CONNECTING Ouachita 2045

TECHNICAL REPORT #4

Needs Assessment

August 2020

Prepared for:

OCOG Ouachita Council of Governments

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1.0 Introduction

This report discusses transportation needs for the Monroe Metropolitan Planning Area (MPA). It is informed by the analysis in *Technical Report 2: Existing Conditions* and an assessment of future needs based on:

- current trends,
- existing plans, and
- public and stakeholder involvement.

2.0 Special Considerations

Federal regulations require long-range transportation plans to consider resilience and tourism as they relate to transportation.

2.1 Resilience

In the context of this plan, "resilience" is the ability of transportation systems to withstand or recover from extreme or changing conditions and continue to provide reliable mobility and accessibility in the region. The impacts of weather, natural disasters, or man-made events need to be considered in resiliency.

Regional Considerations

The Monroe Metropolitan Planning Organization (MPO) should carefully consider transportation resiliency needs related to the following regional issues:

- **High wind events**: The Monroe MPA can experience severe thunderstorms that produce damaging winds. Additionally, there is a risk for tornadoes within the MPA as it is located in "Dixie Alley", an area of the Southern United States that is particularly vulnerable to tornadoes. Although the MPA is located inland from the Gulf of Mexico and Atlantic Ocean, tropical systems can still bring high winds to the MPA. These high wind events can affect transportation systems, such as debris blocking roadways.
- **Floods**: In the MPA, flooding hazards are typically flash flooding, river or small stream flooding, or flooding from tropical systems that pass through the MPA. Flooding can result in significant damage to transportation systems, such as roads being washed out by floodwaters.
- **Snow and Ice**: The MPA, like most of the southeast United States, does not usually experience significant winter weather. However, even a small amount of winter precipitation (snow and ice) can have a significant impact on the MPA's transportation system, such as road and bridge closures due to icy conditions. Most drivers will also be unfamiliar with driving in these conditions, increasing safety concerns.
- **Temperature Extremes**: The Monroe MPA can experience both extremely high and extremely low temperatures. Both temperature extremes can affect transportation systems, such as extremely high temperatures affecting the integrity of pavement and extremely low temperatures resulting in road and bridge closures due to icy conditions.
- **Earthquakes**: Earthquakes can result in damages to transportation systems. However, the risk of earthquakes within the MPA is relatively low. There has not been a reported

earthquake within the Monroe MPA since at least 1931. Nonetheless, distant earthquakes, such as those that could occur in the New Madrid Seismic Zone, may still impact transportation systems within the MPA.

Resiliency Needs

Ensuring resiliency involves understanding hazards and identifying mitigation strategies. The MPO should continue to coordinate with local and regional hazard mitigation planners to proactively plan for a transportation system that is responsive to hazards. The MPO should also continue to advocate for best stormwater management practices and green infrastructure in the design of transportation projects.

Stormwater Mitigation

As an area's population and employment grow and change, its land use and infrastructure change as well. These changes affect how precipitation events, the product of which is stormwater, affect roadways, homes, runoff, ground water, and more. Stormwater can become ground water through runoff or evaporation. When stormwater becomes runoff, it ends up in nearby streams, rivers, or other water bodies as surface water.

The overall effect precipitation from a storm can have is heavily influenced by land use and development. Any change in these factors will change how stormwater behaves within the area. As areas develop, previously pervious areas, such as, grass, wetlands, and wooded areas, are replaced by impervious surfaces. Examples of developed impervious areas include new roadways, sidewalks and driveways in new subdivisions, and parking lots for shopping centers. The increase in impervious areas can significantly decrease the runoff time in an area, which can lead to an increase in flooding.

Significant rainfall in an urban area within a short amount of time can lead to flooding issues for a municipality. This flooding can damage property and create environmental and public health hazards by introducing contaminants into new areas. Without proper drainage and stormwater mitigation efforts, new transportation projects have the potential to exacerbate existing stormwater issues. With well-planned, coordinated efforts and using "green infrastructure" design, projects can create a more natural looking environment and decrease the chances of detrimental stormwater runoff issues. In fact, in some cases, stormwater drainage may even be improved.

Green Infrastructure

Green infrastructure is cost-effective approach to managing weather events, while providing benefits to the community. When rain falls onto impervious areas, stormwater is forced to drain through gutters, storm sewers, and other collection systems. This runoff may collect trash, bacteria, and other pollutants from the urban environment and introduce them to community at large, creating health risks. Green infrastructure uses vegetation, soils, and other elements to mimic a more natural environment, treating stormwater at its source, using the ground and plants as a filter to eliminate potential pollutants. With an increase in green space, the health benefits to a community are obvious.

A natural environment approach to development positively impacts a community's stormwater drainage system in several ways. It can mitigate flood risk by slowing runoff and reducing stormwater discharge. With less water to divert, the risk of flooding is lower. Green infrastructure may also decrease the size of drainage system needed. A smaller system would reduce the overall cost of materials, maintenance, and future repairs. Effective examples of Green Infrastructure, as seen below, include permeable pavements, bioswales or vegetative swales, green streets and alleys, and green parking. Green Infrastructure can also be applied to commercial buildings and residential homes, but when used as stormwater mitigation for transportation development, the health and cost benefits are certainly worth exploring for any community.

Figure 2.1: Green Infrastructure Examples

Source: https://www.epa.gov/green-infrastructure/what-green-infrastructure

Transportation Related Strategies

- During project design, minimize impervious surfaces and alterations to natural landscapes.
- Promote the use of "green infrastructure" and other Low-Impact Development (LID) practices. Examples include the use of rain barrels, rain gardens, buffer strips, bioswales, and replacement of impervious surfaces on property with pervious materials such as gravel or permeable pavers.
- Adopt ordinances that include stormwater mitigation practices, including landscaping standards, tree preservation, and "green streets".
- Develop a Standard Urban Stormwater Mitigation Plan (SUSMP) at multiple levels; including state, region, and municipality. A SUSMP is a useful tool where municipalities put into writing, requirements for stormwater control measures for development, as well as, redevelopment. Incorporating LID practices into a SUSMP is an effective method of reducing a development's impact on its environment. Efforts should be made to coordinate these plans, even though multiple agencies would have them in place.

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Additional Strategies

- Educate residents, business owners, elected officials, and developers on the impacts of stormwater and how they can assist with mitigation.
- Identify the areas most likely to flood during heavy storm events and prioritize mitigation efforts in that area and areas upstream from it.
- The adoption of open space preservation plans, which will balance land use and local developments with preservation and conservation of the existing open space.
- The establishment of stormwater fees to support the funding of stormwater management projects and practices.
- Reduce the amount of impervious surfaces on residential, commercial, and public properties and offer incentives to encourage the change.

Existing Policies and Considerations

The State of Louisiana has a statewide stormwater management plan that has been published through the Louisiana Department of Environmental Quality (LDEQ). Information about the plan can be found at:

https://deq.louisiana.gov/page/storm-water-protection

Within the MPA, none of the incorporated areas, or Ouachita Parish, maintain a stormwater management plan. The MPO should coordinate with all of the agencies above to ensure consistency in the plans and ordinances, as well as to create additional documents and policies necessary to mitigate stormwater impacts within the MPA. The MPO should work with the Cities of Monroe and West Monroe, and Ouachita Parish, to create their own stormwater management plans or SUSMP.

2.2 Tourism

Ouachita Parish 2018 Tourism Earnings[1]

Direct Spending by Visitors: $177.83 million

Direct Employment: 2,540 jobs

Direct Earnings: $60.68 million

Local Taxes Generated: $6.31 million

Leisure and tourism trips are an important consideration in transportation planning. While the Ouachita MPA is not one of the state's top tourism destinations, there are many attractions in the area and tourism is an important part of the overall economy.

In Ouachita Parish, visitors spent almost $178 million in 2018[1]. From 2016-2018 the parish experienced about five (5) percent growth in in its direct spending, employment, and earnings from tourism.

Major Attractions and Tourist Areas

The top activities for visitors to northern Louisiana, according to 2017 data[2], is dining, visiting friends and relatives, and shopping. The Monroe MPA also offers a variety of attractions unique to the area such as:

- natural attractions (i.e. Black Bayou Lake National Wildlife Refuge, Cheniere Lake Park, and Kiroli Park)
- historic and cultural museums (i.e. Northeast Louisiana Children's Museum and the Louisiana Purchase Gardens & Zoo)
- local shopping areas and businesses (i.e. Antique Alley, Landry Vineyards).

Figure 2.2 shows the major tourist destinations listed by the tourist organization Monroe-West Monroe. These attractions are scattered across the region but museums are concentrated in downtown Monroe and parks and natural attractions are located mostly on the outer edges of Monroe and West Monroe and farther out in the parish.

[1] "Tourism Spending In Louisiana Parishes 2018," University of New Orleans (2019), https://www.crt.state.la.us/Assets/Tourism/research/documents/2018-2019/Louisiana%20Parishes%20Spending%20Report%202018%20Rev.pdf

[2] "2017 Louisiana Visitor Profile," Allen, V. (2018), Louisiana%20Visitor%20Profile-Final%20Rev%2081418.pdf

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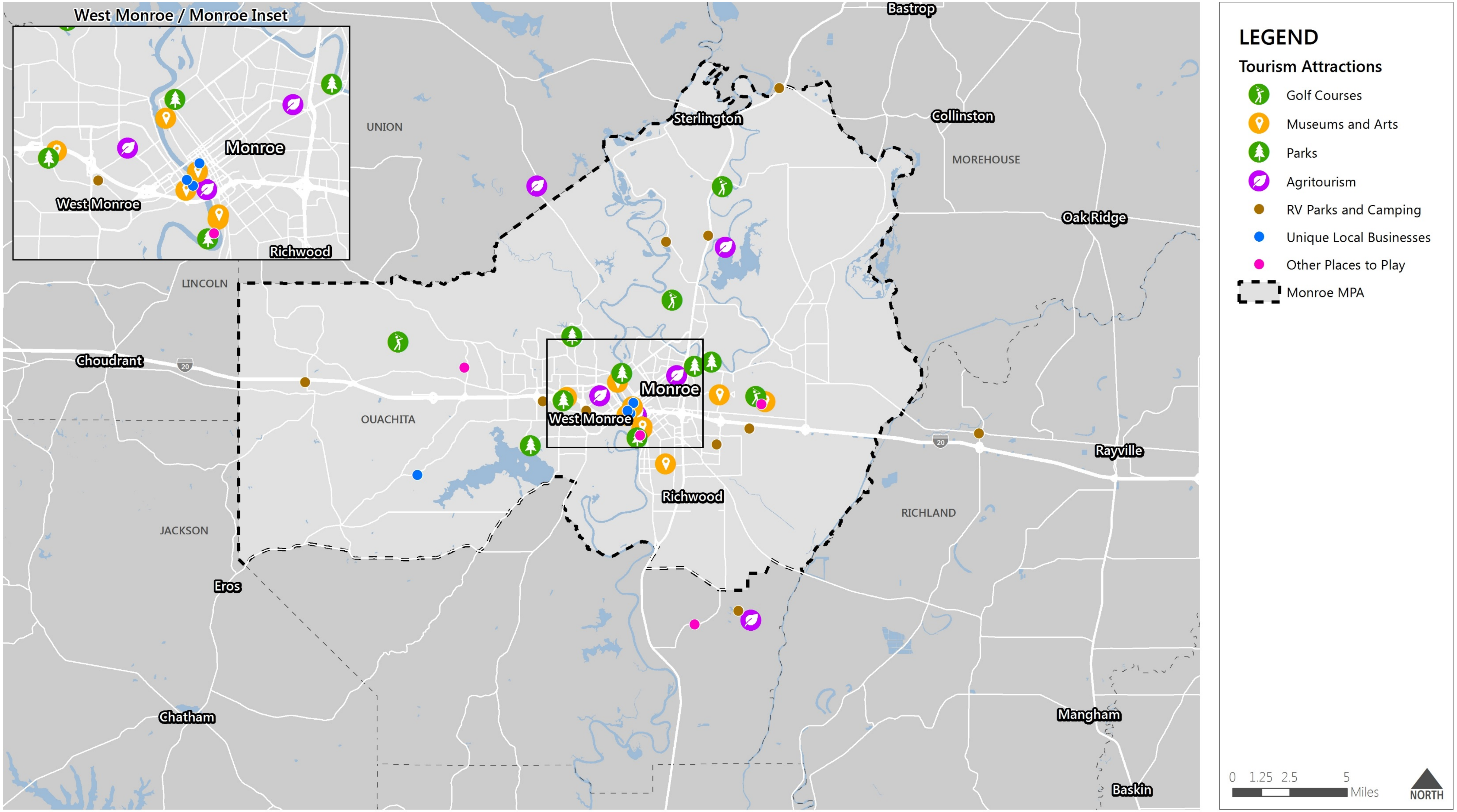
Besides attractions, the MPA offers a large selection of hotels, shopping, and dining options for visitors. Figure 2.3 maps the hotspots of these amenities. The areas with highest concentrations include:

- by Thomas Rd and I-20 in West Monroe
- downtown West Monroe by Trenton St
- by N 18th St, Louisville Ave, and Forsythe Ave in Monroe
- by Pecanland Mall by Garrett Rd and I-20 in Monroe.

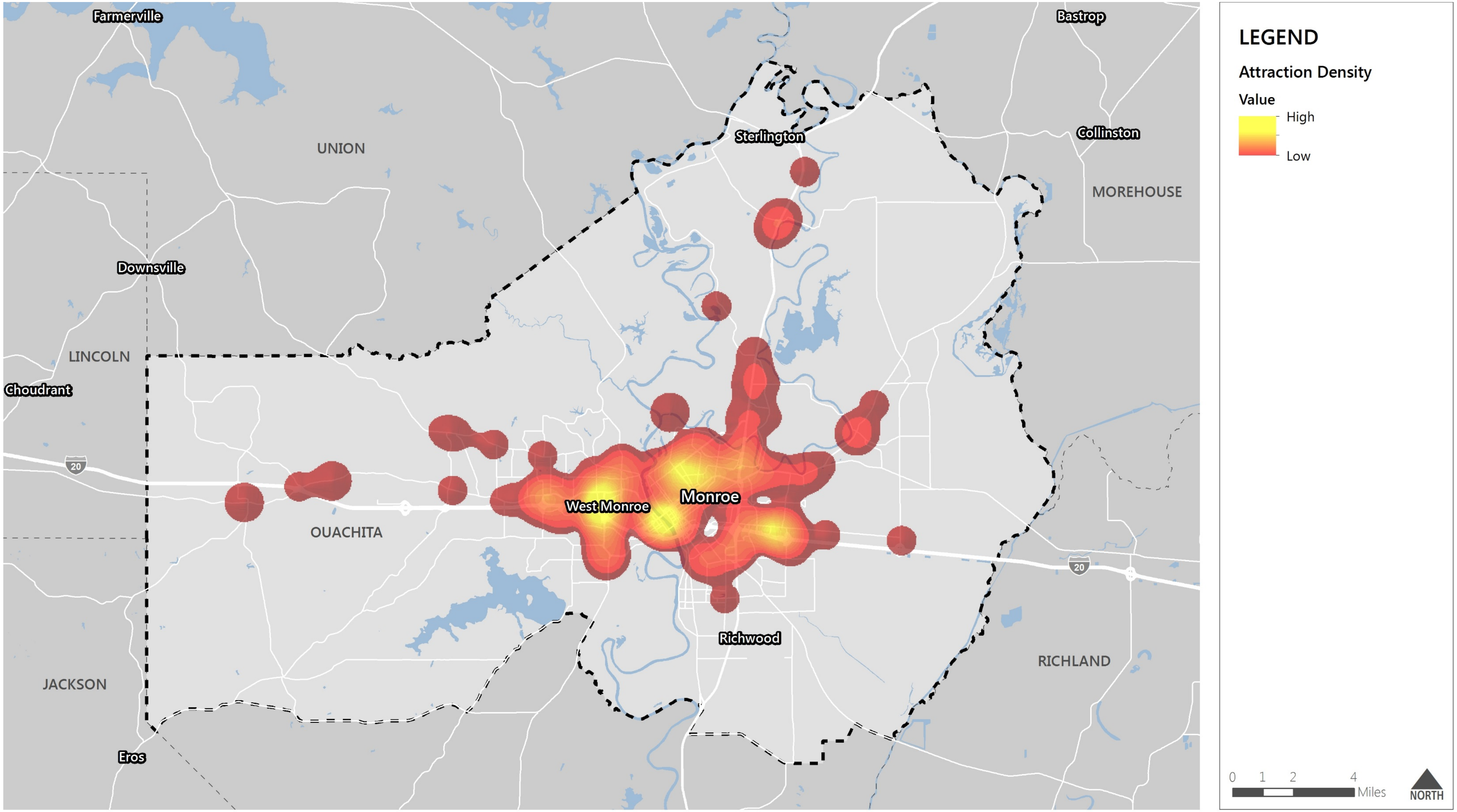
Figure 2.2: Major Tourist Destinations and Areas



Data Source: Monroe-West Monroe

Disclaimer: This map is for planning purposes only.

Figure 2.3: Concentration of Tourist Amenities



Data Source: Monroe-West Monroe; STR Census

Disclaimer: This map is for planning purposes only.

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Arriving and Departing the Region

Most visitors enter the region by driving. Interstate 20, US-80, and US-165 provide major gateways for entering and leaving the region. Greyhound service is also available in Monroe with connections to many cities such as Ruston, Jackson, Atlanta, and Dallas.

In addition to driving, the Monroe Regional airport provides commercial air service. The airport provides shuttle service and Monroe Transit operates bus service to and from the airport.

Traveling Within the Region

Once visitors have arrived to the region, they have several options for traveling, including:

- **Walking and biking:** There are many sidewalks and some bicycle lanes and multi-use paths in the region that visitors could use to reach their destinations.
- **Transit:** Monroe Transit provides fixed route service throughout the city with a user-friendly webpage and app for tracking buses and routes. West
- **Driving:** Visitors can rent a car from any of the several car rental companies in the area.
- **Taxis and Transportation Network Companies:** Traditional taxis, Uber, and Lyft are available in the region.
- **Tour Bus:** Visitors also have the option of traveling via tour buses as a group or as individuals.

Tourism Needs

There are many potential strategies to enhance and encourage tourism within the MPA, including:

- **Wayfinding:** Even with the prevalence of smartphones and navigation technology, visitors to the region may require wayfinding assistance in some areas. This is especially true near gateways and major points of interests.
- **Special Event Transportation Management:** Major special events in the region (such as concerts, college sports events, and more) require temporary solutions such as "contra-flow" traffic on local streets, road closures, detours, special wayfinding, supplemental parking, and shuttles.
- **Expanded Sidewalks and Bike Facilities:** Many visitors to the region may not have a car at their disposal. Improving and expanding sidewalks, bike lanes, and pathways in major tourist areas will improve visitor mobility and reduce the need for additional car traffic.
- **Expanded Public Transportation:** Again, many visitors to the region may not have a car at their disposal. Expanding transit routes and coordination with the airport shuttle service could improve mobility for visitors.

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- **Consultation with stakeholders:** As tourism continues to grow, the MPO should continue to coordinate with tourism stakeholders to understand and accommodate their needs. Furthermore, the MPA is home to several rail lines. Railway needs can impact traffic and travel, including the means by which tourists often navigate the region.

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Table 2.1: Major Tourist Destinations

Destination Type	Name
Museums and Arts	Biedenharn Museum & Garden
	Chennault Aviation & Military Museum
	Louisiana Purchase Gardens & Zoo
	Masur Museum of Art
	Monroe-West Monroe Convention & Visitor Bureau
	Northeast Louisiana Children's Museum
	Northeast Louisiana Delta African American Museum
Golf Courses	Bayou Desiard Country Club
	Calvert Crossing Golf Club
	Chennault Park Golf Course
	Frenchmen's Bend
Other Places to Play	Disc Golf Course
	Excalibur Family Fun Center
	Lazarre Park Disc Golf Center
	Twin City Motorsports Park
Parks	Bayou Park
	Cheniere Lake Park
	Forsythe Park
	Kiroli Park
	Restoration Park
	ULM University Park
Unique Local Businesses	Antique Alley
	Flying Tiger Brewery
	Landry Vineyards
	Ouachita Brewing Company
Wildlife Areas & Agritourism	Black Bayou Lake National Wildlife Refuge
	D'Arbonne National Wildlife Refuge
	Monroe Downtown Rivermarket
	Russell Sage State Wildlife Management Area

Sources: Monroe-West Monroe

3.0 Emerging Trends

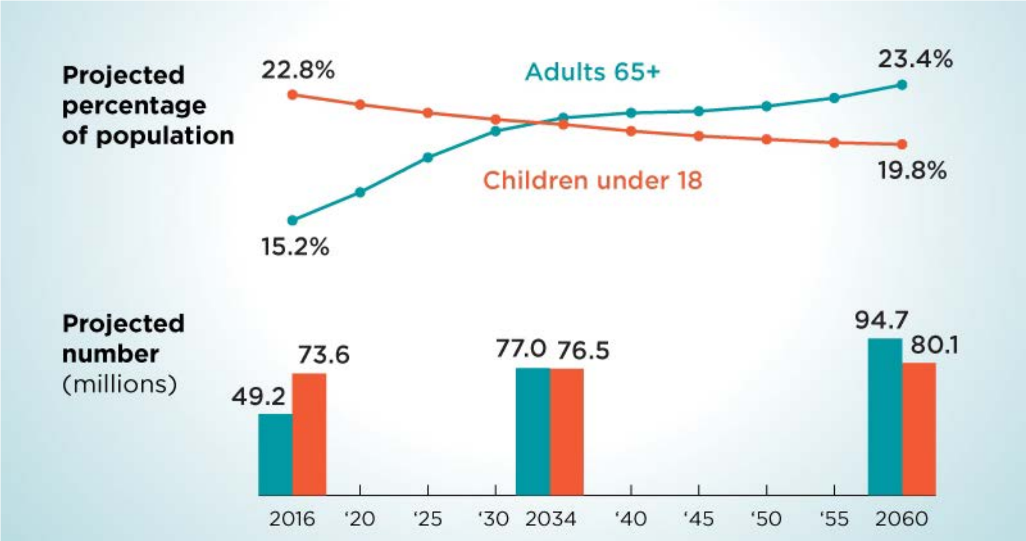
In recent years, travel patterns have changed dramatically due to demographic changes and technological advances. Many of these changes are part of longer-term trends, while others are newer, emerging trends.

3.1 Changing Demographics and Travel Patterns

An Aging Population

The population aged 65 or older will grow rapidly over the next 25 years, nearly doubling from 2012 to 2050.[3] This growth will increase the demand for alternatives to driving, especially for public transportation for people with limited mobility or disabilities.

