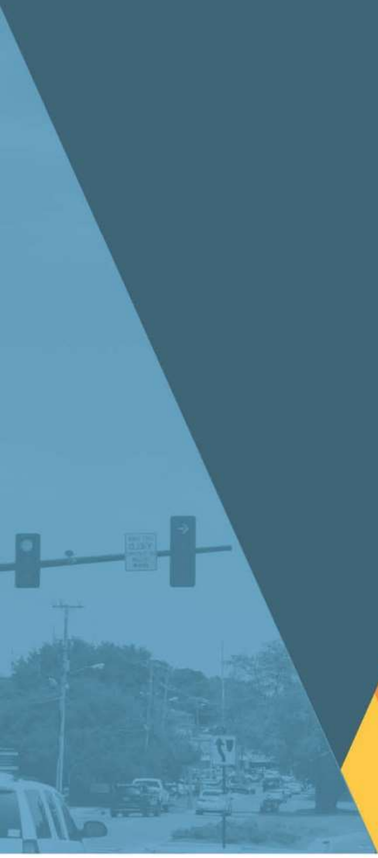
2045

Metropolitan Transportation Plan



Technical Report #4

Needs Assessment

Jackson Metropolitan Planning Organization

November 2020

CMPDD

PROMOTING REGIONAL EXCELLENCE SINCE 1968

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1.0 Introduction

This report discusses transportation needs for the Jackson 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 and forecasted 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.

Regional Considerations

The Central Mississippi Planning and Development District (CMPDD) is the Metropolitan Planning Organization (MPO) for the MPA and should carefully consider transportation resiliency needs related to the following regional issues:

- **High wind events:** The Jackson 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.
- **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 Southeastern 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 Jackson 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. According to the USGS, there were five (5) reported earthquakes in the MPA between 2014 and 2018. However, the magnitude of these

earthquakes was minor (less than 4.0)[1]. 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 grows and changes, its land use and infrastructure change with it. 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.

[1] United States Geological Survey Search Earthquake Catalog

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 a 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 the 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 and 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 the 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 the 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.

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.
- Adopt open space preservation plans, which will balance land use and local developments with preservation and conservation of the existing open space.
- Establish stormwater fees to support the funding of stormwater management projects and practices.
- Reduce the number of impervious surfaces on residential, commercial, and public properties and offer incentives to encourage the change.

Existing Policies and Considerations

The State of Mississippi has a statewide Stormwater Management Plan that has been published through the Mississippi Department of Transportation (MDOT). Information about the plan can be found at:

http://sp.mdot.ms.gov/Environmental/Pages/Stormwater-Management-Plan.aspx

Hinds, Madison, and Rankin Counties each maintain a Stormwater Management Program, with information available at:

Hinds County

http://www.hindscountyms.com/storm-water-management-program

Madison County

https://www.madison-co.com/county-departments/road-department/storm-water-info

Rankin County

https://www.rankincounty.org/egov/documents/1411072927_85198.pdf

Furthermore, the Cities of Brandon and Madison maintain a Stormwater Management Program, with information available at:

City of Brandon

https://www.brandonms.org/departments/public-works/stormwater/

City of Madison

http://www.madisonthecity.com/public-works

In addition to the above plans, the City of Jackson has a stormwater ordinance and monitors stormwater runoff within their jurisdiction.

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.

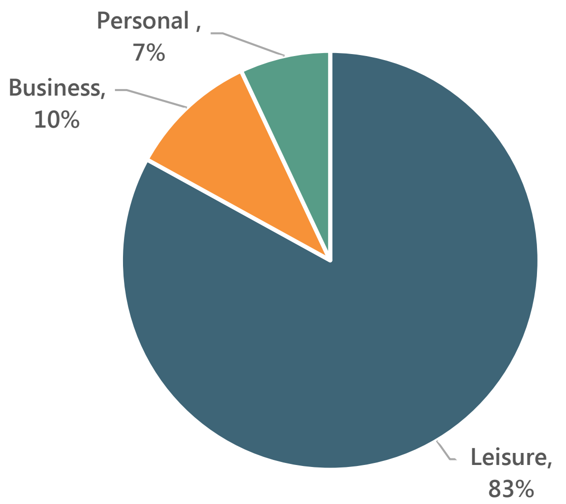
2.2 Tourism

Tourism Overview

Tourism plays an increasingly important role in economies as jobs shift into the service and information sectors and as an expanding middle class travels more frequently.[2] According to the *2017 Mississippi Tourism Economic Impact Report* by Visit Mississippi, "Travel and tourism is one of Mississippi's largest export industries," creating $3 billion in 2017 from labor income. In 2017, 87,335 jobs, or 10.9 percent of all state jobs, were in direct travel and tourism fields. The state also collects property taxes from hotels, motels, restaurants, and casinos as well as motor vehicle rental taxes and gas taxes. Figure 2.1 shows that most visitors to Mississippi come for leisure. In 2017, visitors spent almost $5 billion in the state.

As the capital city, Jackson is one of the most visited cities in Mississippi. In 2016, 3.1 million people visited the city and generated $302 million for the economy. A one (1) percent sales tax on hotels and restaurants also produced $3.8 million in revenue for the city. The City of Jackson offers many museums and cultural centers. Additionally, the surrounding areas in Hinds, Madison, and Rankin Counties contain many retail, dining, recreation, and natural attractions.

Figure 2.1: Purpose for Visiting Mississippi, 2017



Source: Visit Mississippi

[2] *OECD Tourism Trends and Policies*, 2018, Organisation for Economic Cooperation and Development

Jackson Transportation Network

Accessible transportation is an important part of getting tourists into and around the city. Interstate 55 runs north-south through the region and Interstate 20 runs east-west. Interstate 220 bypasses downtown Jackson to connect the two highways. U.S. Highways 49, 51, and 80 also cross the region.

Jackson-Medgar Wiley Evers International Airport is located six miles east of downtown Jackson in Rankin County. The airport provides public flights to eight cities as well as military flights. Downtown Jackson has other multimodal options. Greyhound buses and Amtrak trains both enter and depart the city from Jackson Union Station, allowing tourists to visit the city without private vehicles.

Once inside Jackson, tourists can use JTRAN, Jackson's public transit service, to get around the City of Jackson. The city also has a limited number of sidewalks for pedestrians.

Outside the City of Jackson, personal vehicles are important to travelling the region. However, rideshare companies Uber and Lyft service the region. There is also a limited number of sidewalks and bicycle facilities in Brandon, Madison, Pelahatchie, Raymond, Richland, Ridgeland, and Terry.

Tourism Attractions and Amenities

The region offers a diversity of tourist attractions, shown in Table 2.1, which lists major cultural, outdoor, and retail attractions. The City of Jackson specializes in historical sites, museums, and restaurants. Many of these attractions are located in the center of Jackson near the State Capitol, Union Station, the historic districts, and Jackson State University. The city also has two new museums as part of its $65.9 million investment in tourism: the Museum of Mississippi History and the Mississippi Civil Rights Museum. The surrounding municipalities also offer a mixture of attractions such as the Brandon Amphitheater, Trustmark Park, Jellystone Park, and the Natchez Trace Parkway.

Visitor & Convention Centers

Clinton Visitors Center

Flowood Convention Center

Jackson Convention Complex

Ridgeland Visitors Center

Visit Jackson Welcome Center

The area has also been working to increase business trips and conventions. The Jackson Convention Center serviced 262 conventions in 2017 and hosted pageants and awards such as the Miss Jackson Hospitality and Hometown Hero & SUMITT Awards. Visitors to conventions spent $79,246,208 in 2017. The convention center is also centrally located by Union Station, several bus routes, and I-55. The Flowood Conference Center and Hotel is currently under construction, and will include walking paths, an event lawn, and be golf course adjacent.

The region also offers high-quality dining and retail. The highest concentration of restaurants and bars are located along I-55 in Jackson and in the town centers of Brandon, Pearl, Ridgeland, Madison, Flowood, and Clinton. Downtown Jackson and adjacent neighborhoods like Fondren have a medium to high concentration of bars and restaurants. Larger retail centers are in Pearl, Ridgeland, and Flowood and along I-55. There is a lack of retail in Downtown Jackson where there is a high concentration of tourist attractions and lodgings.

Sufficient hotels and accommodations are an important part of supporting tourism. Third party hotel inventory data indicates that there are three hotspots with a high concentration of hotels and motels: in Downtown Jackson by the Capitol and Convention Center; in North Jackson by the intersection of I-220 and I-55, and in Ridgeland. Spots with a medium concentration are also found in Clinton and Pearl. Several new hotels opened in 2017, including the Westin Jackson in Downtown Jackson, the Marriott Residence Inn in the District at Eastover, and the Homewood Suites in Fondren. These hotels were strategically located to support Downtown activities, the retail and culinary scene in The District, and the historic neighborhood of Fondren, respectively. One thing to note is the absence of hotels in the immediate vicinity of the Airport, but several are located within a 15-minute drive of the airport. New hotels are being constructed or discussed in Flowood, Pearl, and Ridgeland.

Table 2.1: Greater Jackson Tourism Attractions

Destination Type	Name
Colleges and Universities	Belhaven University
	Hinds Community College
	Jackson State University
	Millsaps College
	Mississippi College
	Tougaloo College
Museums and Cultural Centers	Farish and Fondren Districts
	Jackson Zoological Park
	Mississippi Children's Museum
	Mississippi Civil Rights Museum
	Mississippi Museum of Natural Science
	Mississippi State Capitol
	Museum of Mississippi History
Parks and Recreation	LeFleur's Bluff State Park and Golf Course
	Mississippi Fairgrounds Complex
	Jellystone Park
	McClain Safari Tours
	Mississippi Petrified Forest
	Natchez Trace Parkway
	Ross Barnett Reservoir
Stadiums	Trustmark Park
	Brandon Amphitheater
	Mississippi Coliseum
	Smith-Wills Stadium
	Veterans Memorial Stadium
Retail	Dogwood Festival Market
	Northpark Mall
	Outlets of Mississippi
	Renaissance at Colony Park
	Ridgeland Retail Trail

Source: Visit Jackson; Visit Ridgeland; Rankin County; NSI

Tourism Needs

Many amenities and attractions are located near major roadways and are accessible by car. However, there are some ways that transportation improvements can improve mobility for tourism activity, including the following:

- **Wayfinding**: Wayfinding materials such as signs and electronic maps can help visitors easily find their way around the region and can be used for different modes of transportation. Wayfinding can be particularly useful along bicycle paths like the Natchez Trace, along JTRAN service routes, and to guide drivers or pedestrians to other nearby tourist attractions.
- **Expanded Public Transportation**: There are many attractions located in Downtown Jackson by State Street. Such a concentration of destinations lends itself well to public transit. While JTRAN buses currently serve this area, the service frequency could increase to make trips more convenient and quicker. Additionally, bus service could expand beyond the urban core. Many retail and restaurant options are located in the surrounding suburban areas and may not be accessible to visitors without private cars.
- **Expanded Sidewalks and Bike Facilities**: The concentration of attractions and hotels in Downtown Jackson makes walking and bicycling viable transportation modes. In less dense areas outside the capital, recreational multi-use paths can attract visitors. Improving and expanding sidewalks, bike lanes, and pathways in major tourist areas will improve visitor mobility and reduce the need for additional car traffic.

3.0 Emerging Trends

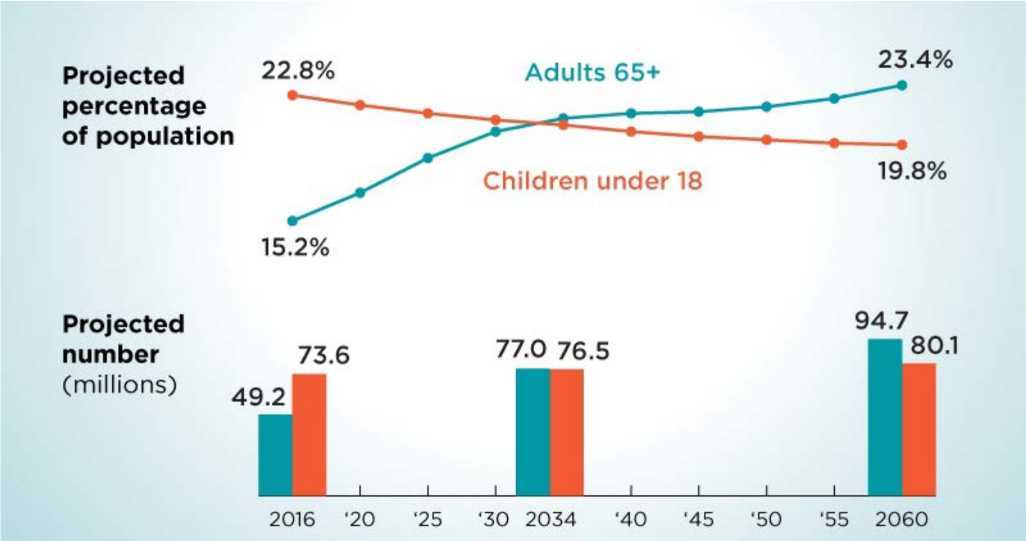
In recent years, travel patterns have changed dramatically due to demographic changes and technological advances. Many of these changes are part of longer-term trends, while others are newer, emerging trends.

