes per Year

No	*Intersection (with MO 34/Jackson Blvd)*	*5-Year Total Number of Crashes*
1	MO 25/ US 61	107
2	Kent St	43
3	Shawnee Ave	77
4	Donna Dr	63
5	Greenway Dr	30
6	K Land Dr	36
7	Walton Dr	53
8	Old Orchard Rd	61

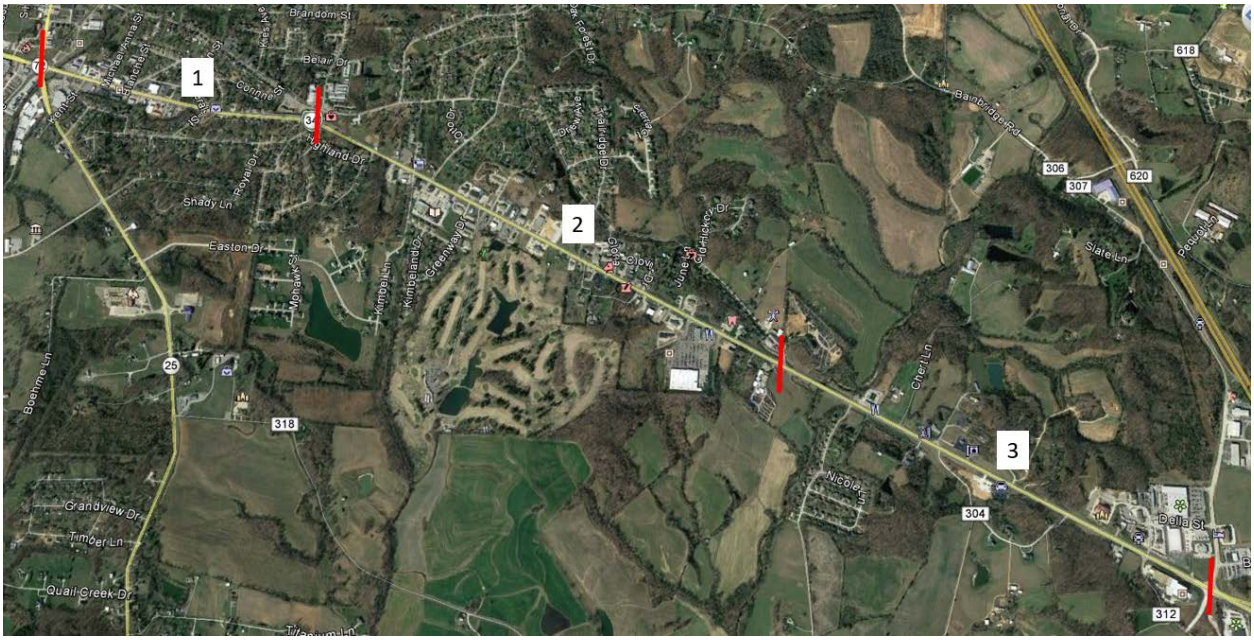
MoDOT already has plans to address three of the Jackson Boulevard intersections noted above to improve the safety and congestion at the intersections. These plans include:

- Adding a 2nd northbound left turn bay at the intersection of MO 25, US 61 and MO 34/72
- Adding a northbound right turn bay at Shawnee Boulevard
- Adding a northbound right turn bay at Donna Drive

Other planned improvements by MoDOT that may have a beneficial impact on safety is the widening of shoulders on Route D and on Route PP.

A roadway segment crash analysis was performed to compare Jackson crash data with Missouri crash data. The analysis was performed on the MO 34/Jackson Blvd corridor shown in **Figure 9**.

Figure 9: Roadway Segments for Crash Analysis



The roadway segments (starting and ending points) and death and injury rates, or number of deaths/injuries per 100 million miles of vehicle travel, comparison between the selected segments and Missouri State are shown in **Table 11**.

Table 11: Jackson Boulevard - Segments for Crash Analysis

Segment No	Segment Start	Segment End	Death Rate		Injury Rate	
			Segment Rate	Statewide Rate[1]	Segment Rate	Statewide Rate[2]
1	MO 25/ US 61	Shawnee Ave	0	1.15	56.41	74.3
2	Shawnee Ave	Old Cape Rd	1.34		93.64	
3	Old Cape Rd	Old Orchard Rd	3.52		51.06	
Total	MO 25/ US 61	Old Orchard Rd	1.65		65.94	

[1] Average death rate between 2011 and 2015 (Insurance Institution for Highway safety: Highway Loss Data Institution, 2016)

[2] Injury rate in 2011 (Department of Public Safety: Missouri State Highway Patrol, 2012)

According to the **Table 11**, Segment 2 and 3 have a death rate of 1.34 and 3.52 death per 100 million miles of vehicle travel, respectively, which is higher than Missouri's 2015 death rate of 1.21. Similar for segment 2, the combined death and injury rate is also higher than Missouri rate. While Missouri has an injury rate of 74.3 death and injury per 100 million miles of vehicle travel, segment 2 has 93.64. The overall death rate for the whole roadway segment is 1.65, also higher than the statewide death rate. The injury rate for the corridor is 65.94, below the statewide rate of 74.3. The high fatality rate is possibly a function of the chosen segment length. No other fatal crashes occurred on Jackson Boulevard, so if a longer segment was analyzed, the death rate would lower, as demonstrated by the calculated rate for the total of all three segments compared to only Segment 3.

Potential reasons for these high crashes rates along these segments include the high speed limit on the east end of the corridor and the large number of driveways and intersections in segments 1 and 2. As development and redevelopment occur along Jackson Boulevard, the City should use these opportunities to implement access management strategies and reduce and limit the number access points to Jackson Boulevard. It is recommended a safety audit be performed for the Jackson Boulevard corridor to determine what safety measures can be implemented to reduce crashes, particularly more severe crashes, along the corridor.

4. Existing Traffic Issues & Concerns

City of Jackson staff identified key issues to be addressed in this Citywide update. These include the following concerns:

1. Parking on arterial roads and possibly collectors
2. W Main Street & Farmington Road
3. Farmington Road & Oak Street
4. US 61 & Independence
5. Oak Street near Elementary and Junior High School
6. Middle School on Independence
7. Orchard Drive Elementary School
8. E Jackson Boulevard and Donna Drive
9. US 61 & Deerwood Drive
10. S Georgia & E Adams St
11. US 61 & Mary Street
12. Circulation in City Park, with closure of Cascade Drive at US 61
13. E Main Street sidewalks between Traveler's Way and Oak Hill Road
14. Right-of-way Procurement

4.1. Parking on Arterial & Collector Roads

In general, on-street parking should be prohibited on major and minor arterials, the only exception being Main Street as it traverses through Uptown Jackson. On-street parallel parking on collector roads should be applied on a case-by-case basis, with determinations based on factors such as vehicular speeds, volume, roads with multiple lanes in one direction, and land use characteristics of surrounding properties. For example, no on-street parking should be allowed on roadways with a speed limit of 35 mph or higher. When on-street parallel parking is allowed, curb extensions should be used at intersections to define the parking zone, improve sightlines at intersecting streets, and to reduce the pavement width for pedestrians. This means less pedestrian exposure and conflict between vehicles and pedestrians, creating a safer overall transportation network.

The City has several locations of commercial and multi-family residential properties where drivers must back out of a parking lot onto a collector street. This type of parking should be restricted on all collector and arterial roads, not allowed for new development, and mitigated where possible at existing developments. Driveways to individual single-family detached residences would be excluded from this restriction, though access should be combined where possible when connecting to roadways with a functional classification of collector or higher.

4.2. W Main Street & Farmington Road

The intersection of W. Main Street and Farmington Road is an existing four-way stop with one lane in each direction except northbound, which has a separate left-turn bay. There is a small skew for southbound drivers traveling through the intersection. Sidewalks are provided on the east approach but not the other three, there are no crosswalks, and the intersection is not ADA compliant. Access is uncontrolled in the northwest quadrant, and the southwest quadrant has parking perpendicular to the street where vehicles must back out onto W. Main Street. Cross-sections on the north and south legs are wider closer to W.

Main Street to help accommodate turns due to the small turning radii on the northeast and southwest corners.

Table 12: Approach Widths at W Main Street & Farmington Road

Approach	*Cross-section*	*Available ROW*
North	32'-39'	63'
South	42'-61'	82'
East	46'	48'
West	28'	76'

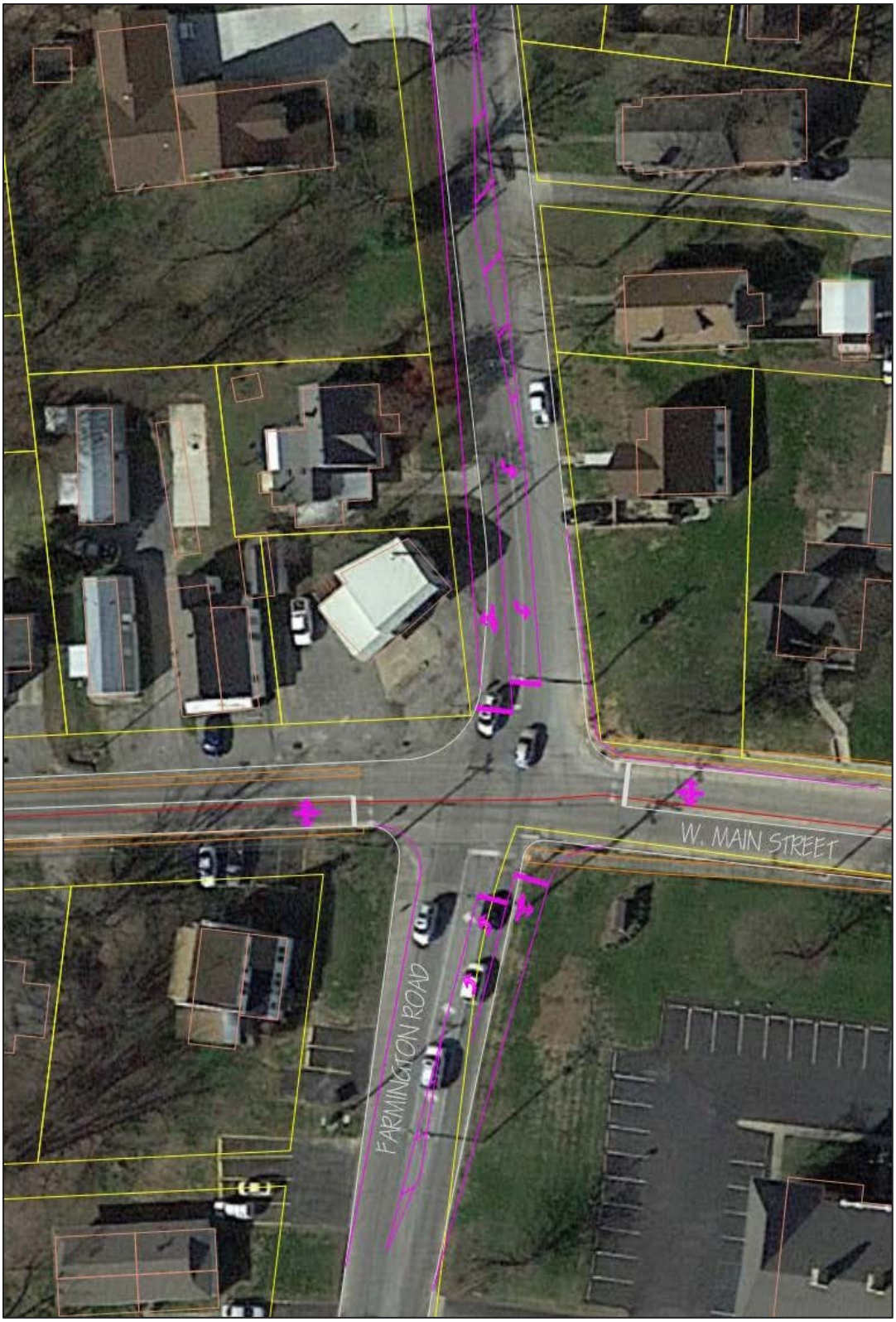
As previously noted, capacity analyses of this intersection showed that the southbound approach operates at a LOS F during the morning peak hour, which brings the overall intersection to an unacceptable LOS E. The afternoon peak hour has acceptable operating conditions.

If redevelopment were to occur on the corner parcels, the skew should be corrected to better align the north and south legs, and northbound and a southbound left-turn bay should be provided. The addition of a turn bay would improve the LOS of the southbound approach to Level C and the overall intersection to a Level C.

A hypothetical realignment of the intersection, with impacts to the adjacent properties, is presented in **Figure 10**. In this concept, the south leg would be realigned to the east, parking would be restricted on the east side of Farmington Road to the north of W. Main Street, and a southbound left-turn bay would be striped within existing pavement on the north leg. This concept reflects parcel boundaries from the City's GIS records, and appears to require property outside of the public right-of-way, but a survey should be performed to verify these boundaries if this concept is to move forward.

In addition, sidewalk facilities should be added to the three remaining legs with crossings improved to meet ADA requirements. Parking on adjacent parcels, particularly along the west side of Farmington Road south of W. Main Street, may need reconfigured in order to create a safe environment for pedestrians.

Figure 10: Recommended Improvements - W Main Street & Farmington Road

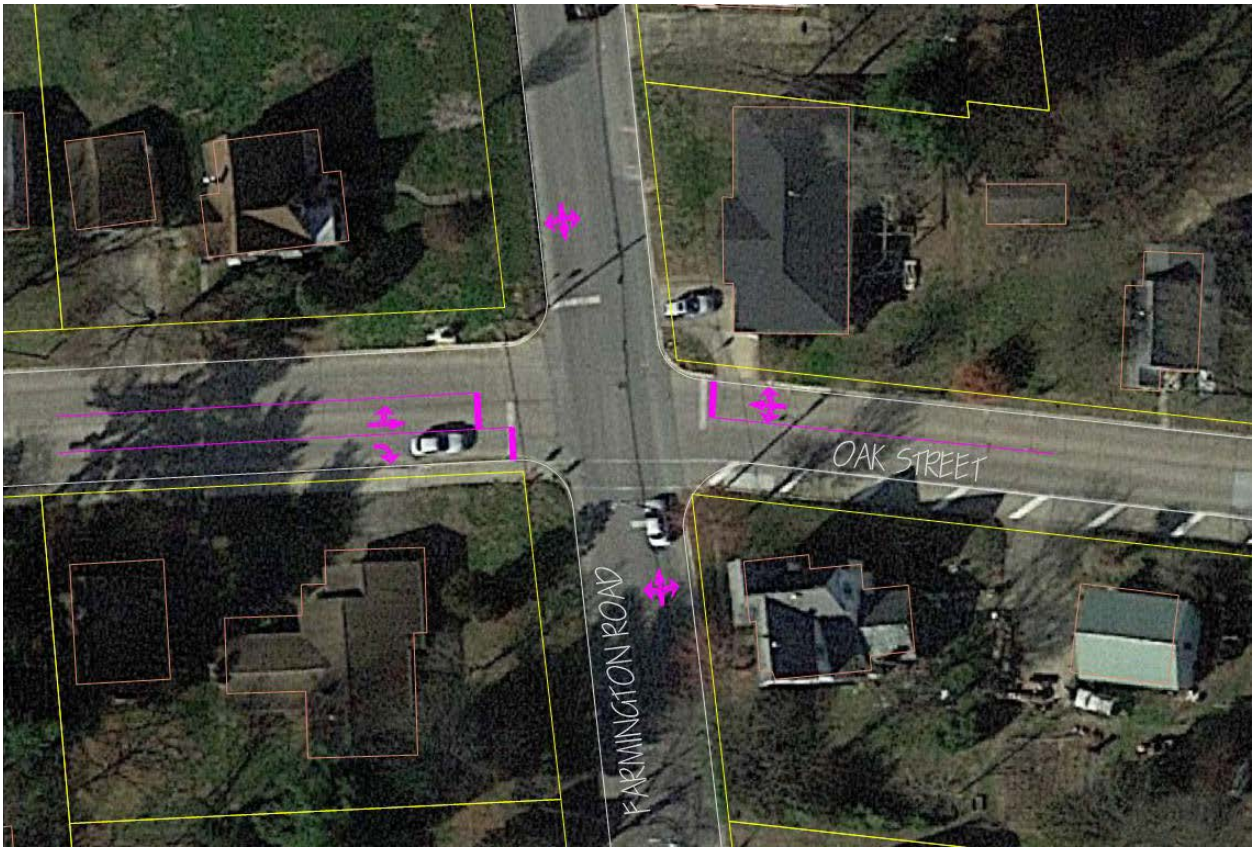


4.3. Farmington Road & Oak Street

The intersection of Farmington Road and Oak Street is an existing four-way stop with one lane in each direction. At present, the intersections operates at LOS C during the PM peak period, but LOS E during the AM peak period. This is mainly due to high volume of traffic on the eastbound and southbound approaches, which operate at LOS E and LOS F, respectively, but also because of the nearby schools located west of Farmington Road. School traffic has a more intense arrival pattern at the intersection, meaning a significant amount of traffic arrives during a short amount of time, causing the intersection to operate poorly during short periods of the morning peak hour.

One potential solution is to restripe the eastbound approach to have a shared left-turn/thru lane and a separate right-turn lane. The stop bar should be offset to accommodate northbound left turning vehicles. This pushes the existing centerline several feet to the north, thereby exacerbating the skew for westbound through traffic. To help mitigate the skew, a centerline should be striped on the east leg marking a 10-11' westbound lane, helping align the vehicles approaching Farmington Road as far north as possible in the lane so there is less transitioning as they cross Farmington Road. With this configuration, there would be no on-street parking for approximately 150 to 200 feet west of the intersection to allow for a 100-foot bay and a 50- to 100-foot taper back to the existing two lane cross-section.

Figure 11: Recommended Improvements - Oak Street and Farmington Road



4.4. US 61 & Independence

The intersection of US 61 and Independence Street marks the transition point between the rural and urban areas of the City. The speed limit on US 61 to the north of the intersection is 45 mph, whereas south of the intersection it reduces to 35 mph. On Independence Street, west of the intersection where the functional classification is a minor arterial, the speed limit is 40 mph. There is no posted speed limit east of the intersection, but the number and spacing of access points of a collector or local street with a lower appropriate speed. MoDOT owns and maintains both roadways, so any improvements would be subject to MoDOT approval.

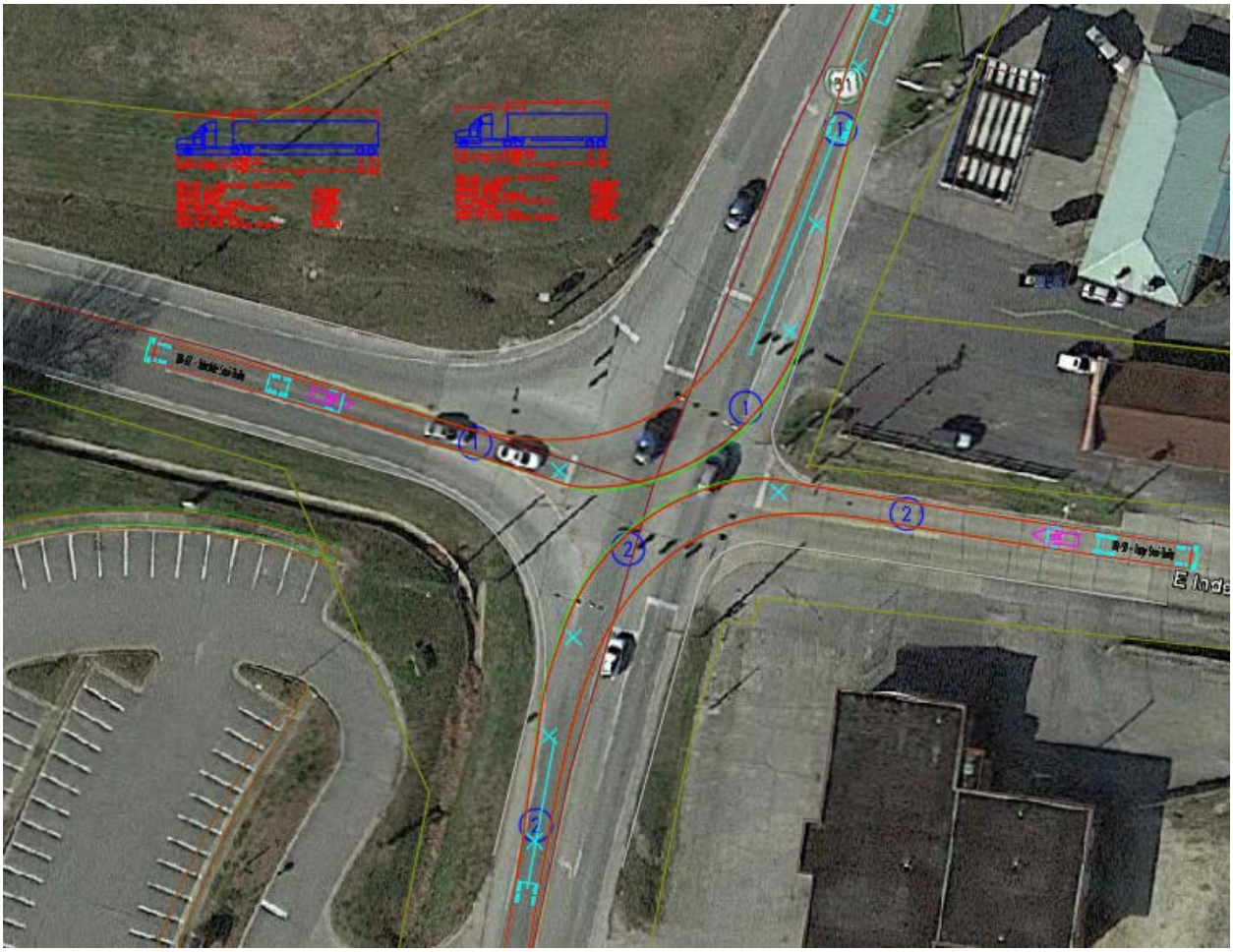
MoDOT indicated they have planned improvements at this intersection, to include constructing a 200-300' southbound right turn bay, which is anticipated to be complete within the next 1-2 years. This improvement will significantly increase the capacity on the southbound approach and improve overall intersection operations.

There are approximately 40 crashes that have occurred at this intersection between 2012 and 2016. Many of these are on the southbound approach, which would likely be rear-end crashes. The capacity improvements planned by MoDOT should help relieve this issue, as vehicles would not be queued as long and would be stopped closer to the signal. Currently, the queue extends to a distance where vehicles may not be properly warned of the downstream traffic signal and may be surprised by the long queue, resulting in a rear-end crash.

Efficiencies may also be gained through an adjustment of signal phasing. The minor street approaches currently have "split phased" operations, whereby they function independently, and left turns from US 61 operate as "protected only", whereby motorists must wait for an arrow. Using traffic volumes provided by MoDOT and the Left Turn Phasing warrants per the MoDOT Engineering Policy Guide (EPG) worksheet, it appears the mainline left turns could operate either as protected only, or as protected-plus-permissive phasing with a green ball or a flashing yellow arrow. For the east-west approaches, it is recommended that a change to concurrent phasing be explored (sightlines and volumes would support concurrent movements). While a review of turning movement templates shows that eastbound and westbound left turning WB-67 semi-trucks would have issues turning concurrently at this intersection, very few semi-trucks would be turning south from the westbound approach. A WB-67 (67-foot wheelbase) tractor trailer truck is a typical design vehicle for many state highways. A smaller WB-50 semi-truck could operate on the westbound left turn movements concurrently with an eastbound left turn WB-67 without issue, as shown in **Figure 12**.

Adjusting the phasing so that minor street approaches have concurrent green phases and changing the mainline left turns to protected-permissive phasing could reduce overall delay at the intersection by approximately 25%. A review of the signal phasing and timing should be performed at the time that MoDOT constructs their geometric improvements. No further improvements are recommended beyond these at this time.

Figure 12: Truck Turning Movements - US 61 & Independence Street



4.5. Oak Street near Elementary & Junior High School

The student pick-ups for West Lane Elementary School (ES) and Russell Hawkins Junior High School (JHS) are both located along Oak Street just to the east of West Lane. Queues of parents on Oak Street waiting to pick up their children were observed to be approximately 1,100 feet long, extending as far as Willow Bend Drive. Queues also occurred on Broadridge Drive and East Lane, which block through traffic on these routes and need to be addressed.

The on-site drop-off lane at West Lane ES is planned to be updated as part of the school's expansion, which will go far to resolve the queuing issues along Oak Street. However, it should be noted that West Lane ES is not the only cause of these queues. Supplemental observations were made on an early-release day for the elementary school, during which significant queuing still occurred along Oak Street from motorists waiting to access the Junior High School.

A potential traffic management solution is to modify the elementary school's circulatory pattern by directing parents to turn right out of the school towards Oak Street and West Lane, while junior high parents would be directed to turn right out of the school towards Broadridge and East Lane. This would help disperse the traffic loads by separating motorists exiting from the two schools, thereby preventing

gridlock at the elementary school's driveway. Special cases may exist where guardians may pick up students from both schools. In this case, it's recommended the junior high school student walk to the elementary school to be picked up.

Another possible traffic management solution would be to temporarily block eastbound traffic between West Lane and the junior high school entrance; all school traffic would be required to approach from the east. However, this would require daily coordination in the placing and removal of a temporary barricade (most likely using road cones). Also, it is generally undesirable to restrict service in a grid network since it would shift through movements to a parallel route, which could result in additional problems.

Reductions in vehicular demands would also be beneficial. Initiatives should be put in place to encourage students to walk to school, ride the bus, or carpool. Sidewalks should be constructed between the schools and the surrounding neighborhoods on both sides of the road to allow and encourage children to walk to school. A Safe Routes to School (SRTS) plan should be prepared, which may suggest non-motorized ways to have children commute to school, such as a Walking School Bus.

4.6. Middle School on Independence Street

Jackson Middle School's driveway on Independence Street is significantly constrained during school dismissal. The school uses a system of both buses and parent pick-up at the end of the day, with buses using the loop that enters and exits the site via Broadridge Drive, and parents using the entrance on Independence Street. However, there is not enough space on-site for parents to wait for their child, so parents currently queue on Independence Street, basically parking on a state highway for up to 20 minutes, in both directions. Independence Street has a speed limit of 45 mph during non-school hours, lowering to 35-mph school zone while school is in session.

Parents waiting to make an eastbound right turn block the eastbound through movement, causing through traffic to utilize the two-way left turn lane to pass those waiting at the entrance (a queue of over 600'). Likewise, the westbound left-turn queue extends over 500' to the east near the crest of the hill. This creates a dangerous situation for westbound through vehicles cresting the hill into a stopped queue. Parents were also observed traveling on the wrong side of the road and entering the school via the exit, conflicting with exiting vehicles.