Figure 3.1: Growth in Senior Population



Source: U.S. Census Bureau

Most People are Traveling Less

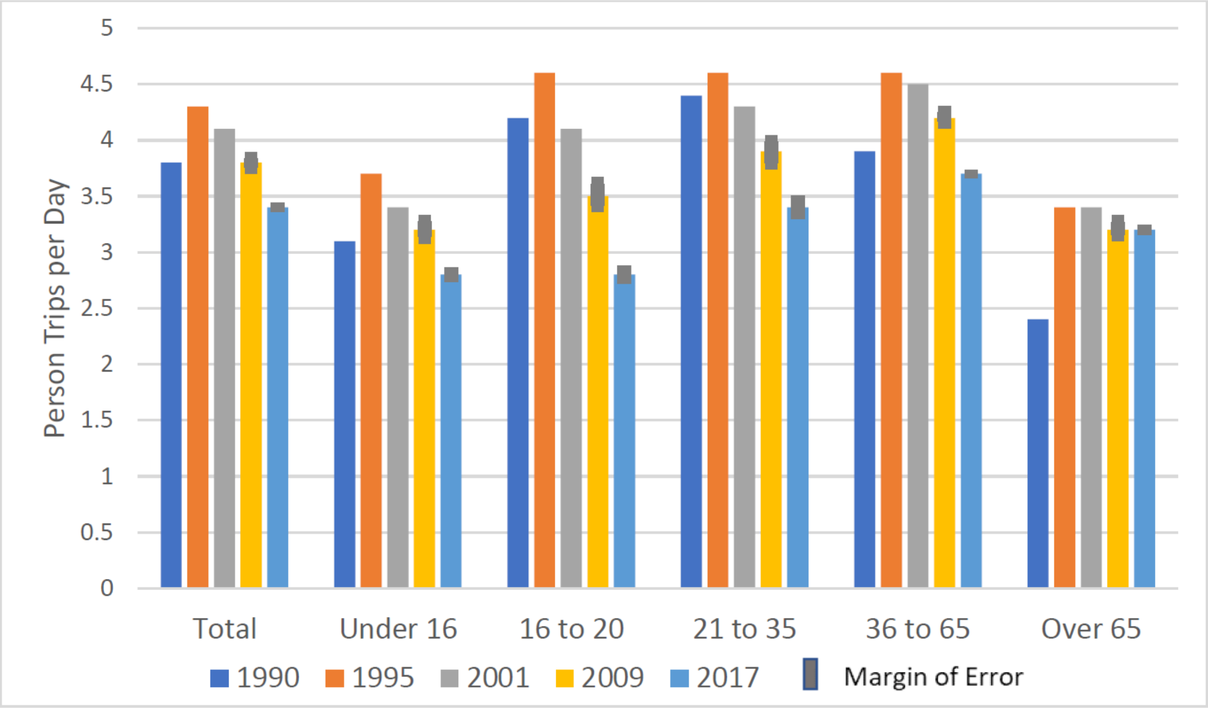
> Except for people over age 65, all age groups are making fewer trips per day.

There are many factors driving this trend, including less face-to-face socializing, online shopping, and working from home.

[3] https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html

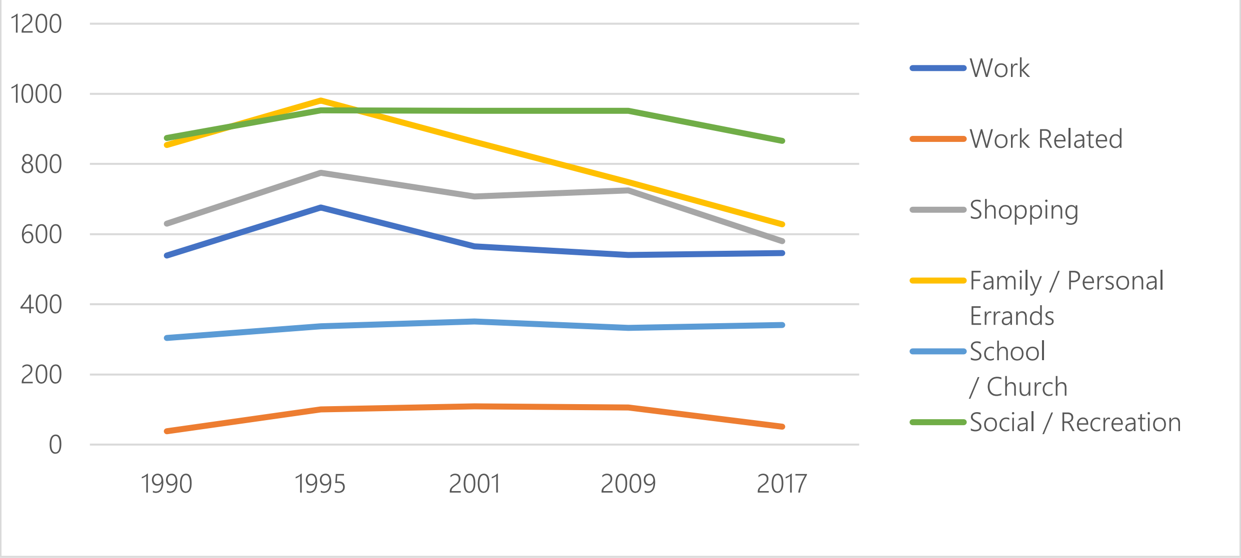
If this trend continues, travel demand may be noticeably impacted. Some major roadway projects may no longer be required and smaller improvements, such as intersection or turn lane improvements, may be sufficient for these needs.

Figure 3.2: Trends in Average Daily Person Trips by Age



Source: 2017 National Household Travel Survey

Figure 3.3: Trends in the Average Annual Person Trips per Household by Trip Purpose



Source: 2017 National Household Travel Survey

3.2 Shared Mobility

People are increasingly interested in car-free or car-lite lifestyles. In the short-term, people are paying premiums for walkable and bikeable neighborhoods and more frequently using ridehailing (Uber/Lyft) and shared mobility (car-sharing/bike-sharing) services. This could result in a long-term decrease in car ownership rates, increasing the need for investments in bicycle, pedestrian, transit, and other mobility options.

A major impetus for the change in travel behavior and reduced reliance on cars is the emergence of shared mobility options. Broadly defined, shared mobility options are transportation services and resources that are shared among users, either concurrently or one after another. They include:

- **Bike-sharing and Scooter-sharing (Micromobility)** – These can be dockless or dock/station-based systems where people rent bikes and scooters for short periods of time. Scooters are all electric while bikes may be electric or not. Examples include Bcycle, Social Bicycles, Lime, Bird, and Jump.
- **Ridesharing/Ridehailing (Transportation Network Companies)** – Examples include Uber, Lyft, and Via.
- **Car-Sharing** – This includes traditional car sharing, where you rent a company-owned vehicle and peer-to-peer car sharing services. Examples include Zipcar and Turo.
- **Public Transit and Microtransit** – Public transit is itself a form of shared mobility and is evolving to incorporate new mobility options like Microtransit.

Source: Corporate Knights

Micromobility

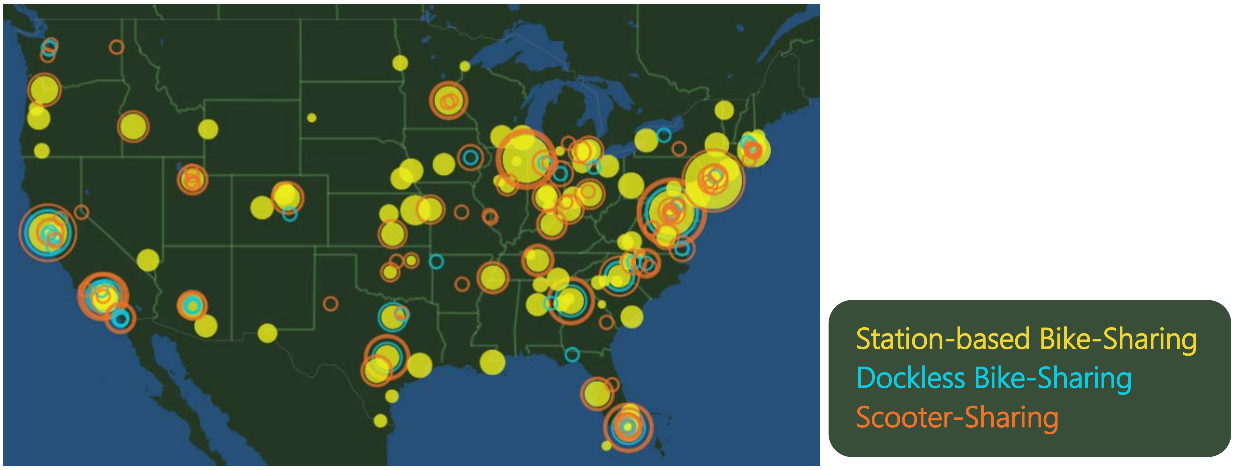
Bike-sharing and scooter-sharing, collectively referred to as micromobility options, are relatively new mobility options and continue to evolve. Modern, station-based bike-sharing emerged around 2010 and dominated the micromobility landscape from 2010 to 2016 until dockless bike-sharing systems emerged. Soon after, in late 2017, electric scooter-sharing emerged and overlapped much of the dockless bike-sharing market.

Today, most bike-sharing and scooter-sharing in the United States occurs in the major urban areas. However, these services are becoming more common in smaller urban areas and around major universities throughout the country.

Survey data from major U.S. cities shows the following micromobility trends[4]:

- People use micromobility services for a variety of trip purposes.
- People use micromobility to travel relatively short distances (1-2 miles) for short durations (10-20 minutes). However, infrequent users of station-based bike-sharing services tend to make longer distance and duration trips.
- Regular users of station-based bike-sharing services are more likely to be traveling to/from work or to connect to transit. They are also more likely to have shorter trip durations and to have cheaper trips.
- People using scooter-sharing services are more likely to be riding for recreational or exercise reasons.

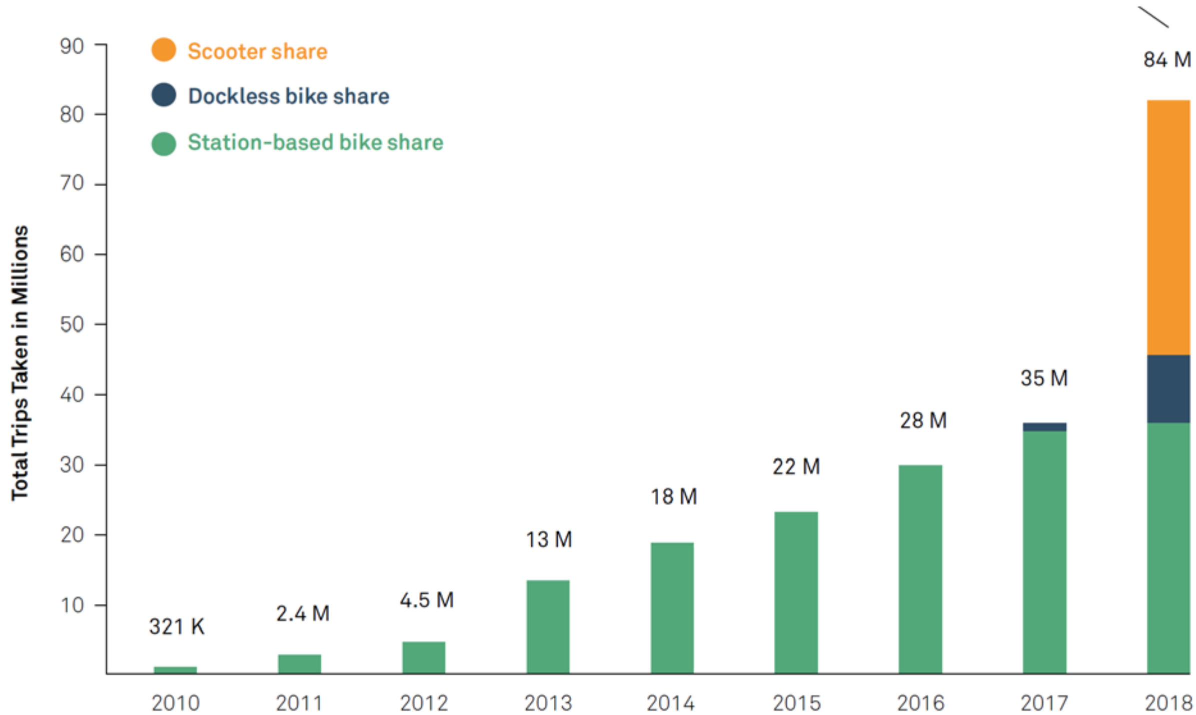
Figure 3.4: Public Bike-Sharing and Scooter-Sharing Systems in United States, 2019



Source: U.S. Department of Transportation, Bureau of Transportation Statistics

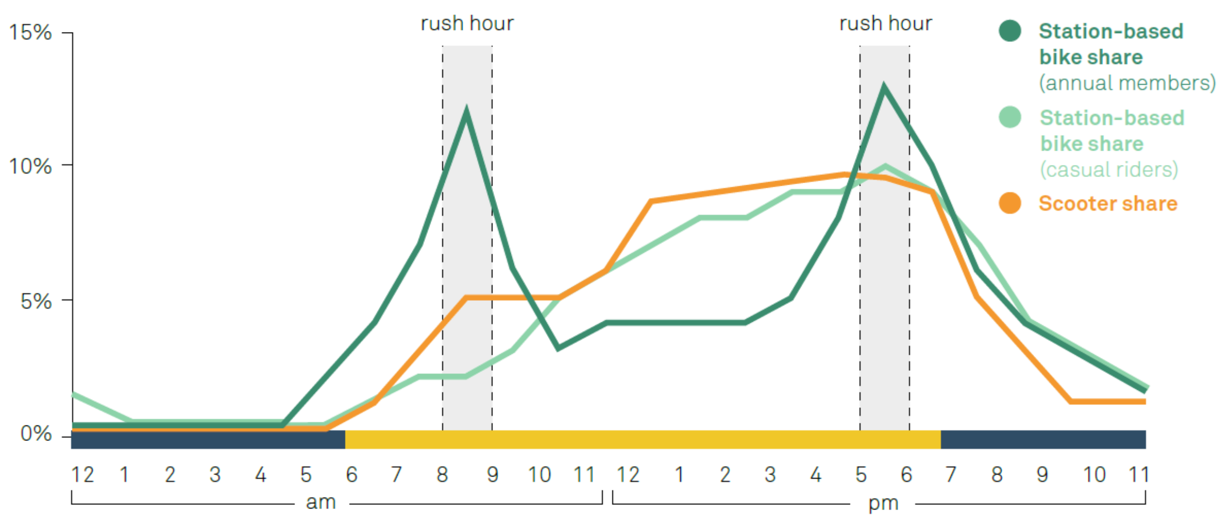
[4] https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf

Figure 3.5: U.S. Micromobility Trips, 2010 to 2018



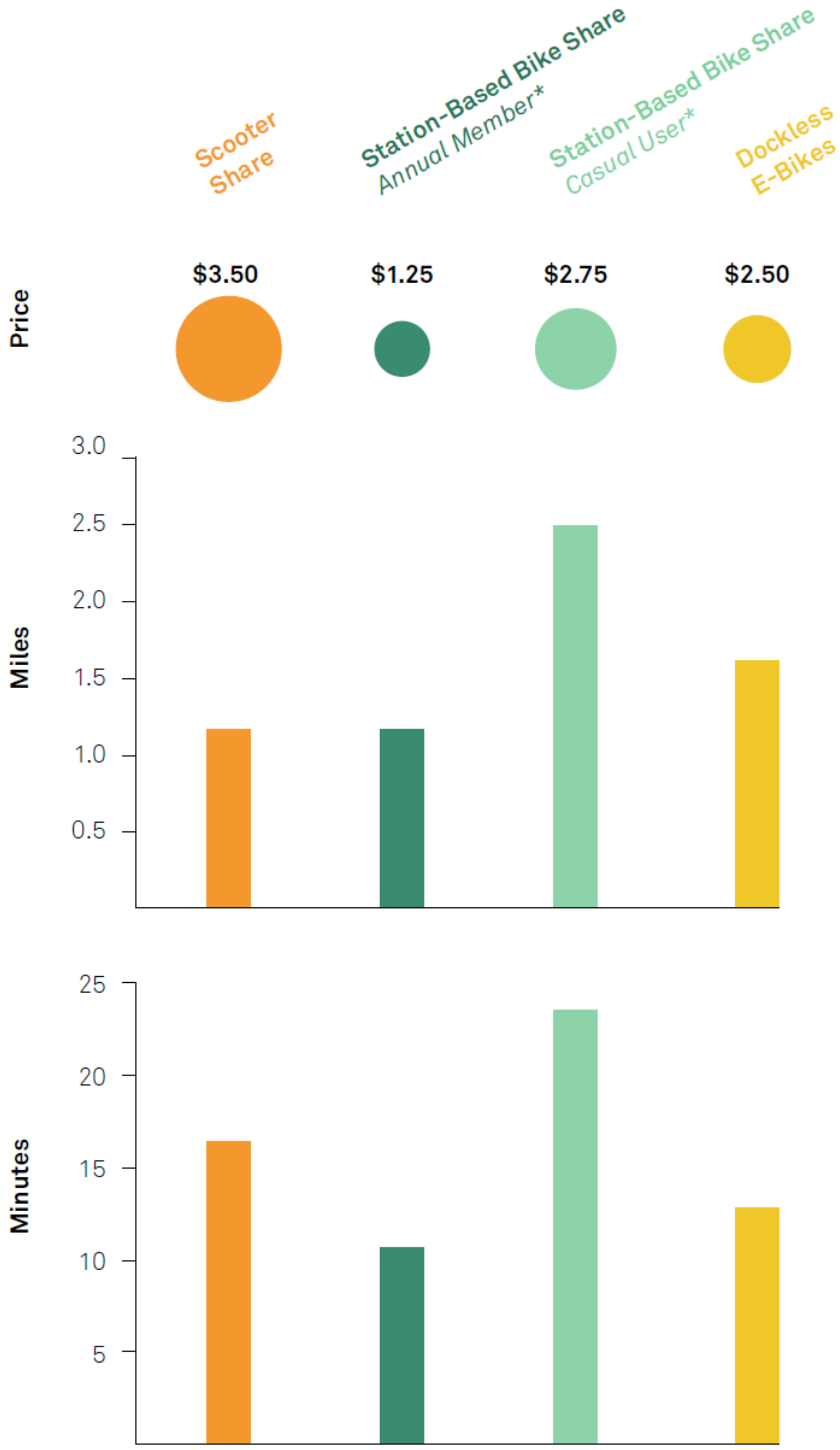
Source: NACTO

Figure 3.6: Average Micromobility Trips by Hour



Source: NACTO

Figure 3.7: Average Micromobility Trip Characteristics



Source: NACTO

Transportation Network Companies

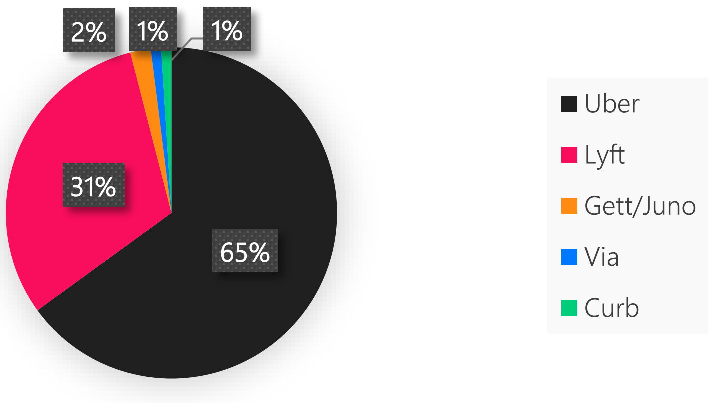
Ridehailing and ridesharing are the terms typically used to describe the services provided by Transportation Network Companies (TNCs) like Uber and Lyft. These TNCs emerged between 2010 and 2012 and have since grown rapidly, surpassing taxis in many metropolitan areas.

Today, TNCs are operating in most urban areas in the United States, including the Hattiesburg area. Outside of these urban areas though, service is limited or non-existent. And even with the growth into most urban areas, some TNC services are still limited to larger markets (e.g. UberPool and Lyft Shared for shared rides) or are being tested in certain markets (e.g. Uber Assist for people with disabilities).

While TNCs continue to evolve, research suggests the following TNC trends[5]:

- Trips are disproportionately work-related and social/recreational.
- Customers are predominantly affluent, well-educated, and tend to be younger.
- The market for TNC trips overlaps the market for transit service.
- People appear to use it as a replacement for transit when transit is unreliable or inconvenient, as a replacement for driving when parking is expensive or scarce, or to avoid drinking and driving.
- The heaviest TNC trip volumes occur in the late evening/early morning.
- Average trip lengths are around 6 miles with a duration of 20-25 minutes.
- Trips in large, densely-populated areas tend to be somewhat shorter and slower while trips in suburban and rural areas tend to be somewhat longer and faster.