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

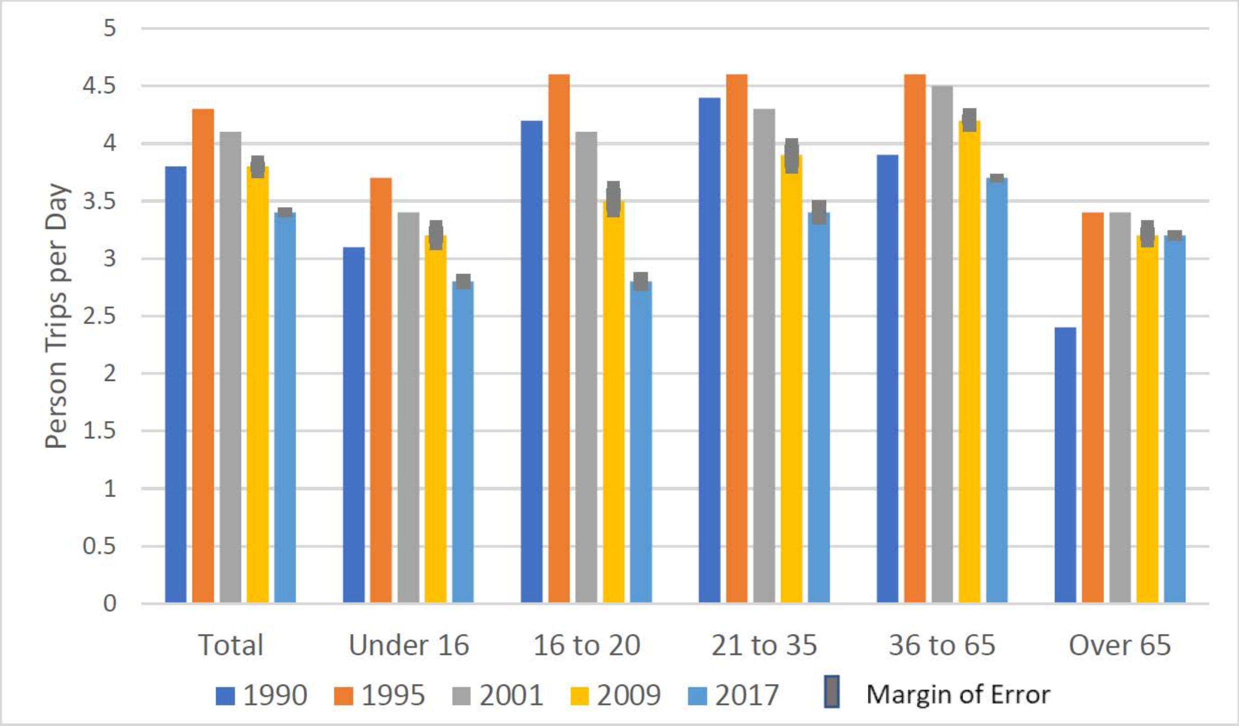
> Except for people over age 65, all age groups are making fewer trips per day.

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

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

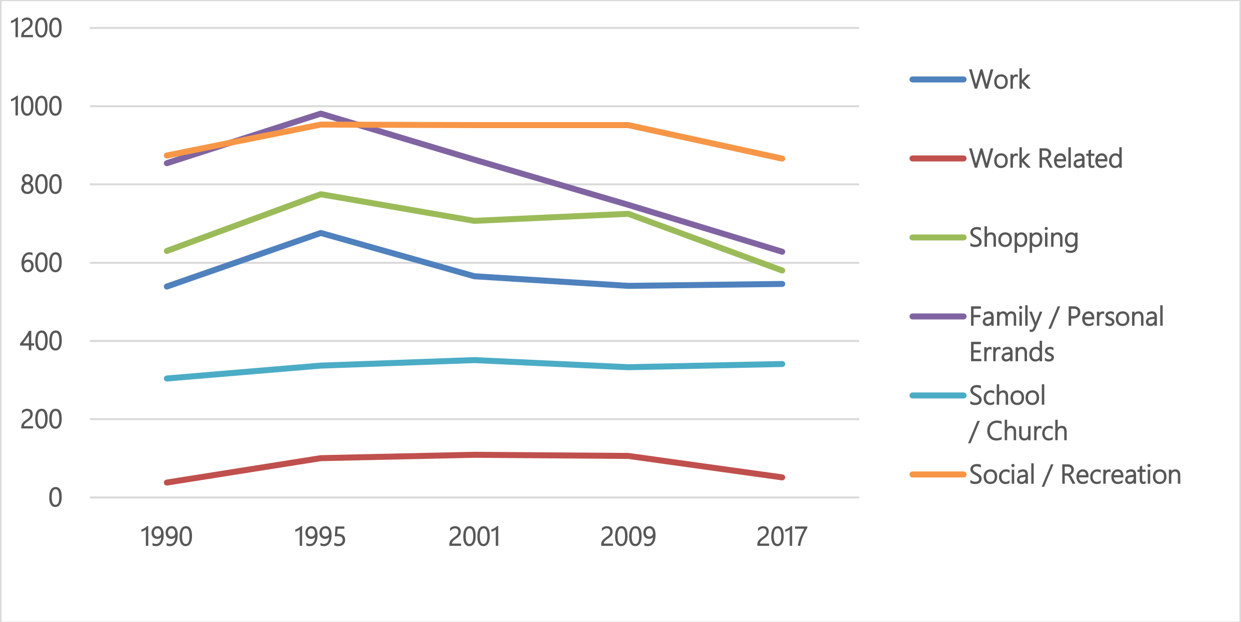
If this trend continues, travel demand may be noticeably impacted. Some major roadway projects may no longer be required and smaller improvements, such as intersection or turn lane improvements, may be sufficient for these needs.

Figure 3.2: Trends in the 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 are 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 dockstation-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.
- **Taxis** - Examples include Veterans Cab and Yellow Cab Co. Inc.
- **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

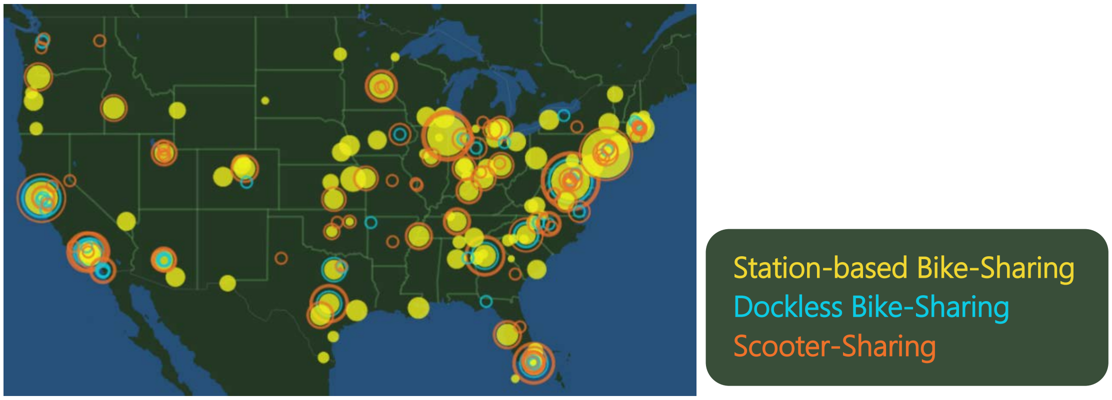
Bike-sharing and scooter-sharing, collectively referred to as micromobility options, are relatively new mobility options and continue to evolve. Modern, station-based bike-sharing emerged around 2010 and dominated the micromobility landscape from 2010 to 2016 until dockless bike-sharing systems emerged. 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 (one (1) to two (2) miles) for short durations (10 to 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.

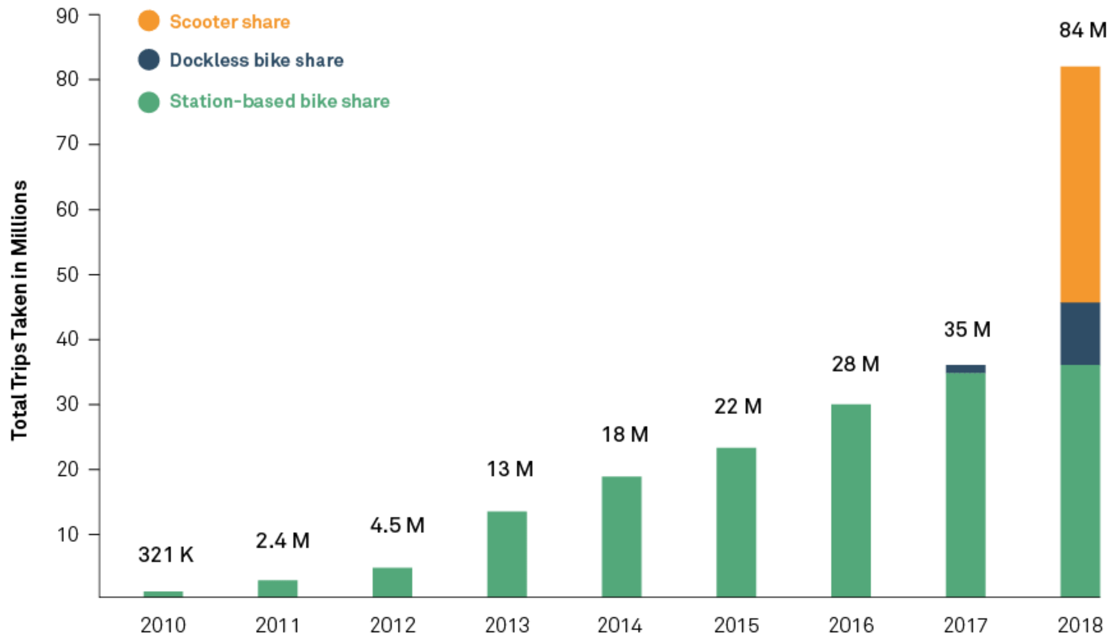
Figure 3.4: Public Bike-Sharing and Scooter-Sharing Systems, 2019



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

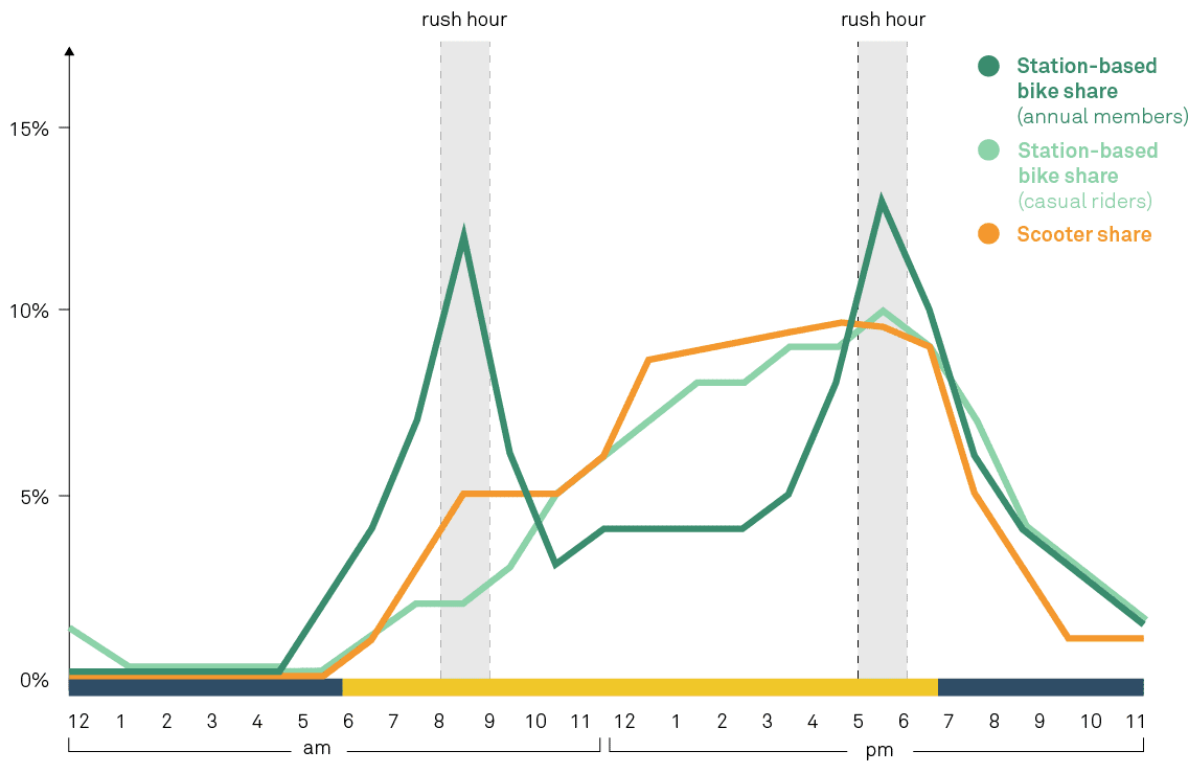
[4] https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf

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



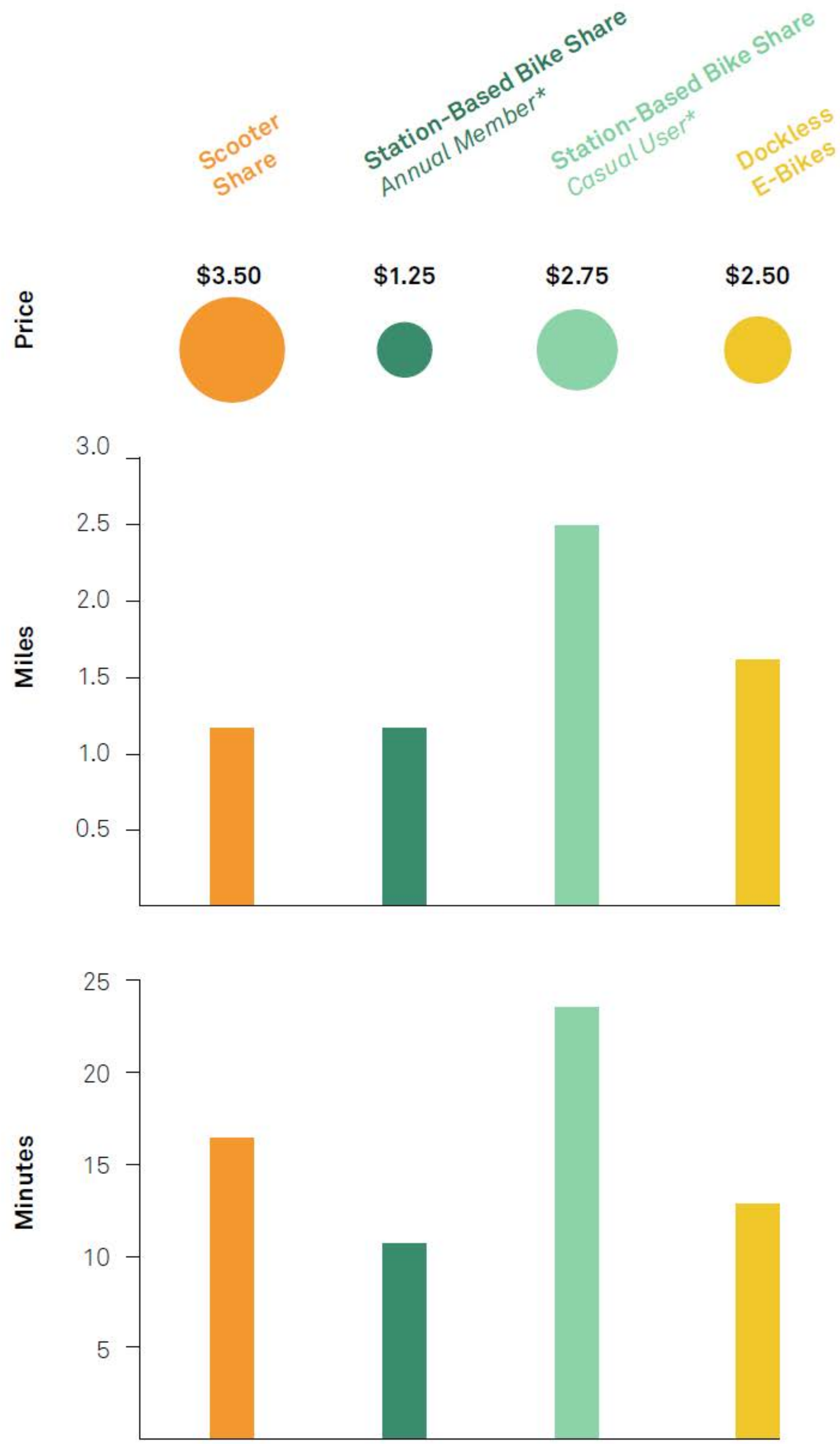
Source: NACTO

Figure 3.6: Average Micromobility Trips by Hour



Source: NACTO

Figure 3.7: Average Micromobility Trip Characteristics



Source: NACTO

Transportation Network Companies

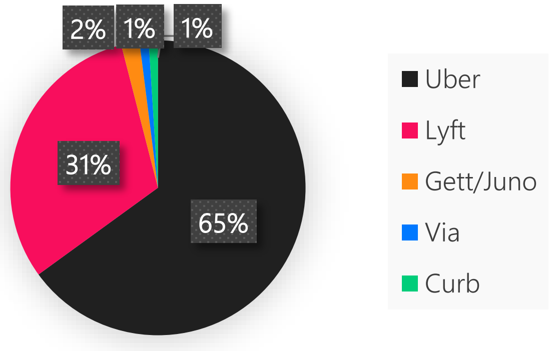
Ridehailing and ridesharing are the terms typically used to describe the services provided by Transportation Network Companies (TNCs) like Uber and Lyft. These TNCs emerged between 2010 and 2012 and have since grown rapidly, surpassing taxis in many metropolitan areas.

Today, TNCs are operating in most urban areas in the United States, including the Jackson 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

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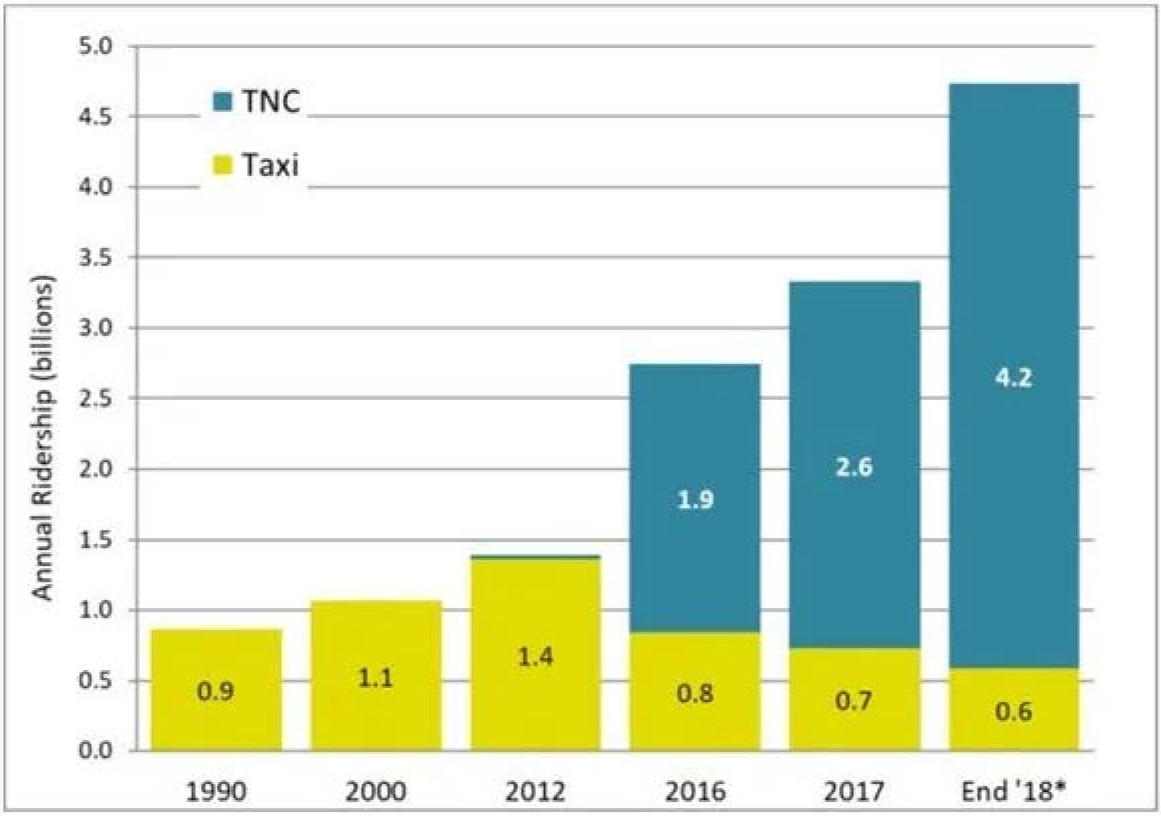
[5] http://www.schallerconsult.com/rideservices/automobility.htm

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-sharing (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.

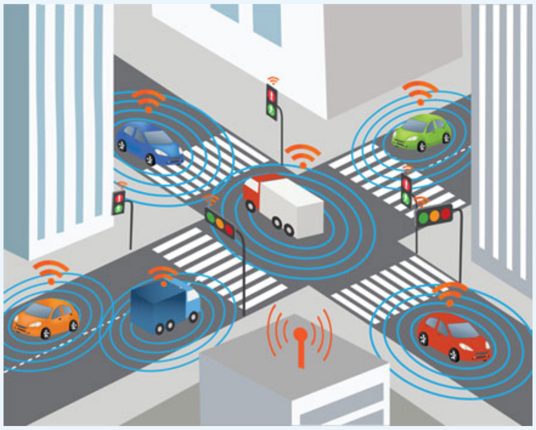
Outside of large urban areas, car-sharing is not that common. However, as connected and autonomous vehicles become more common, it is anticipated that car-sharing will become more widespread.

[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



Connected vehicles are vehicles that use various communication technologies to exchange information with other vehicles, roadside infrastructure, and the Cloud.

Communication Types

- **V2I** • Vehicle to Infrastructure
- **V2V** • Vehicle to Vehicle
- **V2C** • Vehicle to Cloud
- **V2X** • Others

vs.

Autonomous Vehicles

Autonomous, or "self-driving" vehicles, are vehicles in which operation of the vehicle occurs with limited, if any, direct driver input.

Levels of Automation

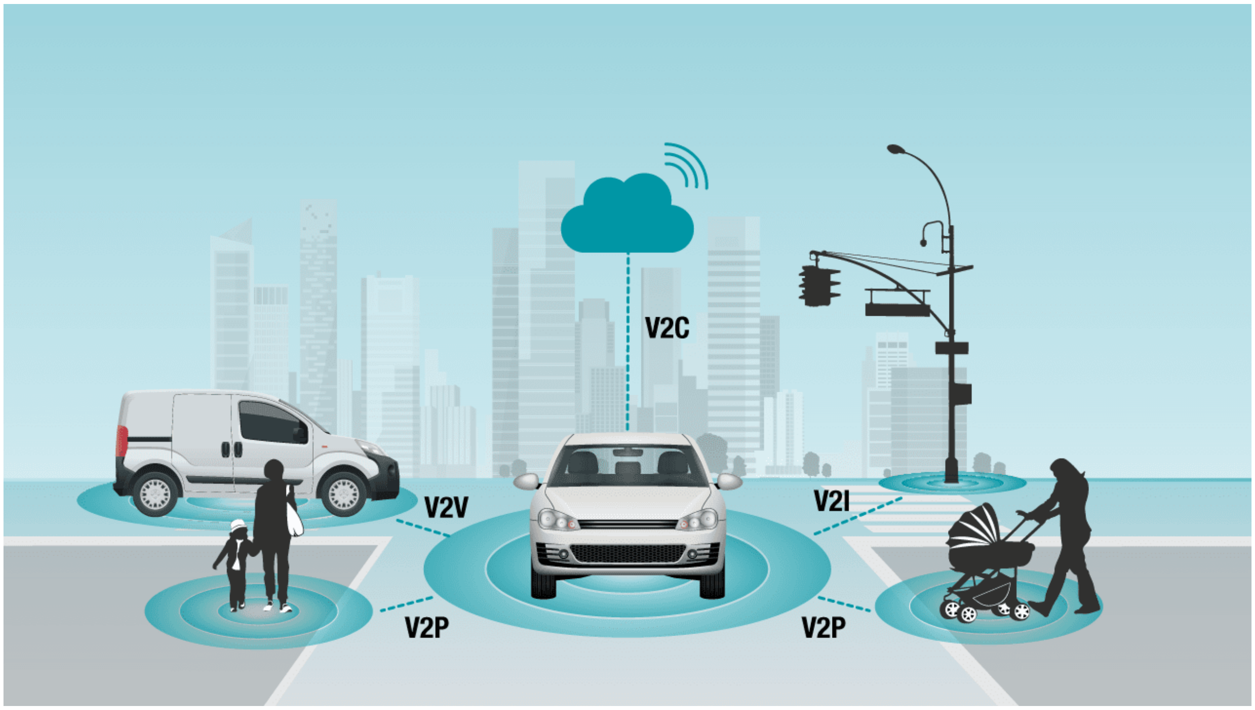
- **1** • Driver Assistance
- **2** • Partial Automation
- **3** • Conditional Automation
- **4** • High Automation
- **5** • Full Automation

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



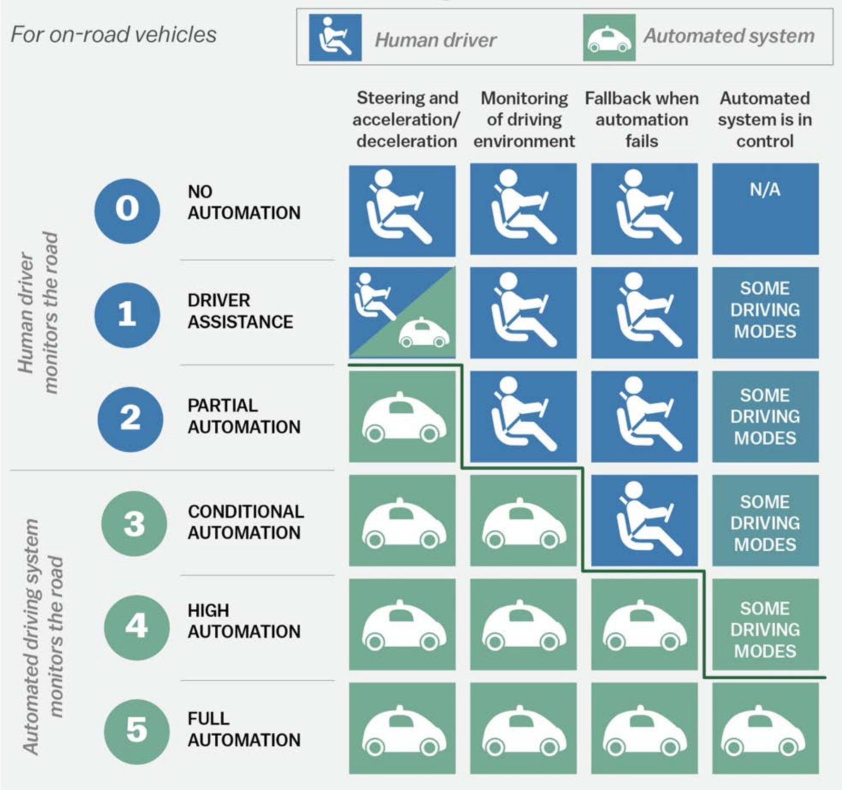
Source: Texas Instruments

Autonomous Vehicle Levels

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)

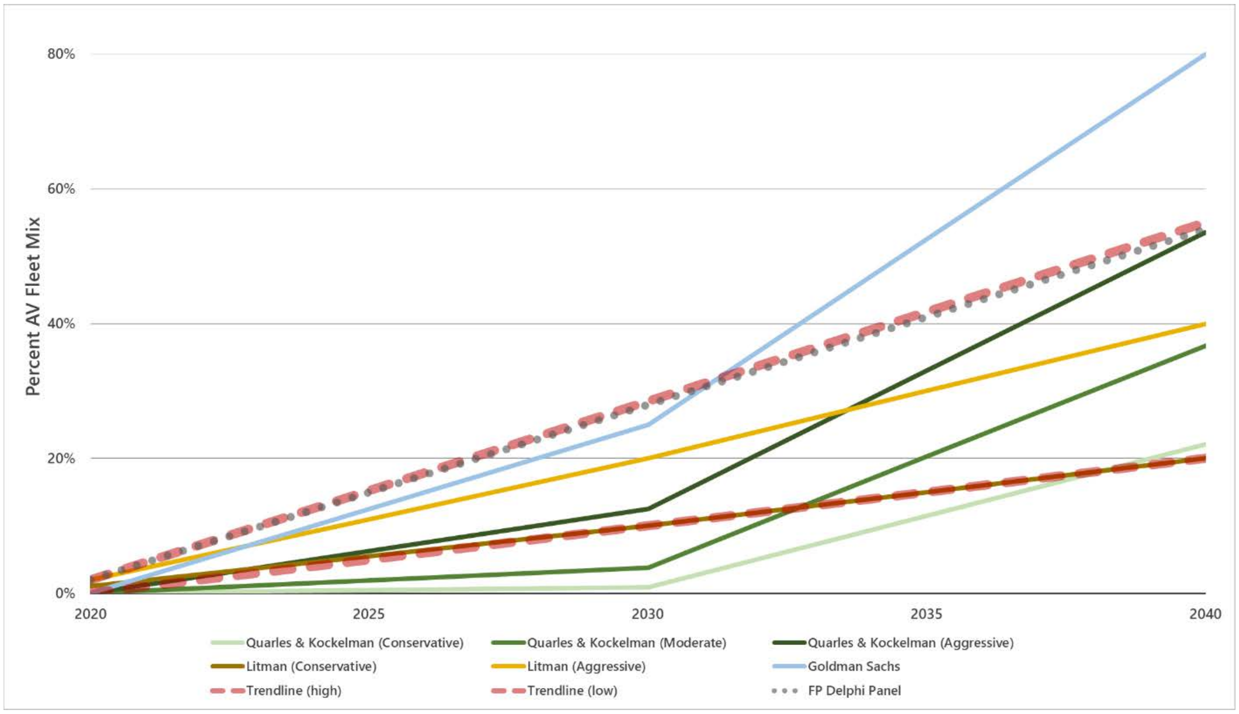
Potential Timeline

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.