Eastbound and Westbound Queues on Independence Street

Wrong Direction Movements

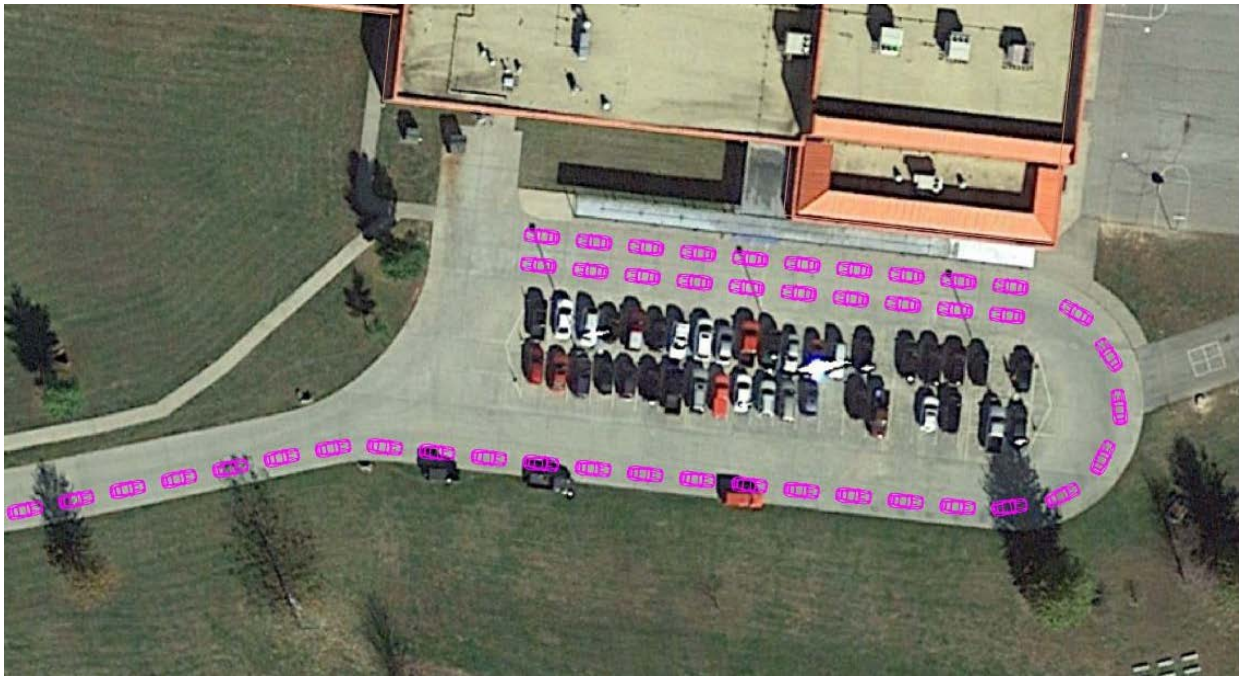
Students Crossing Independence Street

With such limited on-site circulation at the school, some parents choose to wait for their child by parking in the neighborhoods on the north side of Independence. In this case, children cross the busy highway with no assistance of marked crosswalk or signal.

The buses arrive and depart in groups of 6-7 buses at a time, requiring approximately 300-350' of queuing space, while observations on Independence Street show the parents require approximately 1,000-1,100' of queuing space. Analysis shows that buses would be able to turn from Independence Street and circulate through the school site, and have approximately 300' to queue and load buses with students. Meanwhile, the existing bus loop has approximately 1,000' of queuing space available. Therefore, barring physical improvements to the school property and access to Independence Street, it is recommended that the two pick up areas be swapped so that buses use the Independence Street entrance and parents/guardians use the Broadridge entrance. This would have an added benefit of no longer having parents park in the neighborhoods north of Independence Street, eliminating the need for children to cross a state highway without traffic control.

It should be noted that the existing loop is wide enough to accommodate bus storage. Hence, this lot could be restriped to accommodate two rows of cars, potentially making student pick-up more efficient. For example, parents enter and queue ten cars per lane in the two lanes. Once those twenty cars are full, they leave one lane at a time and the next twenty cars file in. A numbering system could be used, where each guardian/child is assigned a number that would be displayed on the passenger-side of the vehicle. Since vehicles would be in a single-file queue, the order in which children will be picked up could be known in advance because of the numbering system, and children can expediently be ushered to the waiting cars once those cars enter the two-lane pick up area.

Figure 13: Example Student Pick-up



As noted, the buses travel in groups of 6-7 between schools. If the above recommendation is implemented, it may be beneficial for the Independence Street entrance to operate under police direction during school dismissal to ensure that the buses can all exit the site concurrently and proceed to the next school. The police presence could also assist children across Independence Street if needed. Similarly if the pick-up areas are swapped, traffic counts and a traffic signal warrant study at Broadridge Drive and Independence Street should be prepared to determine if a signal would be needed to accommodate the additional volume of parents entering and exiting via Broadridge Drive.

If the pick-up areas cannot be swapped, other minor improvements should be considered:

- Construct an eastbound right turn bay into the school.
- Reconfigure the school site to accommodate more room for parent pick up at dismissal time.
- Change school policy, such as a requirement that children walk to school if they live within a certain radius of the school.
    - A Safe Routes to School (SRTS) plan could provide a longer term prospect to have more children walk to school.
    - This option may feasible once a more connected sidewalk network is constructed.
- Construct major road network improvements or consider inter-parcel connections to create a grid road network in this area, allowing more options for dispersal of vehicles.
    - Extend Nell Green Street to connect to Broadridge Drive as a new east-west connector.
    - Connect a roadway between Orchard Drive Elementary and Jackson Middle School to create a new north-south connector.

A renovation is planned for the school that includes a new bus loop on the west side of the school. In this case, the current bus loop can be reconfigured to accommodate passenger cars. A new connection would be made between Independence Street and the bus loop. If this connection is made, it needs to

accommodate 1,000-1,100' of queued parents, otherwise the school will still impact Independence Street. Once buses are in the new area, consideration should be given to having all parents access the current bus loop from Broadridge Drive, and providing a separate entrance to the new bus loop for buses only. This would eliminate impacts to Independence Street.

4.7. Orchard Drive Elementary School

There are limited opportunities for minor traffic flow improvements surrounding Orchard Drive Elementary School. One recommendation is to temporarily block Orchard Drive between Willow Bend Drive and Springview Drive during student pick-up after dismissal on a daily basis. This creates an orderly one-way network where parents must enter the school site via Springview Drive. The blockade could be removed in order to accommodate bus access to the school, or have only eastbound Orchard Drive blocked so buses could still exit to Broadridge Drive.

Other improvements are more major in scope, such as creating more access opportunities and grid network between the middle school and elementary school, as described in the previous section.

4.8. Jackson Boulevard & Donna Drive

The improvements recommended in the 2003 Plan have been made to the intersection, which included restriping the northbound and southbound approaches to have two lanes on each approach, separating the left turns from the through and right turning movements. MoDOT has plans in the next couple of years to construct an eastbound right-turn bay at this intersection. This improvement should help reduce delays on the westbound approach as well as rear end crashes. Signal phasing and timings should also be reviewed at the time of any geometric improvements to determine if efficiencies could be made by adjustments to the signal phasing or timing.

Example of Dynamic Signal Warning Flashers

Another recommendation for this intersection is to consider installation of Dynamic Signal Warning Flashers (see example in photo). These systems are linked to the downstream signal, and activated to alert drivers of the need to stop as the signal turns yellow and red. It helps drivers approaching the signal with their decision whether or not to stop while in the dilemma zone. This system is already in use at another location in Jackson (South Elementary School on Hope Street), and may be useful at other intersections along Jackson Boulevard, such as at Old Orchard Road. Studies show that this low cost ($10,000-$15,000) solution could result in a 19% reduction in number of crashes at an intersection. Particular care should be placed as to where they are installed, so drivers do not rely on or get complacent upon seeing them.

4.9. US 61 & Deerwood Drive

The intersection of US 61 and Deerwood Drive is a two-way stop control with stop signs on both EB and WB (Deerwood Drive) approaches. Deerwood Drive is a collector road that serves motorists from the residential areas east and west of US 61. Both northbound and southbound approaches operate at LOS A during the morning peak period since they are free-flowing. However, as shown in **Table 8**, both eastbound and westbound approaches experience unacceptable delays commensurate with LOS F. It is likely that the calculated delay is worse than that actually experienced during the morning peak hour, but it is indicative that improvements are needed at this intersection. The afternoon peak hour appears to operate acceptably at this time.

To mitigate the unacceptable morning operating conditions, the feasibility of signalization was considered. A preliminary signal warrant analysis was performed that showed the intersection has borderline conditions related to whether a signal is a proper treatment. If Deerwood Drive is extended west or additional development occurs along Deerwood, it is likely volumes would increase to a point where the intersection would warrant a signal.

Until that time, an intermediate improvement could be to restripe the eastbound and westbound approaches to have three lanes (a left turn bay, a shared through-right lane, and a receiving lane) instead of two (one shared left-through-right lane and one receiving lane). This does not entirely mitigate the delay experienced by drivers on the minor street approaches, but it would provide an improvement over existing conditions. Truck turning movements from US 61 onto Deerwood Drive should be verified before restriping is performed. With the higher potential for truck movements at this intersection, minor widening on the side street approaches may be needed to accommodate heavy vehicle turning movements.

A full traffic signal warrant study should be prepared for this intersection to estimate when a traffic signal may be warranted. If it is determined a signal is not warranted for several years, consideration should be given to constructing a high-visibility crosswalk and Pedestrian Hybrid Beacon, also known as a HAWK (High intensity Activated crossWalK) at or near this intersection to assist pedestrians with a safe crossing across US 61, so citizens on the west side of US 61 can access public amenities such trails and the new community center. A Pedestrian Hybrid Beacon is a newer technology gaining popularity in recent years that is a beacon that remains dark until it is activated by a pedestrian waiting to cross a street. The beacon can be used at intersections, though it is recommended more as a mid-block treatment. Once activated, the signal flashes yellow to warn drivers that the signal is about to turn red. After a solid yellow clearance and all-red time (typical of traffic signals), pedestrians receive a walk symbol. After a period of time, the signal faces begin to flash red, and if the pedestrian has cleared the crossing, vehicular traffic can begin to move again. Once the pedestrian flash don't walk time has expired, the beacon goes dark again until activated by another pedestrian. This solution assists pedestrians across the street, but provides no relief from delay experienced by minor street vehicular traffic. Sidewalks should be constructed on the south side of Deerwood Drive across US 61, connecting the pedestrian facilities built with the multi-family residential dwellings in the west and the community center in the east. Due to the high speed and high volume on US 61, any crosswalk at this location should be accompanied by a signal or beacon.

4.10. S Georgia & E Adams Streets

Sightlines for westbound vehicles on E. Adams Street approaching S. Georgia Street are difficult due to a an incline on the approach, on-street parking on the east side of Georgia Street north of Adams Street, and existing foliage on private property on the northeast corner of the intersection. Though no stop bar is striped, a stop sign is installed on a power pole for westbound traffic approximately 20-25 feet from the east curb line of Georgia Street. The sign cannot be posted closer to the intersection without being in the pavement or obstructed by the power pole.

East Approach of S Georgia & E Adams

To improve sightlines, it is recommended that curb extensions be constructed on the northeast corner of the intersection. Extending into Georgia Street does not impede northbound through traffic since the south leg is narrower than the north leg. This would allow approaching vehicles to pull further up the slope as they wait for a gap in traffic, thereby removing obstructions such as on-street parking or the foliage on the corner from their sightlines, and it would place the stop bar at a more appropriate 13-15 feet from the east curbline. A stop bar should be striped to show the appropriate place to stop on the westbound approach.

Extending the curb towards Georgia would not resolve the utility pole's obstruction of the stop sign for westbound vehicles. Hence, a small curb extension into Adams Street is also recommended, which would allow the stop sign to be relocated to the south of the power pole where it would be visible to oncoming traffic. This has a secondary benefit of creating a larger clear zone between moving vehicles and the two power poles on the northeast corner. These curb extensions are shown in **Figure 14**.

Lastly, sidewalks exist on the west leg of the intersection, but are not ADA accessible. Additional sidewalks should be constructed where feasible, and all crossings should be improved to meet ADA requirements.

Figure 14: Recommended Improvements - S Georgia St and E Adams St

4.11. US 61 & Mary Street

Mary Street has gained popularity as a through-route since Washington Street has been closed between US 61 and Court Street. Accompanying the additional traffic on Mary Street is an increase in crashes at its intersection with US 61. North of the intersection, US 61 has a 35 mph speed limit, and south of the intersection it is 30 mph. A speed study should be performed for this section of US 61 to determine the proper location for a speed reduction to account for its transition into Uptown Jackson and the hill located to the north of this intersection. A reduction in speed should reduce the number and severity of crashes at this intersection.

In the event the speed is determined to be proper as it currently exists, alternative safety measures should be considered, such as overhead warning lights at the intersection, or an Intersection Conflict Warning Signal (ICWS). An ICWS is an Intelligent Transportation System (ITS) technology that uses vehicular detection on the minor street to activate a flashing warning sign on the mainline to indicate to drivers that vehicles are approaching or waiting on the side street. These are typically used in rural areas, but can also be appropriate in urban conditions such as this where sightlines are potentially hindered by topography or crashes are occurring due to speeding on the mainline or gap acceptance problems by drivers on the minor street. They are a low-cost solution that aims to reduce right-angle and rear-end crashes.

Example ICWS

A longer term solution to operations at this intersection is to realign the east leg of the intersection to the north and remove the east-west offset that exists at the intersection. The offset causes left-turn movements from US 61 to overlap, which can cause gridlock in high volume traffic situations. Removing the offset fixes this situation and results in smoother operations at the intersection.

The offset is also problematic for pedestrians trying to cross US 61, as pedestrians crossing on the north or south sides of the intersection may be too far away to be seen by those turning from the minor street, resulting in a conflict. Realignment of the east leg of the intersection would resolve this issue as well. Whether or not realignment is possible at this intersection, ramps on all four corners of the intersection should be improved to meet ADA requirements.

4.12. Circulation in City Park (Closure of Cascade Drive at US 61)

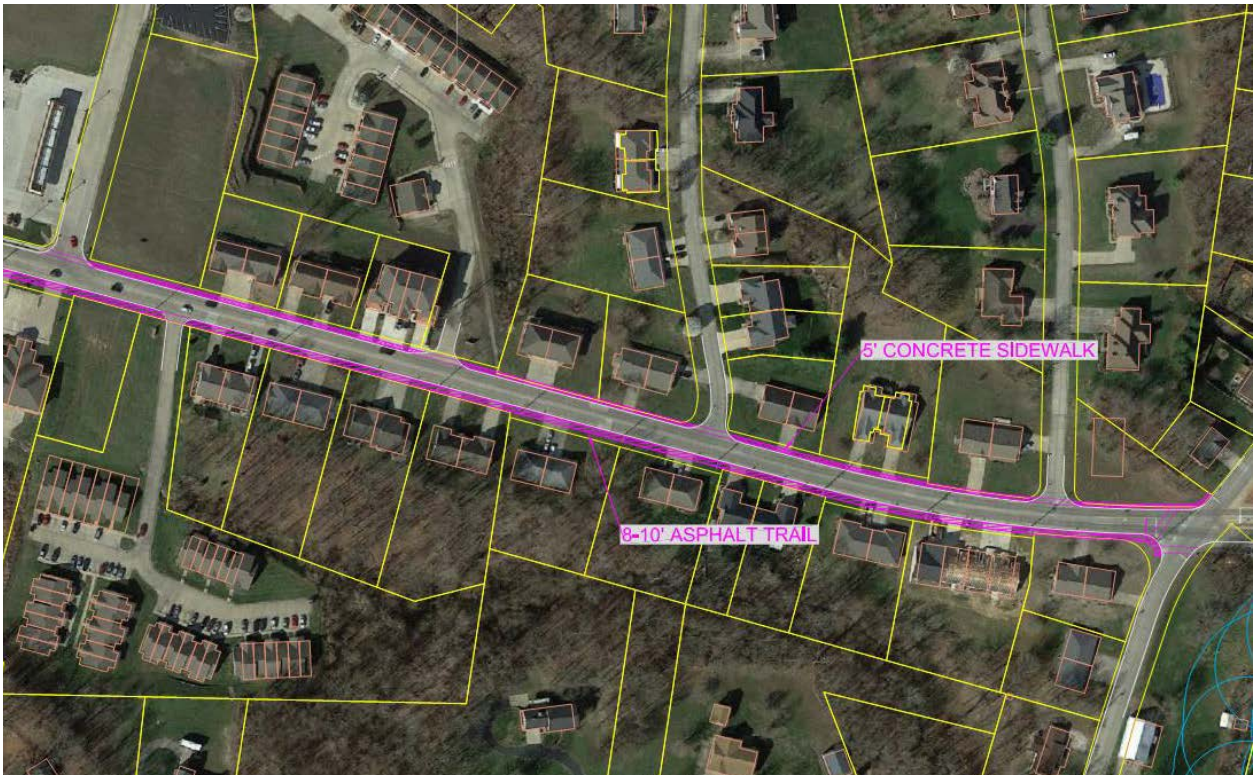
There are concerns regarding safety at the intersection of Cascade Drive at US 61, which is one of the entrances to City Park. The safety concerns involve speeding, lack of sidewalk connections to the pedestrian bridge connection to the rest of the park, and sightline concerns due to the retaining wall. Closing Cascade Drive at US 61 would reduce cut-through traffic using Russell Street, reduce speeding through the park, and provide a safer environment for non-motorized traffic traveling through the park. Patrons to the park would enter the site via Missouri Street and Russell Street, directly or via Park Street instead of US 61, and would likely need more wayfinding signage from US 61 to direct the community to the new route. This closure would have a negligible impact on circulation through the park and neighborhoods.

4.13. E Main Street from Traveler's Way to Oak Hill Road

Though E. Main Street is considered an arterial road, it has direct access to residential driveways along the section from Traveler's Way to Oak Hill Road. Although there is a sidewalk along E. Main Street between Lacey Street and Traveler's Way, no pedestrian accommodations exist on either side of the road between Traveler's Way and Oak Hill Road. The proposed trail network in the 2014 Parks Plan shows a trail is desirable along this corridor. Pedestrian facilities should be provided along this segment on both sides corridor to provide pedestrian access between destinations such as East Elementary School and commercial at the intersection of E. Main Street and Lacey Street, and the residential neighborhoods to the east.

The available right-of-way along this section of E. Main Street appears to be between 50’ and 57’, and the existing roadway cross-section is approximately 34-36’. The typical space available allows for a 5’ concrete sidewalk with a 2’ separation from the street on the north side, and an 10’ asphalt trail on the south side. An 8’ trail could accommodate a minimum 2’ separation from the road, whereas a 10’ trail would be adjacent the curb and gutter. A 10’ trail with separation between the sidewalk and street should be accommodated where feasible. It’s estimated approximately five properties would be affected by a sidewalk or trail as described, but this should be verified based on survey data and concept design. If an alternative trail alignment is selected nearby, the asphalt trail on the south side should be changed to a 5’ concrete sidewalk.

Figure 15: Recommended Improvements - E Main St between Traveler's Way & Oak Hill Road



4.14. Right-of-Way Procurement

The cost of right-of-way procurement is a constantly evolving measure. The values below are valid at the time of this report, but due to the significant number of variables involved, it should be checked on all projects. The information below was prepared by a certified appraiser, and is provided in order to get an order of magnitude estimate for market value of commercial and residential land within the City limits. Market value is briefly defined as that price which a willing buyer would pay in terms of cash, and a willing seller would accept, when the buyer is not compelled to buy and the seller is not compelled to sell. Both current listings of commercial and residential properties and land that has recently sold within the city limits were researched in order to determine the values presented below. Data sources that were used to complete this task include Loopnet, multiple listing service, and local realtors. The conclusions of this research are presented in terms of unit value or price per square foot.

Current listings of commercial land for sale within the Jackson city limits range from $4.00 per square foot to $17.29 per square foot. It is worthy to note that properties typically sell for less than the listing price. Commercial land that has sold within the city limits range from $4.31 per square foot to $11.51 per square foot. Many factors influence the market value of commercial properties, such as location, zoning, density, highest and best use to name a few. Commercial properties located in high density areas where vacant land is scarce tend to sell on the higher side of the range. Likewise, commercial properties located in less dense areas where vacant land is available tend to be on the lower side of the range.

Current listings of residential land for sale within the city limits of Jackson range from $0.50 per square foot to $2.00 per square foot. Again, properties typically sell for less than the listing price. Residential land that has sold within the city limits range from $0.75 per square foot to $1.82 per square foot. Residential land located in a subdivision tends to sell on the higher side of the range. Subdivisions tend to offer amenities such as lighting, sidewalks and access to utilities. Likewise, residential land that is not located in a subdivision would tend to sell on the lower side of the range.

5. Long-Range Traffic Forecasting

5.1. Forecasted Trip Generationp

The SEMPO Sustained Growth Plan was used as a probable future land use scenario on which to base traffic projections for the purposes of determining future constraints in the City's transportation system. The first step in predicting future constraints was to forecast the predicted number of trips generated by each of the identified growth areas. The trip generation for potential growth areas was forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, Ninth Edition.

The SEMPO Sustainable Growth Potential Plan predicts possible growth under three different land uses: low-density residential, commercial and light industrial. The growth areas containing each of these land uses is provided in **Figure 16.**

5.1.1. Residential

There are six areas identified as potential growth zones for low-density residential development with a total of 768 acres. Land Use Code 210 – Single Family Detached Housing was used for generating trips per Dwelling Unit (DU). It was assumed that these zones would contain all single-family detached homes on individual lots, like that in a suburban subdivision.

A National Association of Home Builders Study was used to calculate the number of dwelling units. According to the study, an average single-family-only subdivision has median gross density of 2.1 units per acre. Based on this relationship, it is assumed that the residential zones, in total, will have approximately 366 DUs in total. The calculations take into consideration open spaces and streets as well as the actual residential lots. The ITE average rate of 9.52 trips per DU per weekday was used to calculate the number of trips generated per day. **Table 13** provides the total predicted trips for each of the residential zones.

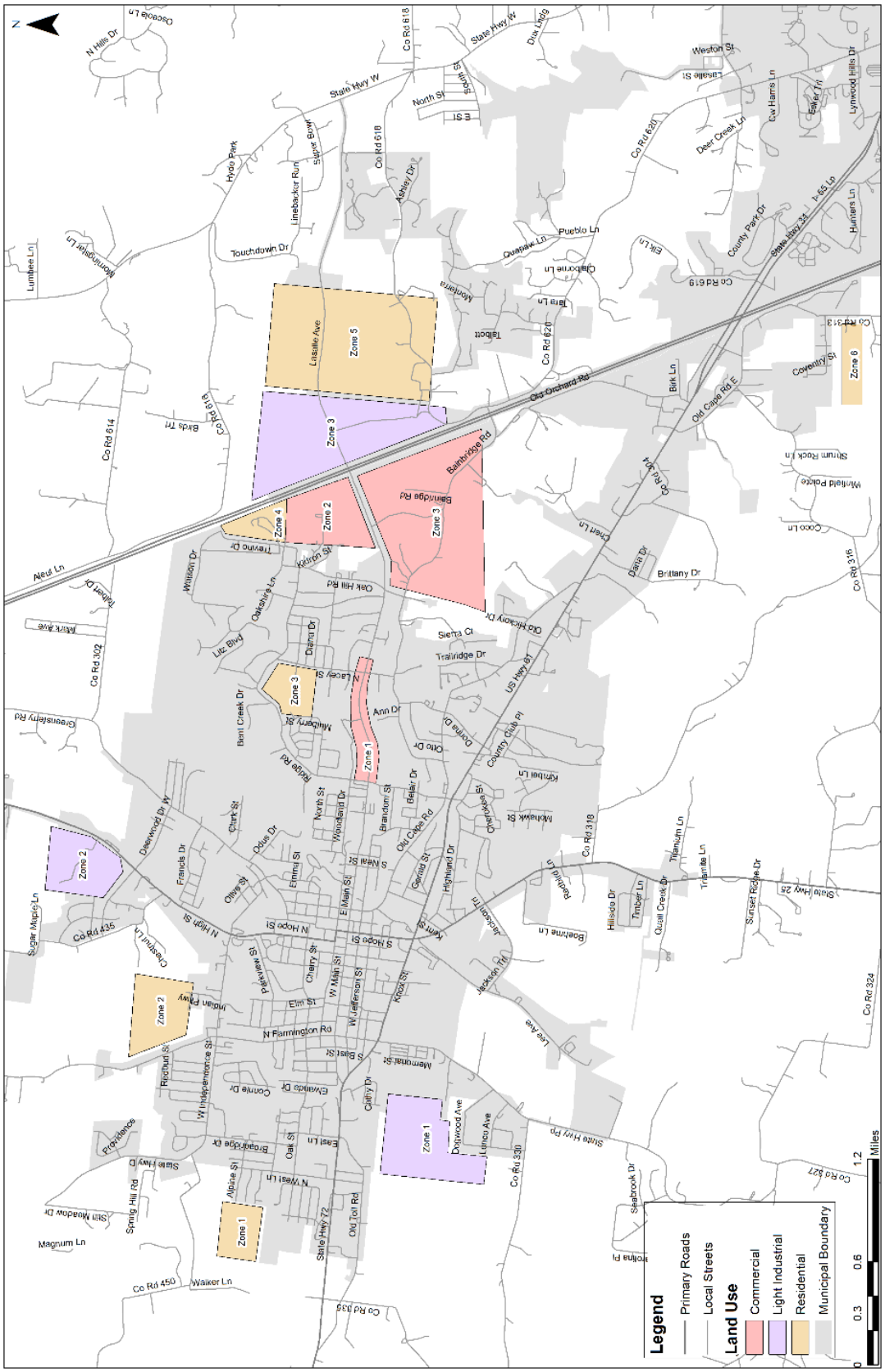
Table 13: Trip Generation for Residential Growth Zones

Residential - Single Family Subdivision					
Residential Zone	Units/Acre	Total Acres	Total Units	Trips Gen/Unit	Total Trips
1	2.1	119	56.67	9.52	539
2	2.1	169	80.48	9.52	766
3	2.1	44	20.95	9.52	199
4	2.1	27	12.86	9.52	122
5	2.1	364	173.33	9.52	1,650
6	2.1	45	21.43	9.52	204

5.1.2. Light Industrial

According to the growth map, there are three potential zones for light industrial development. Light industrial facilities are free-standing facilities devoted to a single use. Typical light industrial facilities include printing, material testing, and data processing equipment. To calculate the number of trips generated, the average rate of weekday trips from the ITE Trip Generation Manual for the Land Use Code 110 (Light Industrial) was used. The average rate of trips generated per weekday per acre is 51.8.