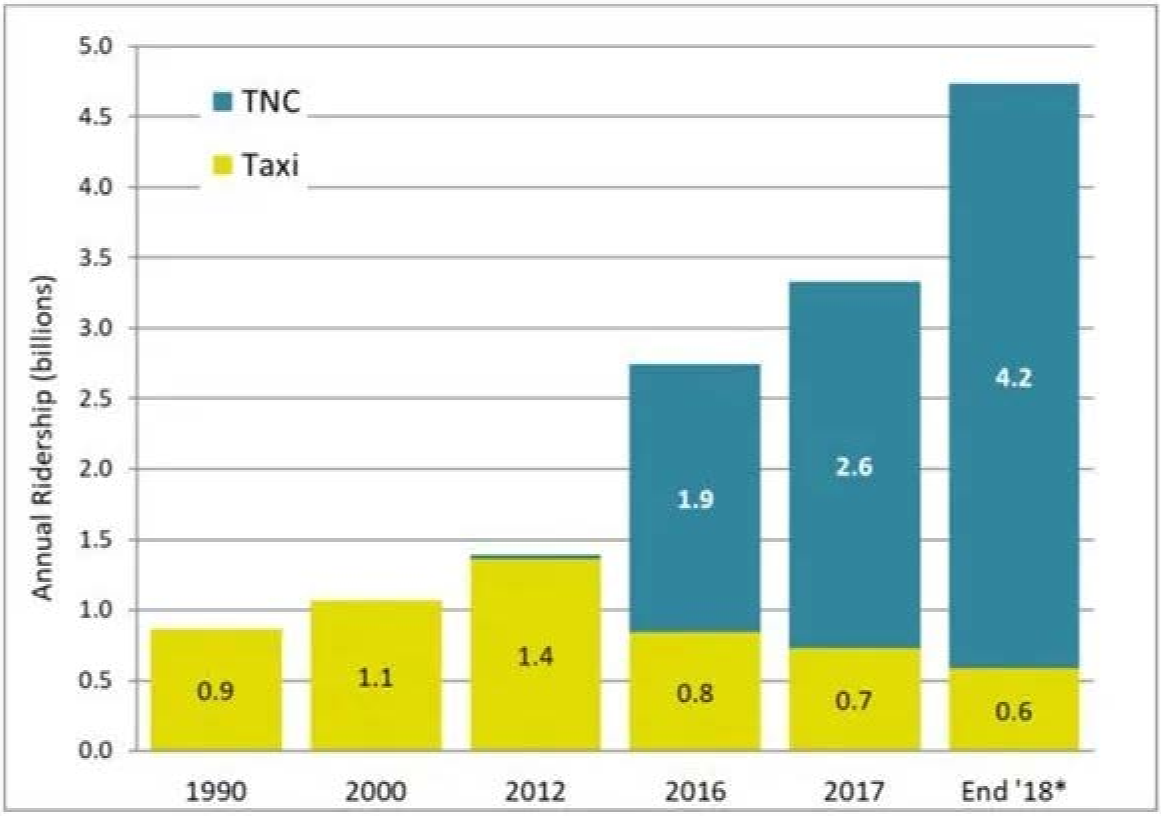
Figure 3.8: U.S. Ridesharing Market Share



Source: Edison Trends

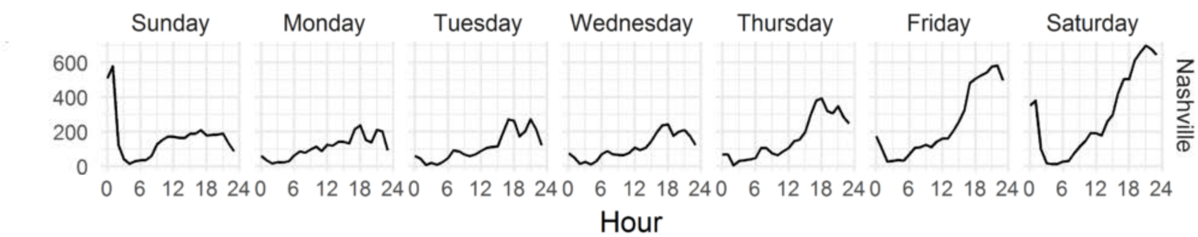
[5] http://www.schallerconsult.com/rideservices/automobility.htm

Figure 3.9: TNC and Taxi Ridership in the U.S., 1990 to 2018



Source: Schaller Consulting

Figure 3.10: TNC Ridership by Time of Day in Nashville



Source: TCRP RESEARCH REPORT 195: Broadening Understanding of the Interplay Among Public Transit, Shared Mobility, and Personal Automobiles

Car-Sharing

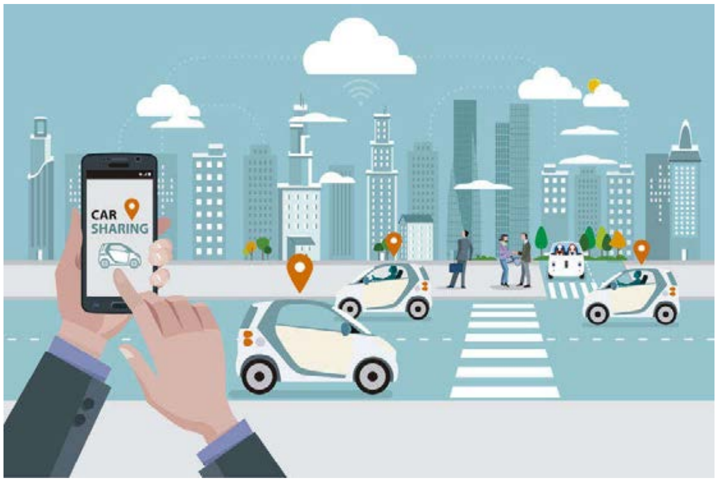
Car-sharing allows for people to conveniently live car-free or car-lite lifestyles and has been shown to increase walking and biking, reduce vehicle miles traveled, increase accessibility for formerly carless households, and reduce fuel consumption.[6]

Car-sharing has been around for decades and has continued to evolve in recent years. Today, there are three models of car-sharing:

- **Roundtrip car-sharing (as station-based car-sharing):** This accounts for the majority of all car-sharing activity. These services, such as Zipcar and Maven, serve a market for longer or day-trips, particularly where carrying supplies is a factor (such as shopping, moving, etc.). These car-share trips are typically calculated on a per hour or per day basis.
- **One-way car-shring (free-floating car-sharing):** This allows members to pick up a vehicle at one location and drop it off at another location. These car-sharing operations, including car2go, ReachNow, and Gig, are typically calculated on a per minute basis.
- **Peer-to-Peer car-sharing (personal vehicle sharing):** This is characterized by short-term access to privately owned vehicles. An example of P2P car-sharing scheme is Turo.

Due to the varied car-sharing models, there are no typical usage patterns. Some car-sharing trips are short and local while others may be longer distance. Trips can be recurring or infrequent.

Outside of large urban areas, car-sharing is not that common. However, as connected and autonomous vehicles become more common, it is anticipated that car-sharing will become more widespread.



[6] https://www.planning.org/publications/report/9107556/

3.3 Connected and Autonomous Vehicles (CAV)

Today, most newer vehicles have some elements of both connected and autonomous vehicle technologies. These technologies are advancing rapidly and becoming more common.

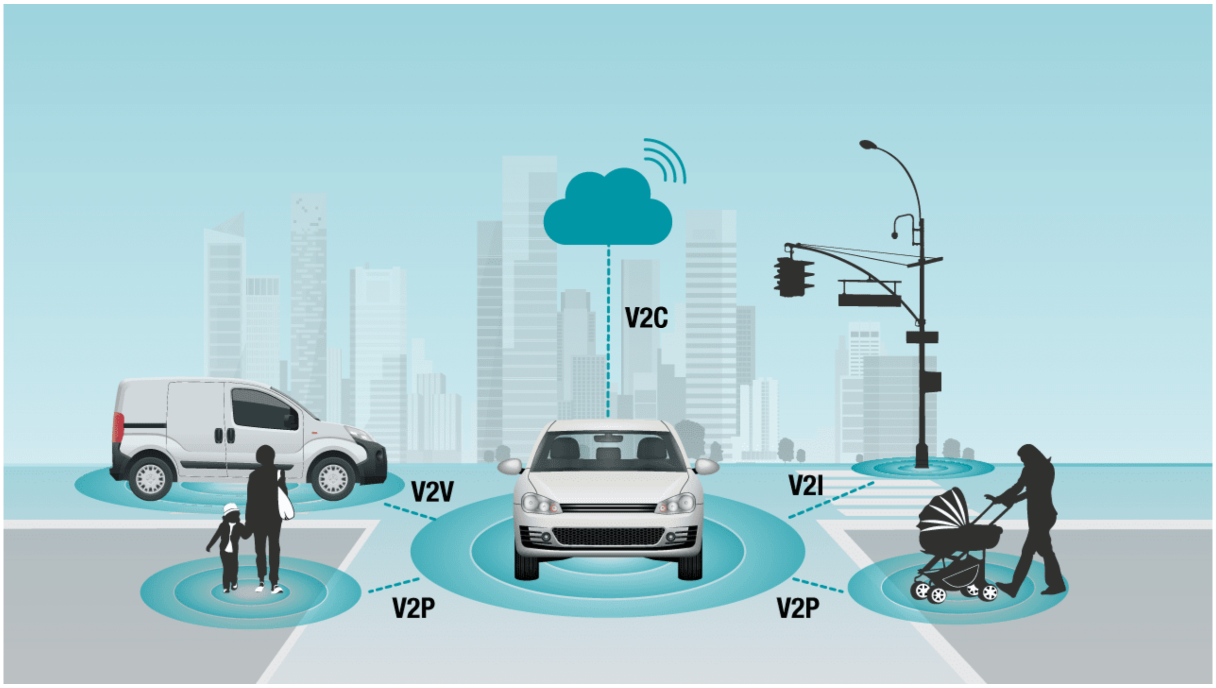
Connected Vehicles		Autonomous Vehicles
		
Connected vehicles are vehicles that use various communication technologies to exchange information with other cars, roadside infrastructure, and the Cloud.	VS.	Autonomous, or "self-driving" vehicles, are vehicles in which operation of the vehicle occurs with limited, if any, direct driver input.
Communication Types V2I • Vehicle to Infrastructure V2V • Vehicle to Vehicle V2C • Vehicle to Cloud V2X • Others		**Levels of Automation** 1 • Driver Assistance 2 • Partial Automation 3 • Conditional Automation 4 • High Automation 5 • Full Automation

Connected Vehicle Communication Types

Connected and autonomous vehicles use multiple communications technologies to share and receive information. These technologies are illustrated in Figure 3.11 and include:

- **V2I: Vehicle-to-Infrastructure –** Vehicle-to-infrastructure (V2I) communication is the two-way exchange of information between vehicles and traffic signals, lane markings and other smart road infrastructure via a wireless connection.
- **V2V: Vehicle-to-Vehicle –** Vehicle-to- vehicle (V2V) communication lets cars speak with one another directly and share information about their location, direction, speed, and braking/acceleration status.
- **V2N/V2C: Vehicle-to-Network/Cloud –** Vehicle-to- network (V2N) communication systems connect vehicles to cellular infrastructure and the cloud so drivers can take advantage of in-vehicle services like traffic updates and media streaming.
- **V2P: Vehicle-to-Pedestrian –** Vehicle-to- pedestrian (V2P) communication allows drivers, pedestrians, bicyclists, and motorcyclists to receive warnings to prevent collisions. Pedestrians receive alerts via smartphone applications or through connected wearable devices.
- **V2X: Vehicle-to-Everything –** Vehicle-to- everything (V2X) communication combines all of the above technologies. The idea behind this technology is that a vehicle with built-in electronics will be able to communicate in real-time with its surroundings.

Figure 3.11: Connected Vehicle Communication Types



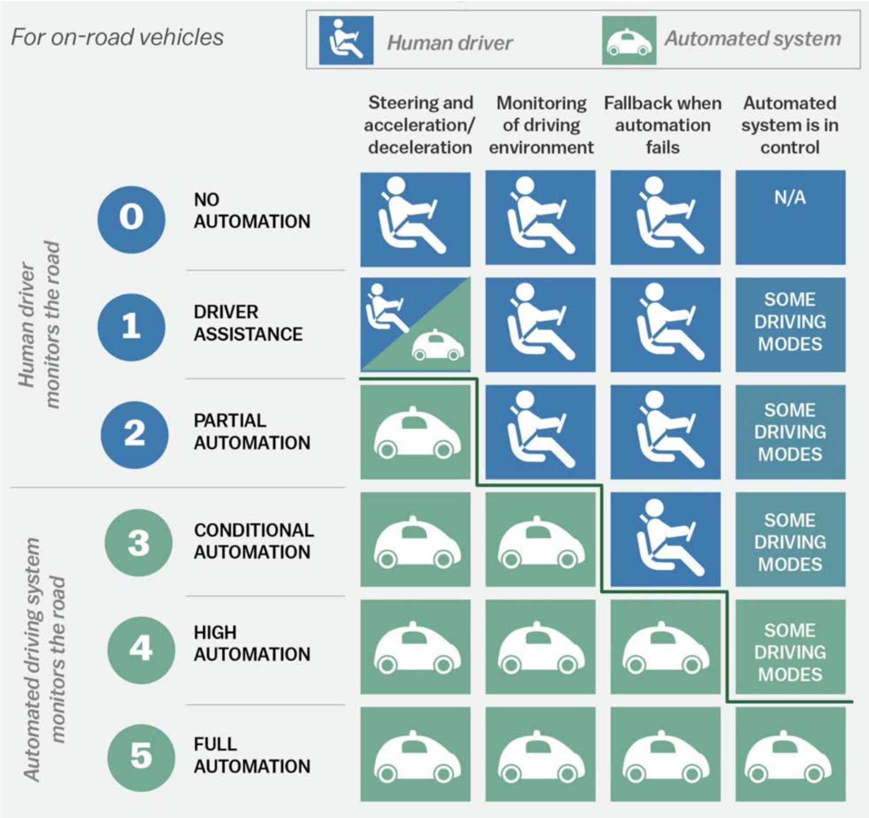
Source: Texas Instruments

Figure 3.12: Levels of Automation

According to the National Highway Traffic Safety Administration (NHTSA), there are five (5) levels of automation. These levels are illustrated in Figure 3.12 and include:

- **Level 1:** An Advanced Driver Assistance System (ADAS) can sometimes assist the human driver with steering or braking/accelerating, but not both simultaneously.
- **Level 2:** An Advanced Driver Assistance System (ADAS) can control both steering and braking/accelerating simultaneously under some circumstances. The human driver must continue to pay full attention at all times and perform the rest of the driving task.
- **Level 3:** An Automated Driving System (ADS) on the vehicle can perform all aspects of driving under some circumstances. In those circumstances, the human driver must be ready to take back control at any time when the ADS requests the human driver to do so.
- **Level 4:** An Automated Driving System (ADS) on the vehicle can perform all driving tasks and monitor the driving environment – essentially, do all the driving – in certain circumstances. The human need not pay attention in those circumstances.
- **Level 5:** An Automated Driving System (ADS) on the vehicle can do all the driving in all circumstances. The human occupants are just passengers.

Figure 3.12: Levels of Automation



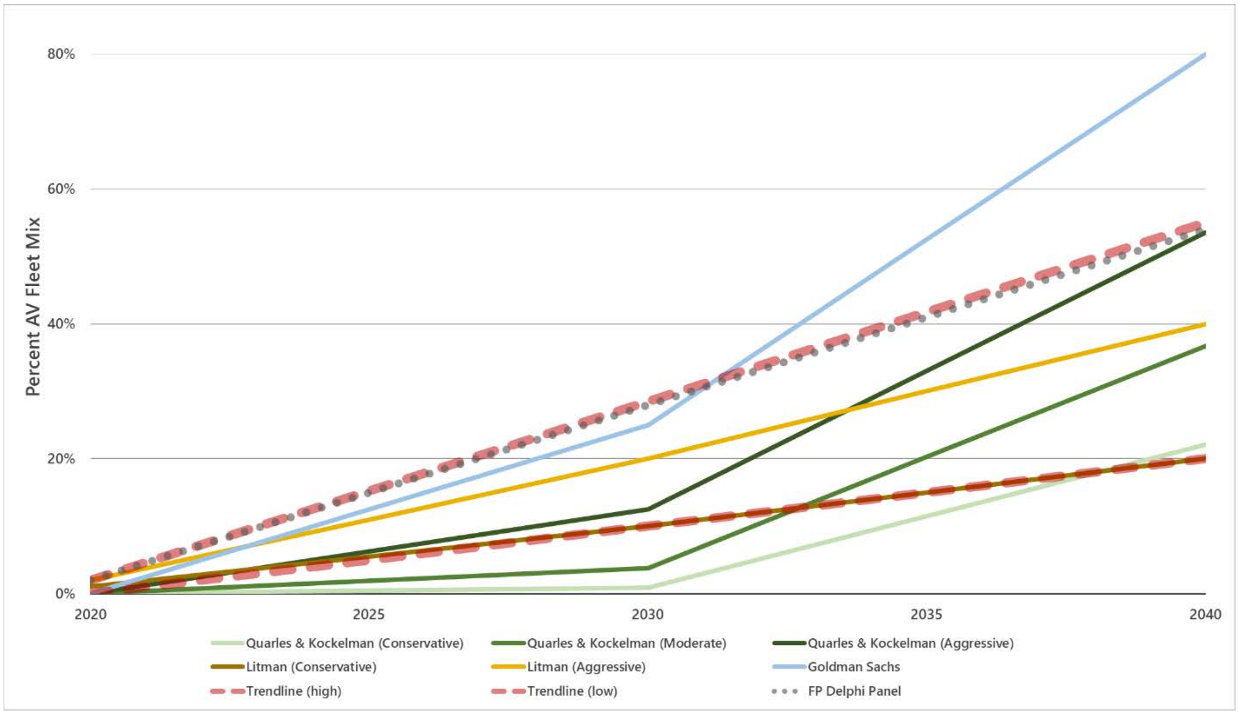
Source: SAE J3016 Levels of Automation (Photo from Vox)

Potential Timeline

While mid-level connected and autonomous vehicles are already on the market and traveling our roadways, there is uncertainty about the long-term future of these vehicles, especially Level 5, fully autonomous vehicles. However, over the past couple of years, some level of consensus has emerged about the timeline over the next 20 years.[7,8,9]

- Over the next five years, partially automated safety features will continue to improve and become less expensive. This includes features such as lane keeping assist, adaptive cruise control, traffic jam assist, and self-park.
- By 2025, fully automated safety features, such as a "highway autopilot," are anticipated to be on the market.
- Through 2030, autonomous vehicles will continue to make up a small percentage of all vehicles on the road due to the large number of legacy vehicles and slow adoption rates resulting from higher initial costs, safety concerns, and unknown regulations.
- By 2040, autonomous vehicles are more common, accounting for 20-50% of all vehicles.

Figure 3.13: Potential Autonomous Vehicle Market Share, 2020 to 2040



Source: Fehr and Peers

[7] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety
[8] http://library.rpa.org/pdf/RPA-New-Mobility-Autonomous-Vehicles-and-the-Region.pdf
[9] https://www.fehrandpeers.com/av-adoption/

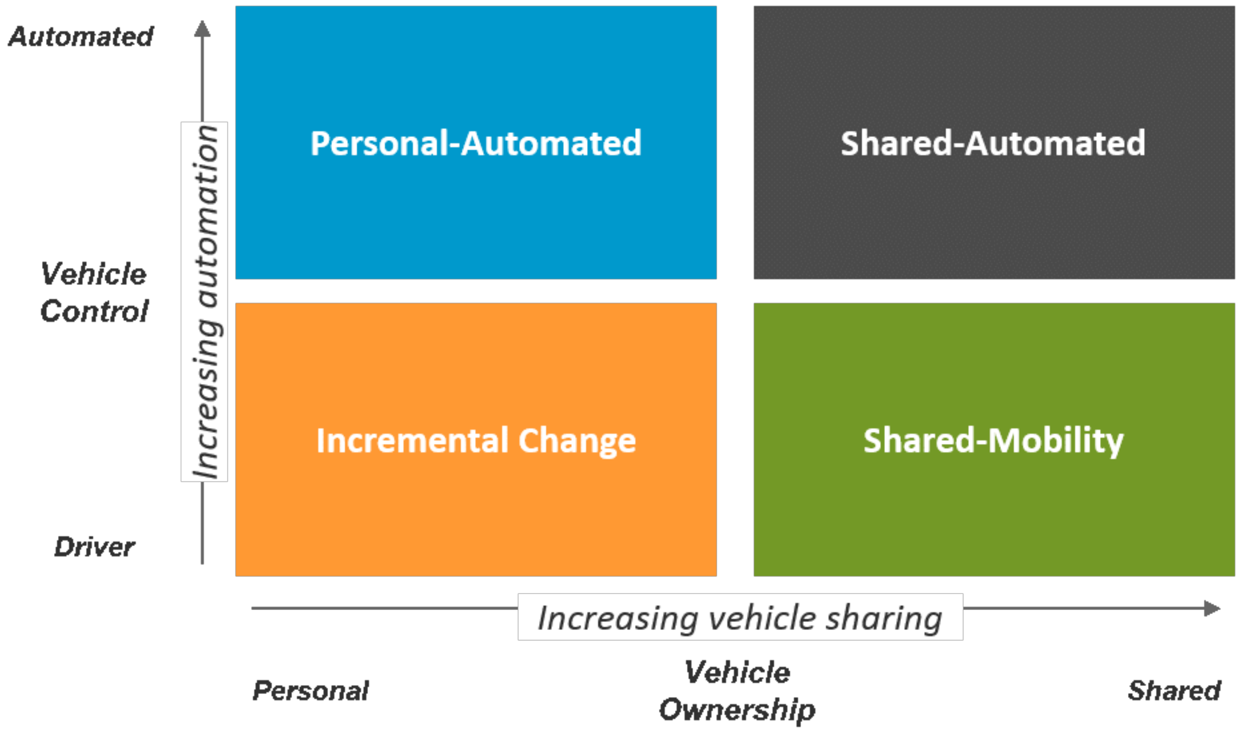
Potential Impacts

The development of connected and autonomous vehicles will change travel patterns, safety, and planning considerations. Ultimately, the actual impact of these vehicles will depend on how prevalent the technology is and the extent to which vehicles are privately owned or shared.

As shown in Figure 3.14, there are four (4) potential scenarios, each with unique implications for transportation planning.

- **Personal-Automated scenario:** vehicles are highly autonomous and mostly privately owned.
- **Shared-Automated scenario:** vehicles are highly autonomous and mostly shared.
- **Incremental Change scenario:** vehicles are not highly autonomous and are mostly privately owned.
- **Shared-Mobility scenario:** vehicles are not highly autonomous and are mostly shared.

Figure 3.14: Future Mobility Scenarios



Source: U.S. Department of Energy/Deloitte

Safety

In the long-term, CAV technology is anticipated to reduce human error and improve overall traffic safety. CAVs are capable of sensing and quickly reacting to the environment via:

- External sensors (ultrasonic sensors, cameras, radar, lidar, etc.)
- Connectivity to other vehicles
- GPS

These features allow the CAV to create a 360 degree visual of its surroundings and detect lane lines, other vehicles, road curves, pedestrians, buildings, and other obstacles. The sensor data is processed in the vehicle's central processing unit and allows it to react accordingly. As this technology becomes more common on the roadways, it should result in increased safety by removing human error as a crash factor. However, this can only be achieved when CAVs are in the majority on the road, if not the only vehicles in use.

CAV interactions with bicyclists and pedestrians is a major area of concern that still needs improvement. However, the use of CAV technologies can be applied at intersections by communicating with the traffic lights and crossing signals. This will result in increased safety for bicyclists, pedestrians, and those with mobility needs or disabilities.

Traffic

CAVs have the potential to improve overall traffic flow and reduce congestion, even as they may increase vehicle miles traveled. However, these benefits, such as increased roadway capacity from high-speed cars moving at closer distances (platooning), are achieved when CAV saturation is very high.

As a whole, CAVs are likely to increase driving, as measured by Vehicle Miles Traveled (VMT). This increase would come in part from people making longer and potentially more trips, due to the increased comfort of traveling by car. People could perform other tasks, such as working or entertainment, instead of driving and longer trips would become more bearable. The increase in VMT would also come from "dead head" mileage, or the time that vehicles are driving on the road without passengers, before and after picking up people.

Transit

CAV technology has the potential to drastically reduce the cost of operating transit in environments that are safe for autonomous transit. For many agencies, labor is their highest operating expense. While not all routes may be appropriate for autonomous transit, there may be opportunities to create dedicated lanes and infrastructure for autonomous transit and other vehicles. Even with some lines operating autonomously, costs can be lowered and these savings can be used to increase and improve service.

From a reliability standpoint, connected vehicle technology can also improve on-time performance and travel times through applications like Transit Signal Priority (TSP) and dynamic dispatching. TSP is an application that provides priority to transit at signalized intersections and along arterial corridors. Dispatching and scheduling could be improved with dynamic, real-time information that more effectively and efficiently matches resources to demand.

Even with the potential improvements to transit operations, transit ridership could decrease if transportation network companies (e.g. Uber/Lyft) become competitively priced. This could be possible if autonomy allows these private transportation providers to eliminate drivers and reduce their operating costs.

Freight

Both delivery and long-haul freight look to be early adopters of CAV technology, reducing costs and improving safety and congestion.

Freight vehicles will also benefit from CAV technology by allowing them to travel in small groups, known as truck platooning. The use of CAV will safely decrease the amount of space between the platooning trucks thereby allowing consistent traffic flow. Platooning reduces congestion as vehicles travel at constant speed, with less stop-and-go, which results in fuel savings and reduces carbon dioxide emissions.

Land Use and Parking

Autonomous vehicles could dramatically reduce demand for parking, opening this space up for other uses. They may also require new curb-side and parking considerations and encourage urban sprawl.

Autonomous vehicle technology has the potential to reduce the demand for parking in a few ways.