[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/

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



Source: Fehr and Peers

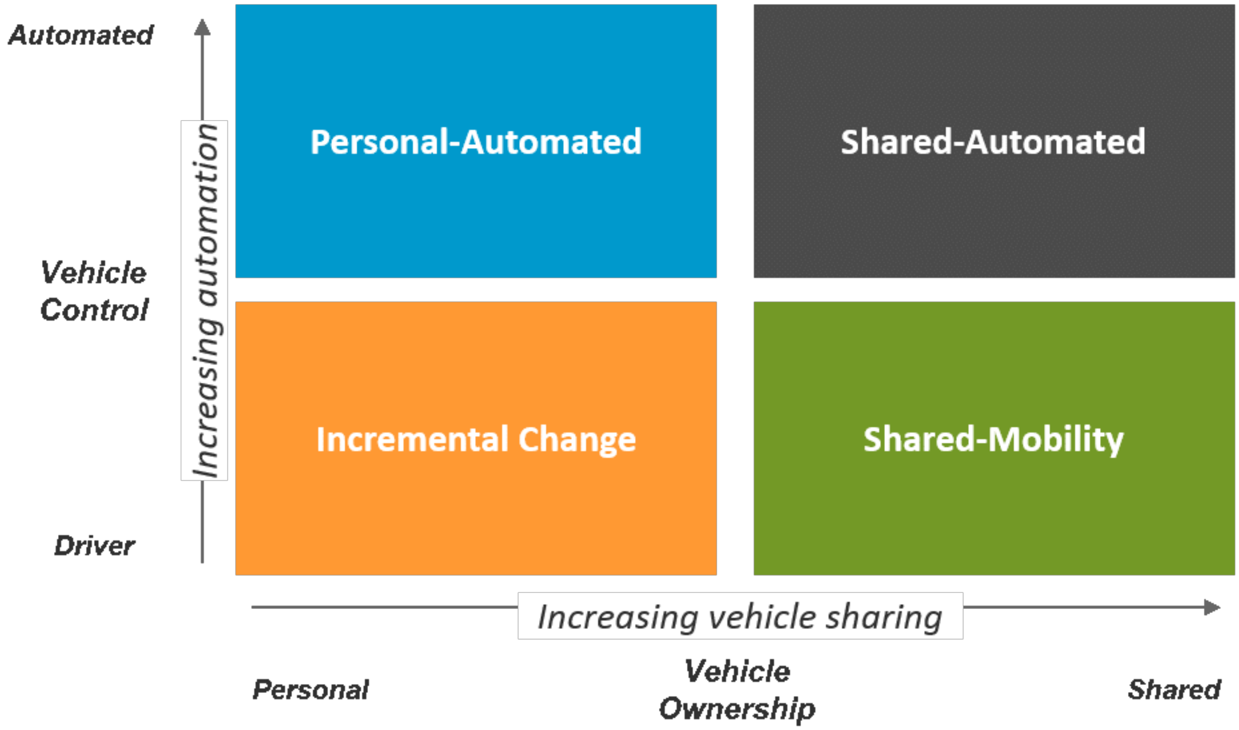
Potential Impacts

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

<u>Safety</u>

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 curbside 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.
- 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 (propane)
- 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 sixteen (16) AFV stations in the MPA: thirteen (13) electric stations, two (2) CNG stations, and one (1) LNG station.

Growth Projections

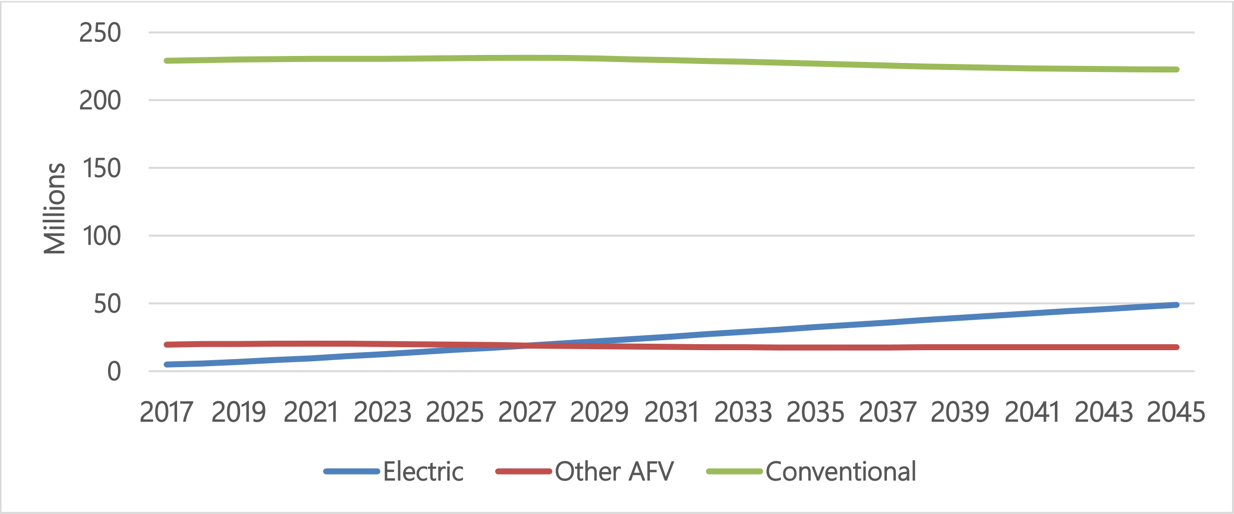
Long-term projections for electric vehicle and other alternative fuels vary considerably. On the higher end, some projections estimate that electric vehicles will make up 30 percent of all cars in the United

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 Mississippi 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 Roadway Congestion Relief Needs

Given the population and employment growth forecasted to occur by 2045, the Travel Demand Model (TDM) indicates that the number of person trips in the MPA will increase from 2.05 million in 2018 to 2.48 million in 2045. Most of the trip types grow by the same rate. However, trips with one or both ends outside of the MPA are forecasted to grow at a slightly faster rate. These changes are summarized in Table 4.1.

Table 4.1: Person Trips by Purpose, 2018 to 2045

Trip Purpose	2018	2045 (E+C)	Change	Percent Change
Home-Based Work	375,508	449,555	74,047	19.7%
Home-Based Other	839,519	1,001,623	162,103	19.3%
Non-Home Based	483,875	579,781	95,906	19.8%
Commercial Vehicle	178,237	217,570	39,334	22.1%
Truck	22,073	26,988	4,916	22.3%
Internal-External	136,301	179,920	43,619	32.0%
External-External	16,804	23,121	6,317	37.6%
Total	2,052,316	2,478,557	426,242	20.8%

20.8%

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: Jackson MPO 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 1.1 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 nearly 28 percent and the VHT will increase by just over 35 percent. However, during this same time period, the VHD will nearly double. These changes are the result of a large growth in person trips and comparatively slow growth of the roadway network.

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	111.85	111.85	0.00	0.0%
Principal Arterial	320.85	324.30	3.45	1.1%
Minor Arterial	388.15	393.40	5.25	1.4%
Collector	698.95	701.63	2.67	0.4%
Total	1,519.80	1,531.18	11.37	0.7%
Daily Vehicle Miles Traveled (VMT)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	5,998,510	7,219,583	1,221,073	20.4%
Principal Arterial	4,889,374	6,301,690	1,412,316	28.9%
Minor Arterial	1,963,323	2,737,783	774,460	39.4%
Collector	1,583,216	2,184,337	601,121	38.0%
Total	14,434,423	18,443,393	4,008,969	27.8%
Daily Vehicle Hours Traveled (VHT)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	115,747	146,454	30,708	26.5%
Principal Arterial	119,557	163,037	43,480	36.4%
Minor Arterial	50,634	72,867	22,233	43.9%
Collector	41,660	60,647	18,987	45.6%
Total	327,597	443,006	115,409	35.2%
Daily Vehicle Hours of Delay (VHD)				
Classification	2018 (Existing)	2045 (E+C Projects)	Change	Percent Difference
Interstate	17,051	28,043	10,992	64.5%
Principal Arterial	13,473	27,503	14,030	104.1%
Minor Arterial	3,498	7,799	4,301	122.9%
Collector	2,356	6,660	4,305	182.7%
Total	36,378	70,005	33,627	92.4%

Note: E+C is future scenario with only Existing and Committed transportation projects.
Source: Jackson MPO Travel Demand Model, NSI

Currently, congestion is concentrated mostly near intersections and interchanges in the MPA. By 2045, congestion continues to remain at these locations, but experienced to a greater degree and at more interchanges.

Figure 4.1 displays the vehicular traffic in the MPA for 2045 if only the E+C projects are implemented. The number of roadway segments with a Volume to Capacity (V/C) ratio exceeding 1.0 would increase significantly by 2045, as shown in Table 4.3 and illustrated in Figure 4.2.

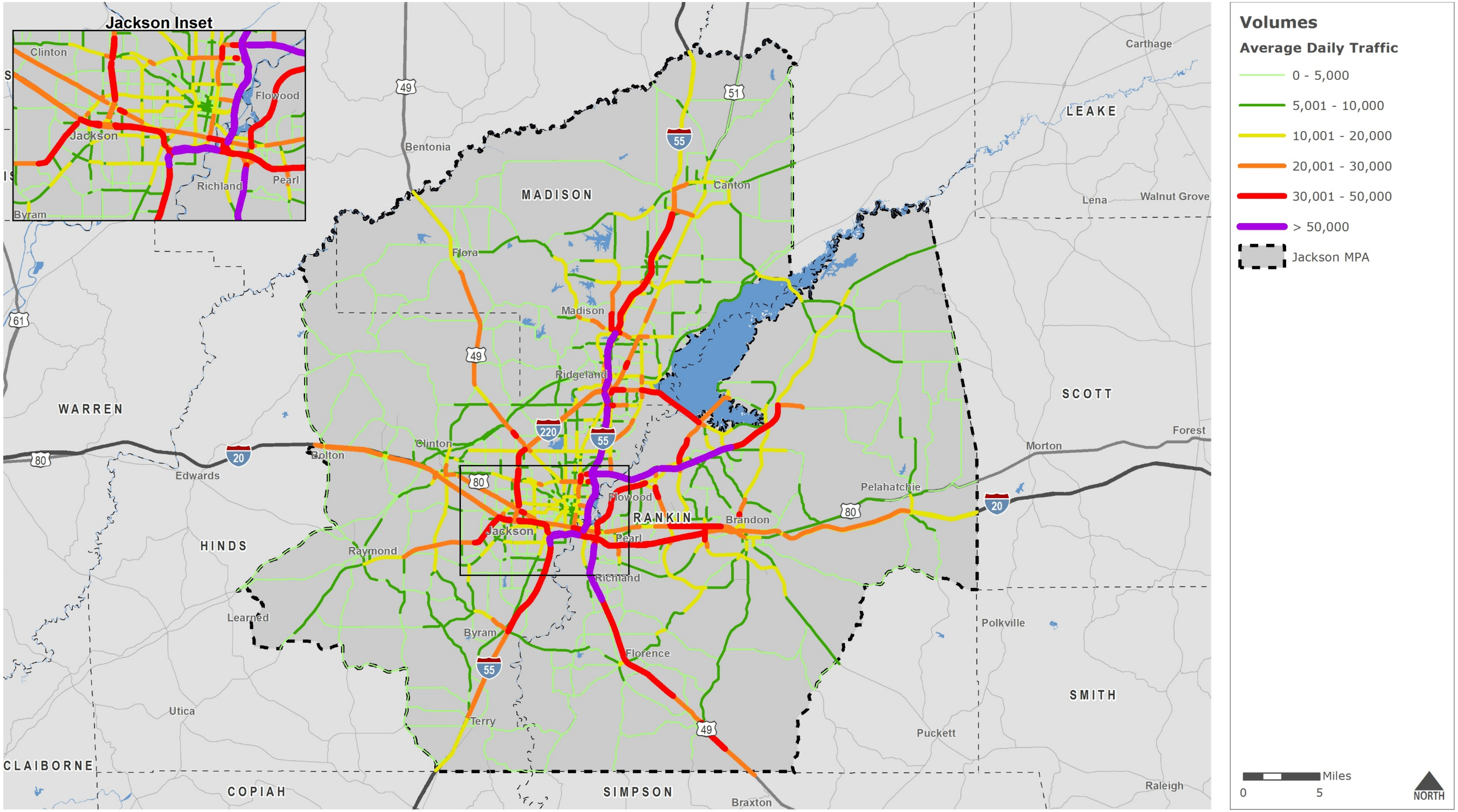
It is important to note that not all congested street and highway segments should be widened with additional through lanes or turning lanes. In urban settings, it may be more appropriate to consider ITS improvements or Travel Demand Management (TDM) strategies. Congestion may also be reduced by improving 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 EB On Ramp	MS 18 W EB to I-20 EB	0.25
I-20 WB Off Ramp	I-20 WB to MS 18 W WB	0.15
I-20 EB Off Ramp	I-20 EB to US 49 SB	0.71
I-20 WB On Ramp	US 49 to I-20 WB	0.37
I-55 NB On Ramp	US 49 to I-55 NB	0.40
I-20 EB Off Ramp	I-20 EB to MS 18 E	0.20
I-20 WB On Ramp	MS 18 E to I-20	0.22
I-55 NB On Ramp	I-55 Service Road at E County Line Rd to NB I-55	0.19
I-55 SB Off Ramp	I-55 SB to I-55 Service Road at W County Line Rd	0.15
I-55 NB On Ramp	I-55 Service Road at Lakeland Dr to I-55 NB	0.13
I-55 SB Off Ramp	I-55 SB to Siwell Rd	0.19
MS 463 Off Ramp	MS 463 to I-55 SB On Ramp	0.03
N Shore Pkwy	0.44 miles east of Parkway Rd to Fannin Landing Cir	1.68
Holly Bush Rd	MS 25 to Adams Rd	1.65