Figure 16: Southeast Metropolitan Planning Organization Sustainable Growth Potential Zones



Since the trips/acre rate only applies to the total built area, an analysis of building area to total land area for industrial parks was performed based on general zoning codes in Missouri for light industrial. Most the municipal zoning regulations require a minimum open space of 15-20% for all types of industrial developments, therefore 20% of the land was dedicated for open areas and green spaces. Industrial developments also require extensive transportation infrastructure, generally requiring large roadways with generous intersection sizes. Thus 40% of the area was dedicated for transportation purposes and parking. The remaining 40% of the land was considered to be the built area, and was used to calculate the number of trips generated per day. **Table 14** provides the total predicted trips for each of the residential zones.

Table 14: Trip Generation for Light Industrial Potential Growth Zones

Light Industrial							
Industrial Zone	Total Acres	Open Space (%)	Road Network (%)	Industrial Built Area (%)	Industrial Built Area (Acres)	Trips/ Acre	Trips Generated
1	307	20	40	40	122.8	51.8	6,361
2	136	20	40	40	54.4	51.8	2,818
3	261	20	40	40	104.4	51.8	5,408

5.1.3. Commercial

The SEMPO growth map shows three development zones for commercial. These zones are assumed to have a mix of general office spaces, shopping centers (which contains a mix of restaurant and retail space) and small specialty retail centers. Based on existing commercial developments in and around the study area, it was assumed that 35% of area would be developed as open and green spaces and 55% as road network and parking lots. The remaining 10% was used to calculate trips generated per day.

It was anticipated that the commercial developments would have office spaces, shopping centers, movie theaters, restaurants and small strip malls. The three land uses that align most closely with the expected development are ITE land use codes 710, 820 and 826. Land Use Code 710 (General Office Building), which could contain a mixture of tenants including professional services, insurance companies, investment brokers, banks, cafeterias, etc. Land Use Code 820 (Shopping Center) is a mix of commercial establishments, developed, owned and managed as a unit. Shopping Centers may or may not contain office buildings, movie theaters, restaurants, health clubs and other recreational facilities. Land Use Code 826 (Specialty Retail Center) are generally small strip shopping centers containing variety of retail shops specializing in quality apparel, hard goods, and services like real estate offices, dance studios, etc.

Zone 1 was assumed to have 20% General Office land use development and 80 percent Specialty Retail development. Alternatively, both Zones 2 and 3 were assumed to have 20% General Office and 80% Shopping Center type development. For all the three land uses the rate used to calculate total trips generated was average vehicle trips generated per 1,000 sq. ft. per weekday.

Since there would be two different land uses within each development zone, retail and office spaces, the trips generated would also include common trips from office to retail and from retail to office. Average rates from ITE Trip Generation Handbook, Ninth Edition were used to estimate these shared internal trips within the site due to synergy between the land uses. According to the manual, in an office-retail mixed development, 24% trips are internal personal trips from office to retail and 17.5% are from retail to office. Thus, an average of the two, 20.75% was reduced from the trips generated to have a more accurate

forecast. The anticipated trip generation for Commercial Zones 1 through 3 are provided in **Table 15**, **Table 16**, and **Table 17**, respectively

Table 15: Trip Generation for Potential Commercial Growth Zone - 1

Commercial Zone 1 - 55 Acres (239,580 sq. ft.)					
Type of Development	Trips/1,000 sq. ft.	Percentage dis.	Total Area	Trips Generated	Total Trips
General Office	11.3	20%	47,916	541	429
Shopping Center	42.7	0%	0	0	0
Specialty Retail Center	44.32	80%	191,664	8,495	6,732
Total Trips					**7,161**

Table 16: Trip Generation for Potential Commercial Growth Zone - 2

Commercial Zone 2 - 71 Acres (309276 sq. ft.)					
Type of Development	Trips/1000 sq. ft.	Percentage dis.	Total Area	Trips Generated	Total Trips
General Office	11.3	20%	61,855	700	554
Shopping Center	42.7	80%	247,420	0	0
Specialty Retail Center	44.32	0%	0	10,565	8373
Total Trips					**8927**

Table 17: Trip Generation for Potential Commercial Growth Zone - 3

Commercial Zone 3 - 366 Acres (1594296 sq. ft.)					
Type of Development	Trips/1000 sq. ft.	Percentage dis.	Total Area	Trips Generated	Total Trips
General Office	11.3	20%	318,859	3603	2855
Shopping Center	42.7	80%	1,275,436	54,461	43160
Specialty Retail Center	44.32	0%	0	0	0
Total Trips					**46015**

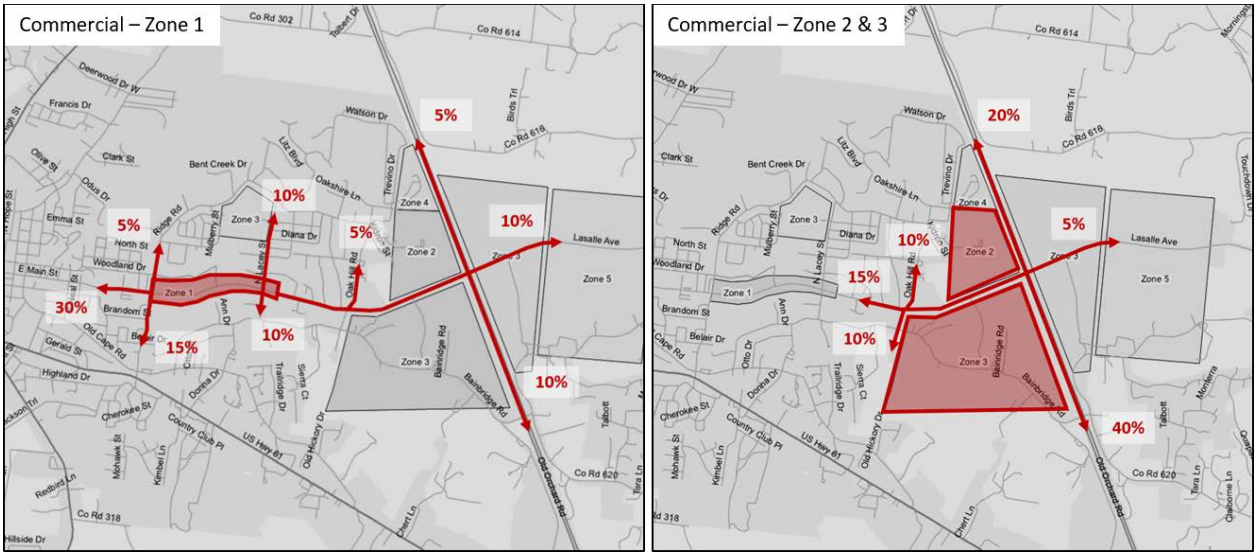
5.2. Directional Distribution

Based on the travel patterns analyzed in the Existing Conditions & Issues memorandum, as well as the existing traffic volumes, the forecasted trips from the trip generation step were distributed through the existing road network. The distribution of trips from all of the growth areas are illustrated in **Figure 17** below. The directional flow is evenly split on local roads but higher emphasis is given to major roadways such as I-55, Jackson Boulevard, Main Street, and High Street.

For Residential Zones 3 and 4, Industrial Zone 3, and Commercial Zones 2 and 3, most of the trips are anticipated to either travel south on I-55 towards Cape Girardeau or north on I-55 due to their close proximity to the interstate and would not produce a high proportion of trips on Jackson's city streets.

Figure 17: Directional Distributions of Traffic by Development Zone

Figure 17: Directional Distributions of Traffic by Development Zone (Continued)



5.3. Forecasted Traffic Volumes

Based on the directional distributions outlined in the previous section, existing traffic volumes were updated by layering on the projected increases in traffic volumes. It was observed that Main Street and Shawnee Boulevard would experience the largest impact from anticipated growth pattern, followed by Independence Street and High Street. **Figure 18** shows the existing and forecasted traffic volumes at 11 locations around the City side-by-side for comparison. Additionally, **Figure 19** shows the existing and projected traffic volumes geographically around the City.

Figure 18: Forecasted traffic volumes

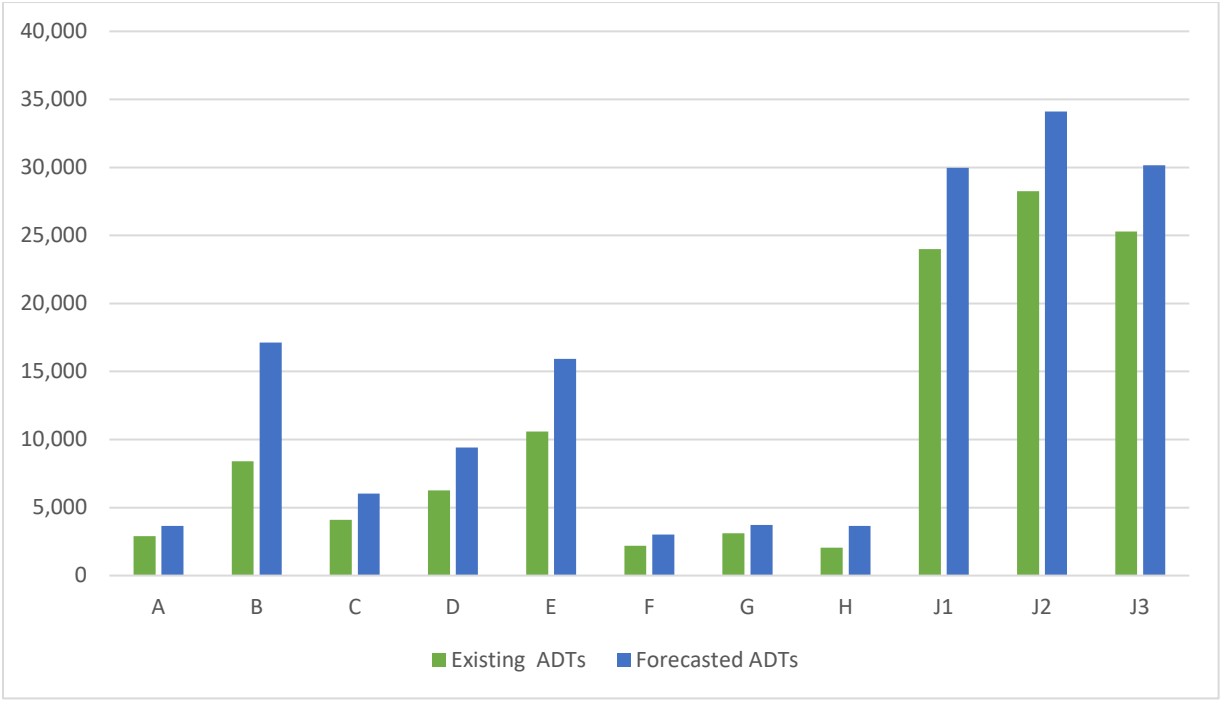
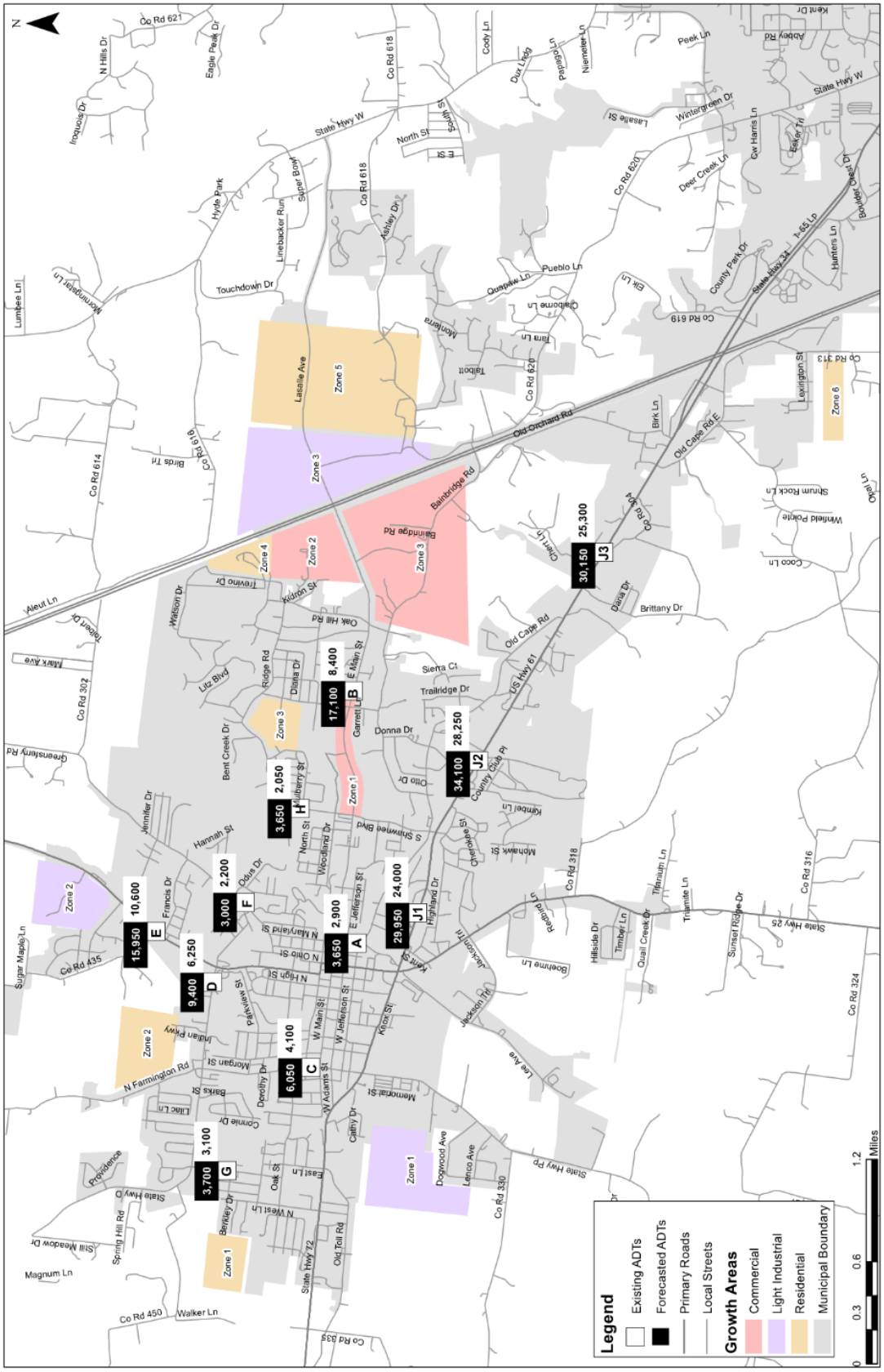


Figure 19: Existing and Forecasted Traffic Volumes



5.4. Forecasted Capacity Analysis

Levels of Service (LOS) were calculated based on existing as well as forecasted ADTs to identify future congestion issues and to understand traffic needs for future developments. Methodology for estimating future LOS on roadways was taken from a tool developed by the Florida Department of Transportation, which uses a roadway's speed, number of lanes, median type, roadway classification and traffic volumes to estimate a planning-level LOS. These estimates are provided in **Table 18**, as well as graphically in **Figure 20** and **Figure 21**.

Table 18: Exiting and Forecasted Levels of Service (LOS)

Location	Speed	Lanes/Median	Existing ADTs	LOS	Forecasted ADTs	LOS
A	30	2/Undivided	2,900	A	3,650	A
B	35	2/Undivided	8,400	C	17,100	E
C	25	2/Undivided	4,100	B	6,050	B
D	40	2/Undivided	6,250	A	9,400	B
E	45	2/Undivided	10,600	B	15,950	B
F	35	2/Undivided	2,200	A	3,000	A
G	25	2/Undivided	3,100	A	3,700	A
H	30	2/Undivided	2,050	A	3,650	A
J1	40	4/Undivided	24,000	B	29,950	B
J2	40	4/Undivided	28,250	B	34,100	C
J3	55	4/Undivided	25,300	B	30,150	B

The two most drastic changes observed were on Main Street and Jackson Boulevard. If the expected growth occurs as estimated, the LOS of Main would change from a LOS C to a LOS E and Jackson Boulevard would change from a LOS B to a LOS C. Since these roadways are expected to see degradation in their traffic operations, providing alternate routes to these facilities in the Major Street Plan will be a main priority.

While these forecasts represent the segment levels of service on the major roadways in Jackson, there may be additional intersection constraints that occur in the future that would also cause bottlenecks in the City's transportation system. Several problem intersections, with either congestion, geometric, or safety issues, were identified in the Existing Conditions & Issues memorandum. These intersections will also be a target when developing the Major Street Plan to either directly or indirectly, by routing of traffic away from problem intersections, improve operations at these locations.

Figure 20: Existing Levels of Service

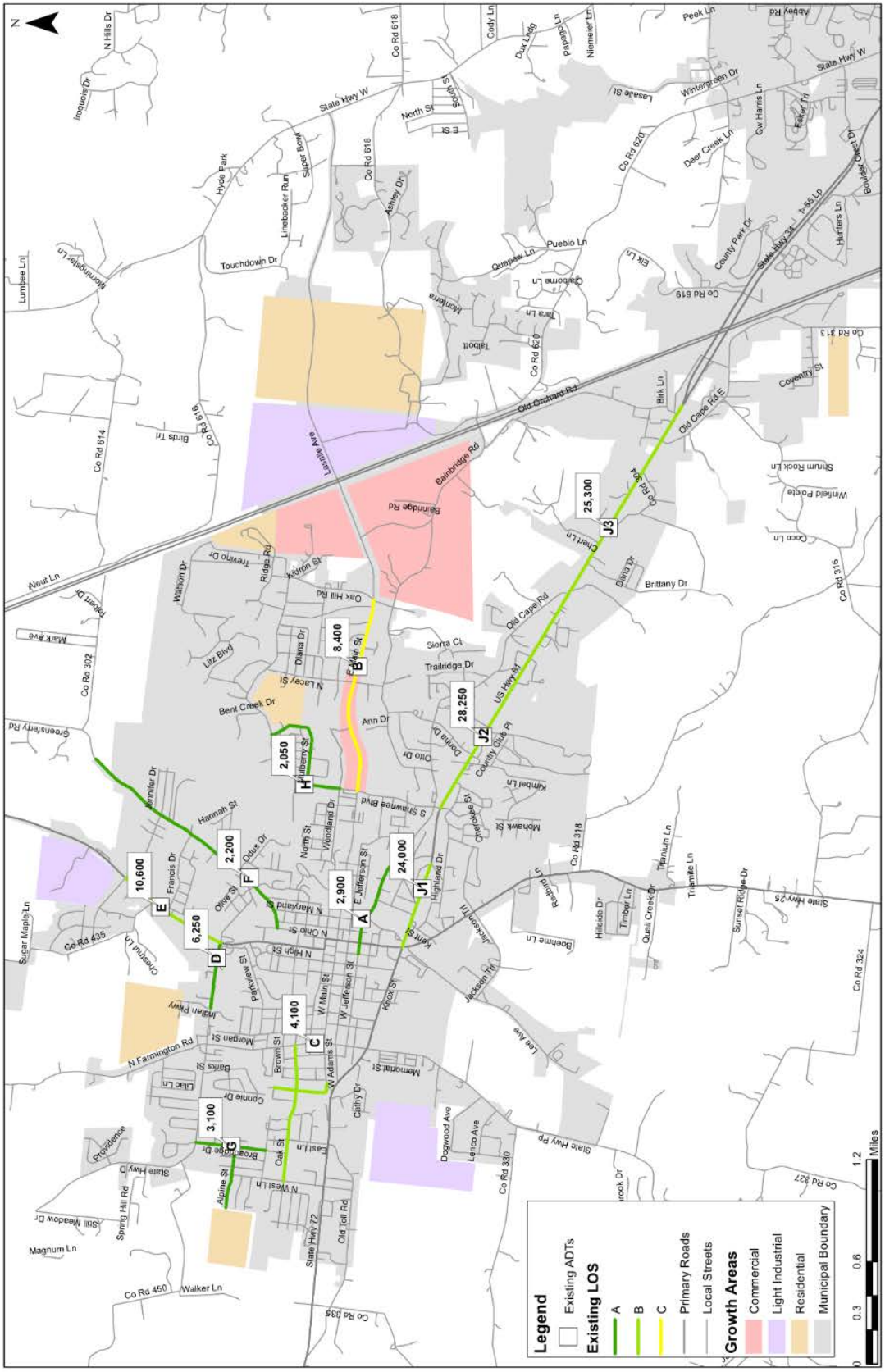
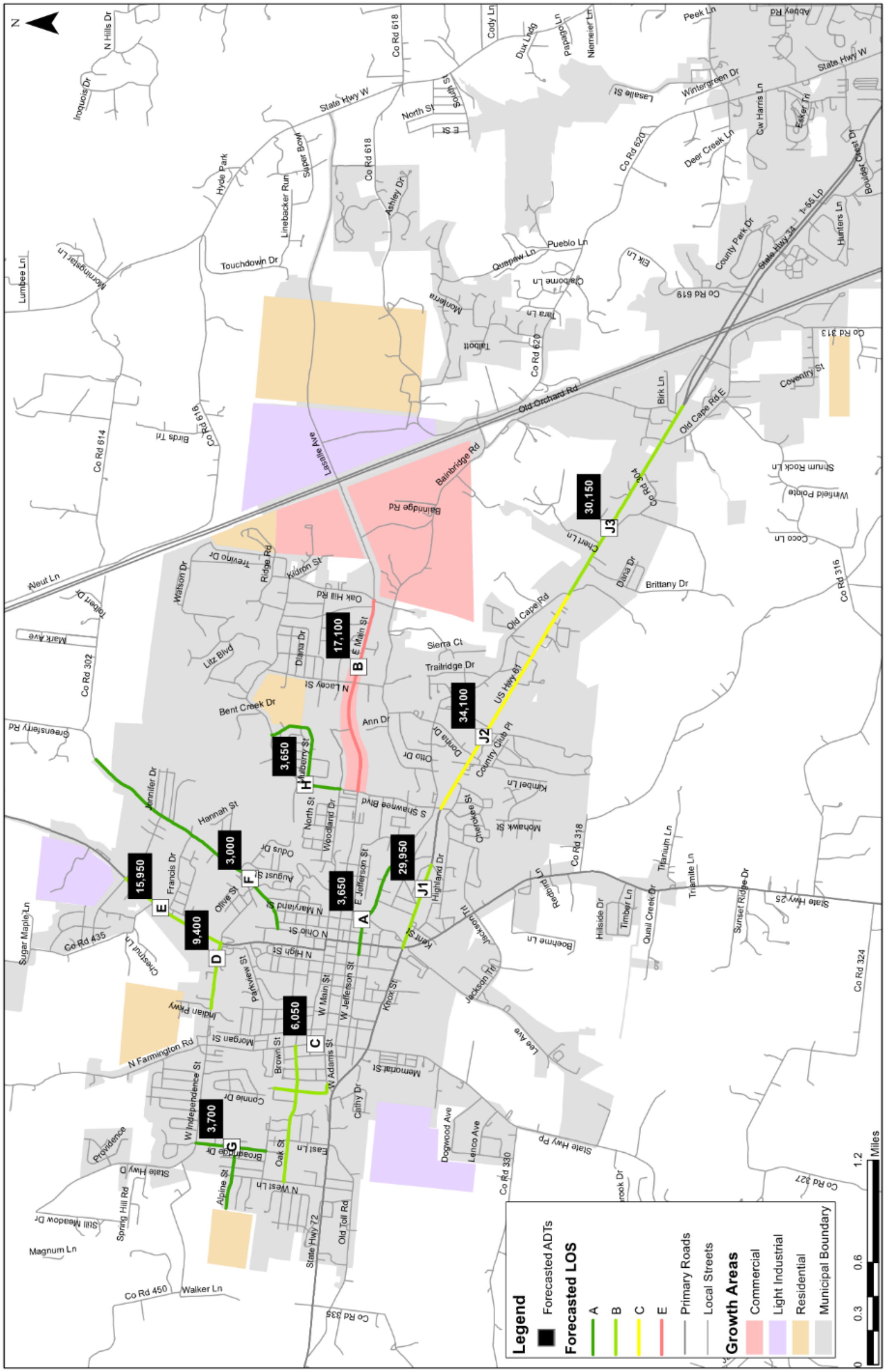


Figure 21: Forecasted Levels of Service



6. Major Street Plan

The Major Street Plan will provide Jackson with a roadmap for future roadway development to provide a connected and efficient transportation system. There are a number of goals the proposed roadways are attempting to achieve, including:

- Providing circumferential connectivity around central Jackson via a new system or arterial roadways to relieve existing and projected traffic in Uptown;
- Extend existing collector roadways to logical endpoints to provide better connectivity through the City and adjacent areas;
- Provide access to areas that are likely to see new development within the next 20 to 25 years;
- Removal of redundant collectors or collectors from the map that do not provide appropriate connectivity to allow for traffic calming and other improvements to improve bicycle and pedestrian infrastructure;
- Address existing traffic and environmental constraints and barriers to provide more direct travel paths through the City; and
- Provide an appropriate scale of planned roadways that are more in line with growth areas in the City's comprehensive plan and growth areas identified by SEMPO.

While the newly planned roadways are an update of the 2014 Major Streets Plan map, they were drawn independently to help avoid the continuation of legacy routes that do not provide value to the City over the next 20 to 25 years. By drawing the roadways independently, intuitive and appropriate roadways from the previous plan can be confirmed if a newly planned roadway approximately follows the same alignment. Conversely, unintuitive or unnecessary connections can be weeded out if no new alignment follows a similar route. The resulting proposed Major Street Plan map is provided in **Figure 22** on the following page.

The following sections provide guidelines for the construction of arterials and collectors, as well as the rationale for each of the proposed roadways on the Major Streets Plan map in more detail. Justification is also provided for the existing collectors that are recommended to be downgraded to local roadways and which routes have been modified or removed from the 2014 Major Streets Plan map.

6.1. What is an Arterial?

Arterial roadways are major, regional facilities that provide efficient and direct connections between different areas of a city or region. Arterials generally do not provide much access to adjacent parcels and land uses as they are designed to provide high speed travel with few interruptions in traffic flow. Access management should be strongly implemented along new arterials and access to adjacent land uses should be primarily via side streets. It is recommended that more detailed corridor studies are performed for proposed arterials to determine more specific alignments so that corridor preservation efforts can be implemented to ensure that these corridors can will have direct alignments and appropriate access point locations.