- Shared-Automated: If autonomous vehicles are mostly shared and not privately owned, there will be less need for parking as these vehicles will primarily move from dropping one passenger off to picking up or dropping off another passenger.
- Personal-Automated: If autonomous vehicles are mostly privately owned, it is also possible that they could return home or go to a shared parking facility that is not on site. In this scenario, some parking demand may simply shift from onsite parking to centralized parking.

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- Smart Parking: Connected parking spaces allow communication from the parking lot to your vehicle, letting the vehicle know which spaces are available. This reduces the need for circling or idling in search of parking and improves parking management.

If parking demand is reduced, land use planners will need to consider repurposing parking areas. In urban areas, this could mean reallocating curb-side space for pedestrians while allowing for safe passage, pick-ups, drop-offs, and deliveries by AVs. In suburban areas, it could mean redeveloping large surface parking lots and revisiting parking requirements.

The benefits of CAV technology are also likely to make longer commutes more attractive and increase urban sprawl unless local land use policy and regulations discourage this technology.

Big Data for Planning

Connected vehicle technology may provide valuable historical and real-time travel data for transportation planning. Privacy concerns and private-public coordination issues may limit data availability, but this data could allow for very detailed planning for vehicles, pedestrians, and other modes. In addition to traffic data, it could provide valuable origin-destination data.

Furthermore, as CAV technologies continue to develop and be implemented, they can be used to refine regional or state travel demand models. This can be accomplished by:

- Providing additional data that can be used for the calibration of existing travel characteristics.
- Analyzing the data, in before and after method, to understand the effect of pricing strategies on path choice and route assignment.
- Potentially developing long-distance travel data in statewide models since CAVs are continuously connected.
- Potentially providing large amounts of data on commercial vehicles and truck movements to develop freight elements.
- Identifying recurring congestion locations within a region or state.
- Supporting emission modeling by assisting with the development of local input values instead of using MOVES defaults.

3.4 Electric and Alternative Fuel Vehicles

There has been growing interest and investment in alternative fuel vehicle technologies in recent years, especially for electric vehicles. This renewed interest has also included the transit and freight industries.

Alternative Fuel Vehicles (AFVs) are defined as vehicles that are substantially non-petroleum, yielding high-energy security and environmental benefits. These include fuels such as:

- electricity
- hybrid fuels
- hydrogen
- liquefied petroleum gas
- Compressed Natural Gas (CNG)
- Liquefied Natural Gas (LNG)
- 85% and 100% Methanol (M85 and M100)
- 85% and 95% Ethanol (E85 and E95) (not to be confused with the more universal E10 and E15 fuels which have lower concentrations of ethanol)

Existing Stock of AFVs

The number of AFVs in use across the county continues to increase due to federal policies that encourage and incentivize the manufacture, sale, and use of vehicles that use non-petroleum fuels. According to the 2019 U.S. Energy Information Administration's *Annual Energy Outlook*, the most popular alternative fuel sources today for cars and light-duty trucks in the U.S. are E85 (flex-fuel vehicles) and electricity (hybrid electric vehicles and plug-in electric vehicles).

The U.S. Department of Energy's Alternative Fuels Data Center locator shows that there are four (4) AFV stations in the MPA: three (3) electric stations one (1) propane station.

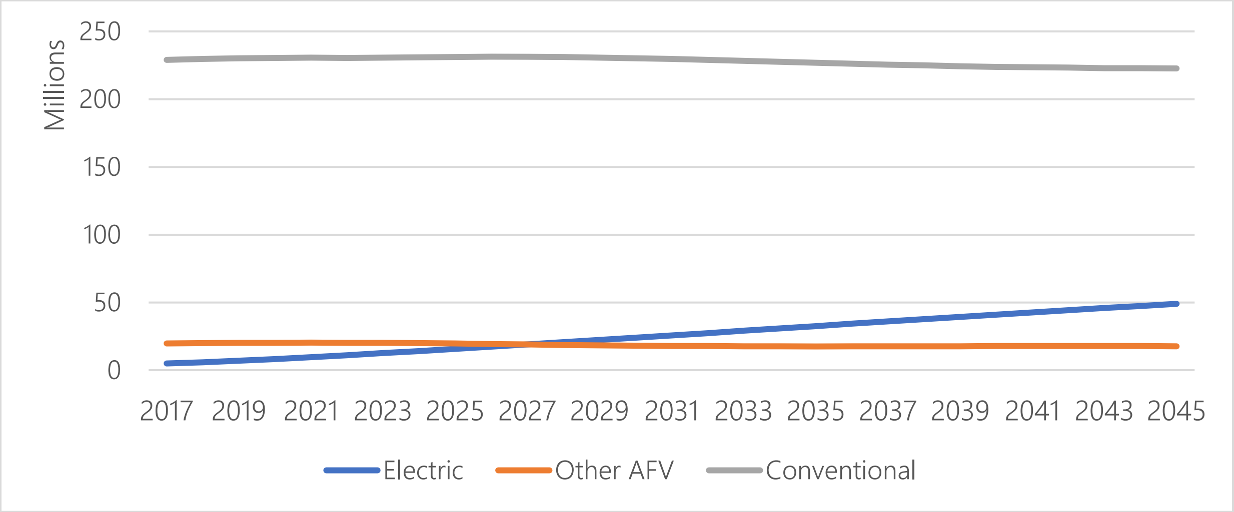
Growth Projections

Long-term projections for electric vehicle and other alternative fuels vary considerably. On the higher end, some projections estimate that electric vehicles will make up 30 percent of all cars in the United States by 2030.[10] The U.S. Energy Information Administration (USEIA) is more conservative, projecting that electric vehicles will make up approximately nine (9) percent of all light-duty vehicles by 2030 and approximately 17 percent by 2045. For freight vehicles, the USEIA projects only a two (2) percent market share for electric vehicles by 2045.

Outside of electric vehicles, which include full electric vehicles and hybrid electric vehicles powered by battery or fuel cell technology, the USEIA does not project other alternative fuels to grow significantly for light-duty vehicles. However, it does anticipate ethanol-flex fuel vehicles to grow significantly for light and medium freight vehicles.

In the United States, electric buses are becoming more common as transit agencies pursue long-term operations and maintenance savings in addition to environmental and rider benefits (less air and noise pollution). While electric buses have many challenges, upfront costs are anticipated to go down and utilization is likely to become more widespread. By 2030, it is anticipated that between 25% and 60% of new transit vehicles purchased will be electric. [11]

Figure 3.15: Light-Duty Vehicles on the Road by Fuel Type, 2017 to 2045



Source: U.S. Energy Information Administration, 2019 Annual Energy Outlook

[10] https://www.iea.org/publications/reports/globalevoutlook2019/

[11] https://www.reuters.com/article/us-transportation-buses-electric-analysi/u-s-transit-agencies-cautious-on-electric-buses-despite-bold-forecasts-idUSKBN1E60GS

Potential Impacts

Air Quality Improvement

Electric and other alternative fuel vehicles have the potential to drastically reduce automobile related emissions. While these fuels still have environmental impacts, they can reduce overall lifecycle emissions and reduce direct tailpipe emissions substantially.

Direct emissions are emitted through the tailpipe, through evaporation from the fuel system, and during the fueling process. Direct emissions include smog-forming pollutants (such as nitrogen oxides), other pollutants harmful to human health, and greenhouse gases (GHGs).

Infrastructure Needs

There may be a long-term need for public investment in vehicle charging stations to accommodate growth in electric vehicles.

Consumers and fleets considering plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs) benefit from access to charging stations, also known as EVSE (electric vehicle supply equipment). For most drivers, this starts with charging at home or at fleet facilities. Charging stations at workplaces and public destinations may also bolster market acceptance.

Gas Tax Revenues

If adoption rates increase substantially, gas tax revenues will be impacted and new user fees may need to be considered.

Because electric and other alternative fuel vehicles use less or no gasoline compared to their conventional counterparts, their operation does not generate as much revenue from a gas tax, which is one of the primary means that Louisiana uses to fund transportation projects. Because of this, many states have begun imposing fees on these vehicles to recoup lost transportation revenue.[12]

[12] http://www.ncsl.org/research/energy/new-fees-on-hybrid-and-electric-vehicles.aspx

4.0 Roadways and Bridges

4.1 Congestion Relief Needs

Given the population and employment growth forecasted to occur by 2045, the Travel Demand Model indicates that the number of person trips in the MPA will increase from 664,273 in 2018 to 787,753 in 2045. These changes are summarized in Table 4.1.

Table 4.1: Person Trips by Purposed, 2018 to 2045

Trip Purpose	2018	2045 (E+C)	Change	Percent Change
Home-Based Work	114,749	121,765	7,016	6.1%
Home-Based Other	245,039	260,062	15,023	6.1%
Non-Home Based	150,471	177,896	27,425	18.2%
Commercial Vehicle	43,658	50,714	7,056	16.2%
Truck	8,707	9,840	1,133	13.0%
Internal-External	76,271	119,369	43,097	56.5%
External-External	25,377	47,807	22,429	88.4%
Total	664,273	787,453	123,180	18.5%

18.5%

Growth in person trips in the MPA from 2018 to 2045

Notes: E+C is future scenario with only Existing and Committed transportation projects. Values do not include special generators.

Source: Monroe Travel Demand Model, NSI

Table 4.2 shows that if the transportation projects that currently have committed funding are constructed, the centerline miles of the roadway network will increase by less than one-half of a percent. The table also shows the forecast change in Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD) if only those projects are constructed.

This data indicates that, by 2045, the VMT will increase by about 41 percent. However, during this same time period, the VHT will increase by nearly 55 percent, and the VHD will be more than double the current delay. These changes are the result of a large growth in person trips and comparatively slow growth of the roadway network. During the public survey, congestion reduction on the roadway network was identified as the top priority for residents and workers. This results in a high emphasis placed on congestion reduction during the project scoring process of the MTP. Projects that will help reduce the large increase in the VHD from 2018 to 2045 therefore receive a higher score.

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Table 4.2: Travel Demand Impact of Growth and Existing and Committed Projects, 2018 to 2045

Centerline Miles of Roadways				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	28.4	28.4	0	0.00%
Principal Arterial	54.5	54.5	0	0.00%
Minor Arterial	109.2	111.85	2.65	2.43%
Major Collector	196.3	196.3	0	0.00%
Minor Collector	78.7	78.7	0	0.00%
Local	72.3	72.3	0	0.00%
Total	539.4	542.05	2.65	0.49%
Daily Vehicle Miles Traveled (VMT)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	1,619,421	2,290,957	671,536	41.5%
Principal Arterial	1,045,751	1,370,870	325,119	31.1%
Minor Arterial	811,635	1,202,595	390,960	48.2%
Major Collector	619,306	893,928	274,622	44.3%
Minor Collector	84,425	163,957	79,532	94.2%
Local	68,627	87,085	18,458	26.9%
Total	4,249,165	6,009,392	1,760,227	41.4%
Daily Vehicle Hours Traveled (VHT)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	32,613	54,767	22,154	67.9%
Principal Arterial	25,618	36,281	10,663	41.6%
Minor Arterial	21,170	33,033	11,863	56.0%
Major Collector	15,984	23,777	7,793	48.8%
Minor Collector	2,192	3,957	1,765	80.5%
Local	2,268	2,838	570	25.1%
Total	99,845	154,654	54,809	54.9%
Daily Vehicle Hours of Delay (VHD)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	6,593	18,444	11,851	179.8%
Principal Arterial	3,814	8,019	4,205	110.2%
Minor Arterial	2,186	5,158	2,972	135.9%
Major Collector	1,050	2,583	1,533	146.0%
Minor Collector	66	196	130	197.1%
Local	74	146	72	97.8%
Total	13,783	34,546	20,763	150.6%

Note: E+C is future scenario with only Existing and Committed transportation projects.

Source: Monroe Travel Demand Model, NSI

Currently, congestion is concentrated mostly near intersections in the MPA during peak times. By 2045, congestion is forecasted to become more widespread if only the E+C projects are implemented.

Existing roadway conditions show no locations where the segment's volume to capacity (V/C) ratio is greater than 1.0. However, this would change significantly by 2045, as shown in Table 4.3 and illustrated in Figure 4.1.

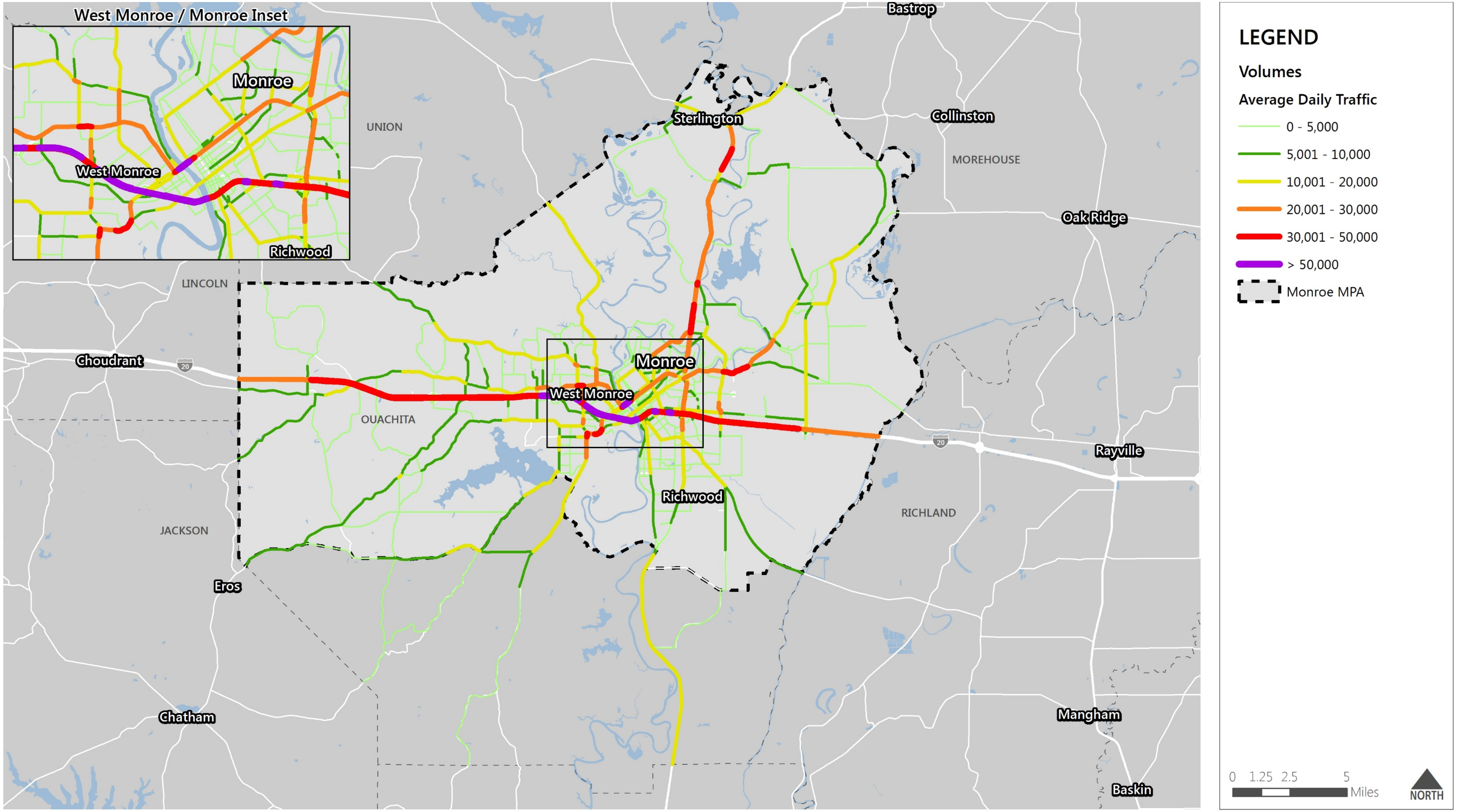
It is important to note that not all congested street and highway segments should be widened with additional through lanes or turning lanes. In urban settings, it may be more appropriate to consider ITS improvements or Travel Demand Management (TDM) strategies. Congestion may also be reduced by improving pedestrian, bicycle, and/or transit conditions that will encourage alternative means of transportation.

Table 4.3: Roadway Corridors with Volumes Exceeding Capacity, 2045

Roadway	Location	Length (miles)
I-20 Eastbound	Thomas Rd to Texas Ave	3.21
I-20 Westbound	Texas Ave to Thomas Rd	3.21
US 80 (Louisville Ave)	Trenton St to Riverside Dr	0.26
Riverside Dr	US 80 (Louisville Ave) to Bres Ave	0.07

Source: Monroe Travel Demand Model

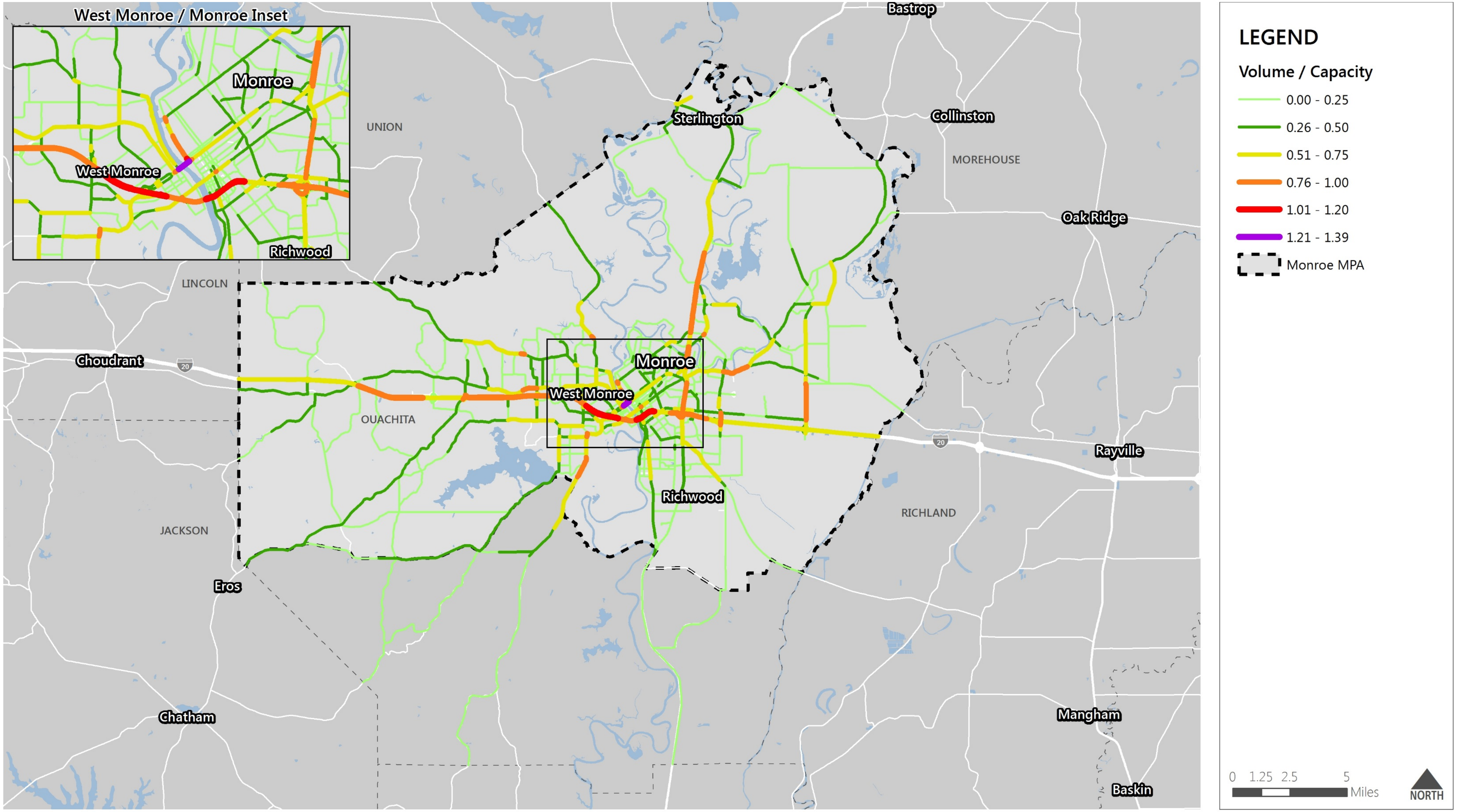
Figure 4.1: Future Roadway Volumes, 2045 (Existing+Committed)



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Figure 4.2: Future Roadway Congestion, 2045 (Existing+Committed)



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Public and Stakeholder Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections they felt were most congested. The most often identified of these locations are:

- I-20
- US 80 (Louisville Rd/Desiard Ave)
- US 165 N
- Cypress Rd
- Thomas Rd

Intersection and Corridor Recommendations

Table 4.4 displays the locations identified through public involvement and engineering review, the observed issues, and recommendations to address the intersection needs.