Source: Jackson MPO Travel Demand Model

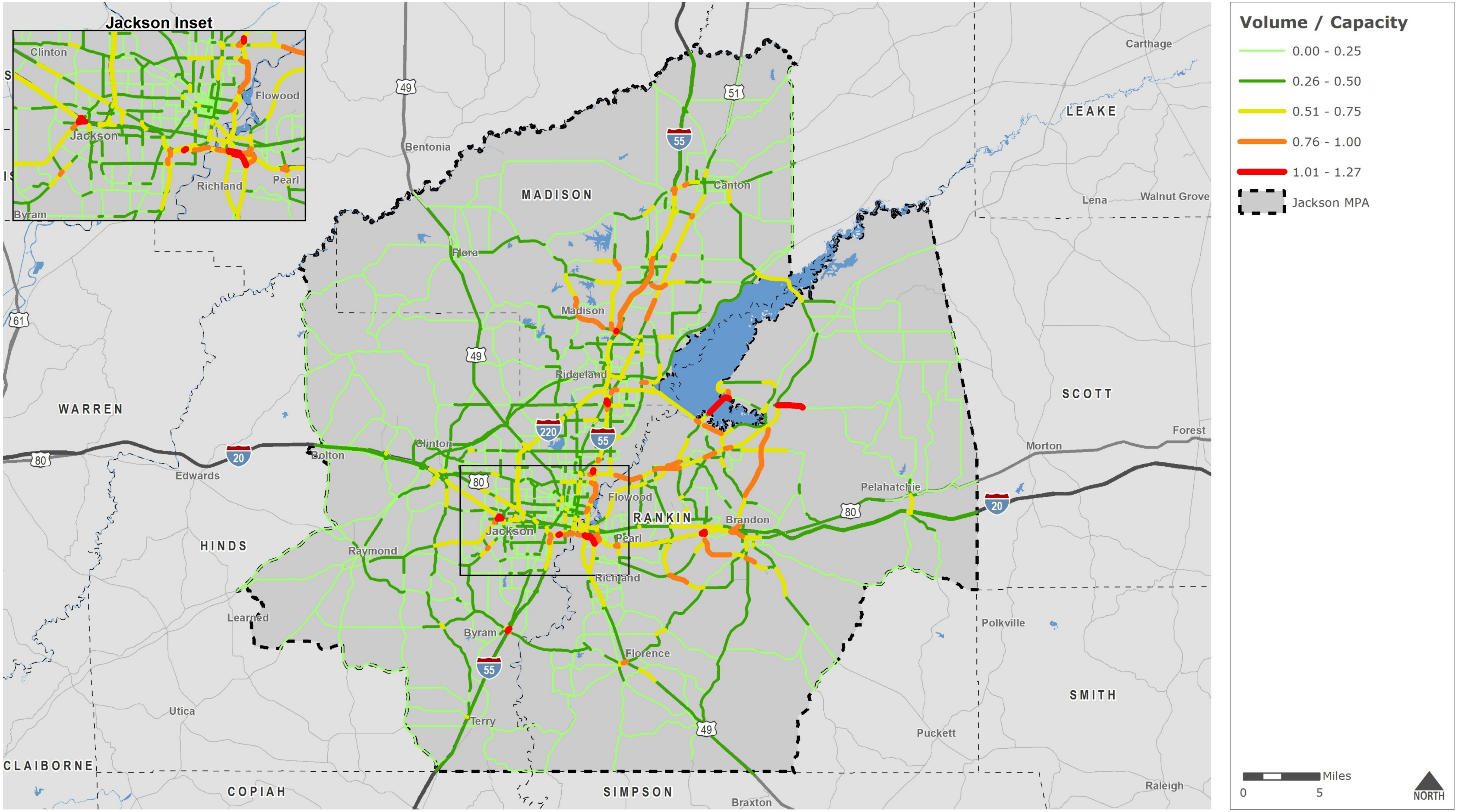
Figure 4.1: Average Daily Traffic on Roadways, 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

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



Data Sources: 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 location types are described below.

I-55 between Canton and Downtown Jackson, including interchanges at:

- I-220
- County Line Rd
- Lakeland Dr
- E Woodrow Wilson Ave
- I-20

Lakeland Dr, including intersections at:

- Ridgewood Rd
- Airport Rd
- US 49 south of I-20

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

Location	Traffic Control Type	Observed Issues	Short-term Solution	Long-term Solution
I-20 and I-55	Interchange	Traffic backs up along I-55 NB and I-20 WB	Corridor Study	Corridor Study
I-55 and County Line Rd	Signalized Interchange	Traffic backs up along EB and WB approaches at both ramp terminals. NB On Ramp traffic backs up, and as a result, WB right turning traffic cannot get to I-55.	Signal retiming	Intersection study for possible improvements
US 51 and Yandell Rd	Signal	Traffic backs up along SB, EB, and WB approaches.	Signal retiming along with turn lane improvements	Intersection study for possible improvements such as innovative intersection designs
I-55 and Old Agency Rd		Traffic backs up along the WB and SB approaches at the I-55 SB terminal and along the EB approach at the I-55 NB terminal.	Adaptive Traffic Control System (ATCS) from US 51 to the I-55 SB Terminal	
E County Line Rd		Traffic backs up along the WB approach from S Pear Orchard Rd to US 51.	Roundabouts or other innovative intersection at I-55 Frontage and US 51, W County Line Rd at US 51	Corridor Study
I-55		Traffic backs up along the NB approach from merge/diverge section between the Frontage Rd on ramp and the I-220 exit.	Restripe with two through lanes for I-55 through this area and one lane weave entering from the frontage road and exiting for I-220	Develop VISSIM microsimulation model to determine if a solution can be achieved without having to widen the bridge over US 51.

Congestion Management Process

A Congestion Management Process (CMP) measures the operational effectiveness of major transportation facilities located within a Transportation Management Area (TMA), an urbanized area with a population greater than 200,000 people. Each roadway in the MPA received a CMP score based on travel time and Level of Service. Roadways with extensive congestion received a higher CMP score.

The roadways experiencing either existing (2018) of future (2045) congestion, based on the CMP score, are shown in Table 4.5. Many of these roadways also experience either existing or future congestion, based on the V/C ratios as shown in Figure 4.1 in this Technical Report and Figure 2.3 in *Technical Report #2: Existing Conditions*. Many of the roadways that experience existing congestion are projected to experience more extensive congestion by 2045.

Table 4.5: CMP Congested Segments

Roadway	Segment
I-20	Gallatin St to State St
	US 49 to I-55 Southbound
I-55	Daniel Lake Blvd to I-20
	Pearl St to Lakeland Dr
	E Northside Dr to Natchez Trace Pkwy
	MS 463 to Gluckstadt Rd
US 49	Cleary Rd to Old Hwy 49
	I-20 to US 80
US 51	County Line Rd to I-55
	Ridgewood Rd to MS 463
	Tisdale Rd to 0.70 miles north of Green Gable Rd
	Sowell Rd to E Sowell Rd
	N Old Canton Rd to Canton One Rd
US 80	I-20/Clinton-Raymond Rd to Wiggins Rd
	MS 18 W (Robison Rd) to Ellis Ave
	Terry Rd to Gallatin St
	State St to Old Hwy 49
	MS 468 to Flowood Dr
	MS 475 to Courtside Dr
	Trickham Bridge Rd to I-20 (East Brandon)
MS 18 W	Maddox Rd to I-20
	John R Lynch St to US 80
MS 18 E	US 80 to College St

Roadway	Segment
	Rosemont Dr to Louis Wilson Dr
MS 22	W Fulton St to King Ranch Rd
MS 25 (Lakeland Dr)	I-55 to Holly Bush Rd
MS 43	I-20 to Grimes St
MS 463	Annandale Rd to Main St
MS 468	Cedar Ridge Blvd to 0.66 miles west of Cedar Ridge Blvd
	Greenfield Rd to MS 475
	Gloria Dr to Riverwind Dr
	4th St to N Flowood Dr
MS 469	N Church St to Williams Rd
MS 471	N College St to Luckney Rd
	Hillcrest Dr to MS 25
MS 475	I-20 to US 80
	MS 468 (Flowood Dr) to MS 25
Airlane	Old Brandon Rd to E Metro Pkwy
Baker Ln	MS 471 to Oakdale Rd
Bozeman Rd and Catlett Rd	MS 463 to Stribling Rd Extension
Cleary Rd	Williams St to US 49
Cross Park Dr and Eldorado Rd	US 80 to Hollow Ln
E County Line Rd	I-55 to Ridgewood Court Dr
E Metro Pkwy	Mackenzie Ln to MS 25
Fannin Landing Cir	N Shore Pkwy to 0.47 miles north of N Shore Pkwy
	Sherrills Ln to Old Hwy 471
Flowood Dr	MS 475 to Old Fannin Rd
Gluckstadt Rd	Dewees Rd to Parkway East
Green Gable Rd	Between I-55 Ramps
Holly Bush Rd	MS 25 to Adams Rd
I-20 Frontage Rd	Woodmoor Dr to US 80
I-55 East Frontage Rd	Between E County Line Rd Ramps
Jackson St	I-55 to US 51
Medgar Evers Blvd	I-220 to Woodrow Wilson Ave
North Shore Pkwy	0.44 miles east of Parkway Rd to 0.07 miles east of Fannin Landing Cir
	0.19 miles west of Old Hwy 471 to Old Hwy 471

Roadway	Segment
Natchez Trace Pkwy	At I-55 Southbound
	Rice Rd to Old Canton Rd
Old Brandon Rd	Country Haven Rd to Crossgates Blvd
Old Canton Rd	Canton Mart Rd to Kaywood Dr
	Rice Rd to Natchez Trace Pkwy
	Tidewater Ln to Ridgecrest Dr
	Calumet Dr to St Augustine Dr
Old Fannin Rd	Flowood Dr to Bridlewood Dr
	Barnett Bend Dr to Spillway Rd
Old Hwy 471	MS 25 to Spillway Rd
	N Shore Pkwy to Holly Bush Rd
Overby St	Jasper St to US 80
Raymond Rd	Forest Hill Rd to Maddox Rd
Ridgewood Dr	E County Line Rd to 0.34 miles north of E County Line Rd
Siwell Rd	Lake Dockery Dr to I-55
Spillway Rd	Harbor Dr to Old Fannin Rd
State St	I-20/I-55 to Beasley Rd
Sunnybrook Rd, Cottonhill St, and Grandview Blvd	Jackson St to MS 463
Value Rd	US 80 to MS 471
Weisenberger Rd and Yandell Rd	Parkway East to Smith Carr Rd
Williams Rd	MS 469 to Copper Ridge Ln
Woodrow Wilson Ave	Medgar Evers Blvd to I-55

The CMP report also lists strategies that could be implemented to reduce congestion on these corridors. The CMP analysis can be found in *Technical Report #7: Congestion Management Process*.

4.2 Roadway Maintenance Needs

Pavement Maintenance

While about three (3) 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 *Technical Report #2: Existing Conditions Analysis* displays the pavement conditions of the NHS monitored roadways within the MPA. Particular attention should be given to:

- US 49 between Old Hwy 49 and 2.0 miles south of MS 469
- MS 16 between 1.2 miles east of MS 43 and 0.7 miles west of Sharon Rd
- MS 18 E between US 80 and I-20
- Medgar Evers Blvd between I-220 and Woodrow Wilson Ave
- State St between I-20/I-55 and I-55
- Woodrow Wilson Ave between W Fortification St and I-55

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 73 bridges in Poor condition within the MPA, three (3) of which are on the National Highway System. Table 4.6 displays the MPA's bridges in Poor condition, sorted by the MDOT Replacement Index. 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 the following categories:

- Decks
- Superstructure
- Substructure
- 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 Metropolitan Transportation Plan (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 MDOT should prioritize these bridges for improvements as funding becomes available.