Figure 22: Proposed Major Street Plan

2018 Jackson Major Street Plan

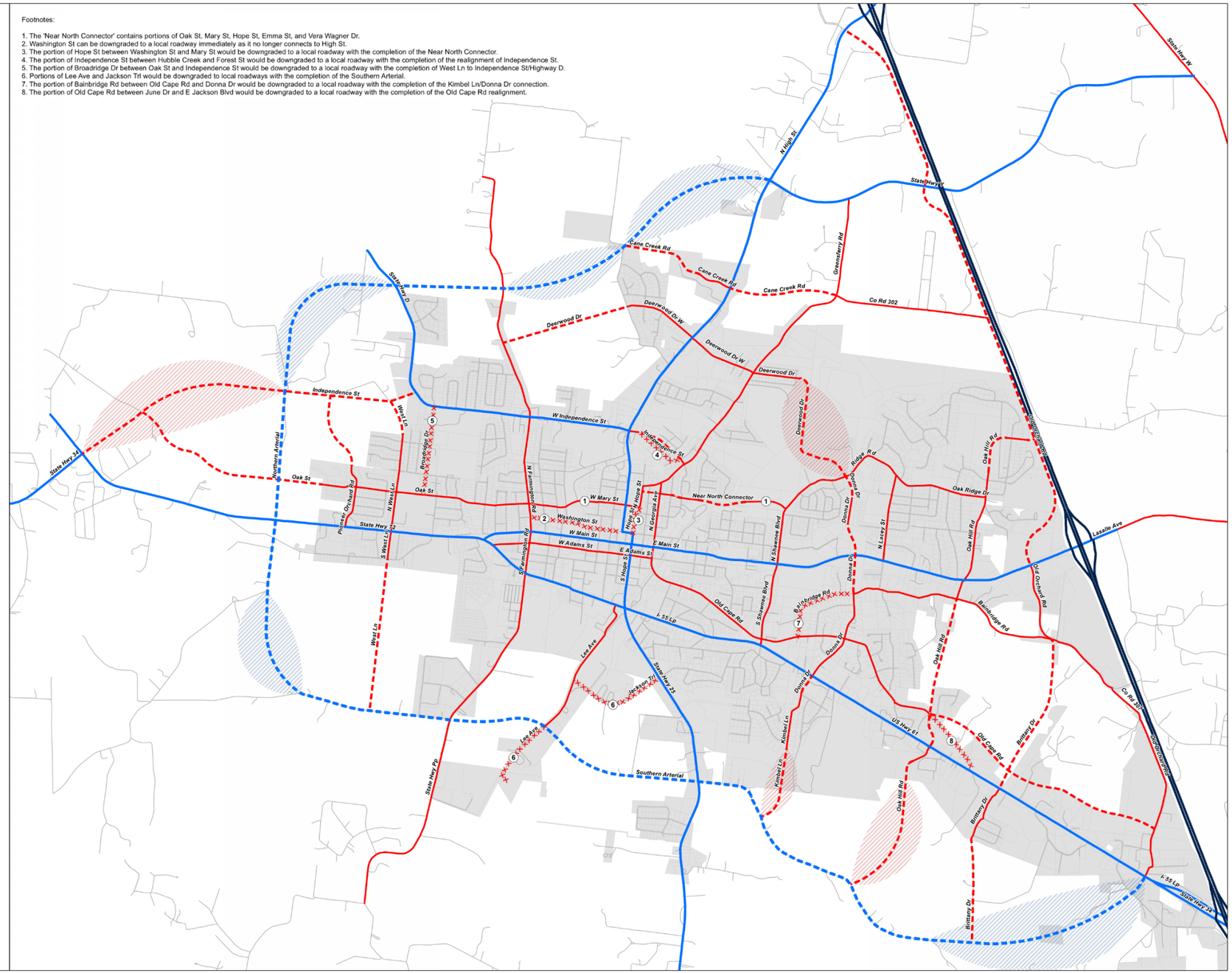
Proposed Roadways
- Proposed Arterial
- Proposed Collector
- Downgrade to Local Roadway

Potential Corridor Alignments
- Potential Arterial Alignment
- Potential Collector Alignment

Existing Roadways
- Arterial
- Collector
- Local
- Interstate 55
- Parcels
- City Boundary

Footnotes:

1. The 'Near North Connector' contains portions of Oak St, Mary St, Hope St, Emma St, and Vera Wagner Dr.
2. Washington St can be downgraded to a local roadway immediately as it no longer connects to High St.
3. The portion of Hope St between Washington St and Mary St would be downgraded to a local roadway with the completion of the Near North Connector.
4. The portion of Independence St between Hubble Creek and Forest St would be downgraded to a local roadway with the completion of the realignment of Independence St.
5. The portion of Broadridge Dr between Oak St and Independence St would be downgraded to a local roadway with the completion of West Ln to Independence St/Highway D.
6. Portions of Lee Ave and Jackson Trl would be downgraded to local roadways with the completion of the Southern Arterial.
7. The portion of Bainbridge Rd between Old Cape Rd and Donna Dr would be downgraded to a local roadway with the completion of the Kimbel Ln/Donna Dr connection.
8. The portion of Old Cape Rd between June Dr and E Jackson Blvd would be downgraded to a local roadway with the completion of the Old Cape Rd realignment.



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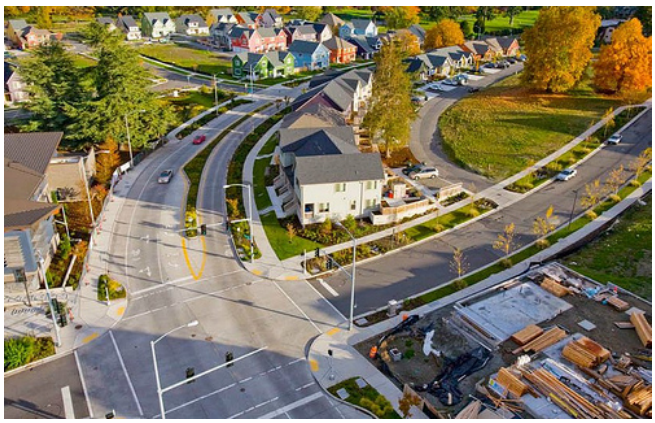
6.2. What is a Collector?



Collector roadways provide connections between land uses, such as residential or commercial districts, to arterial roadways. The main purpose of these roadways is to provide access to tracts of land, rather than provide long-distance mobility. These roads should be designed to serve moderate length trips and connect more directly to land properties than arterials. Some direct access to adjacent properties and on-street parking is acceptable, though driveways should be prohibited or combined wherever possible to reduce the interruptions in traffic along collector roadways.

6.3. Planning Level Cost Estimation

As part of determining the feasibility of the various proposed roadways in the City, planning level cost estimates were developed based on standard industry unit costs. The assumptions made for the roadway cost estimates are provided below:

- **Roadway Characteristics:**
  - Arterials:
    - 3 lanes (one lane in each direction with a center left turn lane)
    - 100 foot right-of-way
    - Sidewalk on one side and multi-use path on other side
  - Collectors:
    - 2 lanes (one lane in each direction)
    - 60 foot right-of-way
    - Sidewalk on both sides
- **Unit Costs:**
  - Baseline Roadway Cost: $1,900,000 per lane-mile
  - Bridge Cost: $1,000,000 per lane-mile (on top of baseline roadway cost)
  - Right-of-Way Cost: $48,000 per acre
  - Sidewalk Cost: $175,000 per mile
  - Multi-Use Trail Path: $1,000,000 per mile

6.4. Proposed Arterials

6.4.1. Northern Arterial

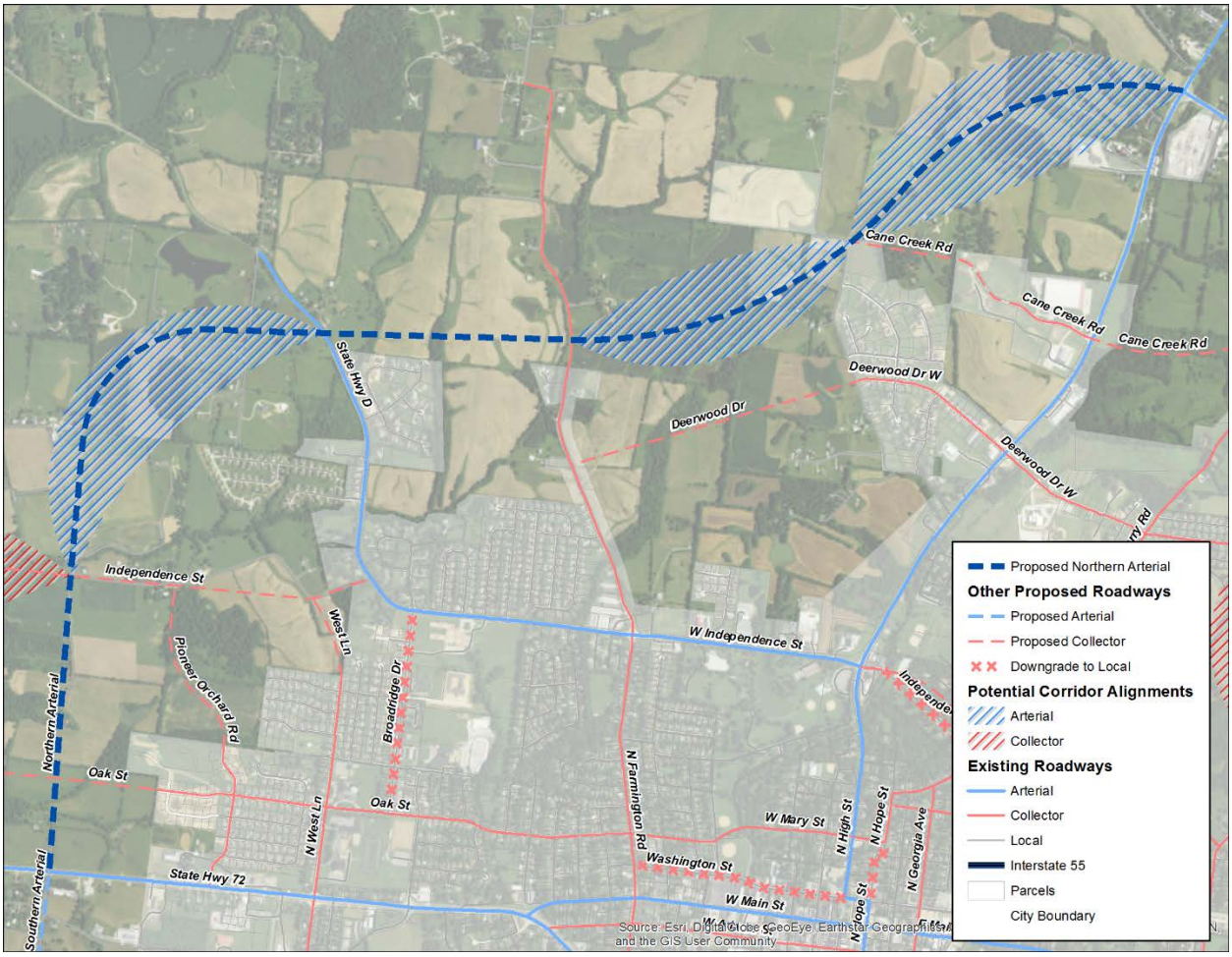
Perhaps the largest change from the previous Master Streets Plan is the introduction of a continuous arterial roadway north of Jackson that provides a fast connection from North High Street to West Jackson Boulevard. **Figure 23** geographically shows the proposed northern arterial.

- **Alignment:** the roadway begins at the existing intersection of West Jackson Boulevard and County Road 335 and runs northward to the approximate location of the intersection of County Road 450 and Walker Lane. The roadway then turns eastward to intersect with Highway D just north of the

Cambridge Estates subdivision. The roadway then proceeds in an east/northeasterly direction to the approximate location of the intersection of County Road 435 and Sugar Maple Lane. The roadway continues northeast to terminate at the existing intersection of US Route 61 (North High Street) and Highway Y.

- **Approximate Length:** 4.4 miles
- **Planning Level Cost:** $32.8M
- **Justification:**
    - Provides a direct connection around central Jackson on the north side of the city;
    - Connects directly to another arterial roadway (Highway Y) which has an overpass on I-55;
    - Connects several existing and proposed collectors (Cane Creek Road, Farmington Road, Independence Street, and Oak Street) as well as one arterial roadway (Highway D);
    - Provides an alternate route for North High Street which experiences occasional traffic congestion; and
    - Forms one side of a continuous arterial loop around Jackson.
- **2014 Plan Relation:** the proposed arterial does not provide a similar route to any of the proposed roadways from the 2014 plan; however, parts of the alignment line up with portions of Cane Creek Road and West Deerwood Drive from the 2014 map.

Figure 23: Proposed Northern Arterial

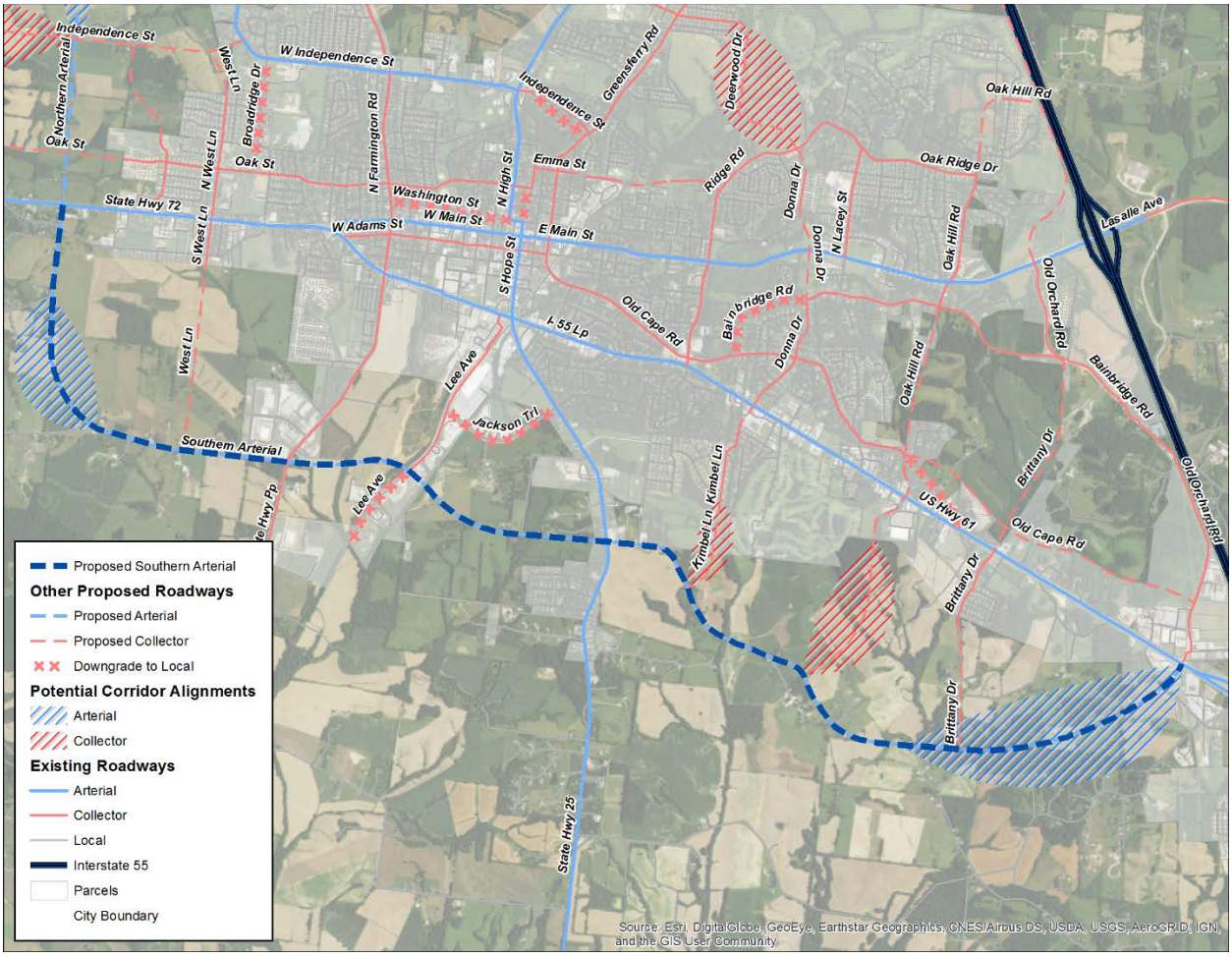


6.4.2. Southern Arterial

A new southern arterial roadway that connects West Jackson Boulevard to East Jackson Boulevard near I-55 via a new alignment to the south is proposed to provide an alternate route to Jackson Boulevard which is expected to see significant growth in traffic over the next 20 to 25 years. **Figure 24** geographically shows the proposed southern arterial.

- **Alignment:** the roadway is planned to follow the alignment of County Road 335 southward from its intersection with Jackson Boulevard for approximately a half mile where it will turn southeastward until County Road 330. From this point the roadway will follow the existing County Road 330 alignment to Highway PP. The roadway will then follow a new easterly alignment to the intersection of Highway 25 and County Road 318. The road will follow the alignment of County Road 318 until the bridge over Williams Creek, where it will follow a new northeasterly alignment until it intersects with East Jackson Boulevard at Old Orchard Road.
- **Approximate Length:** 6.9 miles
- **Planning Level Cost:** $49.3M
- **Justification:**
    - Provides a direct connection around central Jackson on the south side of the city;
    - Connects several existing and proposed collectors (West Lane, Highway PP, Lee Avenue, Kimbel Lane, Oak Hill Road, and Brittany Drive) as well as one arterial roadway (Highway 25);
    - Provides an alternate route for Jackson Boulevard which experiences traffic congestion and is expected to gain a significant amount of additional traffic in coming years; and
    - Forms one side of a continuous arterial loop around Jackson.
- **2014 Plan Relation:** the proposed arterial follows portions of a number of proposed routes in the 2014 plan including West Deerwood Drive, Tilset Road, Dogwood Avenue, and Benton Road.

Figure 24: Proposed Southern Arterial



6.5. Proposed Collectors

6.5.1. Near North Connector

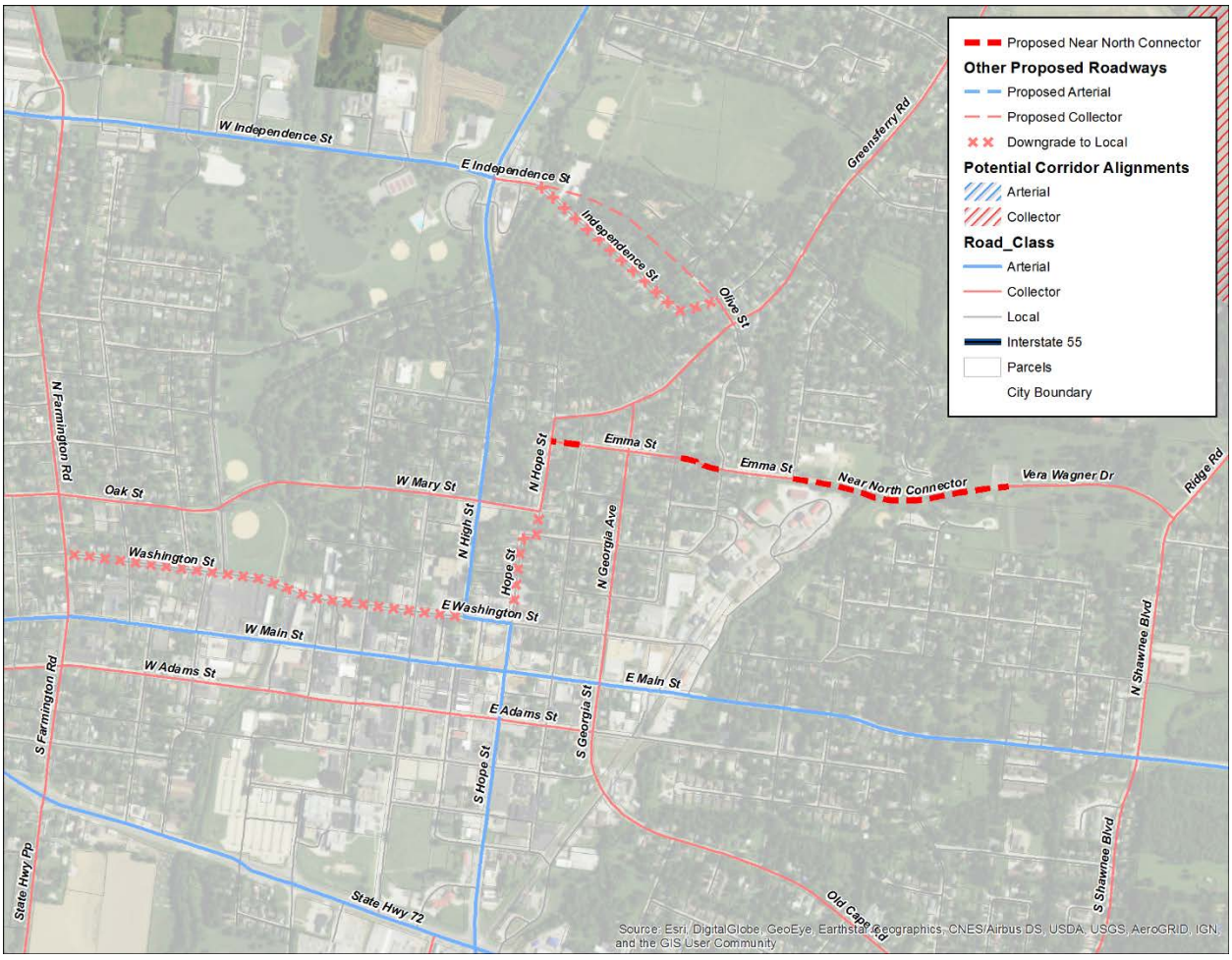
This route provides a new continuous east-west collector roadway through the center of Jackson as well as a new bridge over Goose Creek. This connector would extend from N Farmington Road to Ridge Road, and include the reconstruction of portions of existing roadways including the crossing over Hubble Creek, a treatment at Hope Street, and new segments of roadway to connect Emma Street. **Figure 25** geographically represents the proposed route.

- **Alignment:** the roadway is planned to follow the alignment of Oak and Mary Street from Farmington Road to North Hope Street (a realigned intersection at North High Street is recommended). The road will then turn north on Hope Street briefly where it will then turn east at a new alignment parallel with Emma Street. The road will continue east along Emma Street, making new connections between Hope and Ohio Streets, as well as Maryland Street and Eastview Court. The road will then have a new bridge over Goose Creek and follow Vera Wagner Drive to its intersection with Shawnee Boulevard/Ridge Road.
- **Approximate Length:** 1.7 miles
- **Planning Level Cost:** $2.5M

- **Justification:**
  - Provides a more direct connection through central Jackson than existing collector roadways;
  - Connects several existing and collectors (Farmington Road, Greensferry Road, Georgia Avenue, and Shawnee Boulevard/Ridge Road) as well as one arterial roadway (Highway 25);
  - Provides an alternate route for East Main Street which expected to gain a significant amount of additional traffic in coming years; and
  - Provides a new bridge over Goose Creek, allowing residents in the eastern side of Jackson to reach High Street and beyond without using East Main Street.

2014 Plan Relation: the route is consistent with the 2014 plan east of Hope Street, but the one block diversion at Hope Street and the alignment along Oak and Mary Streets is new in this plan.

Figure 25: Proposed Near North Collector



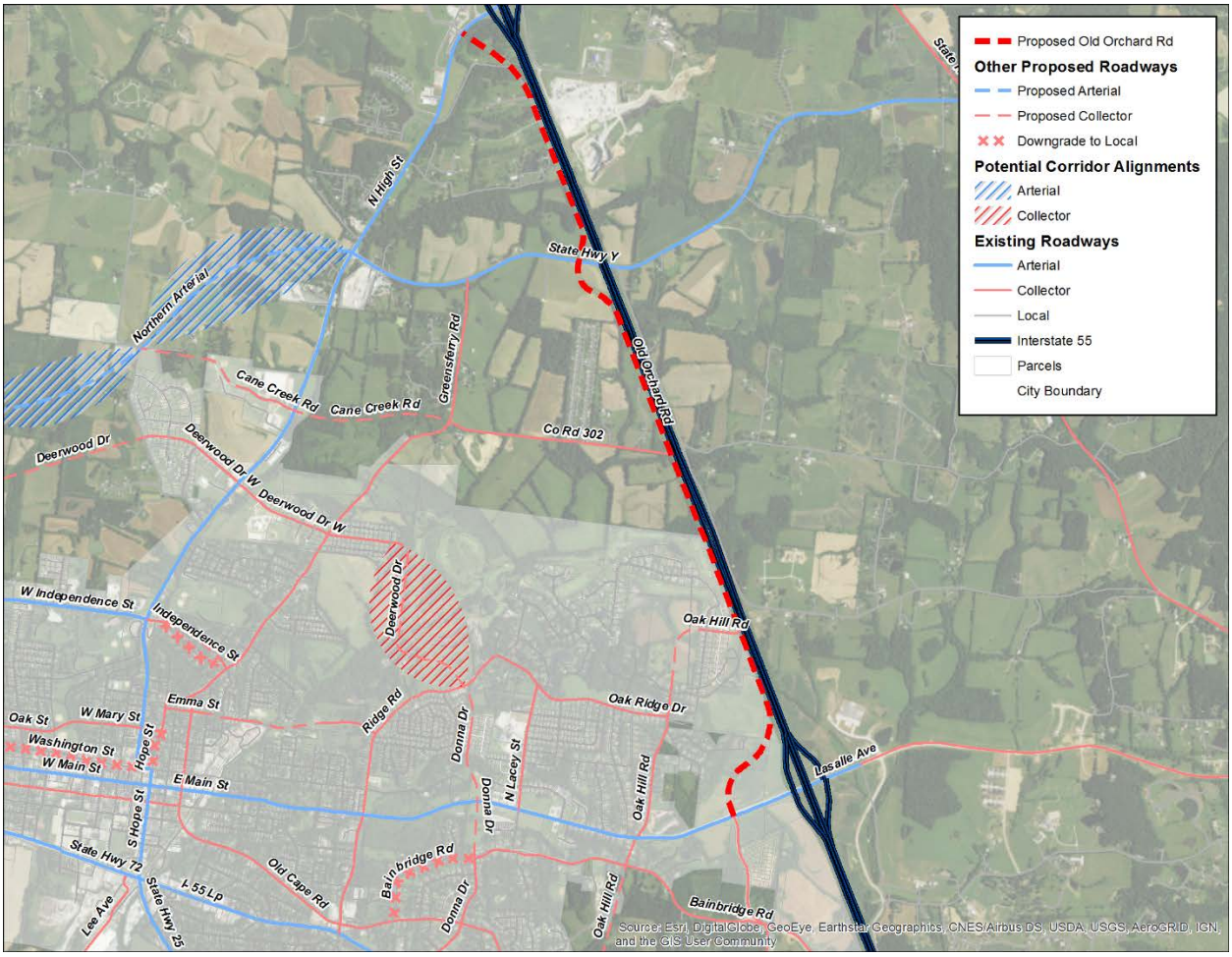
6.5.2. Old Orchard Road

The proposed roadway would be a continuation of the recently constructed extension of Old Orchard Road south of East Main Street, and would serve as an outer road to I-55 between East Main Street and

US 61 (North High Street). This roadway would open up several new tracts of land for development, which would all be visible from I-55. **Figure 26** geographically represents the proposed route.