Table 4.4: Recommended Intersection Improvement Projects

Intersection	Traffic Control Type	Observed Issues	Short-Term Solution	Long-Term Solution
US 165 at Desiard St	Signalized Interchange	Heavy Traffic During AM and PM Peak Periods	Adaptive Traffic Control System (ATCS); signal retiming; southbound and westbound right turn lanes	Corridor Study from I-20 to Morehouse Parish Line
US 165 at Forsythe Bypass	Signal	Heavy Traffic During AM and PM Peak Periods	Adaptive Traffic Control System (ATCS); signal retiming	Corridor Study from I-20 to Morehouse Parish Line
I-20 at Thomas Rd	Interchange	Off ramps backup; safety and efficiency issues with merging onto Interstate	Ramp Metering along I-20; signal retiming at Ramp Terminals	Corridor Study along I-20 to add capacity to ramps
I-20 Ouachita River Bridge	Interchange	Safety and efficiency issues with merging onto Interstate	Ramp Metering along I-20; signal retiming on surface streets to improve traffic flow at Off-Ramps.	Corridor Study along I-20 to add capacity to ramps; roundabouts at ramp terminals
Louisville Ave at N 3rd St	Signal	Heavy and slow traffic during PM Peak Period	Adaptive Traffic Control System (ATCS) along US 80; conduct signal study; signal retiming	Corridor Study along US 80 from Bridge to US 165
Louisville Ave at N 4th St	Signal	Heavy and slow traffic during PM Peak Period	Adaptive Traffic Control System (ATCS) along US 80; conduct signal study; signal retiming	Corridor Study along US 80 from Bridge to US 165
Louisville Ave at N 5th St	Signal	Heavy and slow traffic during PM Peak Period	Adaptive Traffic Control System (ATCS) along US 80; conduct signal study; signal retiming	Corridor Study along US 80 from Bridge to US 165
Louisville Ave at N 6th St	Signal	Heavy and slow traffic during PM Peak Period	Adaptive Traffic Control System (ATCS) along US 80; conduct signal study; signal retiming	Corridor Study along US 80 from Bridge to US 165
Louisville Ave at US 165/Desiard Rd	Signal	Heavy and slow traffic during PM Peak Period	Adaptive Traffic Control System (ATCS) along US 80, Signal retiming	Corridor Study along US 80 from Bridge to US 165

Intersection	Traffic Control Type	Observed Issues	Short-Term Solution	Long-Term Solution
Cypress St at Vancil Rd	Unsignalized	Turning onto US 80 difficult; sight distance	Northbound Left and Right and Westbound Left Turn lanes; realign Vancil Rd to intersect US 80 at 90-degree angle	Corridor Study along US 80 from Harrel Rd to Well Rd; possible roundabouts
Cypress St at Avant Rd	Unsignalized	Turning onto US 80 difficult	Southbound Left and Right and Eastbound Left Turn lanes	Corridor Study along US 80 from Harrel Rd to Well Rd; possible roundabouts
Cypress St at Harrel Rd	Signal	Congestion on cross streets due to West Ridge Middle School Traffic	Signal retiming; eastbound and westbound left turn lanes	Corridor Study along US 80 from Harrel Rd to Well Rd; possible roundabouts
Cypress St at Well Rd	Signal	Congestion at intersection during Peak Period	Adaptive Traffic Control System (ATCS) along US 80; Signal retiming	Corridor Study along US 80 from Harrel Rd to Well Rd; possible roundabouts
Thomas Rd at Old Natchitoches Rd	Signal	Congestion on Thomas Rd during Peak Hour; lack of bus service	Adaptive Traffic Control System (ATCS) along Thomas Rd from I-20 to Cypress Rd; signal retiming; eastbound and westbound left turn lanes	Corridor Study along Thomas Rd from Old Natchitoches Rd to Cypress St; possible access management
Thomas Rd at I-20 Westbound	Signal	Congestion on Thomas Rd during Peak Hour; lack of bus service	Adaptive Traffic Control System (ATCS) along Thomas Rd from I-20 to Cypress Rd; signal retiming	Corridor Study along Thomas Rd from Old Natchitoches Rd to Cypress St; possible access management
Thomas Rd at Glenwood Rd	Signal	Congestion on Thomas Rd during Peak Hour; lack of bus service	Adaptive Traffic Control System (ATCS) along Thomas Rd from I-20 to Cypress Rd; signal retiming	Corridor Study along Thomas Rd from Old Natchitoches Rd to Cypress St; possible access management

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Intersection	Traffic Control Type	Observed Issues	Short-Term Solution	Long-Term Solution
Thomas Rd at McMillan Rd	Signal	Congestion on Thomas Rd during Peak Hour; lack of bus service	Adaptive Traffic Control System (ATCS) along Thomas Rd from I-20 to Cypress Rd; signal retiming	Corridor Study along Thomas Rd from Old Natchitoches Rd to Cypress St; possible access management
Thomas Rd at Cypress St	Signal	Congestion on Thomas Rd during Peak Hour; lack of bus service	Adaptive Traffic Control System (ATCS) along Thomas Rd from I-20 to Cypress Rd; signal retiming	Corridor Study along Thomas Rd from Old Natchitoches Rd to Cypress St; possible access management

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4.2 Maintenance Needs

Pavement Maintenance

While less than ten (10) percent of the MPA's roadways have poor pavement conditions, these roadway segments could eventually experience maintenance needs that will lead to decreased safety or emergency roadway repairs, both of which can increase congestion. Figure 2.5 in the Existing Conditions Analysis displays the pavement conditions of the NHS monitored roadways within the MPA. Particular attention should be given to:

- I-20 at the LA 34 interchange
- US 165 between US 80 and Webster St
- LA 34 between I-20 and US 80/LA 15
- LA 143 between US 80/LA 15 and LA 34
- LA 617 between New Natchoitches Rd and I-20
- LA 3249 between I-20 and US 80/LA 15
- LA 840-6 (N 18th St) between US 80 and Forsythe Ave

These roadways have continuous lengths of poor pavement conditions as well as those in fair condition and should be a priority for roadway maintenance and repaving.

Bridge Maintenance

The existing conditions analysis revealed that there are currently 35 bridges in Poor condition within the MPA; none of which are on the National Highway System. Table 4.5 displays the MPA's bridges in Poor condition. Addressing the needs of these bridges will improve safety, reduce maintenance costs, and avoid future bridge shutdowns. Bridges are rated by the NBIS based on the conditions of their decks, superstructure, substructure, and stream channel and channel protection. A bridge is considered to be in Poor condition if any of the above categories are rated "Poor".

Some of these deficient bridges may be improved via the MTP through other transportation projects, such as a roadway widening. Other bridges could instead be improved through line item funding for operations and maintenance. The MPO and LADOTD should prioritize these bridges for improvements as funding becomes available.

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Table 4.5: Worst Performance Bridges in Poor Condition by Sufficiency Rating

Structure ID	Roadway	Feature Intersecting	Year Built
53700020103111	US 80	Union Pacific Railroad	1936
53703170206181	LA 151	Cockerel Creek	1967
53708371203841	LA 3033	Cheniere Spillway	1947
53708371502001	LA 134	Mill Bayou	1957
53732345922191	Tedeton Rd	Carlton Creek	1964
53732299921861	Britton Rd	Cheniere Creek	1970
53708371406361	LA 838	Steep Bayou	1955
53703170201131	LA 151	Curry's Creek	1950
53732287915761	Russell Sage Rd	Gourd Bayou	1965
53732376915681	Evans Rd	Long Bridge Creek	1965
53703150203831	LA 143	Bayou D'Arbonne	1962
53708371404221	LA 838	Unnamed Creek	1955
53732288920551	South 5th St	Youngs Bayou	1975
53704510625321	Russell Sage Rd	I-20	1968
53732311921691	Joseph Thomas Rd	Patrick Creek	1960
53732328920031	Shenandoah Rd	Coney Creek	1976
53732258922421	Plum Hill Rd	Guyton Creek	1976
53703260204021	LA 594	Caney Creek	1954
53732341915971	Swartz School Rd	Coney Creek	1979
53703170101871	LA 151	Unnamed Creek	1958
53732343922131	Osa Avent Rd	Eureka Creek	1960
53732312920501	Harrison St/Collier Ave	Concrete Canal	1961
53704510611901	Vancil Rd	I-20	1963
53703170200931	LA 151	I-20	1960
53700380105211	LA 139	Caney Creek	1937
53704510614171	Downing Pines Rd	I-20	1963
53708371405131	LA 838	Unnamed Creek	1955
53708371404121	LA 838	Cheniere Creek	1955
53704510606081	Britton Rd	I-20	1964
53732292920451	Ruffin Dr	Pine Bayou	1972
53732333915731	Stubbs-Ritchie Rd	Sawyer Ditch	1980
53732291920411	Hadley St	Youngs Bayou	1965
53732253922061	Cadeville Lodge Rd	Guyton Creek	1964
53732337915981	Lincoln Hills Rd	Caney Creek	1979
53703260100711	LA 594	I-20	1965

Source: National Bridge Inventory, 2018

4.3 Safety Needs

Within the MPA, over 17,000 crashes occurred between 2014 and 2018. During that timeframe, there were 61 fatal crashes and 77 life-threatening crashes. Another 5,027 crashes caused injuries or possible injuries.

The highest number of crashes in the MPA were rear-end collisions, followed by angle crashes and sideswipes. Recommendations for reducing these most common types of crashes are outlined below.

> As traffic continues to increase from 2018 to 2045, historical trends predict that the number of crashes will also increase.

Reducing Rear-End Collisions

The highest number of crashes in the MPA were rear-end collisions. Rear-end collisions can be attributed to a number of factors, such as:

- driver inattentiveness
- large turning volumes
- slippery pavement
- inadequate roadway lighting
- crossing pedestrians
- poor traffic signal visbility
- congestion
- inadequate signal timing, and/or
- an unwarranted signal

In general, the recommendations for reducing rear-end crashes include:

- Analyze turning volumes to determine if a right-turn lane or left-turn lane is warranted. Providing a turning lane separates the turning vehicles from the through vehicles, preventing through vehicles from rear-ending turning vehicles. If a large right-turn volume exists, increasing the corner radius for right-turns is an option.
- Checking the pavement conditions. Rear-end collisions caused by slippery pavement can be reduced by lowering the speed limit with enforcement, providing overlay pavement, adequate drainage, groove pavement, or with the addition of a "Slippery When Wet" sign.
- Ensure roadway lighting is sufficient for drivers to see the roadway and surroundings.
- Determine if there is a large amount of pedestrian traffic. Pedestrians crossing the roads may impede traffic and force drivers to stop suddenly. If crossing pedestrians are an

issue, options include installing or improving crosswalk devices and providing pedestrian signal indications.

- Check the visibility of the traffic signals at all approaches. In order to provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, installing 12" signal lenses, visors, back plates, or relocating/adding signal heads.

- Verify that the signal timing is adequate to serve the traffic volumes at the trouble intersections. Options include adjusting phase-change interval, providing or increasing a red-clearance interval, providing progression, and utilizing signal actuation with dilemma zone protection.
- Verify that a signal is warranted at the given intersection.

Reducing Side Impact/Angle Crashes

Angle crashes were the second highest crash type within the MPA. These crashes can be caused by a number of factors, such as:

- restricted sight distance
- excessive speed
- inadequate roadway lighting
- poor traffic signal visibility
- inadequate signal timing
- inadequate advance warning signs
- running a red light
- large traffic volumes

In general, the recommendations for reducing side impact and angle collisions include:

- Verify that the sight distance at all intersection approaches is not restricted. Options to alleviate restricted sight distance include removing the sight obstruction and/or installing or improving warning signs.
- Conduct speed studies to determine whether or not speed was a contributing factor. In order to reduce crashes caused by excessive speeding, the speed limit can be lowered with enforcement, the phase change interval can be adjusted, or rumble strips can be installed.
- Ensure roadway lighting is sufficient for drivers to see the roadway and surrounding area.
- Check the visibility of the traffic signal at all approaches. In order to provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, installing 12" signal lenses, visors, back plates, and/or relocating or adding signal heads.
- Verify that the signal timing is adequate to serve the traffic volumes. Options include adjusting phase change interval, providing or increasing a red-clearance interval, providing progression, and/or utilizing signal actuation with dilemma zone protection.

- Verify that the intersection is designed to handle the traffic volume. If the traffic volumes are too large for the intersection's capacity, options include adding a lane(s) and retiming the signal.

Reducing Sideswipes

The third highest type of crashes in the MPA were sideswipes. Sideswipes can be attributed to a number of factors, such as:

- excessive speed
- inadequate roadway lighting
- poor pavement markings
- large traffic volumes
- driver inattentiveness

The recommendations for reducing sideswipes include:

- Check for proper signage around the intersection, especially if the roadway geometry may be confusing for the driver. Verify that all one-way streets are marked "One-Way" and "No Turn" signs are placed at appropriate locations.
- Verify that pavement markings are visible during day and night hours.
- Verify that the roadway geometry can be easily maneuvered by drivers.
- Evaluate left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Ensure roadway lighting is sufficient for drivers to see roadway and surroundings.
- Verify that lanes are marked properly and provide turning and through movement directions on lanes as well as signage that indicates lane configurations. This will prevent cars from dangerously switching lanes at the last minute.

Reducing Other Collision Types

The remaining representative crash types can be attributed to incidents involving animals, backing up, bicycle/pedestrian encounters, fixed objects, head on collisions, jackknife, rollovers, running off the road, and vehicle defects. Recommendations for increasing the safety and reducing the number of crashes for these crash types include:

- Determine if the speed limit is too high or if vehicles in the area are traveling over the speed limit. Reducing the speed can reduce the severity of crashes and make drivers more attentive to their surroundings.
- Verify the clearance intervals for all signalized intersection approaches and ensure that there is an all red clearance. For larger intersections, it is particularly important to have a

long enough clearance interval for vehicles to safely make it through the intersection before the light turns red.

- Check for proper intersection signage, especially if the roadway geometry may be confusing for the driver. Verify that all one-way streets are marked “One-Way” and “No Turn” signs are placed at appropriate locations.
- Verify that pavement markings are visible during day and night hours.
- Verify that the roadway geometry can be easily maneuvered by drivers.
- Evaluate left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Ensure roadway lighting is sufficient for drivers to see roadway and surroundings.
- Check the visibility of the traffic signals from all approaches.
- Verify that lanes are marked properly and provide turning and through movement directions, as well as signage that indicates lane configurations. This will prevent cars from dangerously switching lanes at the last minute and reduces crash potential.

High Crash Frequency and High Crash Rate Needs

Technical Report 2: Existing Conditions identified high crash frequency and high crash rate locations within the MPA. These locations were identified in Tables 2.5 through 2.9. Each of these segments or intersections experience either a large amount of crashes in general, or a large amount of crashes for the roadway volume it carries.

The locations listed in those tables, also shown in Table 4.6, should be high priority locations for the MPO to address in order to reduce congestion and increase safety within the MPA. The scope of the MTP does provide for a detailed analysis of the locations, but safety studies can be conducted by the MPO's safety partners for each location to determine the best site-specific crash countermeasures that can be employed.

Table 4.6: High Crash Frequency or Crash Rate Locations in the MPA

Route	Location	Type	Issue
I-20 Westbound	0.17 miles east of LA 617 (Thomas Rd) to 0.24 miles west of LA 617 (Thomas Rd)	Segment	Crash Frequency
I-20 Eastbound	LA 546 (Cheniere Drew Rd) to LA 3249 (Well Rd)	Segment	Crash Frequency
I-20 Westbound	0.43 miles east of LA 34 (Stella St) to 0.28 miles west of LA 34 (Stella St)	Segment	Crash Frequency
I-20 Westbound	0.2 miles east of Coleman Ave to 0.19 miles west of Coleman Ave	Segment	Crash Frequency
I-20 Westbound	St. John St to Coleman Ave	Segment	Crash Frequency

Route	Location	Type	Issue
I-20 Eastbound	0.44 miles west of LA 617 (Thomas Rd) to 0.29 miles east of LA 617 (Thomas Rd)	Segment	Crash Frequency
I-20 Westbound	LA 3249 (Well Rd) to LA 546 (Cheniere Drew Rd)	Segment	Crash Frequency
I-20 Eastbound	0.08 miles west of Coleman Ave to 0.32 miles east of Coleman Ave	Segment	Crash Frequency
US 80 (Louisville Ave)	Lamy Ln to 0.34 miles west	Segment	Crash Frequency
I-20 Eastbound	0.27 miles west of LA 34 (Stella St) to 0.45 miles east of LA 34 (Stella St)	Segment	Crash Frequency
I-20	Jackson St to US 165 (Ouachita Ave)	Segment	Crash Frequency
LA 617 (Thomas Rd)	I-20 West Ramps to I-20 East Ramps	Segment	Crash Frequency
I-20 Eastbound	0.20 miles west of LA 594 (Texas Ave) to 0.23 miles east of LA 594 (Texas Ave)	Segment	Crash Frequency
LA 594 (Millhaven Rd)	Huenefeld Rd to 1.57 miles south	Segment	Crash Frequency
US 165 (Martin Luther King Jr Dr)	Louberta St to 0.15 miles north	Segment	Crash Frequency
I-20 Eastbound	LA 617 (Thomas Rd) to LA 34 (Stella St)	Segment	Crash Frequency
US 80 (Louisville Ave)	Lamy Ln to 0.19 miles east	Segment	Crash Frequency
I-20 Westbound	LA 34 (Stella St) to LA 617 (Thomas Rd)	Segment	Crash Frequency
I-20 Eastbound	US 165 (Ouachita Ave) to 0.25 miles east	Segment	Crash Frequency
I-20 Eastbound	0.40 miles west of LA 617 (Thomas Rd) to 1.33 miles west of LA 617 (Thomas Rd)	Segment	Crash Frequency
US 165 (Martin Luther King Jr Dr) North Service Rd	Reese St to Louberta St	Segment	Crash Rate
US 165 Northbound	Off-Ramp to US 80/US 165 BUS (Louisville Ave)	Segment	Crash Rate
Sterlington Rd	Concordia St to Franklin St	Segment	Crash Rate
US 80	Calhoun Rd to LA 151	Segment	Crash Rate
Garrett Rd	Austin St to 0.23 miles east of Austin St	Segment	Crash Rate
Washington St	Newcombe St to US 80/US 165 BUS (Louisville Ave)	Segment	Crash Rate
Northeast Dr	0.20 miles west of Bon Aire Dr to Bon Aire Dr	Segment	Crash Rate
US 165 (Martin Luther King Jr Dr) South Service Rd	Harvester Rd to US 165 Underpass	Segment	Crash Rate

Route	Location	Type	Issue
I-20 Eastbound	Off-Ramp to LA 594 (Texas Ave)	Segment	Crash Rate
Peacnland Mall Dr	Powell Ave to I-20 Westbound Off-Ramp	Segment	Crash Rate
Constitution Dr	Commercial Pkwy to Constitution Cir	Segment	Crash Rate
W Flowood Dr	Holiday Dr to Old Sterlington Rd	Segment	Crash Rate
Evergreen St	Rosewood St to E Olive St	Segment	Crash Rate
S 8th St	LA 15 (Winnsboro Rd) to Temple Dr	Segment	Crash Rate
US 80/US 165 BUS (Louisville Ave)	Washington St/Lamy Ln to Plaza Blvd	Segment	Crash Rate
Bon Aire Dr	Northeast Dr to Peyton Dr	Segment	Crash Rate
Old Darbonne Rd	Kiroli Rd to Elmwood Dr	Segment	Crash Rate
Camp Rd	Vocational Pkwy to Oglesby Rd	Segment	Crash Rate
LA 617 (Thomas Rd)	I-20 West Ramps to I-20 East Ramps	Segment	Crash Rate
I-20 Eastbound	On-Ramp from Garrett Rd	Segment	Crash Rate
I-20 WB	@ LA 617 (Thomas Rd)	Intersection	Crash Frequency
US 80/US 165 BUS (Louisville Ave)	@ LA 840-6 (N 18th St)	Intersection	Crash Frequency
LA 617 (Thomas Rd)	@ Glenwood Dr	Intersection	Crash Frequency
US 165 (Martin Luther King Junior Dr)	@ Louberta St	Intersection	Crash Frequency
LA 34 (Bridge St)	@ US 80/LA 15 (Cypress St)	Intersection	Crash Frequency
US 80/US 165 BUS (Louisville Ave)	@ Washington St/Lamy Ln	Intersection	Crash Frequency
LA 617 (Thomas Rd)	@ McMillan Rd	Intersection	Crash Frequency
LA 594 (Texas Ave)	@ 18th St Overpass	Intersection	Crash Frequency
US 80 (Cypress St)	@ LA 617 (Thomas Rd)	Intersection	Crash Frequency
US 80 (Cypress St)	@ LA 3249 (Well Rd/Wallace Dean Rd)	Intersection	Crash Frequency
US 165 (Sterlington Rd)	@ Finks Hideaway Rd	Intersection	Crash Frequency
LA 617 (Thomas Rd)	@ Constitution Dr/Basic Dr	Intersection	Crash Frequency

Route	Location	Type	Issue
LA 617 (Thomas Rd)	@ Downing Pines Rd/ Old Natchitoches Rd	Intersection	Crash Frequency
US 165 (Martin Luther King Junior Dr)	@ LA 15 (Winnsboro Rd)	Intersection	Crash Frequency
US 165 (Martin Luther King Junior Dr)	@ East St	Intersection	Crash Frequency
LA 34 (Bridge St)	@ Trenton St	Intersection	Crash Frequency
US 165 (Sterlington Rd)	@ Northeast Dr	Intersection	Crash Frequency
US 165 (Martin Luther King Junior Dr)	@ Century Blvd	Intersection	Crash Frequency
US 80 (Louisville Ave/Lea Joyner Bridge)	@ Riverside Dr	Intersection	Crash Frequency

Stakeholder and Public Input

During the Stakeholder Consultation and Public Input phase, the following locations were identified as those most in need of safety improvements.

- I-20 at
  - Well Road interchange/ on-ramp
  - Stella St/Mill St interchange
  - Bridge over Ouachita River
  - Downtown Monroe corridor
- Hwy-165 at
  - Pedestrian Locations
  - I-20 ramps
  - Thomas Rd at
  - I-20 Ramp
  - Downing Pines Rd
  - Glenwood Regional Medical Center and Glenwood Dr
- Cypress St at
  - Vancill Rd
  - Harrell Rd
  - Drake Dr
  - Avant Dr

I-20 and Hwy-165

Most often mentioned

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- Desiard St at
    - Sterlington Rd
    - Hwy-165
    - Filhiol Ave
    - Bayou Dr
    - Warhawk Way
- Louisville Ave at
    - 18th St
    - Oliver Rd
    - Lamy Rd
    - Bridget St
- Garrett Rd at
    - I-20 Ramp
    - Lowe's Home Improvement
    - Arkansas Rd
    - At Harrell Rd
    - At Traffic circles
    - At Audubon Ave
    - From Wallace Dr to Tasha Dr
- Forsythe Ave at
    - N 18th St
    - N 19th St

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5.0 Freight

Freight needs vary by mode. However, all freight projects within the MPA can improve roadway safety and increase economic development of the region.

5.1 Freight Truck Needs

Forecast Growth

Commodity Flows

As mentioned in *Technical Report 2: Existing Conditions Analysis*, Freight Analysis Framework (FAF) commodity flow data is not available for the Monroe MPA. However, information from the State of Louisiana commodity flow data can be used to show the expected changes in the means of transporting freight between 2018 and 2045.

Table 5.1 shows the expected changes in commodity flow data between 2018 and 2045. According to the FAF commodity flow data, the truck mode is projected to increase by 78 percent between 2018 and 2045. Also, the truck mode is projected to overtake the pipeline mode as the top-ranking mode by commodity flow tonnage between 2018 and 2045.

Table 5.1: Changes in Means of Transporting Freight Originating in Louisiana, 2018 – 2045

Mode	Thousand Tons in 2018	Thousand Tons in 2045	Percent Change 2018 - 2045
Pipeline	309,237	406,855	32%
Truck	265,598	471,859	78%
Water	211,176	224,064	6%
Rail	53,858	89,841	67%
No domestic mode	26,354	25,472	-3%
Multiple modes & mail	18,358	45,319	147%
Other and unknown	1,291	417	-68%
Air (include truck-air)	19	90	361%
Total	**885,892**	**1,263,918**	**43%**

Source: Freight Analysis Framework 4

Volumes

Figure 5.1 illustrates where growth in freight truck traffic is anticipated to be the highest while Figure 5.2 shows the estimated 2045 truck volumes on the MPA’s roadway network.