Table 4.6: Bridges in Poor Condition, Ranked by Replacement Index

Structure ID	Roadway	Feature Intersecting	Year Built	Replacement Index
SA2500000000143	Springridge Rd	Smith Cr	1980	See Note 1
SA2500000000234	Country Club Dr	Lynch Cr	1992	See Note 2
SA2500000000152	Raymond Rd	Big Creek	1976	See Note 3
SA2500000000361	E Coxs Ferry Rd	Bch Big Black River	1956	See Note 4
SA4500000000073	Branscomb Rd	Tilda Bogue Tributary	1973	See Note 5
SA4500000000042	Endris Rd	Bear Creek Tributary	1984	See Note 6
SA4500000000045	Mount Elm Rd	Beatties Branch	1957	See Note 7
SA4500000000090	Sharon Rd	Tilda Bogue	1982	See Note 8
210005104513010	US 51	Doaks Creek	1935	See Note 9
SA2500000000206	Meadow Rd	Trib Hanging Moss Cr	1988	80.00
SA2500000000347	Clinton Tinnin Rd	West Ditch Creek	1973	78.75
SA2500000000340	Clinton Tinnin Rd	Bch Of Straight Fence Cr	1977	78.75
SA2500000000343	Clinton Tinnin Rd	West Ditch Creek	1973	78.75
SA2500000000155	Springridge Rd	Bch Big Cr	1980	75.88
SA2500000000129	South West St	Town Creek	1959	75.63
SA2500000000135	McDowell Rd	Caney Creek	1966	75.25
SA2500000000110	Monument St	Town Creek	1920	72.08
21000800610568A	US 80	KCS RR	1938	71.89
SA2500000000252	M. L. King Jr. Dr	Tributary Town Cr	1994	70.90
SA2500000000280	Adkins Blvd	Purple Creek	1993	70.82
SA2500000000055	Old Byram Rd	Trahom Creek	1959	69.67
SA2500000000007	Rosemary Rd	Pearl River	1945	68.94
SA2500000000008	Rosemary Rd	Vaughn Cr	1945	68.94
SA2500000000272	Williamson Rd	Straight Fence Creek	1966	68.79
SA2500000000283	N.Norrell Rd	Bakers Creek	1961	68.15
SA2500000000218	Woodway Rd	Bch Hanging Moss Cr	1987	67.92
SA2500000000335	Johnson Line Rd	Bogue Falia Crk.	1977	67.80
SA2500000000336	Trotter Rd	Bch Of Bogue Falia	1977	67.33
SA2500000000342	Lorance Rd	West Ditch	1981	67.04
SA4500000000091	Sharon Rd	Bch Of Tilda Bogue	1980	66.40
SA2500000000232	Hawthorne St	Eubanks Cr	1961	66.05
210005104513000	US 51	Relief	1934	65.95

Structure ID	Roadway	Feature Intersecting	Year Built	Replacement Index
SA2500000000236	Cavalier Dr	Bch Eubanks Cr	1991	65.70
210008002504640	US 80	Pearl River	1938	65.50
210005104512470	US 51	Tilda Bogue Creek	1929	65.48
SA2500000000105	S Mill St	Town Creek	1914	65.41
SA4500000000063	King Ranch Rd	Batchelor Creek	1970	65.29
SA4500000000034	Purvis Rd	Spring Creek	1986	65.29
SA2500000000328	Thompson Rd	Trib Of Bogue Chitto	1989	65.06
SA2500000000247	Ofc Thomas Catchin	Lynch Cr	1985	63.71
SA2500000000298	Bol Brsville Rd	Bch Of Fleetwood Creek	1969	63.07
SA2500000000296	Bol Broville Rd	Bch Of Fleetwood Creek	1970	63.07
SA2500000000066	Old Jackson Rd	Rhodes Creek	1964	62.19
SA2500000000196	Kickapoo Rd	Bogue Chitto Relief	1964	62.11
SA2500000000073	Owens Rd	Rhodes Creek	1963	61.00
SA2500000000054	Owens Rd	Bch Of Rhodes Creek	1978	58.63
SA6100000000084	Fox Hall Rd	Neely Creek	2004	57.77
SA2500000000292	St. Thomas Rd	Relief For Bakers Creek	1982	57.04
SA2500000000075	Myers Rd	Tallahalla Creek	1964	56.46
SA2500000000275	Mt Olive Rd	Fleetwood Cr	1978	56.25
SA4500000000150	E Dinkins St	Drainage Ditch	1980	55.99
SA2500000000316	Springdale Hill Rd	Bch Bogue Chitto Cr	1990	55.95
SA2500000000346	Clinton Tinnin Rd	Straight Fence Creek	1973	54.30
SA2500000000004	Old Hwy 51 Terry R	Rhodes Creek	1930	53.62
210008006104860	Old Brandon Rd	Conway Slough	1977	50.57
SA2500000000213	Country Club Dr	Large Stream	1990	49.92
SA2500000000362	E Coxs Ferry Rd ‘	Bch Big Black River	1978	49.45
SA6100000000002	Hickory Ridge Rd	Holcomb Branch	2006	47.53
SA2500000000271	Williamson Rd	Bch Of Straight Fence Cr	1967	46.48
SA2500000000341	Trotter Rd	Bch Of Bogue Falia Creek	1977	45.56
SA2500000000295	S.Norrell Rd	Lindsey Creek	1989	45.56
SA2500000000293	St Thomas Rd	Relief For Bakers Creek	1982	45.56
SA6100000000168	Harrell Rd	Dry Creek	1978	45.33

Structure ID	Roadway	Feature Intersecting	Year Built	Replacement Index
SA2500000000355	Alexander Rd	Bogue Falia Creek	1974	44.78
SA6100000000202	Midway Rd	Bch Of Hurricane Ck	2003	44.00
SA2500000000244	Ford Ave	Town Creek	1989	43.75
SA4500000000047	Virlilia Rd	Panther Creek	1975	38.59
SA4500000000048	Virlilia Rd	Panther Creek	1975	38.59
SA4500000000086	Sharon Rd	Bch Of Tilda Bogue	1982	38.50
SA4500000000071	King Ranch Rd	Creek	1976	38.02
SA2500000000333	Kennebrew Rd	Relief Bogue Chitto Cr	1965	37.38
SA2500000000331	Kennebrew Rd	Relief Bogue Chitto	1965	37.38
SA2500000000062	Flowers Rd	Rhodes Creek	1962	35.19
SA4500000000105	Tithelo Rd	Creek	1985	33.80

Note 1: Bridge has been replaced. Mississippi Office of State Aid Road Construction
Note 2: Bridge has been replaced. Mississippi Office of State Aid Road Construction
Note 3: Bridge has been replaced. Mississippi Office of State Aid Road Construction
Note 4: Bridge has been replaced. Mississippi Office of State Aid Road Construction
Note 5: Bridge no longer in NBI Inventory database and has likely been demolished or abandoned. National Bridge Inventory
Note 6: Bridge no longer in NBI Inventory database and has likely been demolished or abandoned. National Bridge Inventory
Note 7: Bridge no longer in NBI Inventory database and has likely been demolished or abandoned. National Bridge Inventory
Note 8: Bridge closed as shown in Google Maps Imagery. Google Map Imagery from National Bridge Inventory
Note 9: Bridge still opened as of 2020. Planned to be replaced. Mississippi Department of Transportation

Source: National Bridge Inventory, 2018

4.3 Roadway Safety Needs

Within the MPA, over 82,000 crashes occurred between 2014 and 2018. During that timeframe, there were 310 fatal crashes and 229 life-threatening crashes. Another 17,264 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 visibility
- congestion
- inadequate signal timing, and/or
- an unwarranted signal

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

- Analyzing 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.
- Ensuring roadway lighting is sufficient for drivers to see the roadway and surroundings.
- Determining 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.
- Checking 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.

- Verifying 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.
- Verifying 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:

- Verifying 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.
- Conducting 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.
- Ensuring roadway lighting is sufficient for drivers to see the roadway and surrounding area.
- Checking 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.
- Verifying 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.
- Verifying 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 one or more 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:

- Checking 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.
- Verifying that pavement markings are visible during day and night hours.
- Verifying that the roadway geometry can be easily maneuvered by drivers.
- Evaluating left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Ensuring roadway lighting is sufficient for drivers to see roadway and surroundings.
- Verifying 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:

- Determining 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.
- Verifying 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.
- Checking 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.
- Verifying that pavement markings are visible during day and night hours.
- Verifying that the roadway geometry can be easily maneuvered by drivers.
- Evaluating left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Ensuring roadway lighting is sufficient for drivers to see roadway and surroundings.

- Checking the visibility of the traffic signals from all approaches.
- Verifying 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, and also shown in Table 4.7, 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 4.7: High Crash Frequency or Crash Rate Locations in the MPA

Route	Location	Type	Issue
MS 25 (Lakeland Dr)	0.35 miles east of Ridgewood Rd to 0.23 miles west of Treetops Blvd	Segment	Crash Frequency
MS 25 (Lakeland Dr)	0.39 miles west of Old Fannin Rd to Old Fannin Rd	Segment	Crash Frequency
MS 25 (Lakeland Dr)	Old Fannin Rd to 0.42 miles east of Old Fannin Rd	Segment	Crash Frequency
I-20 WB	Gallatin St Off Ramp (Exit 45A) to S State St On Ramp	Segment	Crash Frequency
MS 18 (Crossgates Blvd)	US 80 to 0.19 miles south of US 80	Segment	Crash Frequency
E County Line Rd	I-55 Service Rd to 0.11 miles west of Ridgewood Rd	Segment	Crash Frequency
W Woodrow Wilson Ave	Livingston Rd to 0.16 miles east of Livingston Rd	Segment	Crash Frequency
I-55 SB	E Woodrow Wilson Ave On Ramp to 0.14 miles south of E Woodrow Wilson Ave On Ramp	Segment	Crash Frequency
I-55 SB	E Fortification St Off Ramp (Exit 96C) to E Fortification St On Ramp	Segment	Crash Frequency
Hwy 463	0.13 miles east of Grandview Blvd to 0.10 miles west of Crawford St	Segment	Crash Frequency
Grandview Blvd	Hwy 463 to 0.28 miles south of MS 463	Segment	Crash Frequency
US 80	0.16 miles east of MS 18 (Robinson Rd) to 0.05 miles west of I-220 SB on ramp	Segment	Crash Frequency

Route	Location	Type	Issue
I-55 SB	I-20 EB Off Ramp (Exit 94) to Merge with I-20 WB	Segment	Crash Frequency
US 49	Cleary Rd / Richland Cir to Wilson Dr	Segment	Crash Frequency
US 80	Springridge Rd to 0.34 miles east of Springridge Rd	Segment	Crash Frequency
US 49	Wilson Dr to 0.27 miles north of Wilson Dr	Segment	Crash Frequency
I-55 NB	0.22 miles south of E Woodrow Wilson Ave Off Ramp (Exit 98A) to E Woodrow Wilson Ave Off Ramp (Exit 98A)	Segment	Crash Frequency
I-55 NB	E McDowell Rd On Ramp to S State St Off Ramp (Exit 92B)	Segment	Crash Frequency
US 49	E Main St to 0.63 miles north of E Main St	Segment	Crash Frequency
MS 25 (Lakeland Dr)	Museum Blvd to 0.30 miles east of Museum Blvd	Segment	Crash Frequency
I-55 E Frontage Rd	0.08 miles north of Ridgewood Court Dr to I-55 Northbound Off-Ramp to E County Line Rd	Segment	Crash Rate
Dalton St	W Pascagoula St to Dr Robert Smith Sr Pkwy	Segment	Crash Rate
Monroe St	Leake St to Belmont St	Segment	Crash Rate
Grandview Blvd	0.28 miles south of MS 463 to MS 463	Segment	Crash Rate
E Harper St	US 49 to 0.30 miles east of US 49	Segment	Crash Rate
S Wheatley St	0.25 miles south of Towne Center Blvd to Towne Center Blvd	Segment	Crash Rate
N Jefferson St	E Fortification St to Poplar Blvd	Segment	Crash Rate
St Charles St	Ellis Ave to Fryant Ave	Segment	Crash Rate

Route	Location	Type	Issue
Peachtree St	Riverside Dr to 0.17 miles north of Riverside Dr	Segment	Crash Rate
Williams Rd	MS 469 to Copper Ridge Way	Segment	Crash Rate
Industrial Dr	Cleary Rd to Brandon Ave	Segment	Crash Rate
I-220	NB Off Ramp to WB Clinton Blvd	Segment	Crash Rate
Sedgwick Dr	Westbrook Rd to Parkway Dr	Segment	Crash Rate
US 80	0.16 miles east of Robinson Rd to 0.14 miles west of I-220	Segment	Crash Rate
Terry Rd SB	Raymond Rd to I-20	Segment	Crash Rate
Florence Ave	Lincoln Ave to 0.11 miles east of Lincoln Ave	Segment	Crash Rate
Ridgewood Ct Dr	Ridgewood Rd to 0.20 miles east of Ridgewood Rd	Segment	Crash Rate
N Jefferson St	Poplar Blvd to Pinehurst St	Segment	Crash Rate
I-20	WB On Ramp from SB Ellis Ave	Segment	Crash Rate
Madison Ave	I-55 W Frontage Rd to I-55 E Frontage Rd	Segment	Crash Rate
County Line Rd	I-55 E Frontage Rd	Intersection	Crash Frequency
US 80	Crossgates Blvd	Intersection	Crash Frequency
MS 18	Greenway Dr	Intersection	Crash Frequency
US 80	Springridge Rd / Clinton Pkwy	Intersection	Crash Frequency
State St	Woodrow Wilson Ave	Intersection	Crash Frequency
US 49	MS 469	Intersection	Crash Frequency
MS 25 (Lakeland Dr)	MS 475	Intersection	Crash Frequency
Medgar Evers Blvd	Northside Dr	Intersection	Crash Frequency
US 80	MS 475	Intersection	Crash Frequency
US 49	Harper St	Intersection	Crash Frequency
MS 25 (Lakeland Dr)	Old Fannin Rd	Intersection	Crash Frequency

Route	Location	Type	Issue
MS 463	Grandview Blvd	Intersection	Crash Frequency
US 49	Scarbrough St / Wilson Dr	Intersection	Crash Frequency
MS 25 (Lakeland Dr)	Ridgewood Rd	Intersection	Crash Frequency
Siwell Rd	Terry Rd	Intersection	Crash Frequency
County Line Rd	Ridgewood Rd	Intersection	Crash Frequency
US 80	Ellis Ave	Intersection	Crash Frequency
US 80	US 49	Intersection	Crash Frequency
Beasley Rd / Adkins Blvd	I-55 E Frontage Rd	Intersection	Crash Frequency
County Line Rd	Ridgewood Ct / Centre St	Intersection	Crash Frequency

Stakeholder and Public Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections they perceived has the most safety issues. The most often identified of these location types are described below.

I-55 between Canton and Downtown Jackson, including:

- At Lakeland Drive
- At E Fortification St
- At Waterworks Curve
- At I-20
- State St

MS 18W, including:

- At I-20
- At Greenway Dr

Lakeland Dr, including:

- At Old Canton Rd
- At Cool Papa Bell/Museum Blvd
- At Ridgewood Rd
- At Old Fannin Rd

5.0 Freight

Freight needs vary by mode (truck, rail, air, water, and pipeline) and can include mobility, safety, and asset conditions. Freight projections indicate that commerce and trade will continue to grow throughout the MPA from 2018 to 2045, which will lead to an increase in freight traffic on the MPA freight network. This increase in freight traffic will lead to an increase in congestion and a degrading of the freight network. However, projects in the MPA that address freight needs can improve safety and economic competitiveness in the MPA.