- **Alignment:** the roadway would follow the existing portion of Old Orchard Road between Bainbridge Road and East Main Street, and would then turn eastward and follow along the west side of I-55 all the way to the intersection of US 61 and Bavarian Boulevard.
- **Approximate Length:** 4.1 miles
- **Planning Level Cost:** $16.6M
- **Justification:**
    - Serves as an outer road for tracts of land that face I-55;
    - Connects existing and proposed collectors (Bainbridge Road, Oak Hill Road, and Cane Creek Road) as well as three arterial roadways (East Main Street, Highway Y, and US 61); and
    - Connects existing and proposed residential areas to likely commercial areas.
- **2014 Plan Relation:** the route is consistent with the 2014 plan for Old Orchard Road.

Figure 26: Proposed Old Orchard Road Extension

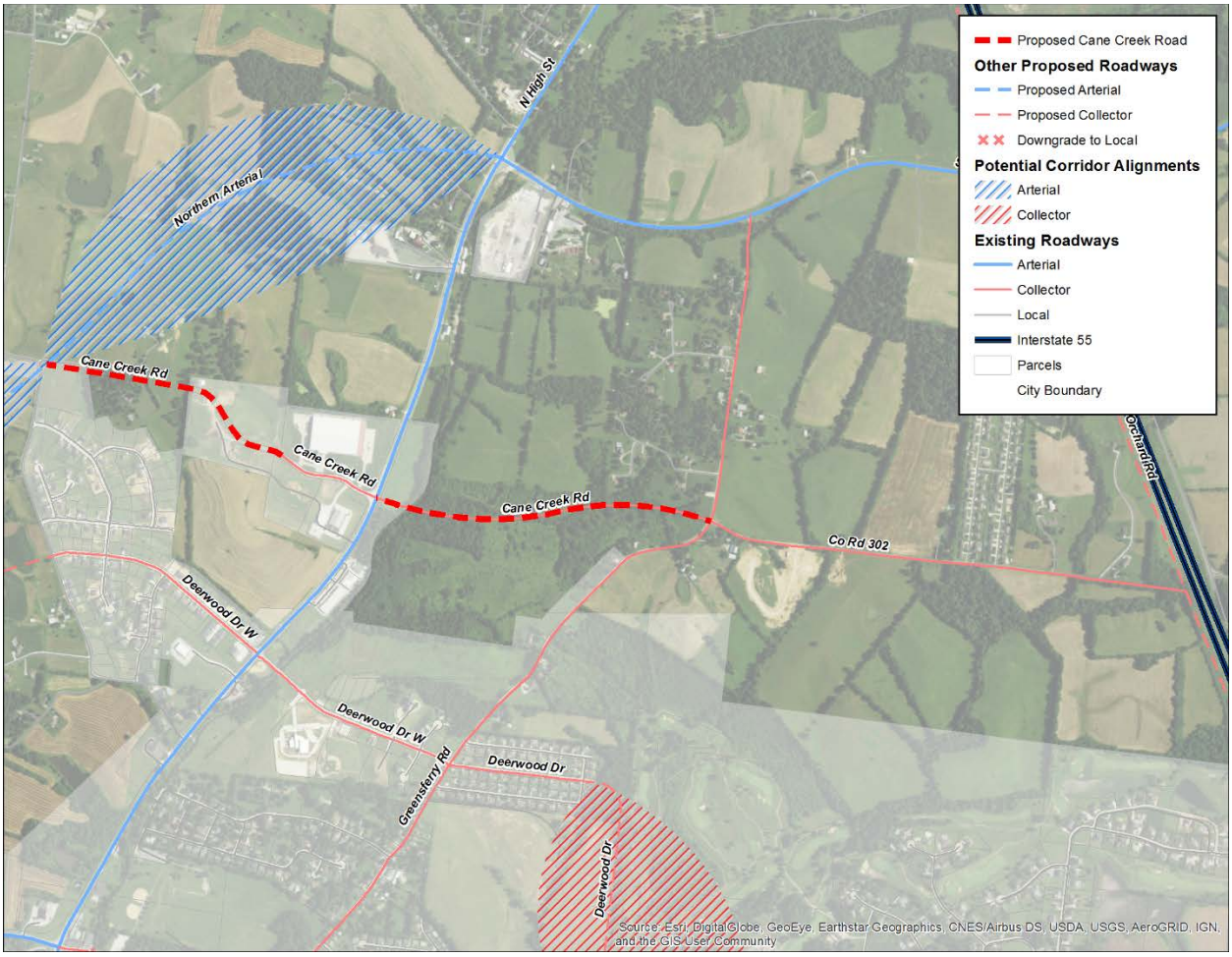


6.5.3. Cane Creek Road

The proposed roadway would utilize two existing roadways, combined with some new alignments to create a continuous east-west collector roadway between the proposed Northern Arterial and Old Orchard Road. This roadway would provide more direct access to land that is likely to see residential development in coming years. **Figure 27** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the approximate location of the intersection of County Road 435 and Sugar Maple Lane and travel east on Cane Creek Road to US 61. Then a new alignment would travel eastward to the intersection of Greensferry Road and County Road 302. It would then continue on the alignment of Count Road 302 to the proposed Old Orchard Road alignment west of I-55.
- **Approximate Length:** 2.3 miles
- **Planning Level Cost:** $6.5M
- **Justification:**
    - Provides a continuous connection through existing industrial and residential areas likely to see growth; and
    - Connects one existing and one proposed collector (Greensferry Road and Old Orchard Road) as well as one existing and one proposed arterial (US 61 and the Northern Arterial).
- **2014 Plan Relation:** the route is consistent with the 2014 plan for Cane Creek Road's eastern alignment.

Figure 27: Proposed Cane Creek Road Extension

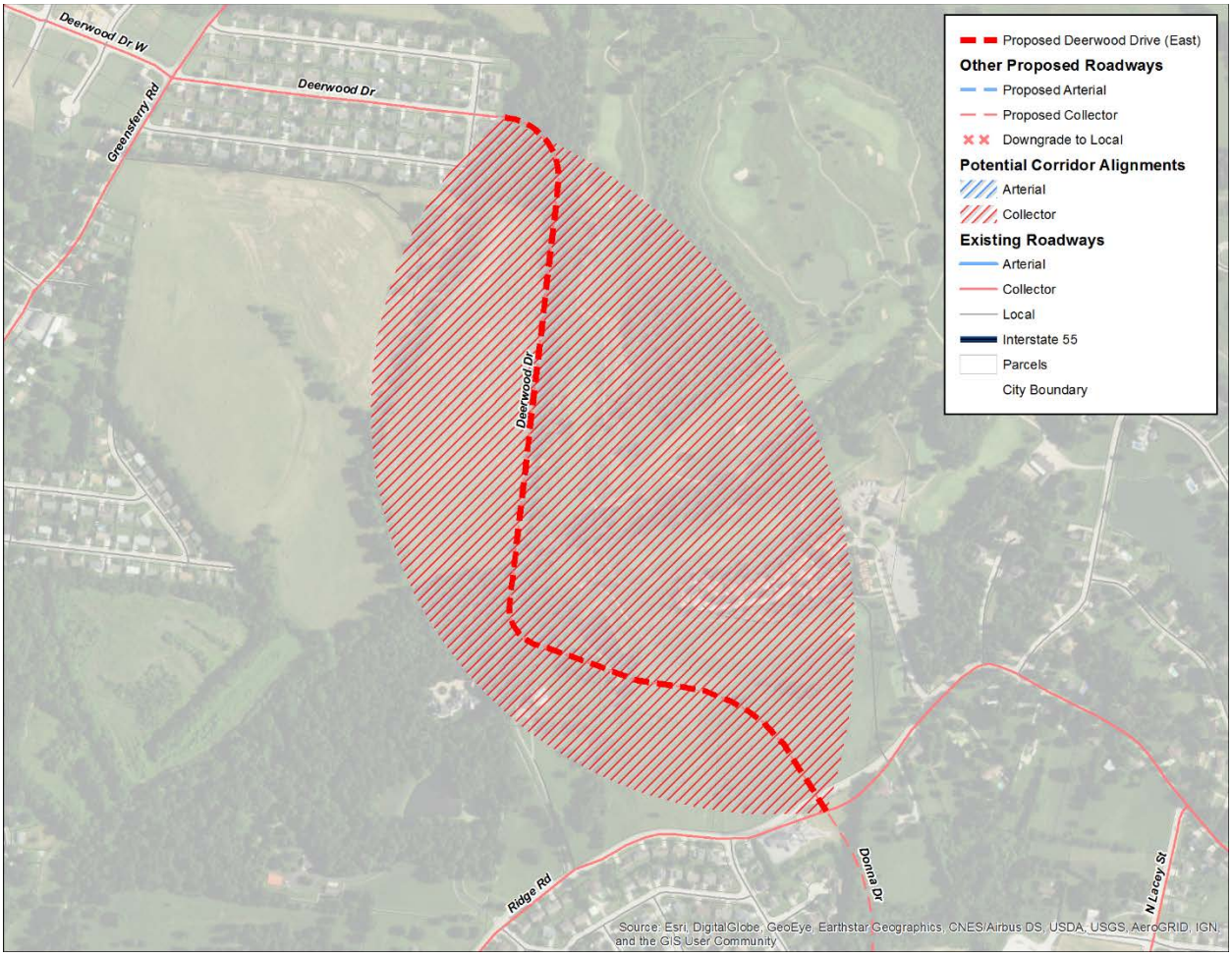


6.5.4. Deerwood Drive (East)

The proposed roadway would connect the existing alignment of Deerwood Drive to Ridge Road, providing an additional connection across Goose Creek. **Figure 28** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the existing stub of Deerwood Drive just east of Oakwood Street and continue south-southeast to Ridge Road, somewhere in the proximity of the proposed Donna Drive extension. While an example alignment is shown, the exact alignment and eastern terminus of the roadway would require further study.
- **Approximate Length:** 0.8 miles
- **Planning Level Cost:** $3.7M
- **Justification:**
    - Connects two areas of the City that are currently difficult and circuitous to drive between;
    - Provides alternate routes for residents traveling between the eastern and northern sections of the City; and
    - Completes the final, eastern section of Deerwood Drive.
- **2014 Plan Relation:** the route is a new alignment, not in the 2014 plan; however, the shown alignment follows a portion of the Miller Street corridor shown on the 2014 map.

Figure 28: Proposed Deerwood Drive Extension (East)



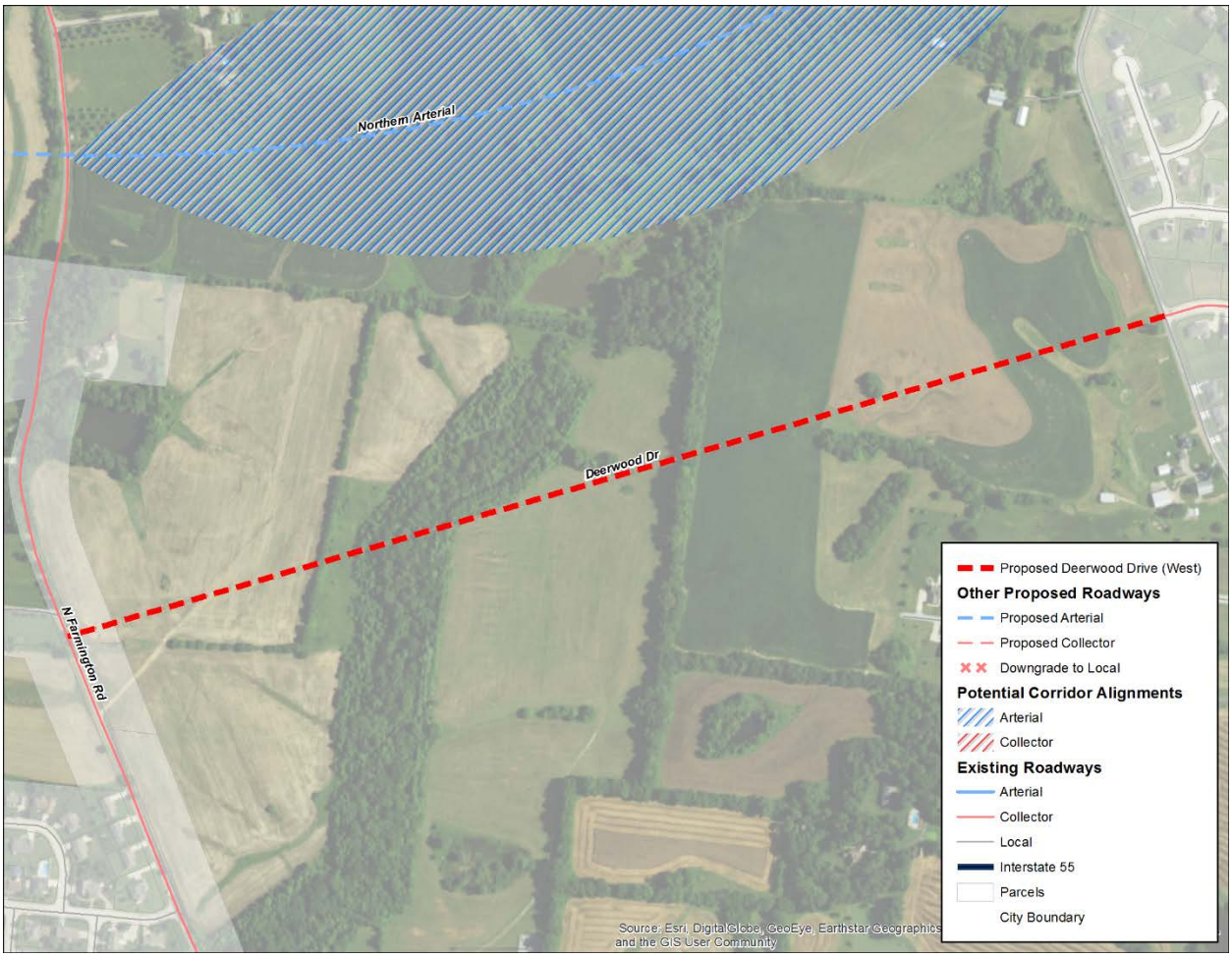
6.5.5. Deerwood Drive (West)

The proposed roadway would connect the existing alignment of Deerwood Drive to North Farmington Road, providing a continuation and termination point for the existing Deerwood Drive corridor. This roadway would serve as a backage road for the proposed Northern Arterial, on which access to the land in between the corridors would be placed rather than directly onto the arterial roadway. **Figure 29** geographically represents the proposed route.

- **Alignment:** the roadway would begin on Farmington Road, approximately 0.2 miles north of its intersection with Redbud Street, and travel east-northeasterly to the existing intersection of Deerwood Drive and County Road 435 (Harmony Lane).
- **Approximate Length:** 0.8 miles
- **Planning Level Cost:** $3.6M
- **Justification:**
    - Opens up access to tracts of land that will likely be developed as residential subdivisions, given the surrounding land uses;
    - Provides a corridor on which to provide access to future subdivisions to limit the number of future intersections along the proposed Northern Arterial; and
    - Completes the final, western section of Deerwood Drive.

- **2014 Plan Relation:** the route follows the Deerwood Drive alignment from the 2014 map, though ends the corridor at Farmington Road rather than continuing it all the way to Jackson Boulevard.

Figure 29: Proposed Deerwood Drive Extension (West)



6.5.6. Independence Street (East)

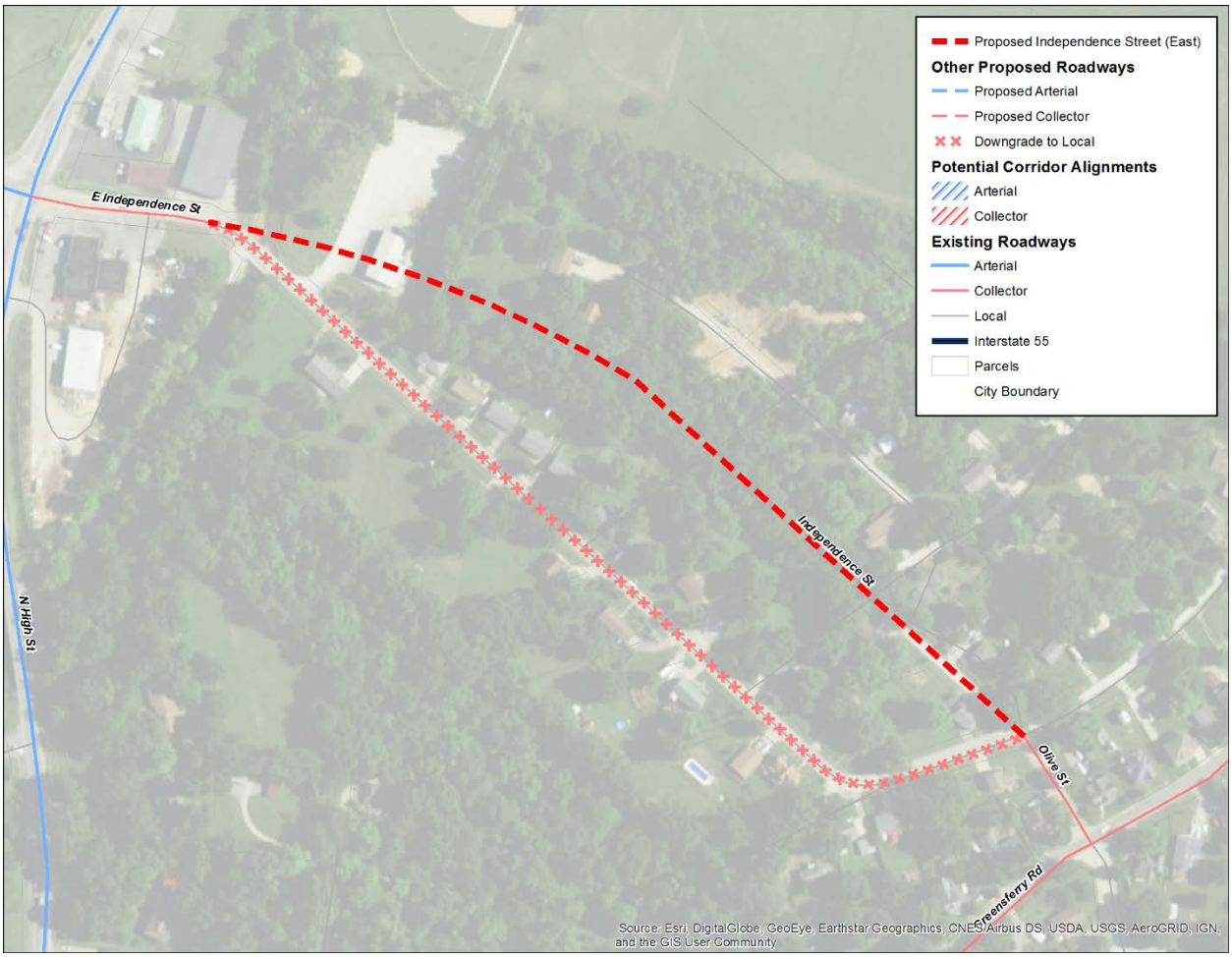
The proposed roadway would realign a current collector route, which has a one-block diversion in the vicinity of Forest Street and Olive Street. The proposed route would take advantage of some existing right-of-way and create a gentler curve in the roadway near Hubble Creek. **Figure 30** geographically represents the proposed route.

- **Alignment:** the roadway would begin just west of the Independence Street Bridge over Hubble Creek and would straighten out the curve in the roadway near the creek. The roadway would travel further eastward through an existing city-owned property to align with the Olive Street right-of-way to the existing intersection of Olive and Hickory Streets where it would continue along Olive Street to Forest Street.
- **Approximate Length:** 0.3 miles
- **Planning Level Cost:** $1.4M
- **Justification:**

- Provides a continuous route between High Street and Greensferry Road, opposite Highway D (Independence Street) by avoiding the one block diversion at Forest Street;
- Addresses a safety concern (poor sight distance) with the sharp curve in Independence Street and the Hubble Creek Trail crossing; and
- Utilizes some existing right-of-way to limit property impacts.

- **2014 Plan Relation:** the route is not included in the 2014 Major Streets Plan.

Figure 30: Proposed Independence Street Realignment (East)



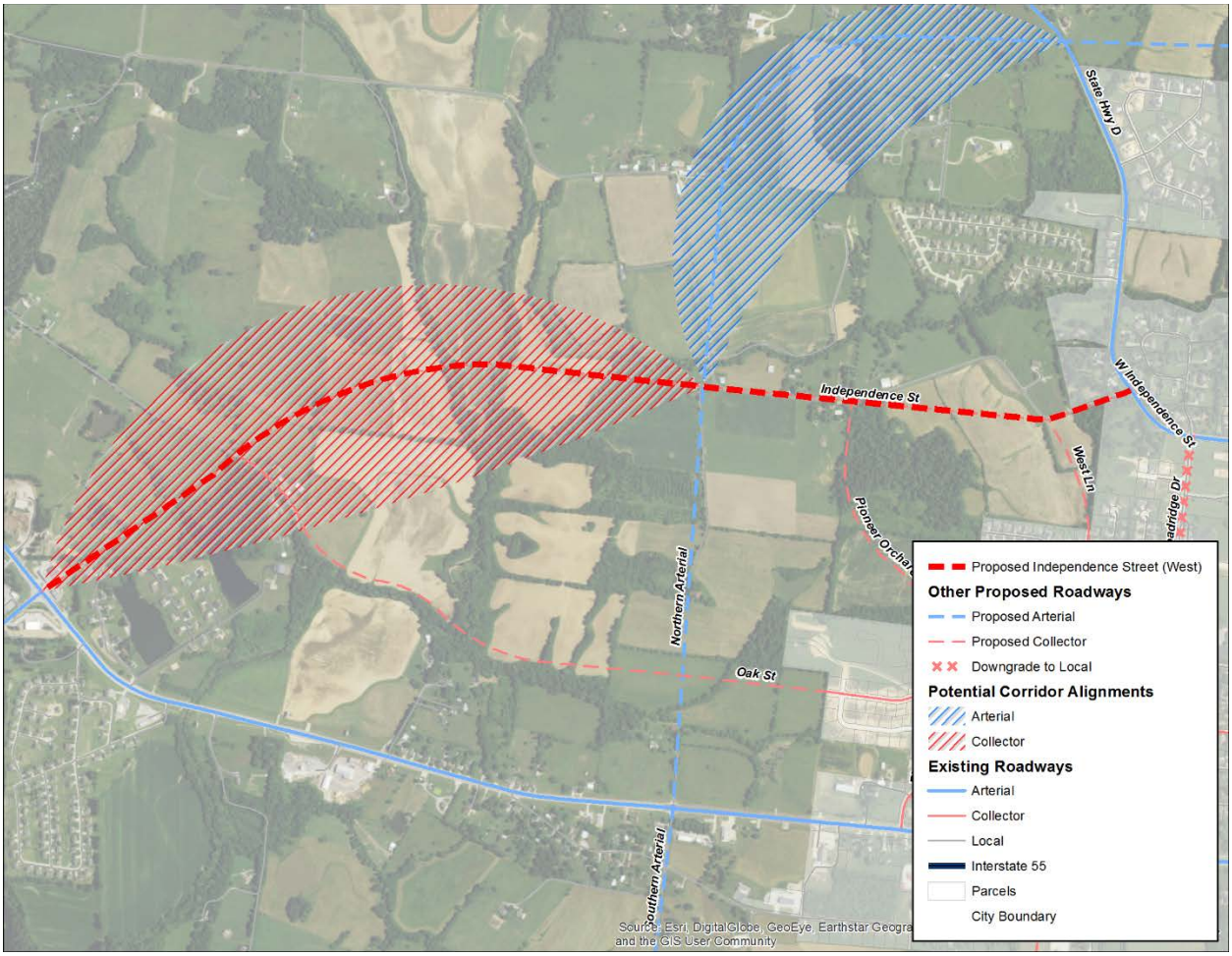
6.5.7. Independence Street (West)

The proposed roadway would provide a direct connection between the northwest side of Jackson, along Highway D, to the intersection of Highways 34 and 72 on the west side of the City. **Figure 31** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the intersection of Highways 34 and 72 and follow an east/northeasterly alignment to the existing intersection of County Road 450 and Walker Lane where it would turn directly eastward to align with an existing segment of County Road 450 just west of Highway D.
- **Approximate Length:** 2.1 miles
- **Planning Level Cost:** $9.7M

- **Justification:**
  - Provides an alternate route to West Jackson Boulevard and better connections between the various MoDOT routes north and west of Jackson;
  - Improves an intersection on Highway D that has sight distance issues;
  - Provides access to tracts of land that are expected to see residential growth in the next 20 to 25 years.
- **2014 Plan Relation:** the route is not included in the 2014 Major Streets Plan.