The largest increases in freight truck traffic are on:

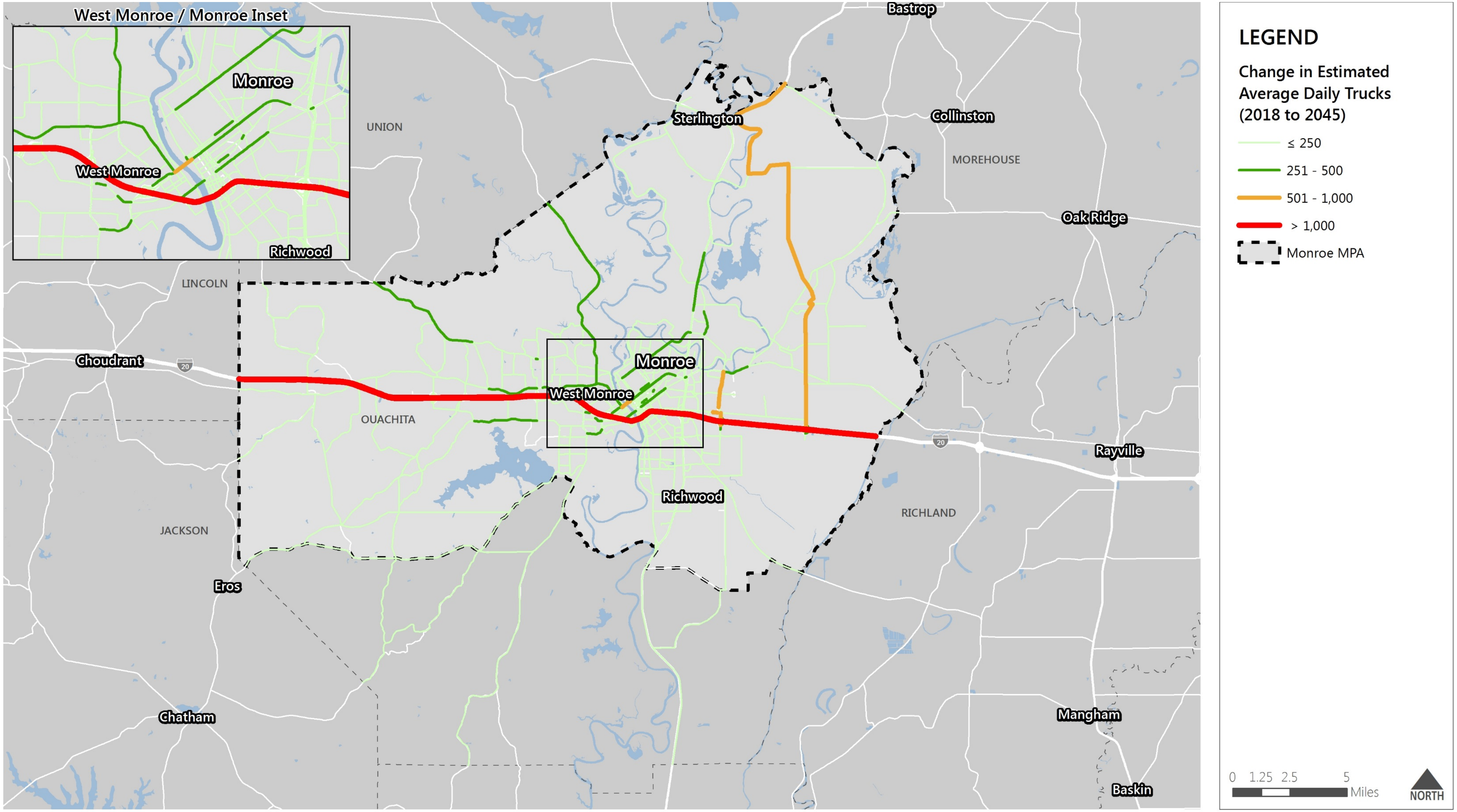
- Interstate 20
- US 165 N from LA 136 to North Study Area Boundary
- LA 594 from I-20 to LA 139
- LA 134/LA 136 from LA 139 to US 165 N
- Kansas Ln to LA 594 (Millhaven Rd) to US 80

Roadway Capacity and Reliability

One method to address freight truck travel time reliability is through ITS improvements. Beyond ITS improvements, traditional capacity improvements can alleviate congestion-related delay.

Figure 5.3 shows the roadway segments that accommodate a large number of daily truck trips (500 trucks or more) and experience peak period and/or daily congestion in the base year. These segments possess the greatest need for capacity/reliability improvements to improve future freight conditions in the short-term. Figure 5.4 displays the roadway segments that are anticipated to have greater than 500 truck trips per day and experience a volume to capacity ratio of 1.0 or greater.

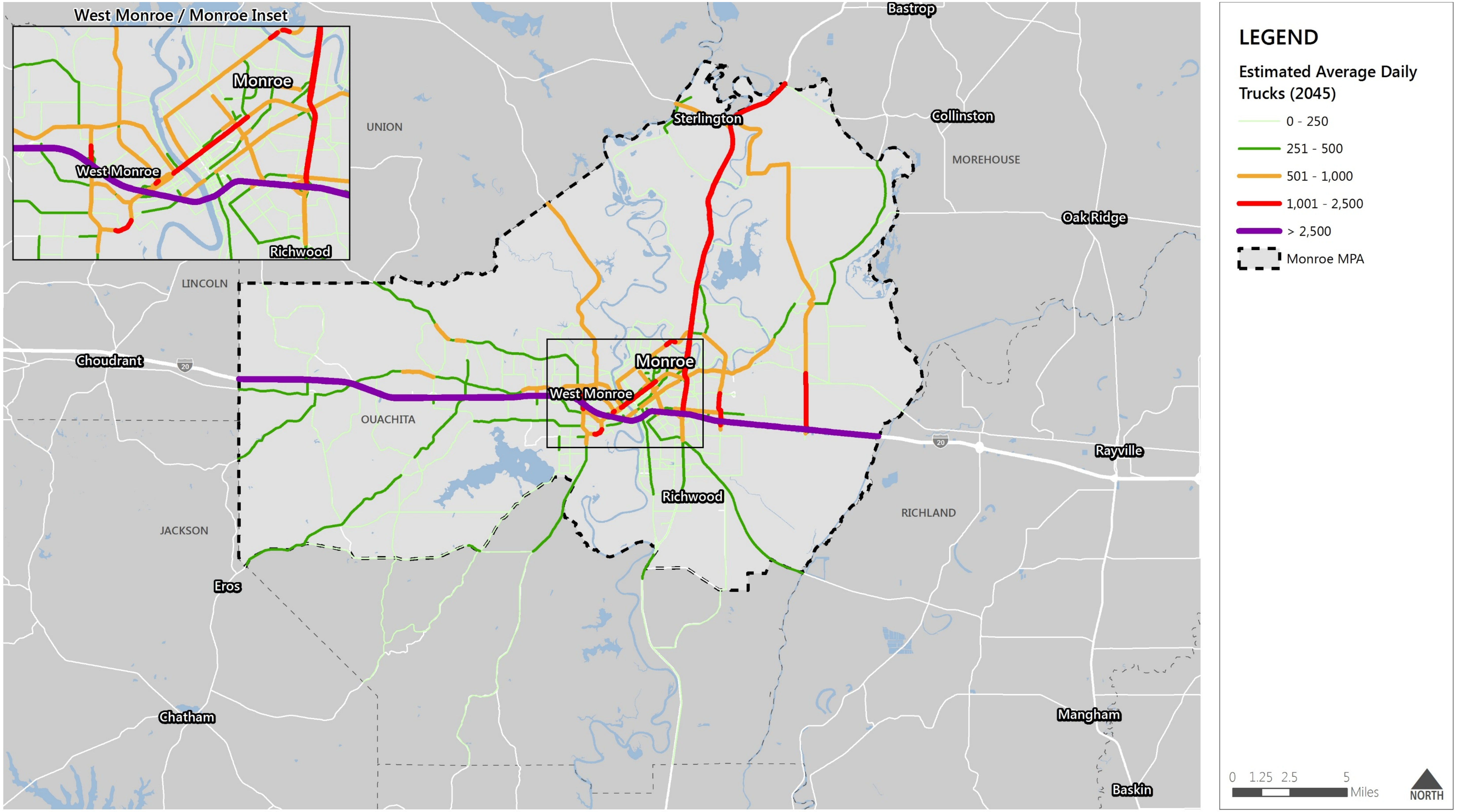
Figure 5.1: Freight Truck Growth, 2018 to 2045



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

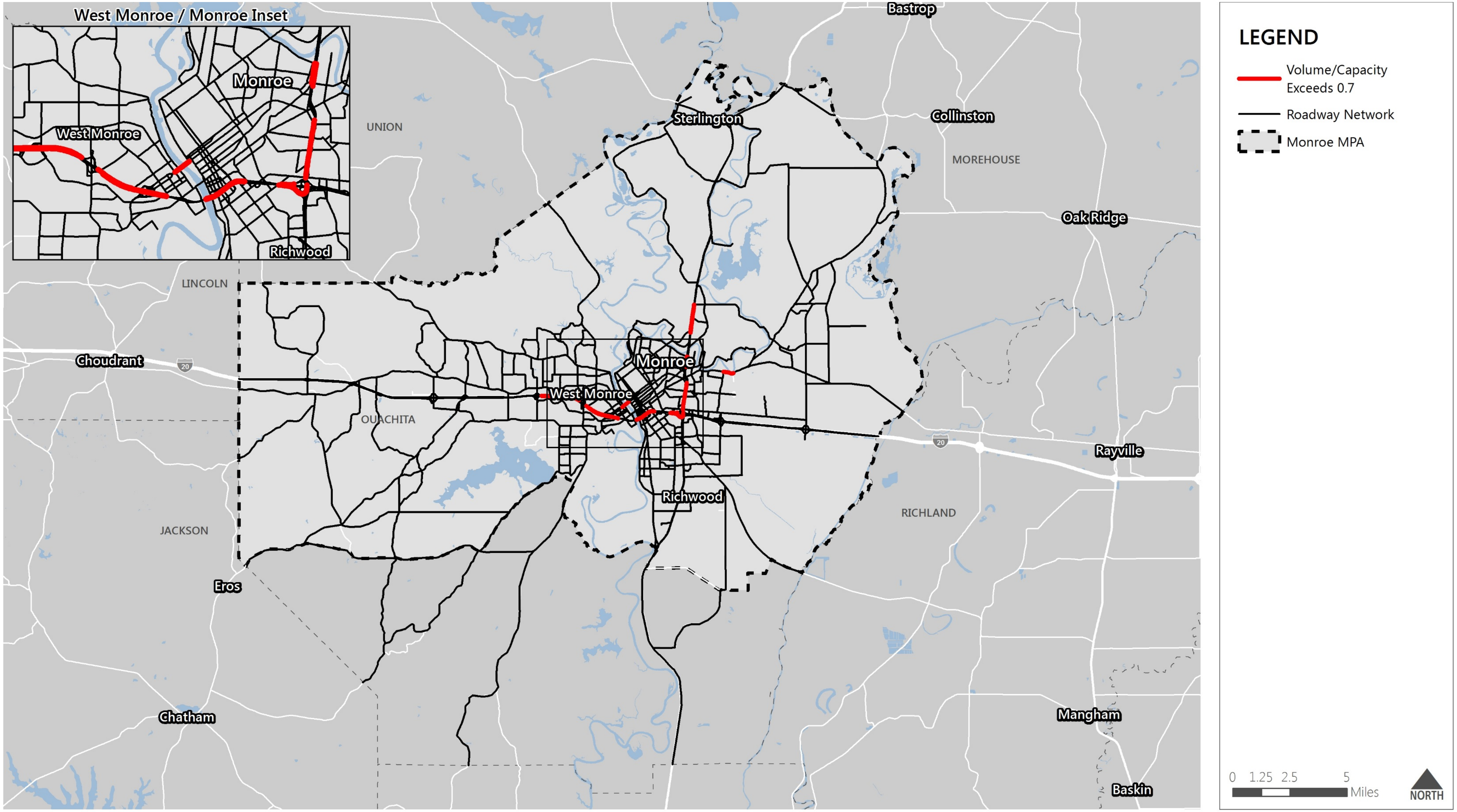
Figure 5.2: Freight Truck Traffic, 2045



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

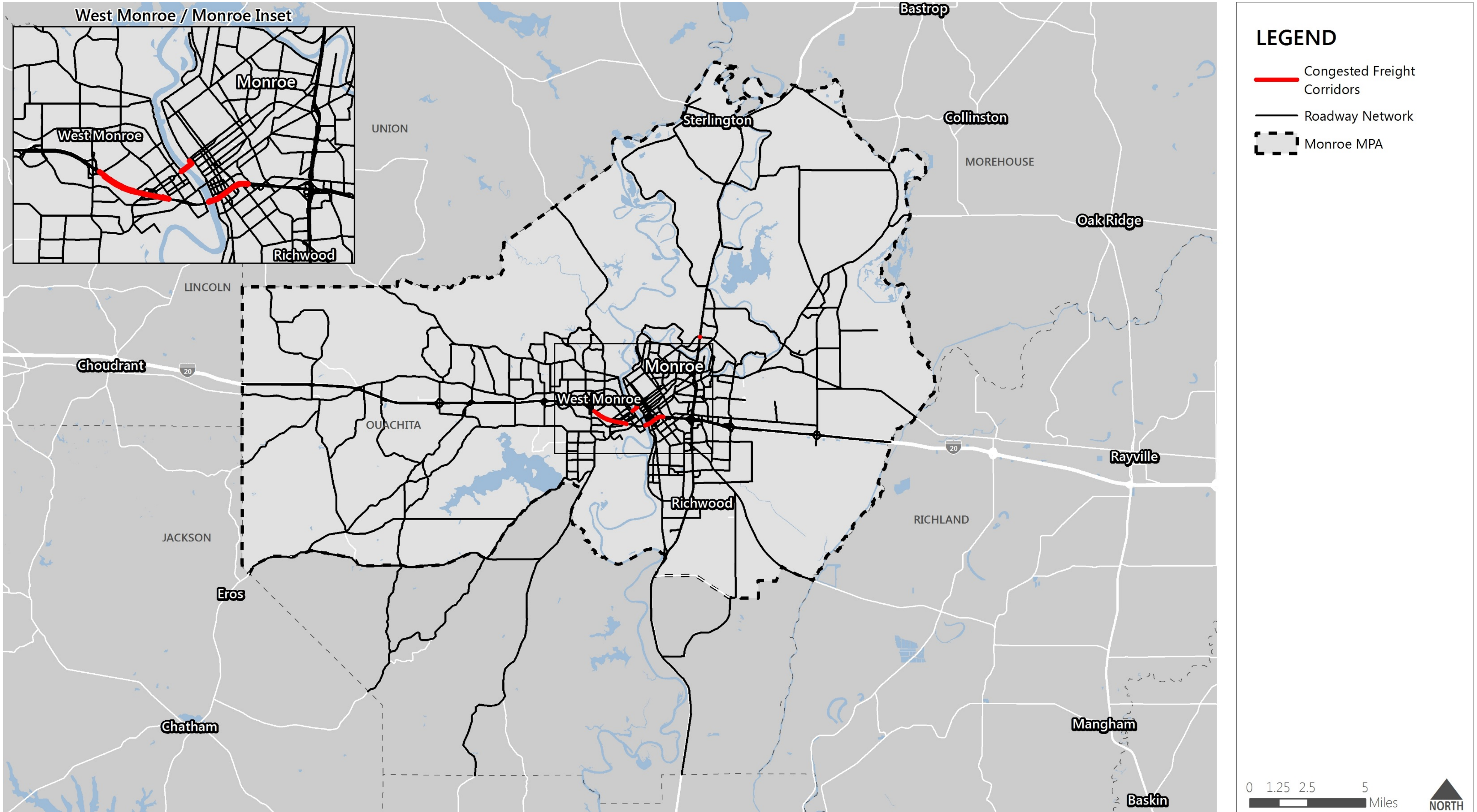
Figure 5.3: Congested Freight Truck Corridors, 2018



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Figure 5.4: Congested Freight Truck Corridors, 2045



Data Source: Travel Demand Model

Disclaimer: This map is for planning purposes only.

5.2 Freight Rail Needs

Forecast Growth

According to the FAF commodity flow data, the rail commodity flow tonnage is projected to increase by 67 percent between 2018 and 2045.

Rail Capacity and Future Projects

Future rail capacity and related needs can be measured in many ways. However, actual volumes and capacities are not known for all rail segments in the Monroe MPA; it is not possible to forecast future capacity utilization rates and needs by segment. The use of rail as a means of freight transportation is becoming a more popular alternative due to increasing roadway congestion. The *Louisiana State Rail Plan* outlines the future efforts anticipated by the State of Louisiana[13].

The following elements are typically assessed to determine physical rail capacity:

Vertical clearances

Information on vertical clearance of railroad overpasses was not available for this plan for the Monroe MPA.

Weight limits

The Class I Railroads (KCS and UP) are capable of handling car weights of 286,000 pounds throughout the entire MPA[14]. The ALM line is capable of handling car weights of 286,000 pounds along only four (4) miles of that track, and the DSRR line, along with the remaining ALM line, can handle only 263,000 pounds.

Number of tracks

There are approximately 87 miles of rail line in the MPA. Approximately 84 percent of the rail line mileage in the MPA is single track and 16 percent is multi-track (two or more tracks).

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13 http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Marine_Rail/Misc%20Documents/2015%20Louisiana%20Rail%20Plan.pdf

14 http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Misc_Documents/Louisiana%20Freight%20Mobility%20Plan%2004-09-18%20FINAL.PRINT%20EDITION.pdf

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Traffic control and signaling

All train operations on the Class I railroads in the MPA (KCS and UP) are controlled by Central Traffic Control (CTC) systems, whereby a dispatcher in a remote location directs train operations by use of wayside signal control systems.

However, there is a new control system, Positive Train Control (PTC), that is designed to automatically stop or slow a train before certain incidents occur. These systems were required to be placed on certain Class I railroads by December 31, 2015 as per the *Rail Safety Improvement Act of 2008*. However, the deadline has not been achieved due to the high costs in implementing the system. The U.S. Congress has considered extending the implementation deadline but has not yet done so. Additionally, the operational benefits to a railroad with PTC in the near term will be limited since PTC is an overlay system. However, in the longer term, PTC will lay the foundations for dynamic train blocks, which will move with trains and ensure sufficient stopping distances based on train speed and weight characteristics.

Terminal and yard capacity

Information on terminal and yard capacities were not available for this plan for the Monroe MPA.

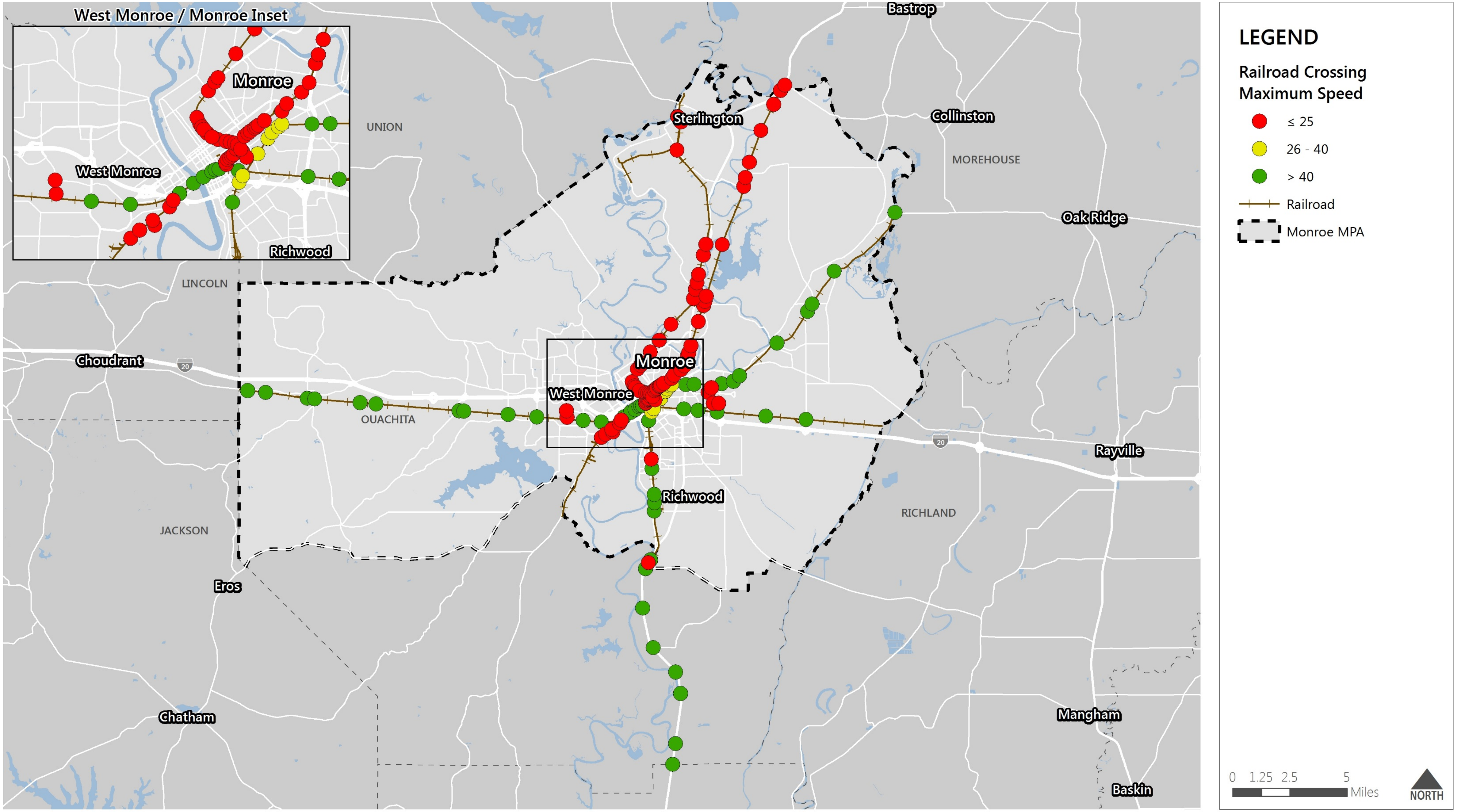
Rail Line Operating Speed

The average speed that trains move on a corridor impacts capacity and effects railroads' ability to move higher value, time-sensitive goods. Table 5.2 breaks down the railroad crossings by maximum speed. Figure 5.5 illustrates the operating speeds at each crossing within the MPA.

Table 5.2: Maximum Operating Speed at Railroad Crossings in the MPA, 2018

Maximum Operating Speed	Number	Percent
Greater than 40 MPH	47	35.6%
21 MPH – 40 MPH	17	12.9%
Less than or equal to 20 MPH	68	51.5%
Total	**132**	**100.0%**

Figure 5.5: Railroad Crossing Speeds



Data Source: Federal Rail Administration

Disclaimer: This map is for planning purposes only.

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Highway-Railroad Crossings

There are 132 public highway-rail grade crossings within the MPA, and 69 of those crossings have only passive warning devices (regulatory and warning signs, crossbucks, and pavement markings). One of the recommendations from the Freight Rail Advisory Council meetings that were held in March 2013 and October 2013 was to continue funding for active warning devices at highway/rail crossings[15].

Section 202 of the Rail Safety Improvement Act of 2008 (RSIA08), Public Law 110-432 (H.R.2095 / S.1889), that was signed into law on October 16, 2008, required the U.S. Secretary of Transportation to identify the ten States with the most highway-rail grade crossing collisions, on average, over the past three years, and to require those States to develop State highway-rail grade crossing action plans. Section 202 further provided that these plans must identify specific solutions for improving safety at crossings, including highway-rail grade crossing closures or grade separations, and must focus on crossings that have experienced multiple collisions, or are at high risk for such collisions. The State of Louisiana was identified as one of those ten states with the most highway-rail grade crossing collisions between 2006 and 2008, and as such, LADOTD developed the *Louisiana Highway/Rail Grade Crossing Safety Action Plan*[16].