5.1 Freight Truck Needs

This section summarizes future freight truck movement and needs. Freight projections indicate that the truck mode will have the largest increases in freight tonnage and value between 2018 and 2045. This will have an impact on the freight highway network; including an increase in truck traffic and congestion, worsening roadway pavement and bridge conditions, and an increased chance of heavy vehicle involved crashes. Although all roadways in the MPA will be impacted due to the increases in freight truck traffic, the roadways with the largest increases in freight truck traffic are on the Mississippi Freight Network (MFN) highways, which include:

- I-20 Tier I Vicksburg-Jackson-Meridian Corridor
- I-55 Tier I Southaven-Jackson-McComb Corridor
- US 49 Tier I Jackson-Hattiesburg-Gulfport Corridor
- MS 25 Tier II Jackson-Louisville-Starkville Corridor

Mobility

The FAF data can be used to understand the projected growth in freight truck commodity flows between 2016 and 2045. This projected growth will lead to an increase in freight truck traffic on MPA's roadways, resulting in an increase in roadway traffic congestion and subsequent decrease in travel time reliability.

<u>Commodity Flow Growth</u>

As shown in *Technical Report #2: Existing Conditions*, the truck mode accounts for 58 percent of the freight truck tonnage and 70 percent of freight value moved into, out of, and within the MPA in 2016. By 2045, the freight truck tonnage share is projected to increase to 62 percent, while the freight truck value share is projected to slightly decrease to 69 percent.

The changes in county ranks for freight truck commodity flows between 2016 and 2045 are summarized below:

- Hinds County is projected to decrease from seventh to ninth in Mississippi by truck freight tonnage and increase from fourth to third by truck freight value.
- Madison County is projected to increase from sixth to fifth in Mississippi by truck freight tonnage and increase from sixth to fourth by truck freight value.
- Rankin County is projected to decrease from 20th to 24th in Mississippi by truck freight tonnage and increase from 13th to 11th by truck freight value.

Table 5.1 shows the growth in freight tonnage and freight value for trucks in the MPA between 2016 and 2045, as projected by the Freight Analysis Framework (FAF).[13] The following observations emerge in the MPA:

- The inbound intrastate movement tonnage is projected to be the largest tonnage increase, increasing by approximately 6.5 million tons.
- The inbound interstate movement value is projected to be the largest value increase, increasing by approximately $6.9 billion.
- The intrastate tonnage increase (11.2 million tons) is projected to be greater than the interstate tonnage increase (5.1 million tons). However, the interstate freight value increase ($11.0 billion) is projected to be greater than the intrastate freight value increase ($4.3 billion).
- The inbound tonnage and freight value increases are projected to be greater (9.8 million tons and $9.5 billion) than the outbound tonnage and freight value increases (6.5 million tons and $5.9 billion).

[13] A disaggregated version of the Freight Analysis Framework (FAF) database was used to get the data to the county level.

- Outbound tonnage percent growth is projected to be larger (increase of 83 percent) than inbound tonnage percent growth (increase of 76 percent).
- Between 2016 and 2045, the total truck tonnage is projected to increase by 79 percent, and the total truck freight value is projected to increase by 73 percent.

Table 5.1: Changes in Commodity Flows by Truck, 2016 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2016	2045	Change	Percent Change	2016	2045	Change	Percent Change
Inbound (Interstate)	5,744	8,953	3,209	56%	$8,110	$14,964	$6,855	85%
Inbound (Intrastate)	7,186	13,770	6,584	92%	$4,215	$6,853	$2,638	63%
Outbound (Interstate)	2,638	4,543	1,905	72%	$5,879	$10,072	$4,193	71%
Outbound (Intrastate)	5,213	9,861	4,648	89%	$2,672	$4,338	$1,666	62%
Within MPA	423	775	352	83%	$369	$605	$236	64%
Total	21,205	37,902	16,698	79%	$21,245	$36,831	$15,587	73%

Source: Freight Analysis Framework 4

Table 5.2 and Table 5.3 show the top ten (10) inbound and outbound domestic trading partners in the MPA by truck tonnage increases between 2016 and 2045, respectively. Most of the partners with the largest increases are either Mississippi counties or in states bordering Mississippi. The partner with the largest tonnage increase is the area of Louisiana that is outside the FAF designated metropolitan areas ("Rest of Louisiana").

Table 5.2: Top Inbound Truck Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2016	2045		
1	Rest of Louisiana	1,204	1,801	596	50%
2	Lee County, Mississippi	437	943	506	116%
3	Rest of Alabama	571	934	363	64%
4	Copiah County, Mississippi	314	598	285	91%
5	Lowndes County, Mississippi	246	519	273	111%
6	Pike County, Mississippi	292	536	245	84%
7	Rest of Texas	752	989	237	31%
8	Jackson County, Mississippi	209	440	231	111%
9	Tippah County, Mississippi	237	464	227	96%
10	Choctaw County, Mississippi	216	405	188	87%

Source: Freight Analysis Framework 4 (FAF4)

Note: "Rest of Louisiana", "Rest of Alabama", and "Rest of Texas" refer to those areas of those states that are outside the FAF 4 designated metropolitan areas.

Table 5.3: Top Outbound Truck Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2016	2045		
1	Rest of Louisiana	489	927	438	90%
2	Lee County, Mississippi	377	806	429	114%
3	Lowndes County, Mississippi	208	435	227	109%
4	Rest of Arkansas	270	491	221	82%
5	Jackson County, Mississippi	198	400	202	102%
6	Rest of Alabama	220	376	155	71%
7	Alcorn County, Mississippi	121	260	139	115%
8	Copiah County, Mississippi	143	280	137	96%
9	Prentiss County, Mississippi	125	253	127	102%
10	Grenada County, Mississippi	102	211	109	106%

Source: Freight Analysis Framework 4

Note: "Rest of Louisiana", "Rest of Arkansas", and "Rest of Alabama" refer to those areas of those states that are outside the FAF 4 designated metropolitan areas.

Table 5.4 and Table 5.5 show the top freight truck commodities by tonnage and value increases between 2016 and 2045, respectively. By tonnage, the largest increase is coal n.e.c. By value, the largest increase is motorized vehicles.

Table 5.4: Top Commodities by Truck Tonnage Increase

Rank	Commodity	Tons (thousand)		Change	Percent Change
		2016	2045		
1	Coal n.e.c	3,937	10,032	6,094	155%
2	Agricultural products	1,673	3,180	1,507	90%
3	Gravel	1,758	3,212	1,454	83%
4	Non-metallic minerals	1,514	2,516	1,002	66%
5	Waste and scrap	1,041	1,890	849	82%
6	Motorized vehicles	960	1,518	558	58%
7	Cereal grains	910	1,434	524	58%
8	Mixed freight	1,390	1,897	506	36%
9	Other foodstuffs	778	1,263	486	62%
10	Wood products	1,081	1,546	465	43%

Source: Freight Analysis Framework 4

Table 5.5: Top Commodities by Truck Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2016	2045		
1	Motorized vehicles	$2,215	$4,610	$2,395	108%
2	Electronics	$1,511	$3,248	$1,737	115%
3	Mixed freight	$4,188	$5,722	$1,534	37%
4	Machinery	$1,088	$2,189	$1,101	101%
5	Coal n.e.c.	$654	$1,570	$916	140%
6	Transportation equipment	$296	$1,145	$849	287%
7	Precision instruments	$306	$986	$680	222%
8	Agricultural products	$521	$1,132	$611	117%
9	Non-metallic minerals	$981	$1,581	$600	61%
10	Other foodstuffs	$816	$1,384	$567	69%

Source: Freight Analysis Framework 4

Roadway Capacity

Roadways that have the highest freight truck traffic in 2018 are shown in *Technical Report #2: Existing Conditions*. These roadways are expected to see an increase in truck traffic between 2018 and 2045. 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 roadways with the highest freight truck traffic growth between 2018 and 2045, as well as roadways with the highest truck traffic volume, are on the MFN. Other roadways that are projected to have the highest truck traffic volumes are on segments of I-220 and MS 468.

The largest increases in freight truck traffic are on:

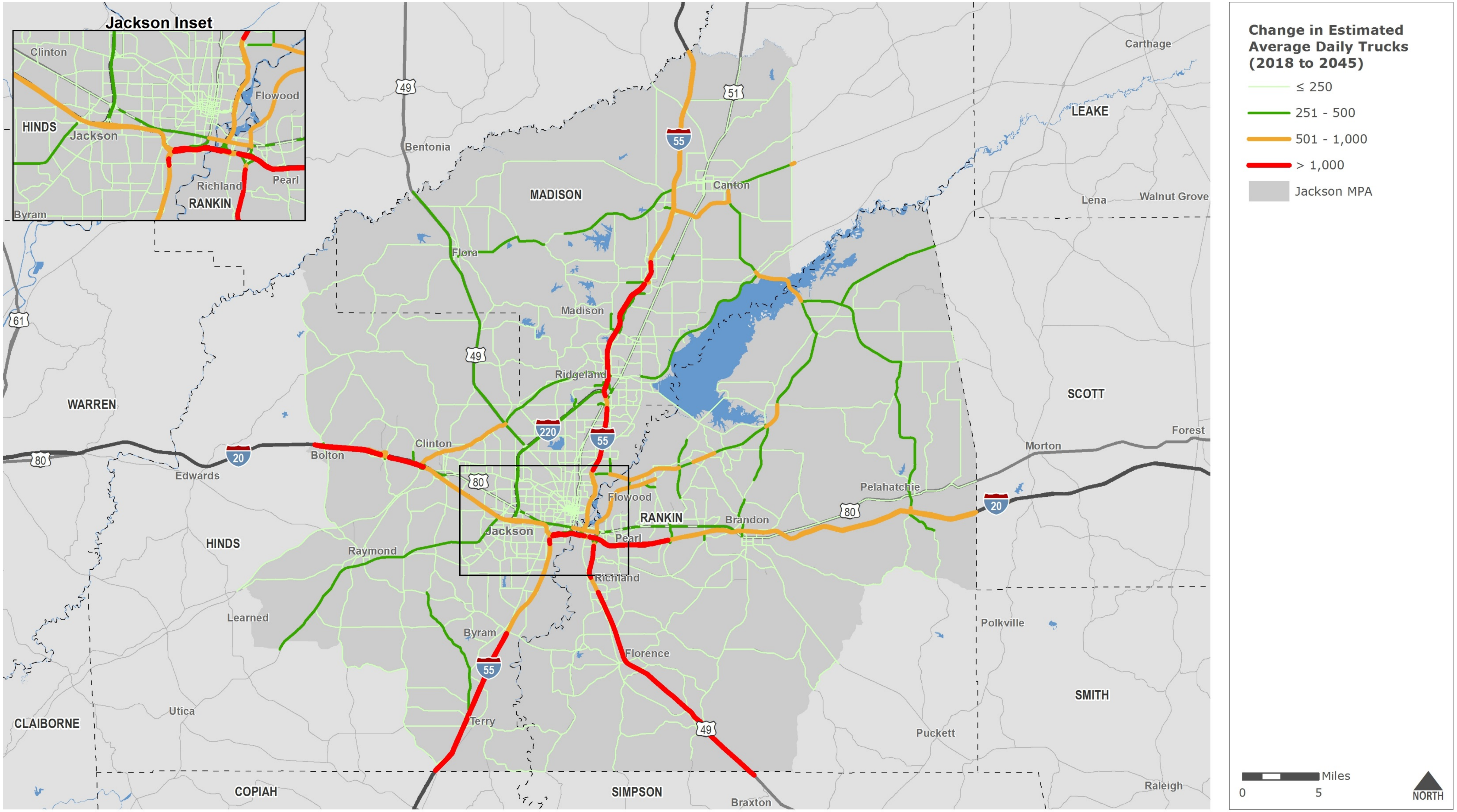
- I-20 from Bolton to Natchez Trace Pkwy
- I-20 from I-55 to MS 475
- I-55 from Copiah County to Siwell Rd
- I-55 from I-220 to Sowell Rd
- US 49 from Simpson County to I-20

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.

Reliability

The Truck Travel Time Reliability (TTTR) index for Interstates in the MPA are summarized in *Technical Report #2: Existing Conditions*. Although future TTTR cannot be estimated, the Interstates that currently experience existing reliability issues are projected to experience more significant reliability issues in the future. Additionally, Interstates that may not currently experience reliability issues may experience future reliability issues as truck traffic volumes and congestion continue to increase.