Figure 31: Proposed Independence Street Extension (West)



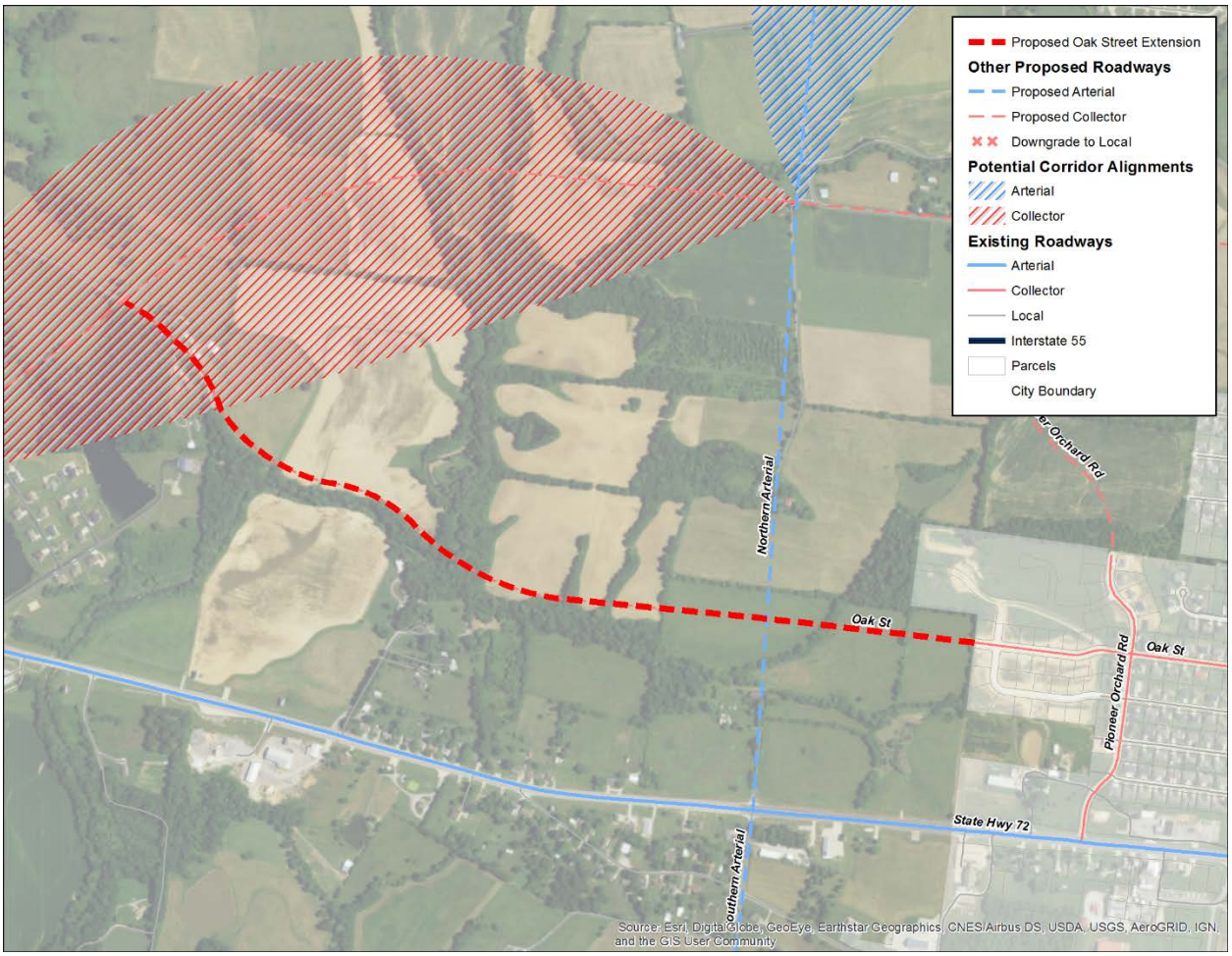
6.5.8. Oak Street

The proposed roadway would extend Oak Street westward to intersect with the Northern Arterial and the proposed extension of Independence Street, providing access to areas that may see additional development over the next 20 to 25 years. **Figure 32** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the current western endpoint of Oak Street, west of Pioneer Orchard Road and travel directly westward to an intersection with the proposed Northern Arterial. The alignment would then travel west/northwest along Cane Creek to join County Road 467 to its intersection with the proposed Independence Street extension.
- **Approximate Length:** 1.2 miles

- **Planning Level Cost:** $5.6M
- **Justification:**
    - Provides access to land that may see residential growth in the near future;
    - Provides a roadway to which new subdivisions could connect rather than adding additional access on West Jackson Boulevard or the proposed Northern Arterial, which should implement a higher level of access management; and
    - Continues a roadway that has been extended several times through the construction of new subdivisions.
- **2014 Plan Relation:** the eastern portion of the route is present in the 2014 plan, but the portion west of the proposed Northern Arterial is a new route.

Figure 32: Proposed Oak Street Extension



6.5.9. Pioneer Orchard Road

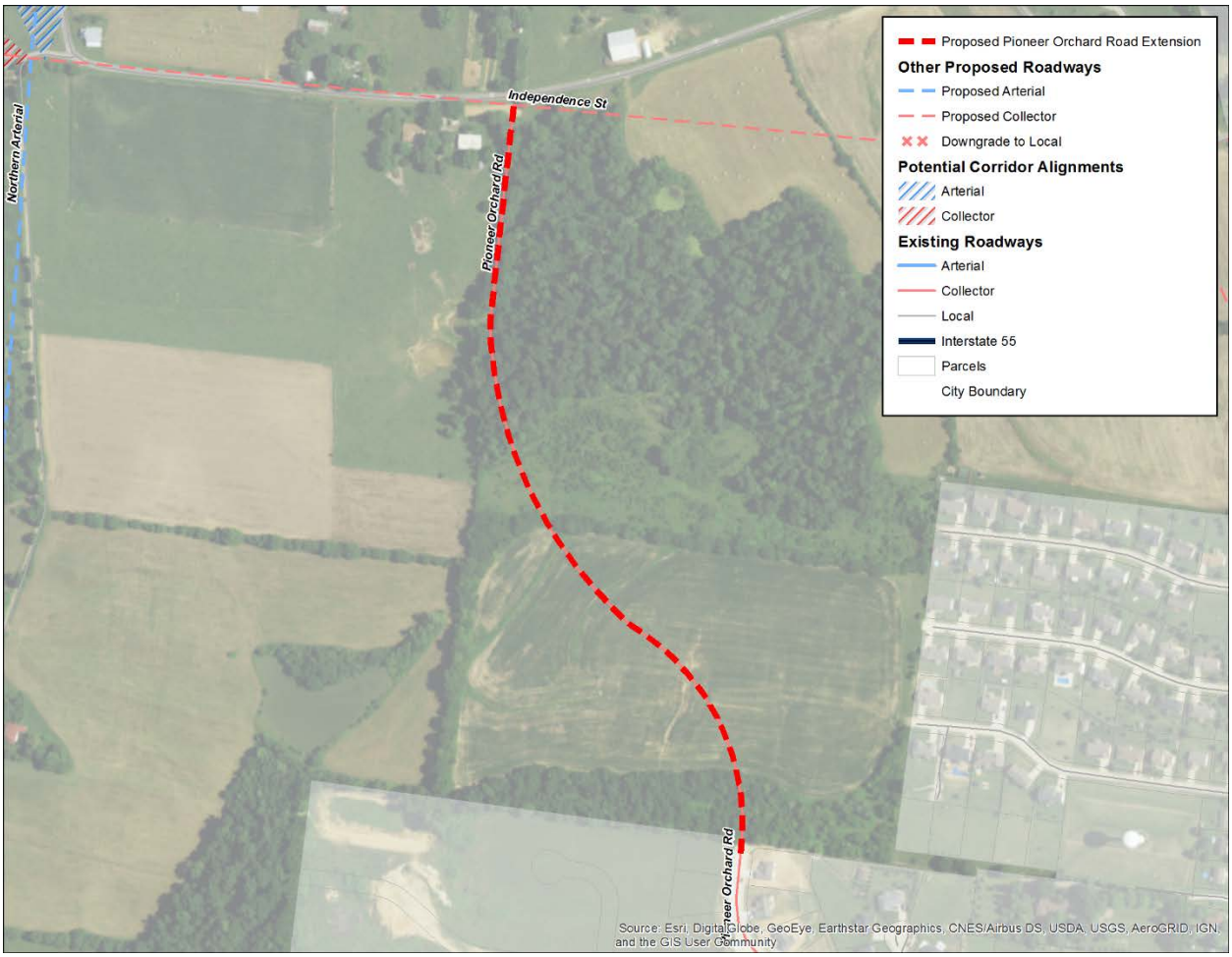
The proposed roadway would extend Pioneer Orchard Road northward to the proposed extension of Independence Street, providing access to areas likely to develop as residential in the near future. **Figure 33** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the current northern endpoint of Pioneer Orchard Road, north of Oak Street and travel directly north/northwest to a new intersection with the proposed

extension of Independence Street approximately half way between the extension of West Lane and the proposed Northern Arterial.

- **Approximate Length:** 0.5 miles
- **Planning Level Cost:** $2.1M
- **Justification:**
    - Provides access to land that are likely to see residential growth in the near future;
    - Provides a roadway to which new subdivisions could connect rather than adding additional access on the proposed Northern Arterial, which should implement a higher level of access management; and
    - Continues a roadway that has been extended several times through the construction of new subdivisions.
- **2014 Plan Relation:** the proposed roadway is consistent with the 2014 Major Street Plan map.

Figure 33: Proposed Pioneer Orchard Road Extension



6.5.10. West Lane (North)

The proposed roadway would extend West Lane from its current northern terminus to the proposed extension of Independence Street to provide a logical endpoint for the corridor. **Figure 34** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the current northern terminus of West Lane just north of Alpine Drive and travel north/northwest to meet with the extension of Independence Street opposite the existing portion of County Road 450 that travels northwest for a short segment.
- **Approximate Length:** 0.2 miles
- **Planning Level Cost:** $0.9M
- **Justification:**
    - Creates a more continuous north-south corridor through western Jackson;
    - Provides access to the extension of Independence Street which connects directly to Highway D and allows for the downgrade of Broadridge Drive to a local roadway; and
    - Provides more direct access from the north to West Lane Elementary School and Jackson Junior High School.
- **2014 Plan Relation:** this route is somewhat consistent with recommendations from the 2014 Master Streets Plan, though does not connect directly to Highway D.

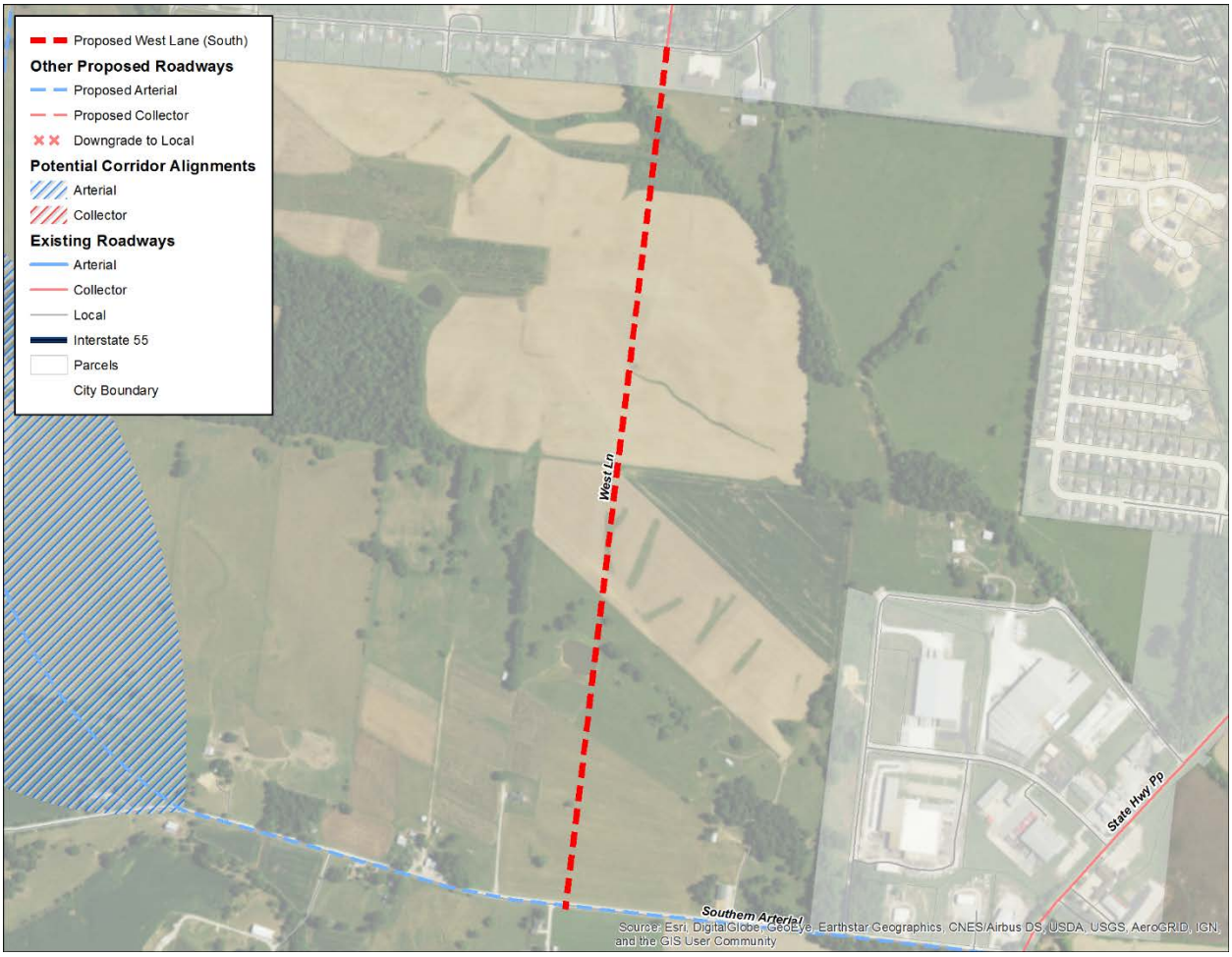
Figure 34: Proposed West Lane Extension (North)

6.5.11. West Lane (South)

The proposed roadway would extend West Lane from its current southern terminus to the proposed Southern Arterial, through an area that is expected to see significant industrial growth in the next 20 to 25 years. **Figure 35** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the current southern terminus at County Road 328 (Old Toll Road) and proceed directly southward to the proposed Southern Arterial, which is proposed to be on the alignment of County Road 330.
- **Approximate Length:** 0.9 miles
- **Planning Level Cost:** $4.2M
- **Justification:**
    - Creates a continuous north-south corridor through western Jackson;
    - Provides access to tracts of land that are expected to see light industrial growth in the future, allowing for multiple arterial routes to and from this area; and
    - Provides a route to which access to adjacent industrial and residential subdivisions can be provided rather than directly to the proposed Southern Arterial, which should implement a higher level of access management.
- **2014 Plan Relation:** this route is consistent with recommendations from the 2014 Master Streets Plan.

Figure 35: Proposed West Lane Extension (South)

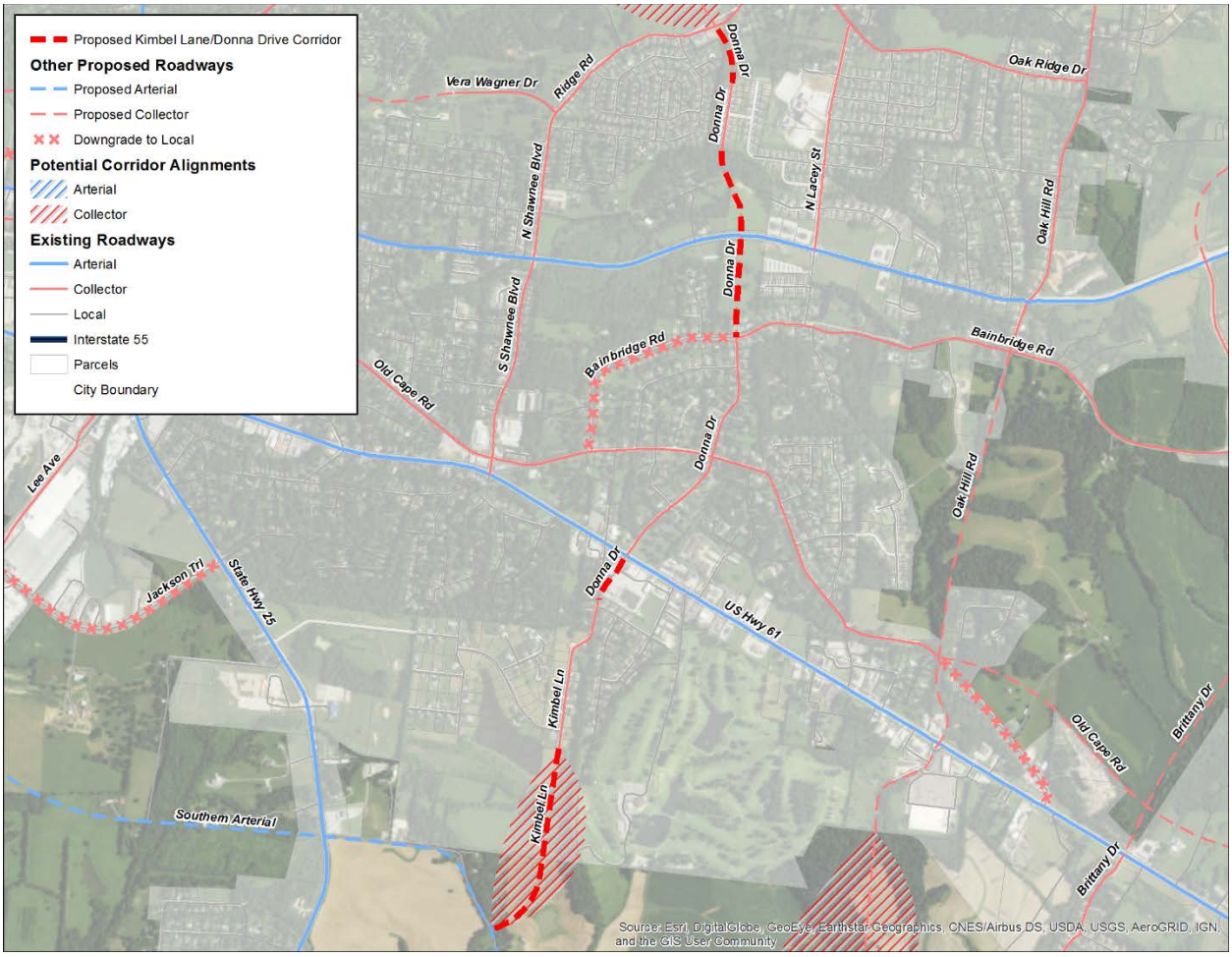


6.5.12. Kimbel Lane/Donna Drive

The proposed roadway would provide a new north-south corridor between East Main Street and the new Southern Arterial in the near eastern side of Jackson, through an area with no continuous north-south corridors. **Figure 36** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the Southern Arterial approximately 0.5 miles east of Highway 25 and connect northward to the existing segment of Kimbel Lane. A segment of road would connect Kimbel Lane through a shopping center to the signal at East Jackson Boulevard and Donna Drive. The corridor would continue along Donna Drive to its northern terminus at Bainbridge road where a new segment would connect northward to an existing segment of North Donna Drive, and ultimately to Ridge Road opposite the proposed Deerwood Drive extension.
- **Approximate Length:** 2.3 miles
- **Planning Level Cost:** $5.2M
- **Justification:**
    - Provides a new corridor through an area with no continuous north-south corridors;
    - Provides an alternate route to Highway 25; and
    - Provides incentive to improve the signal at East Jackson Boulevard and Donna Drive, which has a relatively high crash rate for the corridor.
- **2014 Plan Relation:** the corridor is consistent with the 2014 plan.

Figure 36: Proposed Kimbel Lane/Donna Drive Extension

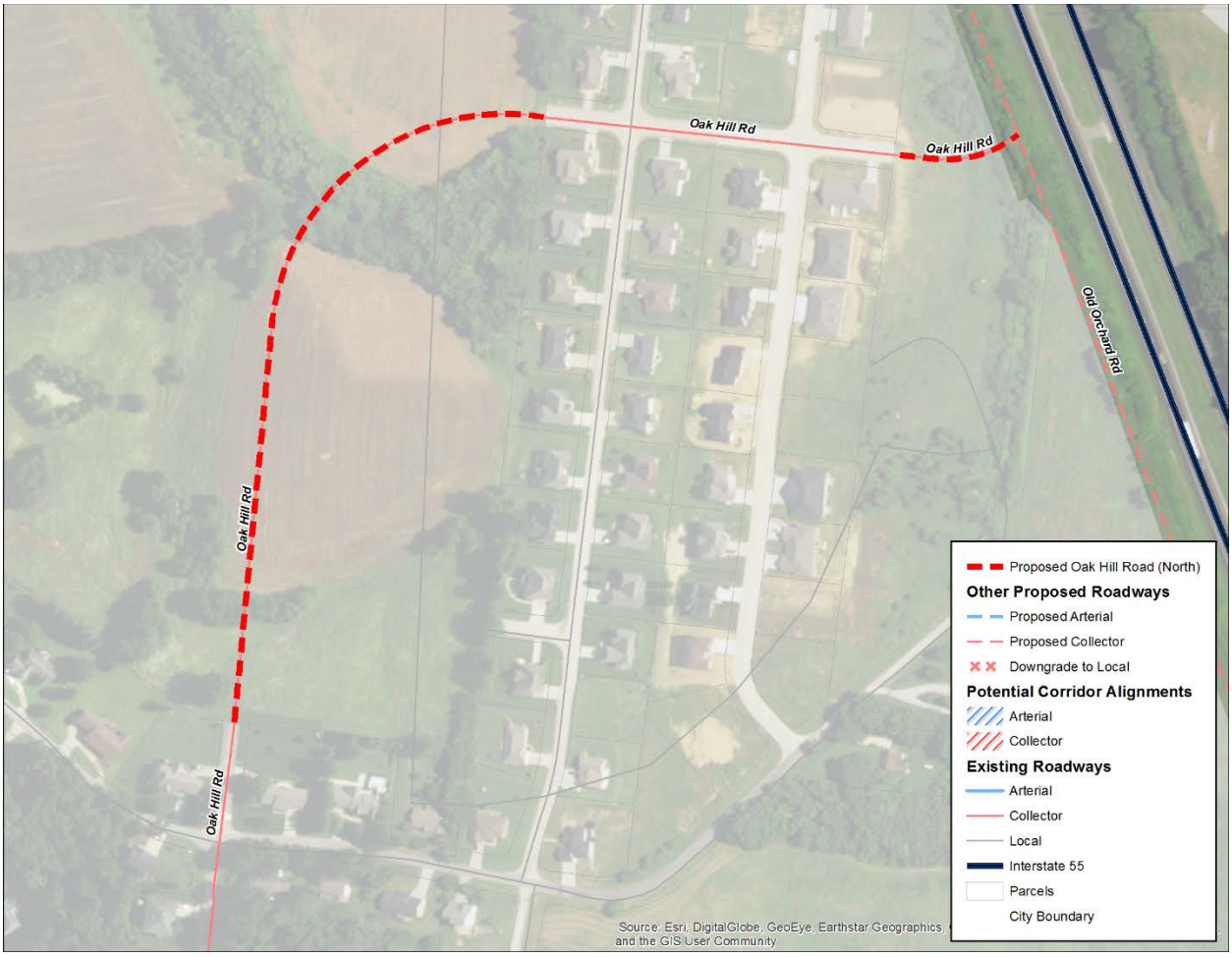


6.5.13. Oak Hill Road (North)

The proposed roadway would connect existing segments of Oak Hill Road to create a new continuous corridor between the existing eastern Jackson residential neighborhoods and the proposed Old Orchard Road extension. **Figure 37** geographically represents the proposed changes.

- **Alignment:** the roadway would begin at the existing stub of Oak Hill Road north of Ridge Road and travel northeasterly to connect to the stub of Oak Hill Road west of Trevino Drive. The roadway would then travel east through the existing stub east of Watson Drive to the proposed Old Orchard Road extension.
- **Approximate Length:** 0.5 miles
- **Planning Level Cost:** $1.6M
- **Justification:**
    - Provides a new connection between the existing residential neighborhoods in eastern Jackson to the proposed Old Orchard Road extension;
    - Connects three existing stubs of Oak Hill Road; and
    - Continues an existing collector roadway to a new northern terminus.
- **2014 Plan Relation:** this route is consistent with recommendations from the 2014 Master Streets Plan.

Figure 37: Proposed Oak Hill Road Extension (North)



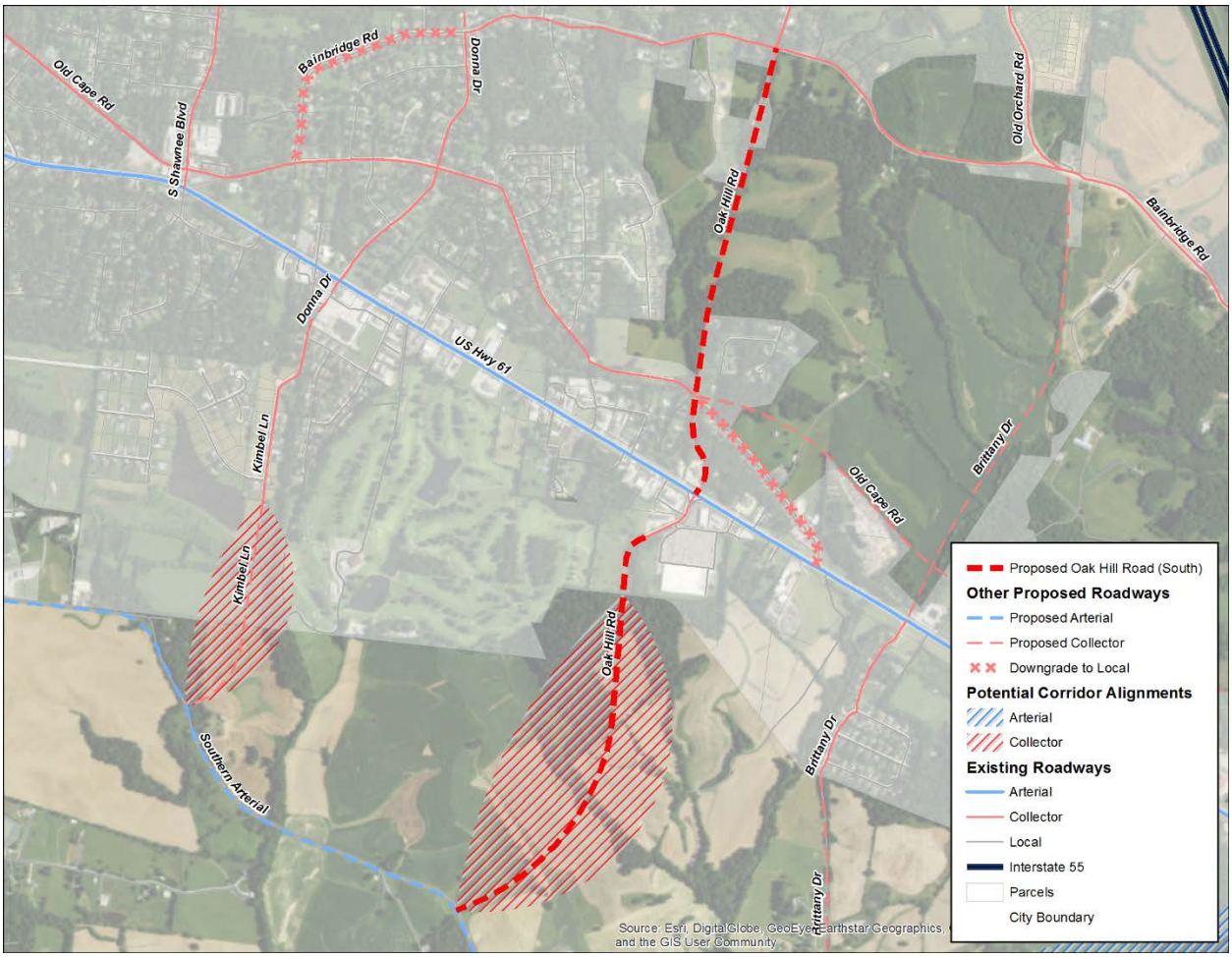
6.5.14. Oak Hill Road (South)

The proposed roadway would provide a new north-south corridor through a part of the City that does not have any continuous north-south roadways and utilizes an existing collector roadway. **Figure 38** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the existing intersection of Oak Hill Road and Bainbridge Road and travel southward to the intersection of Old Cape road and June Lane, traveling directly west of the existing subdivision on Old Hickory Drive. The roadway would bend eastward to go behind the US Bank building and utilize the existing signal at East Jackson Boulevard and Wal-Mart, and continue southward to the proposed Southern Arterial along its alignment on CR 318.
- **Approximate Length:** 2.0 miles
- **Planning Level Cost:** $8.3M
- **Justification:**
    - Provides a new continuous corridor through a part of eastern Jackson where there are no north-south collector roadways; and
    - Provides access to tracts of land that are currently difficult to reach via the City's collector roadways.