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15 http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Marine_Rail/Misc%20Documents/2015%20Louisiana%20Rail%20Plan.pdf

16 https://safety.fhwa.dot.gov/hsip/xings/docs/la-sap.pdf

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5.3 Air Network Needs

Forecast Growth

According to the FAF commodity flow data, the commodity flow tonnage shipped by air is projected to increase by 361 percent between 2018 and 2045. However, the air mode accounts for less than 0.1 percent of commodity flow tonnage.

Airport Projects

A list of planned airport projects for Monroe Regional Airport can be found in the *LADOTD Airport Construction & Development Priority Program*[17].

17 http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Aviation/Pages/Construction_Development.aspx

5.4 Waterway Network Needs

Forecast Growth

According to the FAF commodity flow data, the commodity flow tonnage shipped by water is projected to increase by six (6) percent between 2018 and 2045.

Port Projects

A list of planned port projects for the Greater Ouachita Port can be found in the *Louisiana Freight Mobility Plan*.

5.5 Pipeline Network Needs

Forecast Growth

According to the FAF commodity flow data, the commodity flow tonnage shipped by pipelines is projected to increase by 32 percent between 2018 and 2045. Although the pipeline mode ranks first in commodity flow tonnage in 2018, the truck mode is projected to surpass the pipeline mode to become the top-ranking mode by commodity flow tonnage in 2045.

Pipeline Projects

There is no information on any planned pipeline projects within the MPA.

6.0 Bicycle/Pedestrian

The bicycle and pedestrian needs for the Monroe MPA were primarily determined by evaluating the following data:

- latent demand analysis,
- anticipated growth,
- public input, and
- pedestrian and bicycle collisions and fatalities.

This data was compared to existing infrastructure and plans to identify bicycle and pedestrian needs.

6.1 Infrastructure/Facility Needs

Existing and Future Gaps

A sidewalk inventory was not available for the Monroe MPA. Imagery from Google Earth and visits to the area showed that sidewalks were largely present in the downtown areas of Monroe and West Monroe and along many major roads. These sidewalks vary in condition from poor to great. Intersections often lack crosswalks. Some new sidewalks have recently been constructed along roads like Arkansas Road in West Monroe and University Drive in Monroe. Most of the ULM campus is covered by sidewalks and even has a pedestrian footbridge across Bayou Desiard. Outside of these areas, sidewalks appear sporadically. Sterlington largely lacks sidewalks and Richwood has a small number of sidewalks like Dellwood Drive.

For recreational walking, many of the region's parks like Forsythe Park and Kiroli Park have walking paths and more are in planning stages.

Additionally, a bicycle facility inventory was not available. Imagery from Google Earth and field review showed that the MPA largely lacks bicycle infrastructure. There are a few bicycle friendly paths located in or near parks in Monroe. Near Monroe, the Forsythe Park to Northside Loop and Forsythe Park trail are both listed as recommended bike routes by the Louisiana State Official Travel website[18].

West Monroe has been constructing more bicycle lanes and paths, such as Ridge Avenue and Olympic Drive[19], and more facilities are in the planning process.

[18] https://www.louisianatravel.com/bike/trails-routes

[19] https://www.thenewsstar.com/story/news/local/2019/05/24/cycling-safety-priority-west-monroe-addition-new-bike-lanes/3767244002/

Figure 6.1 shows existing demand for biking and walking based on land use, demographics, and built environment conditions. The methodology for the demand mapping is located in *Technical Report 2: Existing Conditions*. The highest bicycle and pedestrian latent demand occurs in the following areas:

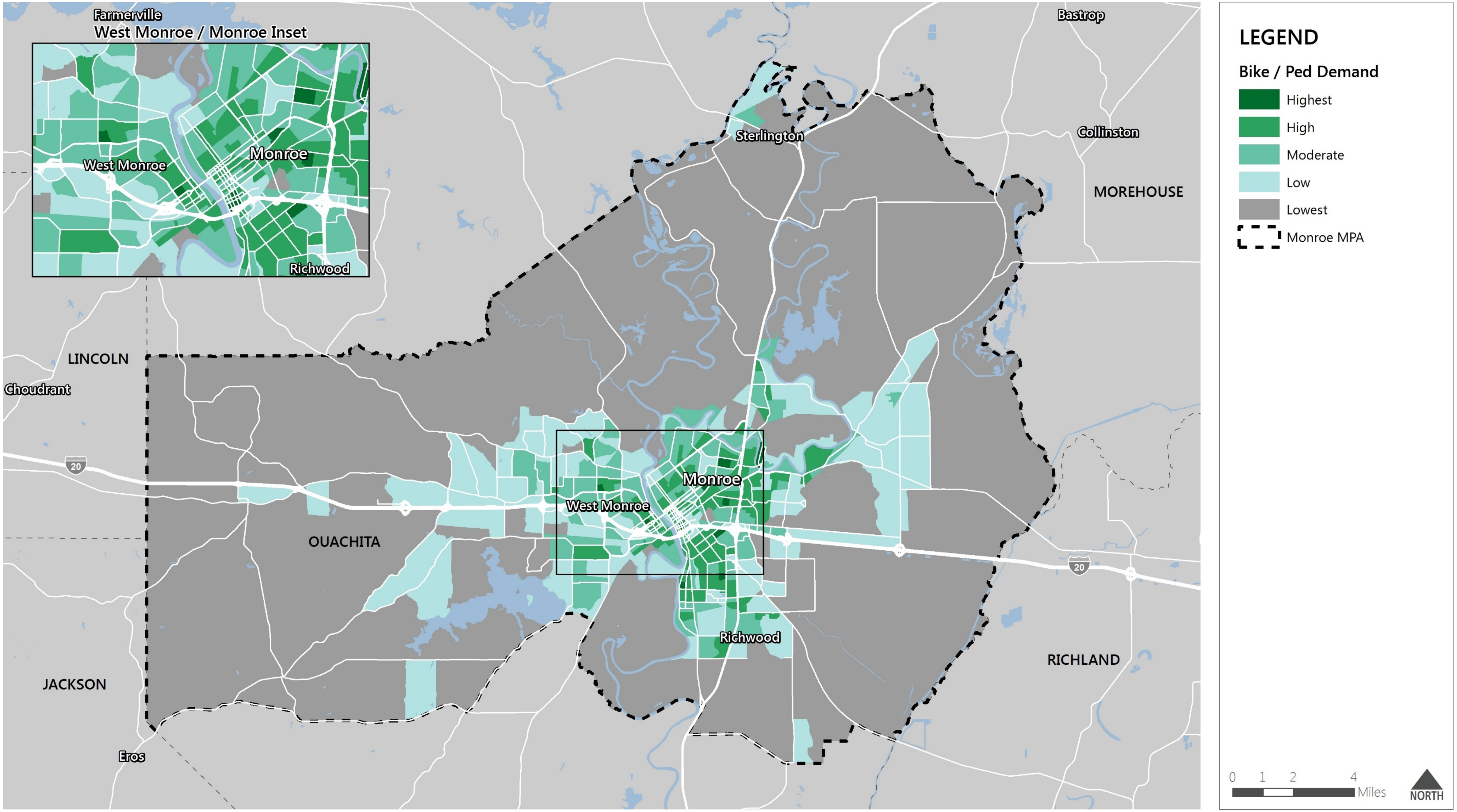
- Downtown Monroe and West Monroe,
- The University of Louisiana at Monroe and surrounding neighborhood,
- around Richwood and US 165 S,
- around Warren Drive in West Monroe,
- northern Monroe by the US 165 and Sterlington Road,
- around Brownsville in West Monroe, and
- Claiborne by Cypress Street and Wallace Road.

Figure 6.2 shows where a high amount of growth is anticipated in population, jobs, and school enrollment by 2045. Three of these areas- ULM, Sterlington by Lamkin and Treasure Island, and Richwood by US 165 S- are also the areas with high bicycle and pedestrian demand in 2020. Four other areas where higher growth is anticipated are:

- western West Monroe,
- West Monroe High School by North 7th Street and Travis Road,
- Formosa Avenue, and
- east of Pecanland Mall between I-20 and Millhaven Road.

It is difficult to forecast exactly how this anticipated growth will impact demand for bicycle and pedestrian facilities. However, changes such as an increase in active downtown spaces, denser land uses, increased bicycle and pedestrian infrastructure, and changing demographics could increase future demand.

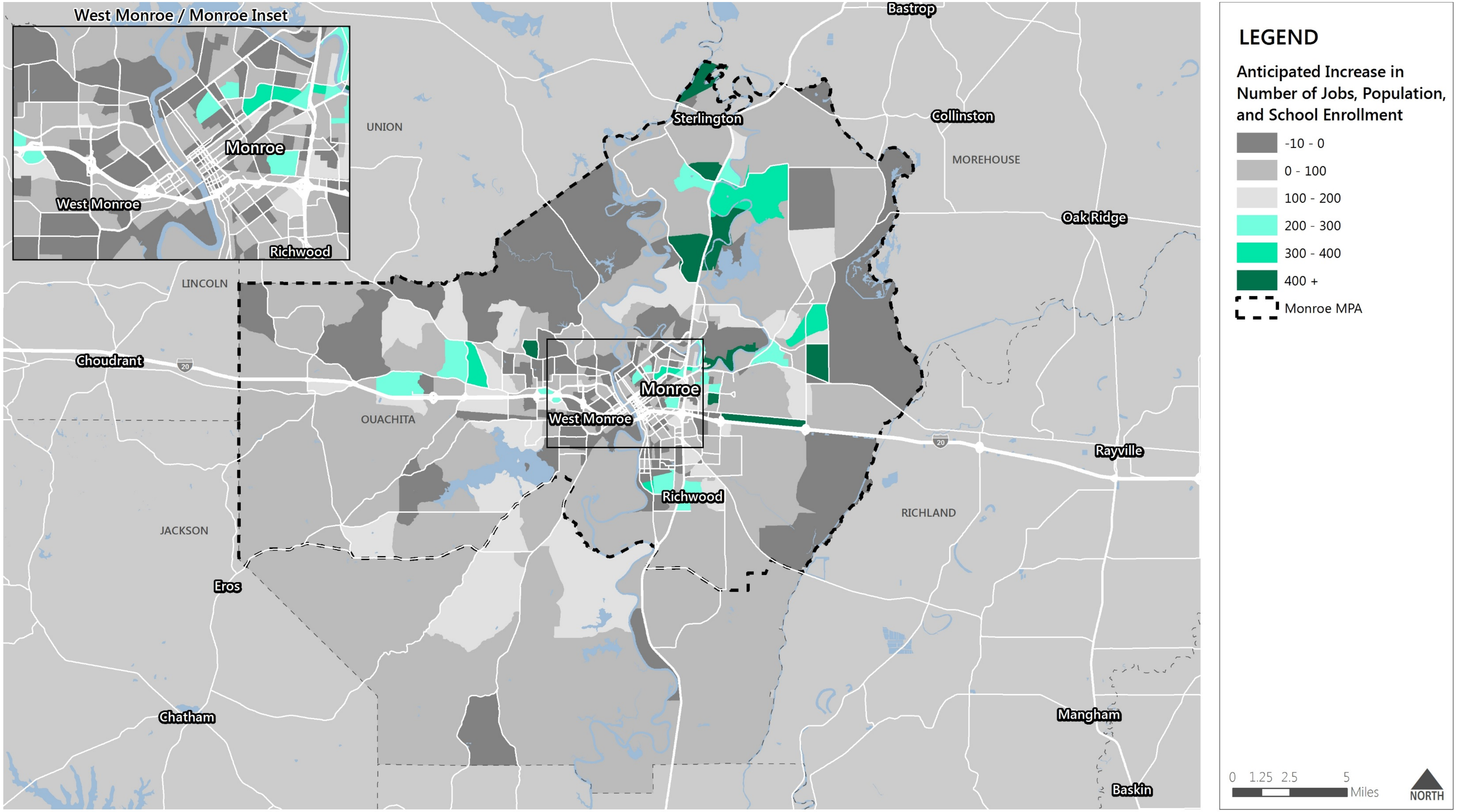
Figure 6.1: Existing Bicycle and Pedestrian Demand in the MPA, 2017-2018



Data Source: Census Bureau; MPO Staff; Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

Figure 6.2: Anticipated Growth in the MPA, 2018-2045



Data Source: Census Bureau; MPO Staff; Neel-Schaffer, Inc.

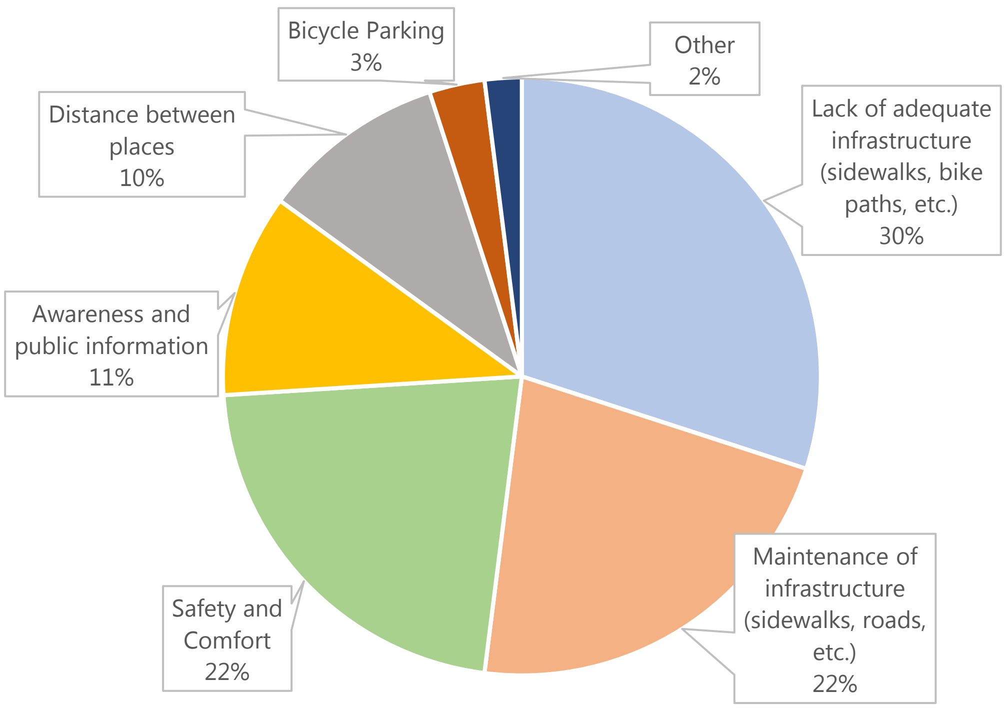
Disclaimer: This map is for planning purposes only.

Public and Stakeholder Input

Stakeholders and the public prioritized roadway maintenance above bicycle and pedestrian needs. However, increasing safety for all users was a second priority. In particular, several people mentioned the need for increased pedestrian safety.

Survey respondents were also asked the biggest challenges to bicycling and walking. Figure 6.3 shows that over half respondents named infrastructure as the biggest challenge- either the lack of infrastructure, or the maintenance of it. The next biggest challenges were safety and comfort, followed by awareness and public information.

Figure 6.3: Public Responses to the Biggest Challenges to Bicycling and Walking



When asked to share big ideas for improving transportation in the MPA, over 95 respondents mentioned improving bicycle and pedestrian infrastructure. Almost all these comments asked for a larger and safer active transportation system, including sidewalks, bicycle lanes, and off-road paths. These ideas plus some more specific comments about bicycling and walking are listed below in Table 6.1.

Table 6.1: Public Ideas for Improving Bicycle and Pedestrian Transportation

Idea	Times Mentioned
Increase bicycle and pedestrian infrastructure and safety	41
Maintain and expand the sidewalk network	36
Construct off-road paths for bicycling and walking	19
Improve safety for pedestrians and bicyclists (i.e. reduce vehicle speeding and driver inattentiveness; improve street lighting; reduce crime)	17
Build on-road bicycle lanes	14
Create safe crosswalks	6
Clean and maintain shoulders and sidewalks	4
Connect parks with a bicycle path	3
Find reliable funding for sidewalks (ideas include grants, adding into city budget, or requiring developers to construct sidewalks)	3
Provide education for safe bicycling and information on bicycle routes	2
Build sidewalks and bicycle paths around and connecting to schools (i.e. Lee Junior High and Neville High School)	2
Build a levee bicycle and pedestrian path	2
Create sidewalks in neighborhoods and bicycle routes between neighborhoods	2
Build sidewalks by the following areas or roads: • Louisville Rd • Desiard Rd • 18th St • Forsythe Ave • West Monroe • High traffic areas	1 mention per location (2 for Louisville)
Build bicycle lanes or paths along the following areas: • Downtown Monroe • Bon Aire Drive • Areas with high rush hour traffic	1 mention per location
Provide bicycle parking	1
Repurpose old rail tracks for a lit bicycle/walking pass	1
Improve markings for bicycle lanes	1
Improve ramps and crosswalks for wheelchair users	1
Provide crosswalks at Louisville Ave and 18th St	1

6.2 Existing Plans

The following planning documents have listed locations for potential bicycle and pedestrian improvements:

- **Monroe Urbanized Area 2040 MTP** (2015). The Monroe Urbanized Area 2040 Metropolitan Transportation Plan provided a map of several potential bicycle routes throughout the MPA.
- **City of Monroe Comprehensive Plan** (2008). In 2008 the city completed its Monroe Comprehensive Plan. The plan provides some concepts for pedestrian and bicycle improvements such as:
  - streetscape improvements along DeSiard Street,
  - a riverfront boardwalk along the Ouachita River,
  - a waterfront greenway that connects to a citywide greenway,
  - an urban greenway that connects the waterfront to the city's south side neighborhoods,
  - a trail along the right-of-way of US 165,
  - pedestrian trails to help with neighborhood infill in south Monroe, and
  - improved pedestrian walkways in Pargoud Boulevard Park, Orange Street Park, Sherrouse Park, Lexington Street Park, Lincoln Park, Lamyville/Magnolia Park, and Jasmine Park.
- **City of West Monroe Bicycle and Pedestrian Master Plan Phase 1** (2018). In 2018 the city adopted their Bicycle and Pedestrian Master Plan Phase 1, which added bicycle and pedestrian improvements to already funded on-going projects[20]. The Phase 1 plan is only the beginning of a larger effort to enhance and preserve the wetlands areas and green space across the city. Since the approval of the plan in 2018, bike lanes were added on neighborhood roads, such as Ridge Avenue and Olympic Drive[21].

[20] https://www.knoe.com/video?vid=497636331

[21] https://www.thenewsstar.com/story/news/local/2019/05/24/cycling-safety-priority-west-monroe-addition-new-bike-lanes/3767244002/

- **ULM Campus Facilities Master Plan** (2013). The 2013 ULM Campus Facilities Master Plan looks to make the following pedestrian improvements:
  - expanded pedestrian paths throughout campus including a bayou-centric path,
  - three new crosswalks across University Drive,
  - street trees and signage along major roads, and
  - traffic calming devices with embellished pedestrian crosswalks at major roads.

6.3 Safety Needs

Based on available crash data, one-hundred and seven (107) bicycle collisions and 4 (four) bicycle fatalities occurred in the MPA from 2014 to 2018. In the same period, 331 pedestrian collisions and 29 fatalities occurred. Figure 6.4 shows the bicycle and pedestrian crash hot spots, which are concentrated near:

- Downtown Monroe Area,
- 2nd Street,
- the area near Lea Joyner Bridge,
- the area near the intersection of US 80 and US 165 N, and
- Washington Street.

These fatality rates are more than double the national average and the public frequently expressed concern about pedestrian safety at the meetings and online surveys. In order to better understand safety needs, the MPO should work with LA DOTD and local police departments to obtain detailed crash records for analysis, where feasible.

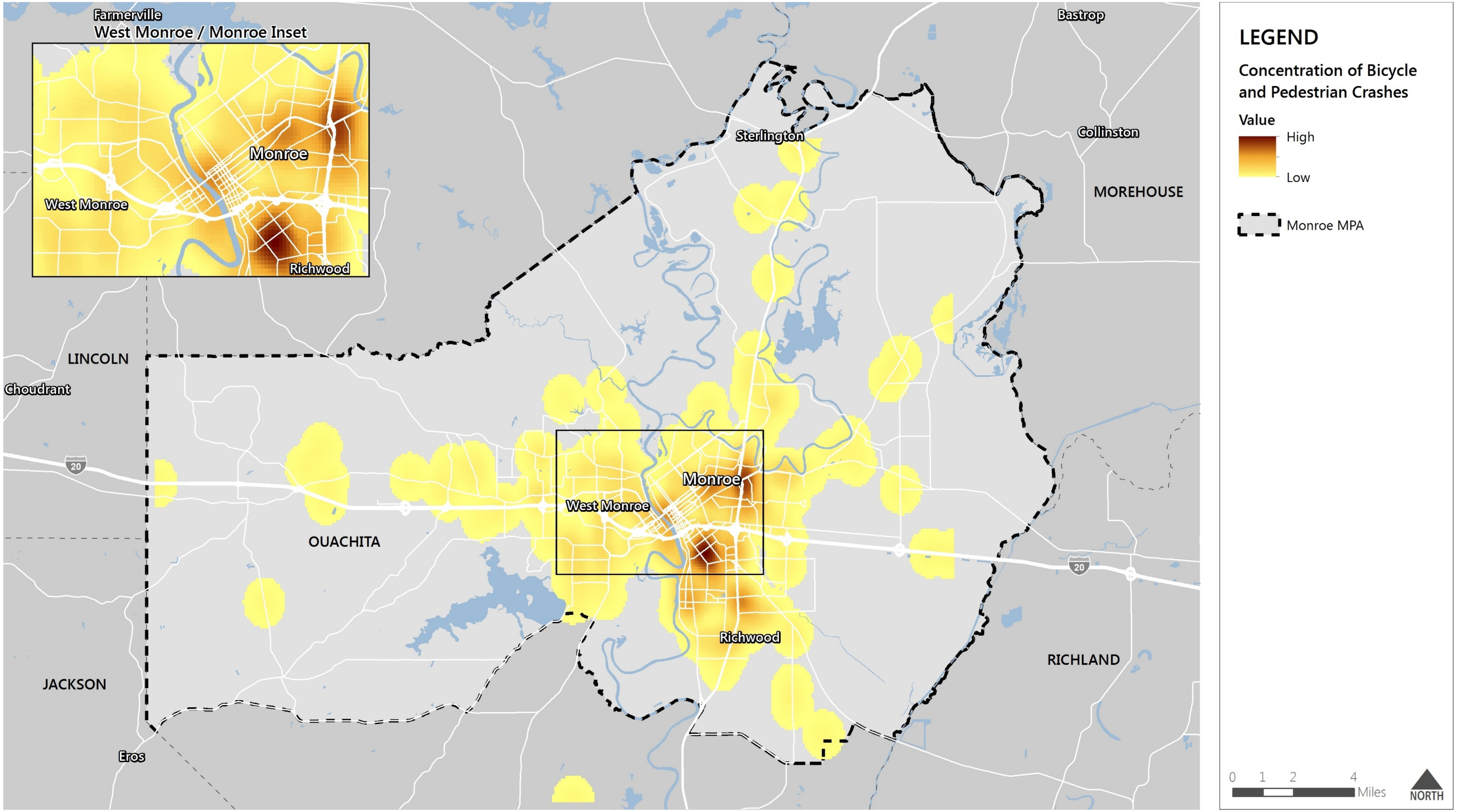
6.4 Gaps in Bicycle and Pedestrian Infrastructure

Table 6.2 identifies the major areas that have a gap between the existing and needed facilities. The table indicates whether these needs were identified from the existing and future demand analysis, public input, safety reports, or existing plans.