- **2014 Plan Relation:** the southern portion of this route follows the Walton Drive corridor identified in the 2014 Master Streets Plan map, though the northern section between Jackson Boulevard and Bainbridge Road is a new corridor that replaces the old alternative for South Oak Hill Road.

Figure 38: Proposed Oak Hill Road Extension (South)



6.5.15. Brittany Drive

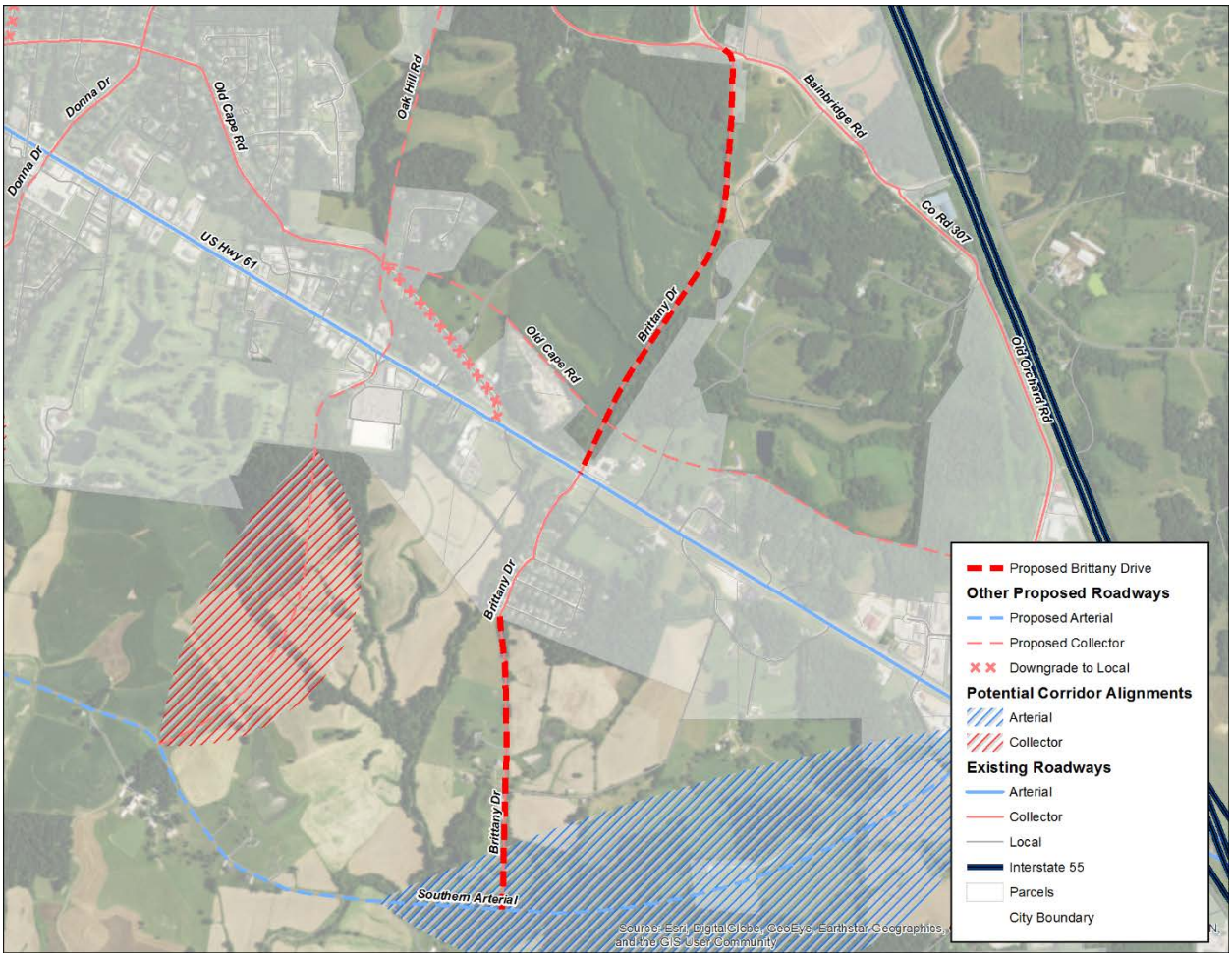
The proposed roadway would provide a new north-south corridor through a part of the City that does not have any continuous north-south roadways and provides access to areas that are likely to see growth in the near future. **Figure 39** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the existing intersection of Old Orchard Road and Bainbridge Road (providing an opportunity for a roundabout) and would travel south/southwest along Williams Creek to the intersection of Jackson Boulevard and Brittany Drive. The road would follow the existing alignment of Brittany Drive and create a new intersection with the proposed Southern Arterial east of where it would split from the alignment with County Road 318.
- **Approximate Length:** 2.0 miles
- **Planning Level Cost:** $7.4M
- **Justification:**

- Provides a new continuous corridor through a part of eastern Jackson where there are no north-south collector roadways;
- Utilizes significant portions of existing right-of-way to limit cost and property impacts; and
- Provides access to tracts of land that are likely to see development in the near future.

- **2014 Plan Relation:** the route does not follow a route outlined by the 2014 Major Streets Plan, but would replace the Apple Road corridor identified on the map.

Figure 39: Proposed Brittany Drive Extension



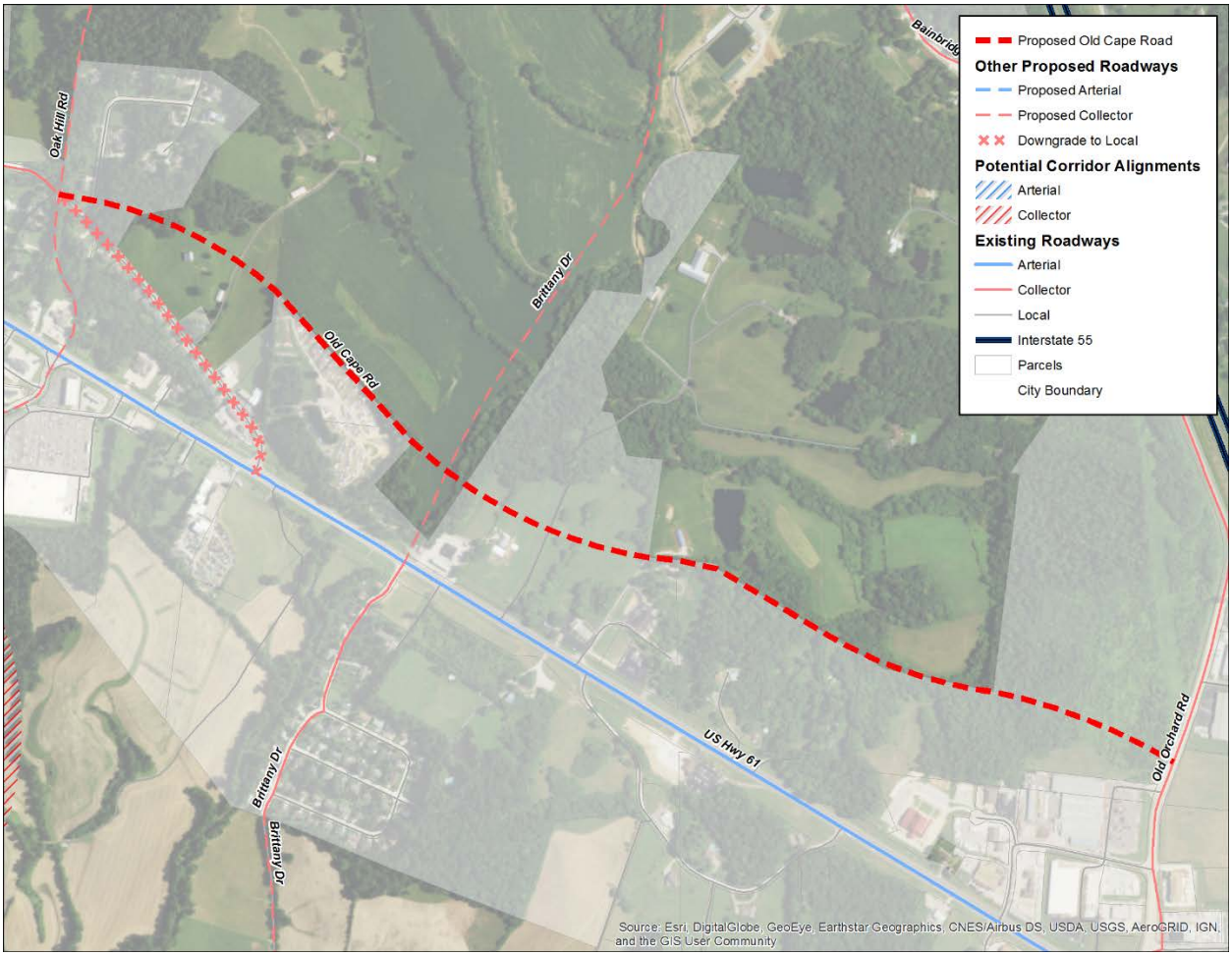
6.5.16. Old Cape Road

The proposed roadway would provide a backage roadway along East Jackson Boulevard which could provide access to surrounding commercial and residential developments instead of providing access directly onto Jackson Boulevard. **Figure 40** geographically represents the proposed route.

- **Alignment:** the roadway would begin at the existing intersection of Old Cape Road and June Lane, where it would travel eastward north of its existing alignment and follow several parcels that form the current boundary of the City and intersect Old Orchard Road just north of the Buchheit retail store.
- **Approximate Length:** 1.6 miles
- **Planning Level Cost:** $7.0M

- **Justification:**
  - Provides a backage road for the commercial parcels along Jackson Boulevard which can help with implementing access control along the arterial;
  - Provides access to tracts of land that are likely to be developed as future residential subdivisions; and
  - Removes a non-standard, skewed intersection along Jackson Boulevard at Old Cape Road.
- **2014 Plan Relation:** the route does not follow a route outlined by the 2014 Major Streets Plan, but would replace the Apple Road corridor identified on the map.

Figure 40: Proposed Old Cape Road Extension

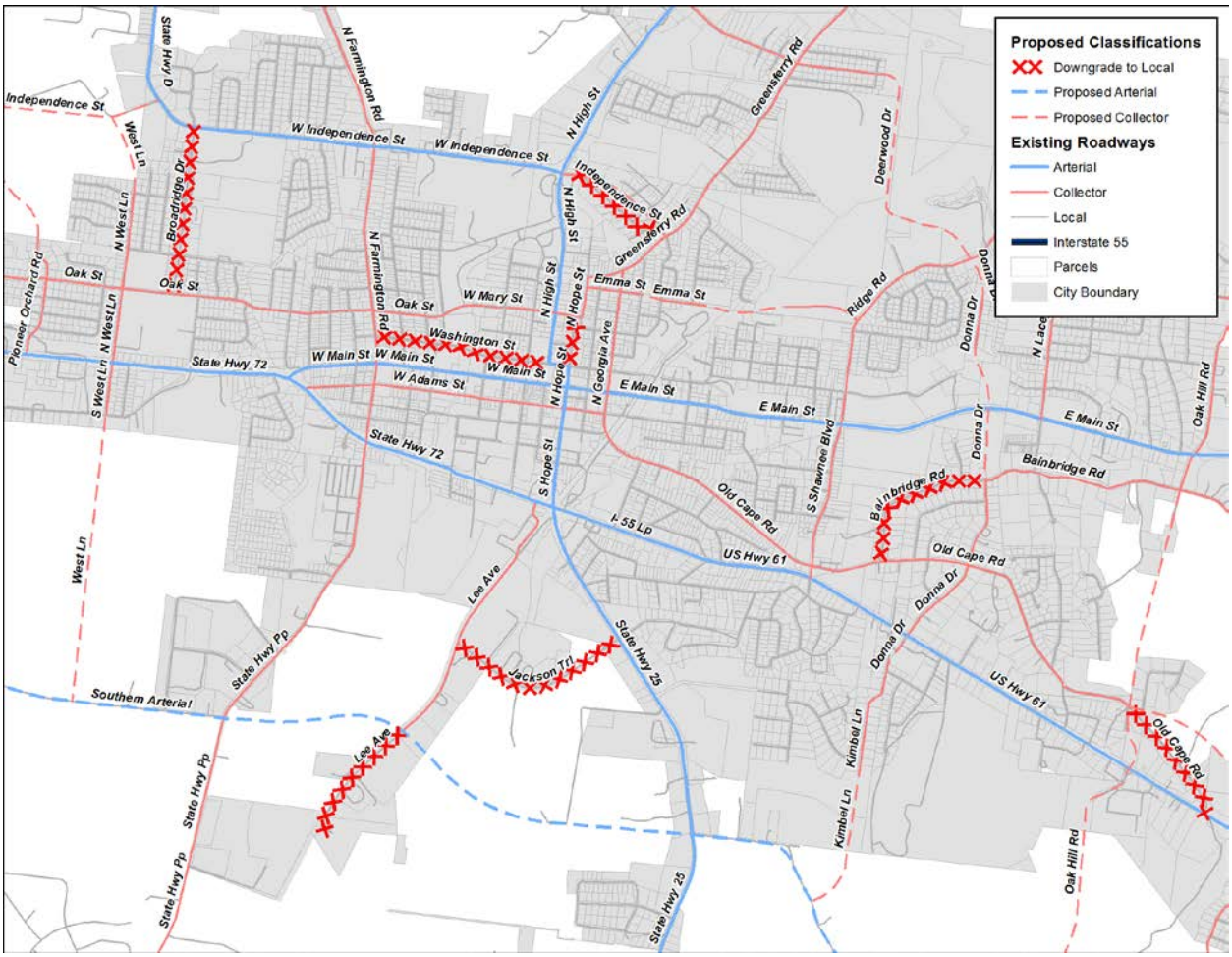


6.6. Roads to be Downgraded

There are a handful of roadways within the City that have been classified as collector roadways that may not make sense to continue to classify as the Major Street Plan is implemented. Some of these roadways are located in areas where there is an unnecessarily high density of collector roadways and some roadways are made redundant or their importance is greatly decreased with the implementation of some of the corridors in the Major Street Plan. **Figure 41** geographically represents the proposed downgraded roadways.

It is recommended that these roadways are removed from the classified roadway system and be considered local roadways as certain corridors of the Major Street Plan are completed. This change in classification could open up the possibility of adding traffic calming elements or removing access from these roadways to major arterials as they would no longer be important connections in the transportation system.

Figure 41: Roadways Proposed to be Downgraded



The suggested roadways to be downgraded and the justification for the changes in functional classification are provided below:

- **Washington Street:**
  - **Location:** Farmington Road to High Street
  - **Timing:** Immediately
  - **Justification:** this roadway has been disconnected from High Street and no longer serves as a continuous route through Uptown Jackson. Additionally, if a new collector corridor is developed along Oak and Mary Streets, there will be a new east-west connection one block to the north.
- **Hope Street:**
  - **Location:** Washington Street to Mary Street

- **Timing:** with the completion of the Near North Connector corridor
- **Justification:** this roadway no longer has full access at Washington Street and may not have full access at Mary Street with the development of the Near North Connector, making it a much less important route in the City.

- **Independence Street/Forest Street:**
  - **Location:** High Street to Olive Street
  - **Timing:** with the completion of the realignment of Independence Street
  - **Justification:** if the alternative alignment of Independence Street is constructed to the north of the existing route along the Olive Street right-of-way, this roadway will no longer serve as an important connection in the northern part of the City.
- **Old Cape Road:**
  - **Location:** June Lane to East Jackson Boulevard
  - **Timing:** with the completion of the realignment of Old Cape Road north of East Jackson Boulevard
  - **Justification:** if the concept for Old Cape Road to the east of this area is developed, this roadway would be disconnected either from East Jackson Boulevard or from the portion of Old Cape Road that will remain to only serve local access to existing homes and businesses along the roadway.
- **Jackson Trail:**
  - **Location:** Lee Avenue to Hope Street
  - **Timing:** with the completion of the Southern Arterial
  - **Justification:** this roadway is not proposed to be extended to the west and therefore only provides local access to the industrial properties on the west side of Hope Street. Therefore, this roadway is not consistent with the definition of a collector roadway and should be downgraded.
- **Lee Avenue:**
  - **Location:** Dead End to Southern Arterial
  - **Timing:** with the completion of the Southern Arterial
  - **Justification:** if the Southern Arterial concept is developed, the remaining portion of Lee Avenue to the south would not serve anything but local access to industrial parcels, and therefore would not meet the definition of a collector roadway.
- **Broadridge Drive:**
  - **Location:** Oak Street to Independence Street
  - **Timing:** with the completion of the northern extension of West Lane and western extension of Independence Street
  - **Justification:** there is a high density of north-south collector roadways on the west side of Jackson. The recommendation in the Major Street Plan is that West Lane get extended to the north and south, making additional north-south collector roadways in the area unnecessary. This downgrade makes it possible to implement future traffic calming on this roadway to make the walking environment for students at the adjacent schools safer.
- **Bainbridge Road:**
  - **Location:** Old Cape Road to Donna Drive
  - **Timing:** with the extension of Donna Drive to East Main Street

- **Justification:** once Donna Drive is extended to East Main Street, it will provide a new north-south connection that makes the westernmost portion of Bainbridge Road redundant in the classified road system.

6.7. Project Prioritization

The following list of project prioritizations, shown in **Table 19**, are based on existing as well as the future identified roadway capacity constraints identified in the forecasted level of service maps, serving the future growth areas identified by SEMPO and the City's Comprehensive Plan, and either directly or indirectly addressing existing safety concerns. However, it is recognized that many of the collector roadways will be developed in a relative piecemeal fashion as development occurs, similar to many of the existing collector roadways have been constructed in recent years.

Additionally, a top priority should be to perform more detailed corridor studies for the two proposed arterial roadways in order to develop more detailed alignments and pursue corridor preservation efforts. These corridor studies could also further identify appropriate times to secure funding to construct the arterial roadways. These roadways would not be constructed by developers, as many collector roadways have been, because these would not provide direct access to residential lots or specific commercial properties. These are regional roadways that would need to be funded by the City, through SEMPO, or MoDOT.

Table 19: Major Street Plan Project Prioritization

Priority	Roadway	Cost	Notes
Top	Northern Arterial Corridor Study	-	Study would determine timeframe for further investment
	Southern Arterial Corridor Study	-	Study would determine timeframe for further investment
High	Near North Connector	$2.5M	Downgrade Hope to Local Roadway
	Old Orchard Road	$16.6M	-
	Old Cape Road	$7.0M	Downgrade remnant of Old Cape
	Oak Hill Road (South)	$8.3M	-
	West Lane (South)	$4.2M	-
Medium	Oak Hill Road (North)	$1.6M	-
	Cane Creek Road	$6.5M	-
	West Lane (North)	$1.0M	Downgrade Broadridge to Local Roadway
	Independence Street (East)	$1.4M	Downgrade remnant of Independence Street
	Deerwood Drive (West)	$3.6M	-
Low	Brittany Drive	$7.4M	-
	Independence Street (West)	$9.7M	-
	Kimbel Lane/Donna Drive	$5.2M	Downgrade remnant of Bainbridge Road
	Oak Street	$5.6M	-
	Deerwood Drive (East)	$3.7M	-

6.8. Potential Funding Mechanisms

There are various funding options available through SEMPO and MoDOT to begin to fund expansions of the transportation system in Jackson. Additionally, collector roadways can be partially or fully constructed at the expense of developers as they construct residential, commercial, or industrial subdivisions. This

method has been used heavily in recent years; however, access management should still be enforced on the classified roadway system even if it is being funded privately by developers.

6.8.1. SEMPO Funding Programs

The local metropolitan planning organization (SEMPO) is responsible for dispensing federal transportation dollars from various programs to local projects sponsored by individual jurisdictions, including the City of Jackson. It should be noted that these funds would be most applicable for the two proposed arterial roadways. Available funding sources that can be secured through SEMPO to expand the city's transportation network include:

- Surface Transportation Block Grant (STBG): The FAST Act (the most recent FHWA funding program) changed the Surface Transportation Program (STP) into the Surface Transportation Block Grant Program. This program is the most flexible federal-aid highway program providing financial support to state and local agencies for construction, reconstruction, rehabilitation, resurfacing, operational improvements to federal-aid highways, transit capital projects, and replacement and rehabilitation of bridges on public roads. This program also has a set-aside of funds for Transportation Alternatives (TA), which can include improvements to:
    - On- and off-road pedestrian and bicycle facilities;
    - Infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity;
    - Recreational trail projects;
    - Safe routes to schools projects; and
    - Projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.
- Highway Safety Improvement Program (HSIP): HSIP funds are intended to significantly reduce traffic fatalities and serious injuries on the regional roadways, as well as publicly owned bicycle and pedestrian pathways or trails. Eligible projects include, but are not limited to, intersection improvements, traffic calming, rural corridor improvements, and bicycle and pedestrian safety projects. The federal share of this program is 90 percent.
- Transportation Investment Generating Economic Recovery (TIGER) Grants: a highly competitive grant administered by the U.S. Department of Transportation which awards grants of between $5 million and $25 million for projects that have a significant impact on the Nation, a metropolitan area, or a region.

6.8.2. MoDOT Funding

- Surface Transportation Program (STP) for Small Urban Areas: this program provides funding for transportation facilities classified as collectors or above within urban areas with a population greater than 5,000, of which Jackson is one.
- Community Development Block Grants (CDBG) for Small Urban Areas: this program provides states the opportunity to provide assistance to smaller units of local government that develop and preserve decent affordable housing, provide services to the most vulnerable in communities, and to create and retain jobs. The final opportunity regarding creating and retaining jobs is where the funding can be used to develop transportation infrastructure to attract new jobs through

business expansion or relocation, or to retain existing jobs by improving access to employment centers.

6.8.3. Local Funding Options

- Tax Increment Financing (TIF): provide the means for cities to gain approval of redevelopment of blighted properties or public projects, such as transportation investments. This type of funding allows the municipality to divert future property tax revenue increases for a defined area or district toward an economic development project or transportation improvements in that district. The general belief is that if a transportation or other investment is made that the corresponding increases in property values, and thereby taxes, around that project will offset the cost of the subsidy.
- Transportation Trust Fund (TTF), Transportation Development Districts (TDD): these types of funding provides upfront funding for projects, including roadway, streetscape, sidewalk, or trail investments, in exchange for an increase in sales tax, typically in 1/8% increments ranging between 1/8% and 1%. This type of funding is used extensively around Missouri to fund transportation improvements, including in neighboring Cape Girardeau. The TDD or TTF is a sales tax levied on the all or any (contiguous) portion of the City to fund specifically identified projects as designated on its voter ballot submission.

7. Engineering Guidelines

7.1. Street Design Guidelines

The standard drawings for the construction of new local roadways were reviewed to ensure that they still meet current planning and engineering best practices. The following changes are recommended to be updated in the City's standard specifications for street improvements:

7.1.1. Local Streets (Drawing No. 301, 306, 310)

- All local roadways should require sidewalks on both sides of the street, regardless of the street width or presence of on-street parking.
- The asterisks are not immediately apparent in their meaning. The 32' street width option has an asterisk, yet in the dimensions in the graphic below, the 17' dimension has an asterisk, which would be associated with the 38' street width option and not the 32' option. The intent and meaning of the asterisks should be clarified on the drawing.
- All sidewalks should be a minimum of 5 feet, with a strong preference for 6-foot sidewalks on all streets, regardless of their functional classification.

7.1.2. Arterial Roadways (Drawing No. 303, 308, 310)

- On-street parking should be prohibited on all arterial roadways.
- New arterial roadways should not be constructed with four through travel lanes and no center left turn lane; instead, it is proposed that three-lane sections (one travel lane in each direction and a center left turn lane) replace the four-lane option in the standards.
- Arterial roadways should provide a sidewalk on one side of the street and a multi-use path on the other side to create a safe and comfortable environment for all modes of travel.

7.1.3. Sidewalk and Ramp Standards (Drawing No. 315)

- Directional ramps should be required instead of the omnidirectional ramps outlined in the current standards. Omnidirectional ramps should only be allowed under extenuating circumstances that show directional ramps cannot be achieved, and at the direction of an engineer.

7.1.4. Driveways (Drawing No. 312)

- Narrow the maximum width of new residential driveways from 36 feet to 20 feet with a 3 foot 45 degree flare to avoid excessively wide curb cuts on residential streets.

Alterations to the access management guidelines are provided in the 'Access Management' section of this chapter.

7.2. Bicycle & Pedestrian Systems

The inclusion of coordinated bicycle and pedestrian systems within the larger transportation system is an important concept to continue to make Jackson a livable city that is able to attract and retain new residents. "Quality of life" improvements, such as the city's off-street trail network, are integral to making Jackson the community of choice for new residents in the area.

7.2.1. Sidewalks

Increasing sidewalk coverage is a key component of improving the walkability of Jackson. Sidewalks and safe crossings for pedestrians should be a component of every new roadway constructed within the City. As outlined in the street specifications above, a minimum of 5-foot sidewalks (preferably 6-foot) should be included on both sides of all local and collector roadways, regardless of width or amount of anticipated pedestrian activity. On new arterial roadways, a minimum of 10-foot multi-use path should be included on one side of the roadway and a minimum 6-foot sidewalk on the opposite side.

7.2.2. Recreational Trails & Bicycle Facilities

A review of the City of Jackson Parks Master Plan was reviewed, in part, to determine if the recommended routes are still appropriate. A review of the proposed trail and bicycle routes in the SEMPO Bicycle & Pedestrian Plan, as they relate to Jackson, was also performed to determine where the two plans overlap and where they differ.

There are a number of locations where the two plans overlap, including new trail recommendations along Goose Creek, a southern extension of the Hubble Creek Trial, connections to Cape Girardeau, access to Jackson Football Park, and new trails in the eastern residential areas of the City. In fact, the SEMPO plan provides for more connections through the south and east quadrants of the City that are not identified in the 2014 Parks Plan. Therefore, it is recommended that the City adopt the SEMPO regional plan as the city's trail plan moving forward, which would also open up many of the city's trail expansion efforts to federal funding if they are consistent with a regionally-adopted plan.

The SEMPO plan does not identify any on-street bicycle facilities on existing city streets. There are four reasons for this:

1. There was not much support for on-street bicycle facilities during the public outreach portion of the SEMPO plan. Jackson is a very family-oriented city, and bike lanes generally appeal to cyclists who are comfortable riding on-street or in mixed traffic.
2. There is a high density of trails proposed for Jackson, making the need for additional bike facilities within the existing extents of the City less essential.
3. The grid of streets, particularly in and around Uptown Jackson, have low speed and low traffic volumes, which are generally conditions where cycling on the street is comfortable and render additional striping for bike lanes unnecessary.
4. Many of the City's roadways do not have the extra road width to accommodate bike lanes. For many existing roads to include bike lanes, they would need to be widened or potentially restrict on-street parking.

The city could invest in signage to remind road users that bicycles are vehicles that belong on the road, not the sidewalk. If signage is posted along city roads, it should be "Bicycles May Use Full Lane" (BMUFL) sign, and not "Share The Road" (STR) signs. Studies have found the latter sign to be ineffective at spreading the message that cyclists are entitled to ride in the center of the lane. In addition, per the Manual on Uniform Traffic Control Devices (MUTCD), the shape and color of the BMUFL is a white regulatory sign, whereas the STR is a yellow warning sign. Bicyclists should be viewed less like potential hazards and more like the legal road users that they are.

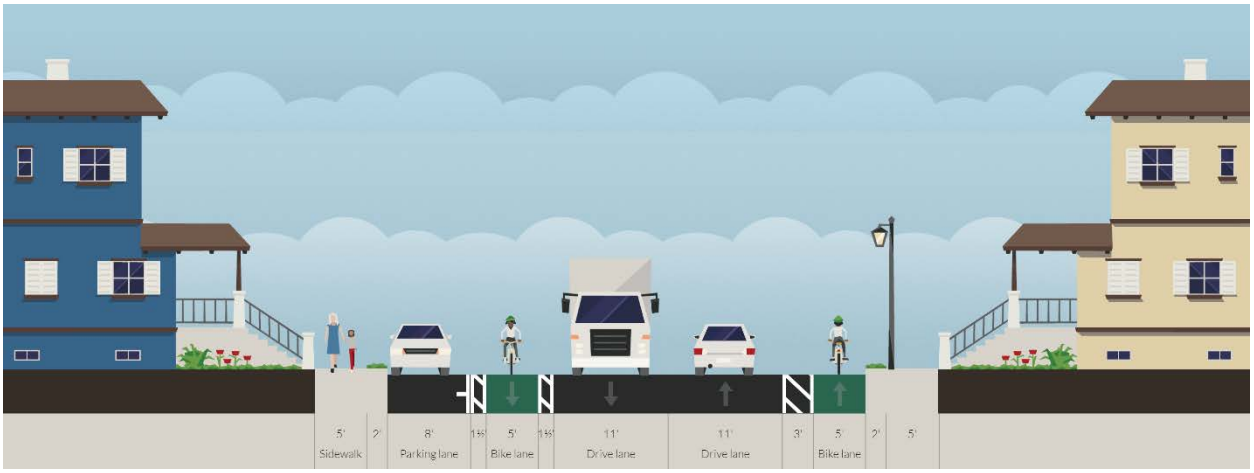
There is potential for on-street bicycle facilities on future collector roadways as the city builds out the Major Street Plan (arterial roadways are recommended to have multi-use paths, making bike lanes

redundant). These collector roadway bike lanes could be good feeder routes to the regional trail system and provide "last mile" connections to residential areas and destinations throughout the City that are not directly served by the trail system.

The minimum bicycle facility type that should be considered for collector roads is a protected bike lane, also known as a cycle track, which provides physical separation between moving vehicular traffic and bicycles typically in the form of a raised medians, on-street parking, or bollards. If physical protection cannot be achieved, a buffered bike lane should be the next consideration, where a striped buffer is provided in lieu of a physical barrier. Only in extenuating circumstances should a bike lane with no buffer be designed for implementation.

The recommended design guidance on protected, buffered, and conventional bike lanes should be taken from the latest version of the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide. Current design standards for buffered bike lanes is an entire "bike lane width" of 8 feet. This includes a 5-foot bike lane with 3-foot buffer. The buffer can be placed between the bike lane and moving traffic, between the bike lane and on-street parking to prevent "dooring" conflicts, or split half and half, with the bike lane 1.5-feet from moving traffic and 1.5-feet from parked vehicles. An example of buffered bike lane configurations is provided below in **Figure 42**.

Figure 42: Collector Road with Bike Lanes



With the hilly terrain in the city, consideration should be given to providing bicycle climbing lanes. Typically these can be accommodated by narrowing the vehicular travel lanes to 10-11 feet wide and adding a bicycle lane on the uphill grade. Before and after the hill, there does not need to be a bicycle lane and can be lanes shared by both bicyclists and vehicles. Transition signing and striping should be provided to guide vehicles to the correct placement within the travel lane. Since bicyclists are slowest going uphill, this would provide additional space and comfort level for bicyclists, while narrowing vehicle travel lanes would lower speeds and be a traffic calming measure.

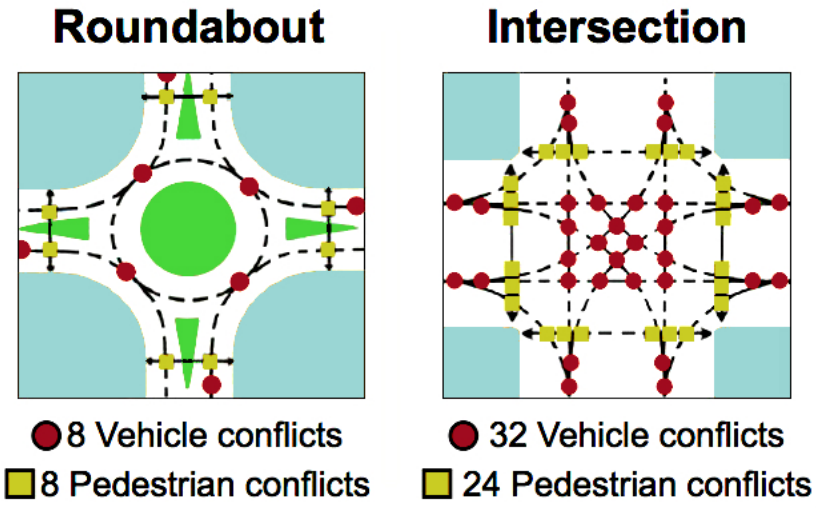
Any future traffic counts performed in and around the City should not only count the number of pedestrians as well as vehicles, but also cyclists. This will begin to provide historical documentation of bicycle usage in and around the City, and a baseline of favorite routes that may need more attention in the future.

7.3. Signals & Roundabouts

As the City moves forward, particularly with implementing the Major Street Plan, attention should be paid to the type of intersections that are constructed. Before implementing a new traffic signal, it should be standard practice in the city to evaluate a roundabout to determine if they are a suitable intersection control in lieu of additional traffic signals. Roundabouts can reduce travel delays and keep traffic moving continuously, rather than relying on signal timing to minimize delay at intersections.

Roundabouts also have positive benefits on intersection safety over traditional traffic signals. As shown in **Figure 43**, roundabouts cut the number of conflict points between vehicles as well as between vehicles and pedestrians by 75% and 67%, respectively. Additionally, according to FHWA, roundabouts have been shown to reduce the types of crashes where people are seriously hurt or killed by 78-82% when compared to conventional stop-controlled or signalized intersections[4]. Roundabouts can also be used to improve aesthetics or add a gateway feature along a corridor without reducing capacity or operations up to a certain point.

Figure 43: Roundabout vs. Traditional Intersection Conflict Points



If roundabouts are not feasible at a location due to traffic volumes or geometric constraints, there are some design aspects of new signals to reduce their impacts on multi-modal travel and operations. If possible, channelized right turns should be avoided due to their significant negative impacts on walkability, navigability by the sight impaired, and right-of-way impacts. Flashing yellow left-turn arrows should be implemented for all permissive left turn arrows to indicate that drivers need to yield to oncoming traffic and pedestrians. Regardless of the type of intersection, signal or roundabout, the minimum distances between intersections, as outlined in the subsequent access management section, should be enforced.

7.4. Access Management

Implementing access management principles improves the safety and efficiency of roadways (arterials in particular) by providing minimum spacing between intersections and driveways and limiting access to adjacent land uses. Access management helps ensure that roadway investments are used to their full

[4] Taken from: https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/ on 11/6/2017

potential by maintaining optimal traffic flow, reducing the number of conflict points on a segment of road, and reducing the number of crashes. Common treatments used to impose access management include:

- Enforcing minimum distances between intersections and driveways;
- Construction of frontage or backage roads;
- Driveway consolidation and cross access between adjacent parcels;
- Installation of medians;
- Allowing U-turns at intersections and other locations; and
- Right-in/right-out driveways and side street intersections.

For more comprehensive information on access management principles and impacts, FHWA has a compilation of research available at https://safety.fhwa.dot.gov/intersection/other_topics/corridor/.

7.4.1. Intersection & Driveway Spacing

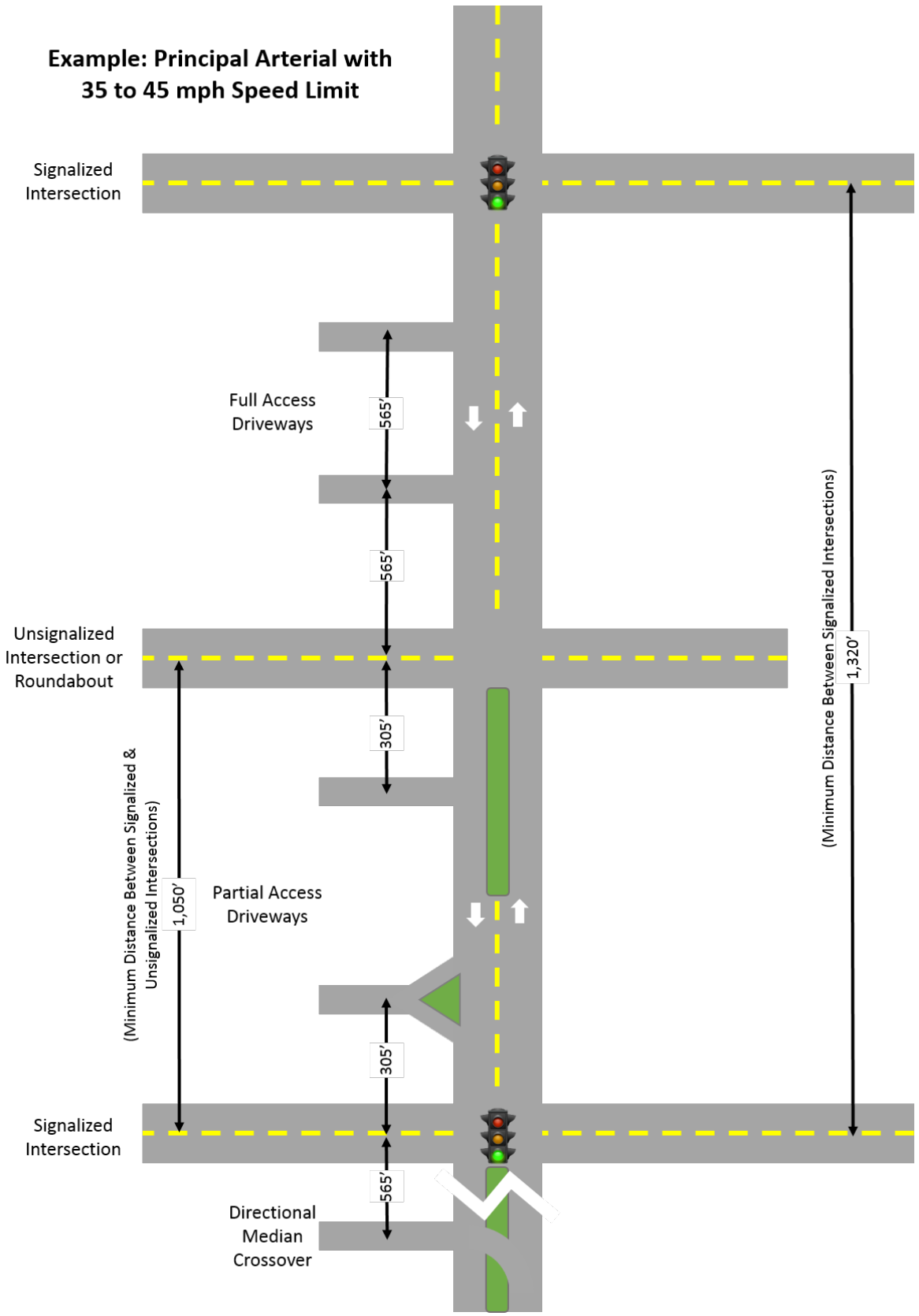
Arguably the most important tenet of access management is enforcing minimum spacing requirements between intersections and driveways. Recommended minimum spacing between driveways and intersections are generally based on a roadway's functional classification and speed limit. **Table 20** below provides the recommended minimum spacing for various types of access. An example of the concept shown in the table is provided graphically in **Figure 44**.

Table 20: Minimum Spacing Standards for Driveways, Intersections, & Median Crossovers

Roadway Functional Classification	Speed Limit	Minimum Centerline to Centerline Spacing (ft)			
		Signalized Intersections to Other Signalized Intersections	Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers	Full Access Entrances or Directional Median to Other Full Access Entrances and Any Intersection or Median Crossover	Partial Access One- or Two-Way Driveways to Any Type of Driveway, Intersection, or Median Crossover
Major Arterial	≤ 30 mph	1,050	880	440	250
	35 to 45 mph	1,320	1,050	565	305
	≥ 50 mph	2,640	1,320	750	495
Minor Arterial	≤ 30 mph	880	660	355	200
	35 to 45 mph	1,050	660	470	250
	≥ 50 mph	1,320	1,050	555	425
Collector	≤ 30 mph	660	440	225	200
	35 to 45 mph	660	440	325	250
	≥ 50 mph	1,050	660	445	360

For local street spacing, a spacing distances of 50 feet between entrance radii is specified to assure a minimum separation between such entrances. No commercial entrance is to be within 115 feet minimum measured from the outer edge of the inscribed circle of a roundabout. If an entrance is approved within that 115 feet, it should be limited to right-in/right-out movements only. The 115 feet minimum is based on the stopping sight distance for 20 mph.

Figure 44: Illustration of the Relationship between Spacing Standards

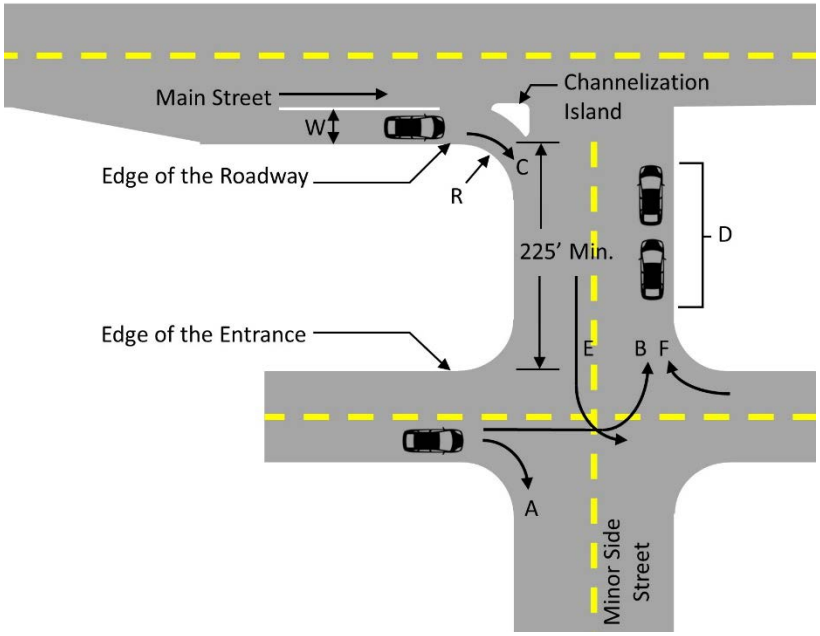


7.4.2. Corner Clearance

Corner clearance for driveway access should meet or exceed the minimum driveway spacing requirements for that roadway. Corner clearance is the minimum distance entrances on a minor side street need to be separated from an intersection to prevent queued vehicles from backing up into the highway or blocking entrances near the intersection. This separation protects the functional area of the intersection, so the intersection operates as optimally and safely as possible. The entrance and spacing standards from Table 20 are measured from the centerlines of the intersections, whereas the corner clearance is measured from the edges of the roadway. The corner clearance distance should apply where it is greater than the Table 20 spacing standard.

The downstream corner clearance should be a minimum of 225 feet, which equals the intersection sight distance for 20 mph. For the right turn out of the side street entrance (flow A), the vehicle approaching from the left (flow C) should be considered; the greater the radius (R) for right turning vehicles from the main roadway, the faster they will be approaching the side street entrance. For the driver exiting the side street entrance to go left (flow B) or right (flow F) or to enter the opposite entrance (flow E), the length of the queue at the main intersection should be considered to assure there is enough room that the entrance will not be blocked by queue D. The minimum upstream corner clearance is the greater of 225'+W or the queue D. An example of the concept shown in the table is provided graphically in **Figure 45.**

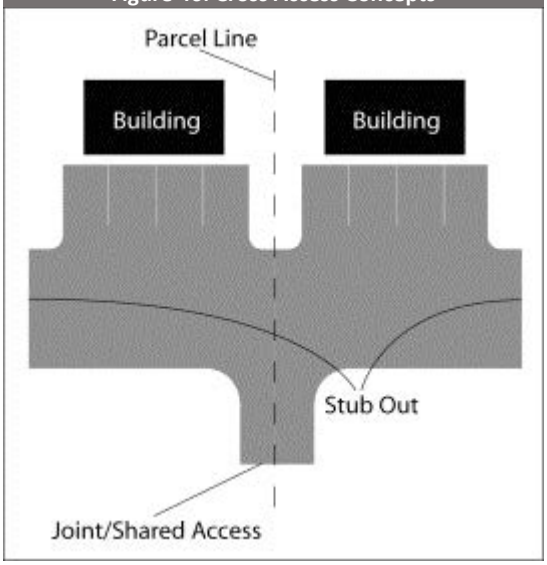
Figure 45: Corner Clearance Illustration



7.4.3. Driveway Consolidation & Cross Access

A joint private access easement should be considered between adjacent lots fronting on arterial and collector roadways in order to minimize the total number of access points along those streets, to enforce the minimum driveway spacing provided above, and to facilitate traffic flow between private parking lots.

Figure 46: Cross Access Concepts



The provision for cross access should be enforced during the City's review of proposed site plans along arterial and collector roadways. All commercial properties fronting these roadways should provide stub entrances on their parking lots to any adjacent property that has the potential to be developed into another commercial property. Additionally, the provision for joint, or shared, access should be included in the approval process for any commercial properties that develop simultaneously. These concepts are illustrated in **Figure 46**. This additional access will allow for the overall reduction in access points per parcel of land, thereby increasing the safety along the roadway.

7.4.4. Driveway Design

Many of the design criteria identified in the 2003 Plan still apply today. To reiterate some of those important points, the following criteria should be applied to the design and configuration of a driveway access:

- Driveway access should not be permitted for parking or loading areas that require backing maneuvers in an arterial or collector roadway.
- A single curb cut should be allowed for access to single family and duplex residential tracts.
- For corner tracts, access should be provided from the lesser street. The determination as to the lesser street should be based on the functional street classification and traffic volumes.
- No cuts through a left-turn bay or a median should be permitted in order to provide for left turn movements to driveway approaches.
- Driveways in right-turn bays or right-turn transition areas should not be permitted.
- When a commercial or multi-family development abuts more than one public street, access to each abutting street may be allowed if the following criteria are met:
    1. It is demonstrated that additional access is required to adequately serve driveway volumes and would not be detrimental or unsafe to traffic operations on public streets;
    2. The minimum requirements for corner clearance for commercial or multi-family driveways are met; and
    3. The proposed access does not promote cut-through traffic.

7.4.5. Entrances on Opposite Sides of a Roadway

Unless entrances are directly across from each other creating a four-way intersection that meets the spacing standards identified above, entrances on opposite sides of the street should be offset from each other to prevent conflicting left turns. Spacing of two T-intersection entrances across from each other

should be such that distinct left and right turn maneuvers could be made, rather than a diagonal movement across the major street. Separation of T-intersections helps reduce the crash potential, and helps prevent interlocking left turn movements that lead to gridlock.

7.4.6. Access Control (Medians)

The inclusion of medians on busy collector or arterial roadways can have major positive impacts on safety and traffic operations without adverse impacts on adjacent commercial land uses. According to materials produced by the Federal Highway Administration (FHWA), provisions for raised medians can reduce overall crashes by 15% - 30% and reduce severe and fatal crashes even more effectively[5]. Additional benefits to roadways resulting from the construction of raised medians include:

- Decreasing delays for motorists by over 30%;
- Increasing capacity of the roadway by over 30%;
- Reducing speeding along roadways; and
- Providing space for landscaping and city branding within the right-of-way[6].

7.4.6.1. Economic Impacts

The installation of medians often raise concerns from adjacent business owners about losses in potential businesses due to the reduction of direct access points. These are often concerns raised by businesses that rely heavily on pass-by traffic such as gas stations or fast food restaurants. Additional materials from FHWA and other sources regarding the economic impacts of median treatments indicate no statistically significant difference in business revenues between locations with and without median treatments. In fact, the evidence shows that once medians are installed, there is a much more favorable opinion of the treatment from business owners[7]. Some business owners have indicated an increase in property values (as much as 18% in one study) resulting from the access management treatments. This increase could be attributed to improved aesthetics along the corridor or better multi-modal accommodations.

As important as the economic impacts to businesses along the corridor are the economic impacts of reducing crashes along a roadway. When an accident occurs, there is more than just the cost of the damage to the vehicle or property. The total picture of crash costs also include lost productivity, medical costs, legal and court costs, emergency service costs, insurance administration costs, congestion costs, and workplace losses. In 2015, these costs added up to $242 billion in the United States, an average cost of $784 per person in the nation[8]. The average cost per crash by severity in Missouri[9], adjusted for inflation to 2017, are:

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[5] FHWA Benefits of Access Management Brochure:
https://ops.fhwa.dot.gov/access_mgmt/docs/benefits_am_trifold.pdf
[6] State Best Practice Policy for Medians:
https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa11019/fhwasa11019.pdf
[7] Economic Effects of Access Management Techniques in North Carolina:
http://digital.ncdcr.gov/cdm/ref/collection/p249901coll22/id/221356
[8] The Economic and Societal Impact of Motor Vehicle Crashes:
https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013
[9] Cost of Crashes by State:
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0ahUKEwiQ0KicxJjXAhWDeSYKHW

- Property Damage Only: $4,671
- Non-Incapacitating Injury: $83,499
- Incapacitating Injury: $321,149
- Fatality: $5,138,392

It is easy to see how preventing crashes, particularly severe crashes, has a significant benefit to the area's economy as a whole in addition to the individuals who were involved in the accident. Access management, and in particular median treatments, have an impactful bearing on reducing severe crashes because uncontrolled left turns into and out of properties and side streets are statistically the most dangerous movements in traffic.

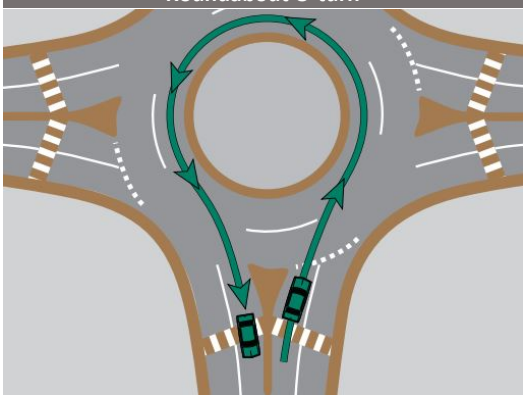
7.4.6.2. Accessibility

The construction of medians has an impact on how certain parcels are accessed, particularly in the vicinity of traffic signals and other intersections. Special accommodations must be made to provide adequate access to parcels along the roadway. Examples of some of these accommodations are provided below.

7.4.6.2.1. Roundabouts

Replacing certain traffic signals or side-street stop intersections with roundabout can help safely facilitate U-turns for access to properties in lieu of providing left-turn access from the major roadway. Roundabouts and medians are often used together when adding access management principles to a corridor because they allow for safe U-turn movements with no special infrastructure or yielding priorities required.

Roundabout U-turn



7.4.6.2.2. Intersection U-Turns

If property access is restricted near intersections by medians, and roundabouts are infeasible due to right-of-way constraints or cost, provisions should be made to safely accommodate U-turns at intersections. The intersection will need to be wide enough to safely allow for U-turns for a specified design vehicle and special signage or striping may need to be added, particularly for the first locations where median treatments are being introduced.

NtDwcQFgggMAE&url=http%3A%2F%2Fwww.cmfclearinghouse.org%2Fcollateral%2FServiceLife_and_CrashCostUserGuide%2FCrash%2520Cost%2520Summary%2520Table.xlsx&usg=AOvVaw21D23MCuSX1VydkjtPm2M5

Combined Left Turn/U-Turn Signage	Side Street Signage
	

7.4.6.2.3. Mid-Block Left Turns & U-Turns

At safe locations, where sight distances are adequate and driveway conflicts are minimal, left turns into properties and U-turns can be included in the medians to provide access that is not at an intersection.

Directional Median Crossover	Mid-Block U-Turn Accommodations