Table 6.2: Major Bicycle and Pedestrian Gap Areas

Gap Area	Gap Type	Source Indicating Need				
		Existing Demand	Future Demand	Public Input	Safety Data	Existing Plans
Downtown Monroe and West Monroe by river crossings	Bicycle; Need to upgrade sidewalks and crossings	X	X	X	X	X
ULM	Bicycle	X	X	X		X
West Monroe neighborhood east of Warren Drive	Bicycle and Pedestrian	X		X		X
US-165 by Dellwood Dr; Richwood Rd	Bicycle and Pedestrian	X	X	X	X	
Kiroli Rd	Bicycle			X		X
Coleman Ave Neighborhood	Bicycle	X				X
Downtown Monroe and West Monroe by Desiard St	Bicycle; Need to upgrade sidewalks and crossings			X		X
Carver Elementary School	Bicycle and Pedestrian	X				X
S 2nd St	Bicycle and Pedestrian			X	X	
S Grand St	Bicycle; Need to upgrade sidewalks and crossings			X		X
Charles Johnson Park Neighborhood	Bicycle; Need to upgrade sidewalks and crossings	X		X		
Washington St by N 21st St	Bicycle; Need to upgrade sidewalks and crossings	X			X	
Area around Evangeline St and Armand St	Bicycle and Pedestrian	X		X		

Figure 6.4: Concentration of Bicycle and Pedestrian Collisions, 2014-2018



Data Source: Louisiana Highway Safety Comission, 2014-2018

Disclaimer: This map is for planning purposes only.

7.0 Transit

7.1 Service Needs

Existing and Future Demand

Monroe Transit operates ten (10) bus routes within city limits. Most routes run Monday through Saturday from 6:30 a.m. to 6:30 p.m. The routes run every 50 minutes with all routes beginning at the Monroe Terminal on Catalpa Street. Figure 7.1 maps the routes. Bus fares are:

- $1.25 for adults;
- $0.90 for students;
- $0.50 for elderly, disabled, or Medicare riders; and
- free for children.

Transfers are free. Adult day passes are available for $3.00 and a monthly pass with unlimited rides costs $42.50.

Figure 7.2 shows existing demand for public transit in the region based on land use, demographic, and built environment conditions. Methodology details can be found in *Technical Report 2: Existing Conditions*.

Based upon Figure 7.2, there are nine (9) high-demand areas for transit. These areas are:

- St. Francis Medical Center and downtown Monroe,
- around The Oaks Nursing Center and Brookshire's Grocery,
- Glenwood Regional Medical Center,
- between Peach and Beauregard Streets and South 8th and 10th Ave,
- between 21st Ave, Louisville Ave, and Washington Ave,
- University of Louisiana at Monroe,
- off Swayze Street between Renwick and Louberta St, and
- off Louisville Ave by Hudson Ln, N 6th and N 3rd Ave.

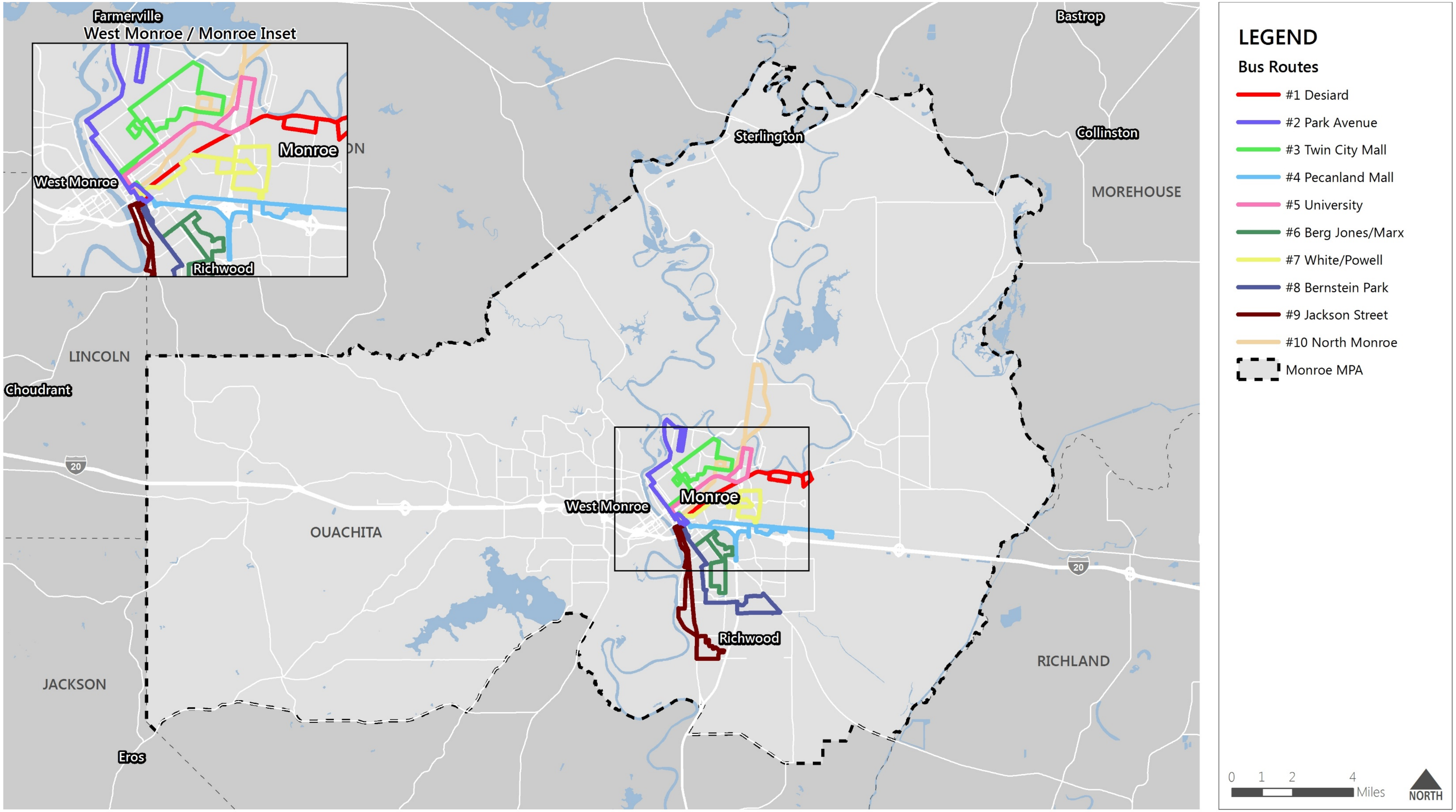
Currently Monroe Transit serves all of these high-demand areas except for the Glenwood Regional Medical Center, which is located in West Monroe. These routes currently run about once an hour and may support more frequent service. There are also many areas that currently are not served by Monroe Transit but could support 30-60 minute service. These areas include a large portion of West Monroe above the interstate and of Monroe north of Forsythe Avenue.

Figure 7.3 shows anticipated growth of population, employment, and school enrollment by TAZ. While it is difficult to forecast exactly how growth will impact demand, it is likely that high growth that increases density would increase demand for transit. The five areas with the highest anticipated growth are:

- Sterlington and north Monroe along Hwy-165 N,
- ULM and the neighboring area to the east along the bayou,
- east Monroe around Lincoln Rd and the railroad,
- the area between Millhaven Rd and I-20 by the Monroe Regional Airport, and
- Richwood, especially by US 165 S.

Of these areas, only ULM is currently served by transit.

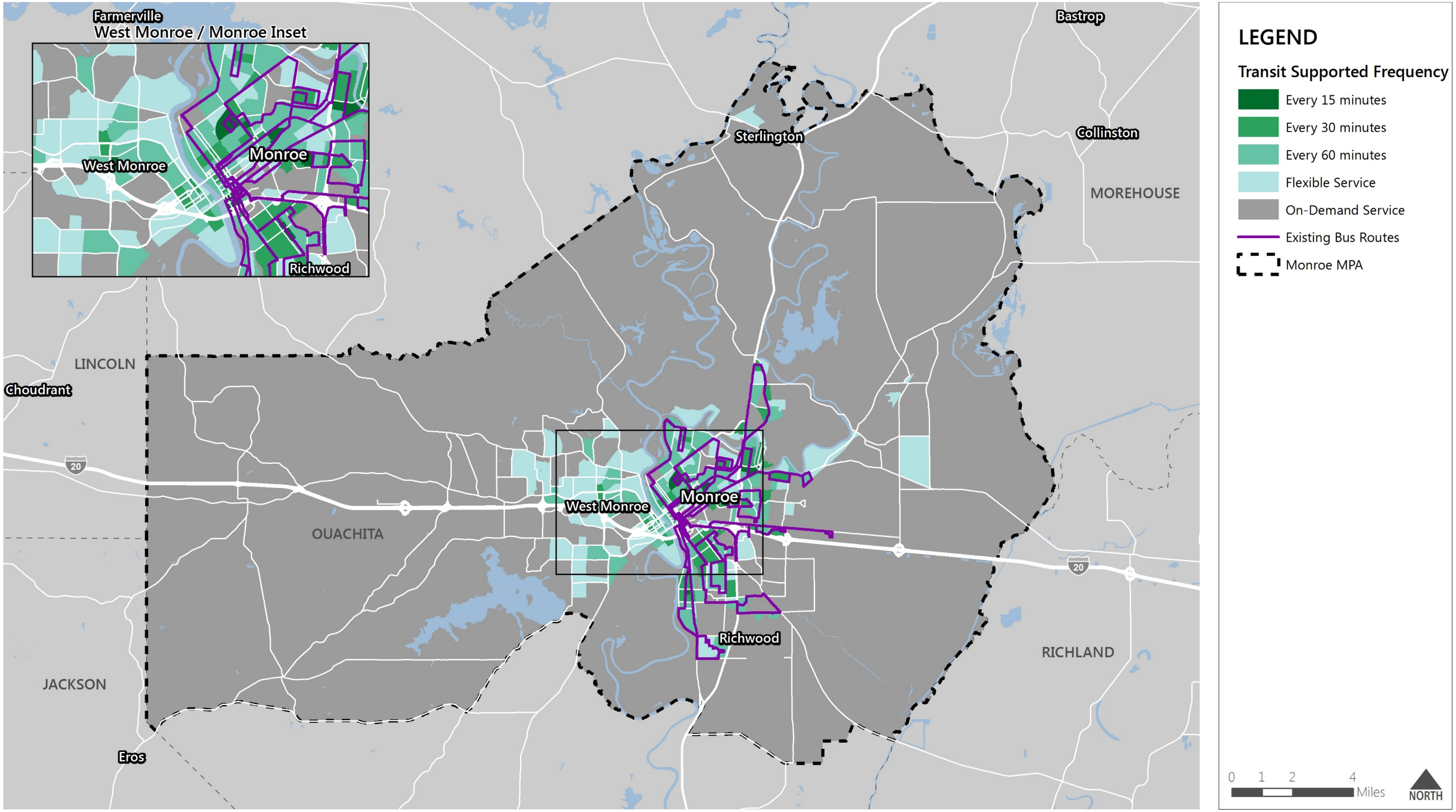
Figure 7.1: Monroe Transit Fixed Route System



Data Source: City of Monroe

Disclaimer: This map is for planning purposes only.

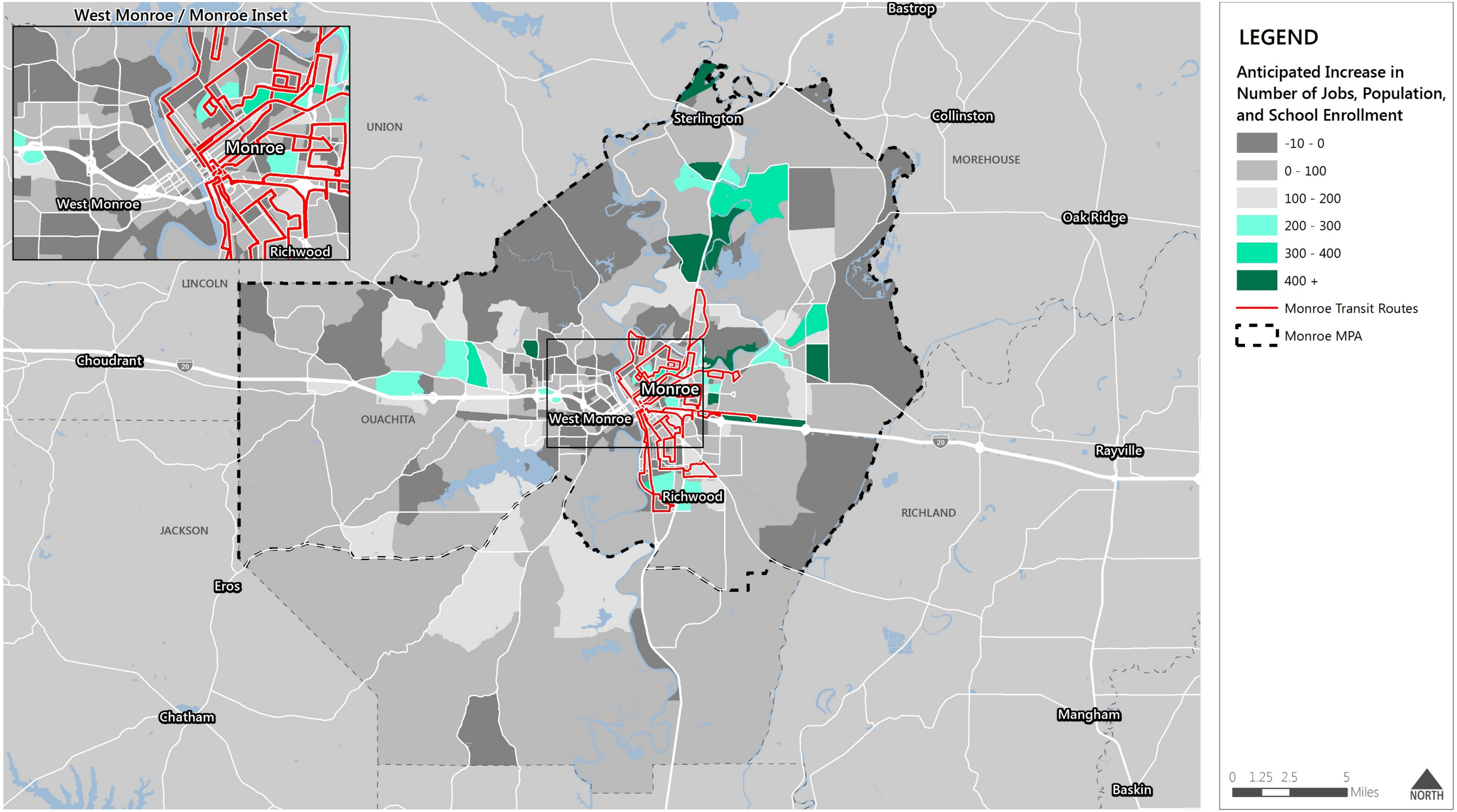
Figure 7.2: Existing Transit Demand in the MPA, 2017-2018



Data Source: Census Bureau; MPO Staff; City of Monroe; Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

Figure 7.3: Anticipated Growth in the MPA, 2045



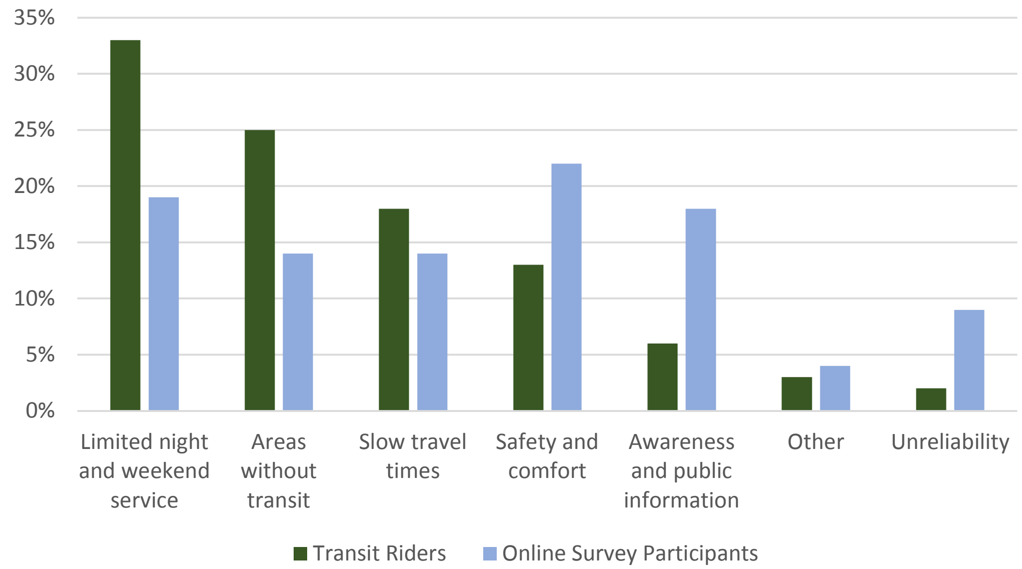
Data Source: Census Bureau; MPO Staff; Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

7.2 Public and Stakeholder Input

In general, stakeholders and the public prioritized roadway maintenance above transit needs. However, increasing safety for all users was also a high priority, including the safety of transit riders walking between buses and their destinations.

Figure 7.4: Biggest Challenges to Riding Transit



When asked the biggest challenges to riding transit, answers noticeably varied between the transit riders surveyed on the bus and the participants of the online survey who mostly drove. Transit riders found the biggest challenges to be limited hours and service area, followed by slow travel times. The participants who mostly drove said the biggest challenge was safety and comfort, awareness and public information, and limited hours of service.

Transit Improvements

When asked their big ideas for improving transit, over 75 respondents discussed improving transit. Table 7.1 lists these ideas. The most popular request was to increase the areas of service for transit, especially to include West Monroe. The next most popular request, especially from transit riders, was to provide nighttime service. The other popular ideas were to provide inter-city rail service like Amtrak and to improve bus routes to connect key destinations.

Table 7.1: Public Ideas for Improving Transit

Idea	Times Mentioned
Increase service area of transit • Increase access to all areas, both urban and rural (10 comments) • Unify Monroe and West Monroe transit or create West Monroe transit system (7 comments)	17
Extend hours of service to include nighttime	11 (7 of these came from transit riders)
Provide Amtrak service to cities like Jackson, Longview, Ruston, and Meridian	8
Improve the routes. Ideas for stops or routes include: • Express bus down US 165 to the Pecanland Mall • Sport complexes and parks • 18th St • LA Delta Community College • Mass transit or express route connecting ULM, downtown Monroe, and West Monroe • Garrett Rd • Connect Target and the mall to downtown	8
Create light rail that services the parish, provides jobs, runs on clean energy, and connects to Ruston	5
Decrease wait time between buses and sync bus connections	4
Add more buses to the Louisville Route; the bus gets crowded	3 (all were transit riders)
Add benches and maintain bus stops, even for West Monroe transit	3
Create a water trolley or shuttle between downtown Monroe and West Monroe	3
General desires to improve transit	2
Decrease the size of buses in Monroe, especially in North Monroe	2
Advertise West Monroe Transit Service and provide more readily available bus route information	2
Improve public safety for transit riders walking to their stops, especially for seniors and by assisted living like St. Joseph's	2
Add bus stops, especially on Hwy-165 S and people have to walk very far	2
Decrease length of routes; the spoke-and-hub system takes too long	1
Slow down bus speeds in residential neighborhoods	1
Maintain buses better so they do not break down	1
Keep buses cool in the summer	1
Create vanpool or transit around congested areas like Thomas and Well Road exits off I-20	1
Have large employers in West Monroe like the paper mills fund transit	1

7.3 Existing Plans

- **Monroe Urbanized Area 2040 MTP** (2015). This previous MTP studied gaps in service and identified the lack of fixed-route service In West Monroe as the largest transit deficit. Additionally, many key destinations were not reachable at night or on the weekends. Some key destinations like the West Monroe Convention Center, Glenwood Regional Medical Center, and the Super 1 Shopping Center were not served by fixed-route transit.
- **North Delta Human Services Coordinated Transportation Plan** (2018). This plan determines transit gaps and coordination opportunities among publicly funded human service transportation programs in the 11 parishes of the North Delta region. The plan highlighted two major transit needs:
  - There is a currently a high demand for on-demand and rural transit services, and this demand is expected to significantly rise as the senior population increases. Demand will also increase by residents who live with disabilities, below the Federal Poverty Level, or in rural areas.
  - Current coordination among various agencies needs significant improvement.

7.4 Capital Needs

Of the Monroe Public Transit and West Ouachita Senior Center rolling stock, 18 percent are past their Useful Life Benchmark (ULB), as defined by their age and the default ULB established by the Federal Transit Administration. Only one (1) of the seven (7) equipment vehicles was past its useful life. While actual vehicle lifespans may extend beyond the default ULB depending on local roadway and environmental conditions, older vehicles will still need to be replaced on a regular basis over the next 25 years. Efforts should also be made to extend vehicle lifespans beyond their ULB through preventative maintenance.

MPT and WOSC will need to carefully monitor the frequency of vehicle breakdowns and other road calls. It may become necessary to revisit standard operating procedures and develop a fleet management plan to more efficiently replace, refurbish, and maintain vehicles.

All facilities reported to NTD were in an acceptable condition, scoring a 3.0 or above on the Transit Economic Requirements Model (TERM) Scale.

Table 7.2: Monroe Transit Rolling Stock Inventory and Performance

Agency	Vehicle Type	Active Vehicles with ULB Reported	Active Vehicles Past Useful Life	% Past ULB
Monroe Public Transit	Bus	22	3	13.6%
	Cutaway	5	0	0.0%
West Ouachita Senior Center Transit	Bus	1	0	0.0%
	Cutaway	10	4	40.0%

Source: NTD Urbanized Area Asset Summary, 2018

Table 7.3: Monroe Equipment Inventory and Performance

Agency	Vehicle Type	Vehicles with ULB Reported	Vehicles Past Useful Life	% Past ULB
Monroe Public Transit	Automobiles	4	1	25.0%
	Trucks and other Rubber Tire Vehicles	3	0	0.0%

Source: NTD Urbanized Area Asset Summary, 2018

Table 7.4: Monroe Facility Inventory and Performance

Agency	Asset Category	Facilities with Condition Assessment	% Under 3.0 on TERM Scale	% Below 3
Monroe Public Transit	Bus Transfer Center	1	0	0.0%
	Combined Administrative and Maintenance Facility	1	0	0.0%
West Ouachita Senior Center Transit	General Purpose Maintenance Facility	1	0	0.0%

Source: NTD Urbanized Area Asset Summary, 2018

7.5 Safety Needs

Monroe Public Transit has had no reported incidents from 2014-2018, comparing very well against the state and national averages. West Ouachita Senior Center Transit had two events and one injury during the last five years which did not result in fatalities or injuries. MTS and WOPT should continue to measure and monitor their safety performances, per their standard operating procedures for operations and maintenance. This will ensure that any safety needs are identified and that mitigation measures are implemented as needed.