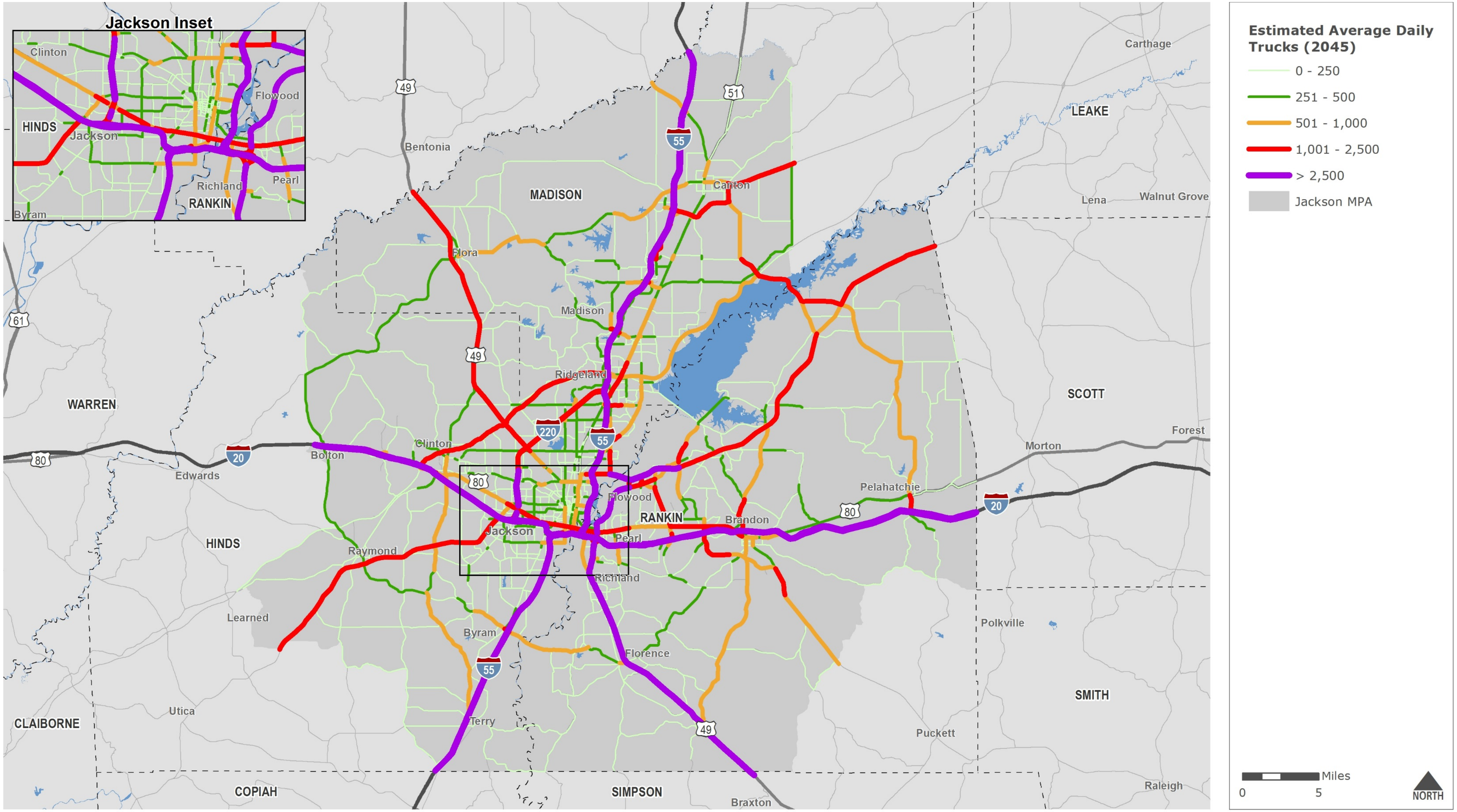
Figure 5.1: Freight Truck Growth, 2018 to 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

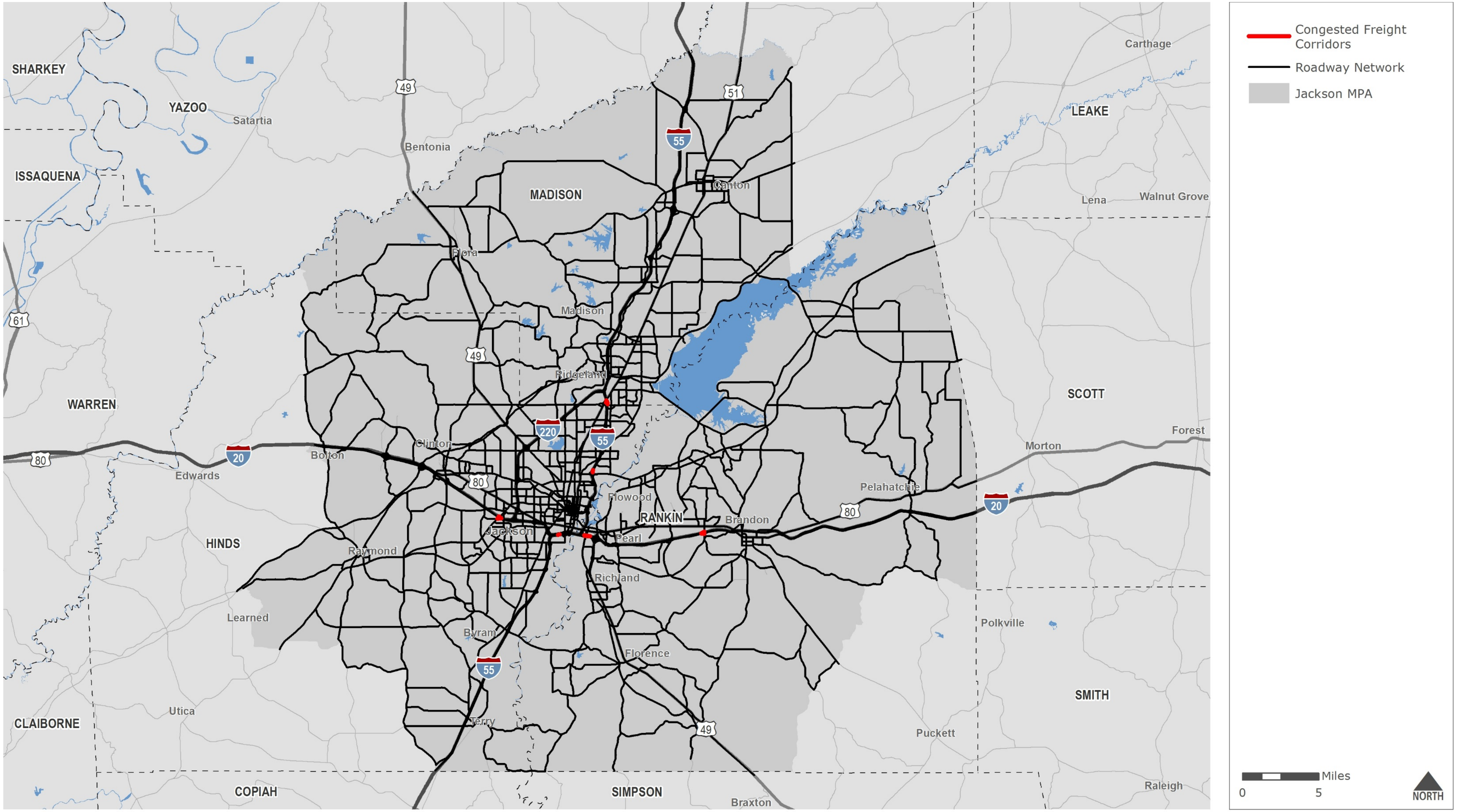
Figure 5.2: Freight Truck Traffic, 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

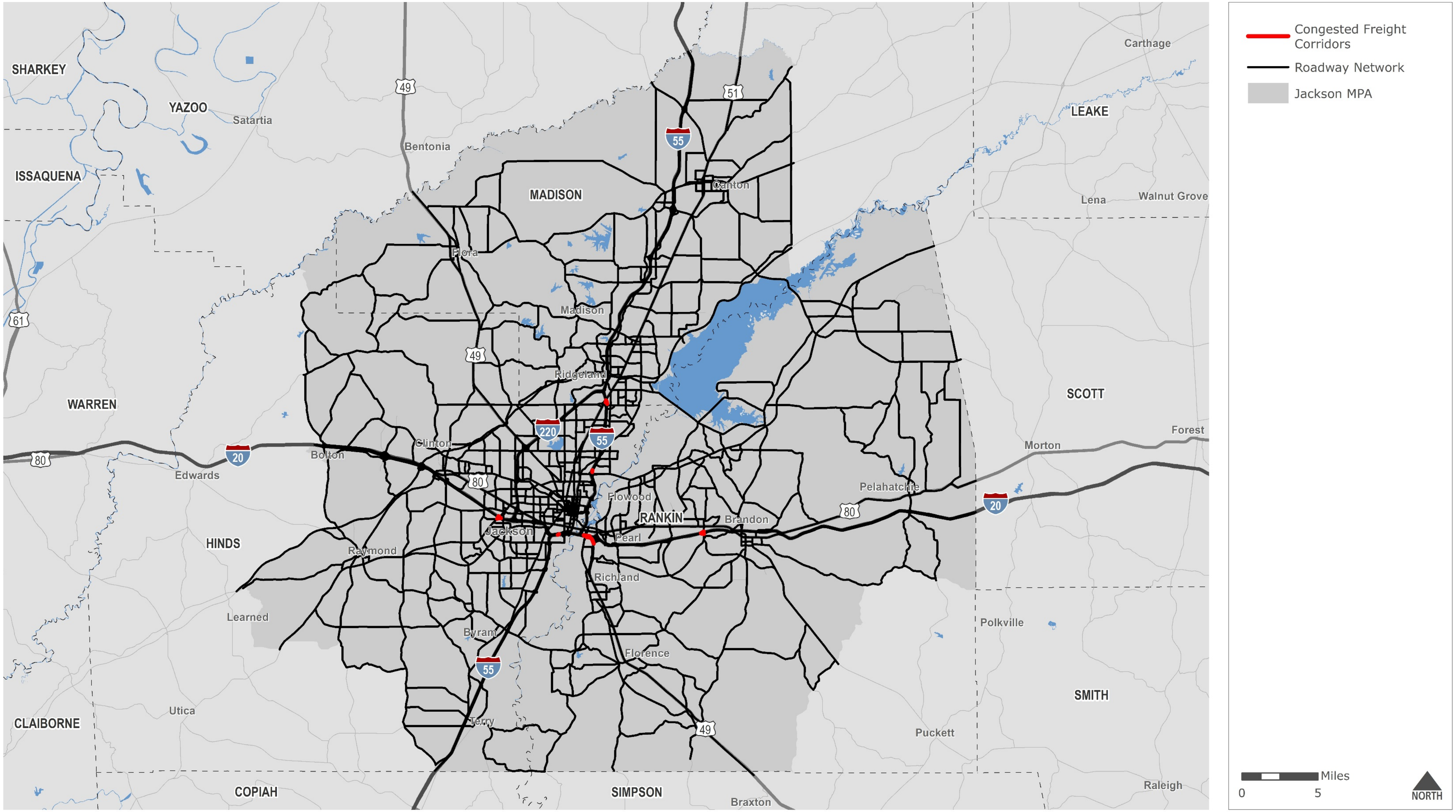
Figure 5.3: Congested Freight Truck Corridors, 2018



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Figure 5.4: Congested Freight Truck Corridors, 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

Non-Capacity Freight Truck Implications

Increases in freight truck traffic can adversely impact bridges, pavement, and safety. Those impacts can include, but are not limited to, increased vehicle wear and tear, increased operating costs, and an increased chance of heavy vehicle related crashes.

Bridge Condition

The existing bridge conditions are summarized in Section 2.6 of *Technical Report #2: Existing Conditions* and in Section 4.2 of this report. None of these bridges in "Poor" condition are on the MFN. However, the bridge conditions should be monitored to ensure that bridges can handle the increases in freight traffic.

Bridges that have vertical clearances can also have an impact on freight truck conditions since trucks must detour to avoid low vertical clearance bridges. There is also a risk of trucks striking low vertical clearance bridges, which can result in bridge and road closures, leading to an increase in freight operating costs. The *MDOT Bridge Design Manual* specifies that the minimum vertical clearance for bridges to be 16.5 feet.[14] There are currently 124 bridges in the MPA that have a vertical clearance of less than 16.5 feet, most of which are on MFN roadways.

Pavement Condition

Poor pavement conditions can result in increased wear and tear and operating costs for freight truck traffic. The existing pavement conditions are summarized in Section 2.5 of *Technical Report #2: Existing Conditions* and in Section 4.2 of this report. The MFN roadways in the MPA with "Poor" pavement conditions include US 49 between Old Hwy 49 and 2.0 miles south of MS 469. However, this roadway is currently being widened from four lanes to six lanes, which will include new pavement. Pavement conditions should be monitored to ensure that pavements can handle the increases in freight traffic.

Safety

The increases in truck traffic will potentially increase heavy vehicle crashes. All crashes can result in delays, and thus increased operating costs, for freight truck traffic. However, crashes involving heavy vehicles, especially those that involve hazardous chemicals, can result in extended delays. The heavy vehicle crashes are summarized in *Technical Report #2: Existing Conditions*. Seven (7) intersections and four (4) segments experienced at least five (5) heavy vehicle crashes between 2014 and 2018; five (5) of the intersections and all four (4) segments were on the MFN.

[14] Mississippi Department of Transportation Bridge Design Manual

5.2 Freight Rail Needs

This section summarizes future freight rail movement and needs. Freight projections indicate that the rail mode will have the third largest increase in freight tonnage and fifth largest increase in freight value between 2016 and 2045. This increase in freight rail commodity flows will lead to an increase in rail traffic on railroads. The majority of railroads in the MPA are on the MFN, which include the following Tier I railroads:

- the Kansas City Southern (KCS) Railroad paralleling I-20
- the Canadian National (CN) Railroad paralleling I-55
- the CN Railroad paralleling US 49 south of Jackson

Mobility

The FAF data can be used to understand the projected growth in freight rail commodity flows between 2016 and 2045. This growth in commodity flows, as well as the existing rail infrastructure, can have an impact on future railroad conditions.

Commodity Flow Growth

As shown in *Technical Report #2: Existing Conditions*, the rail mode accounts for approximately four (4) percent of freight tonnage and 2.6 percent of freight value in the MPA in 2016. By 2045, the freight truck tonnage share is projected to remain at approximately four (4) percent, while the freight truck value share is projected to slightly decrease to 2.3 percent.

The changes in county ranks for freight rail commodity flows between 2016 and 2045 are summarized below:

- Hinds County is projected to increase from seventh to fourth in Mississippi by truck freight tonnage and increase from sixth to fifth by truck freight value.
- Madison County is projected to increase from ninth to eighth in Mississippi by truck freight tonnage and increase from eighth to fourth by truck freight value.
- Rankin County is projected to increase from 15th to 14th in Mississippi by truck freight tonnage and decrease from 16th to 17th by truck freight value.

Table 5.6 shows the growth in freight tonnage and freight value for rail in the MPA between 2016 and 2045, as projected by the Freight Analysis Framework (FAF). The following observations emerge in the MPA:

- The inbound interstate movement is projected to be the largest tonnage increase, increasing by approximately 600,000 tons.
- The outbound interstate movement is projected to be the largest value increase, increasing by $367 million.
- The increases in interstate tonnage and value are projected to be greater (902,000 tons and $669 million) than the increase in intrastate tonnage and value (40,000 tons and $12 million).
- The inbound tonnage increase is projected to be greater (increase of 616,000 tons) than outbound tonnage (increase of 326,000 tons).
- The outbound value increase is projected to be greater (increase of $371 million) than inbound value (increase of $310 million).
- Between 2016 and 2045, the truck tonnage is projected to increase by 64 percent, and the truck freight value is projected to increase by 99 percent.

Table 5.6: Changes in Commodity Flows by Rail, 2016 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2016	2045	Change	Percent Change	2016	2045	Change	Percent Change
Inbound (Interstate)	997	1,588	591	59%	$369	$671	$302	82%
Inbound (Intrastate)	52	77	25	49%	$22	$30	$8	37%
Outbound (Interstate)	388	699	311	80%	$282	$649	$367	130%
Outbound (Intrastate)	29	44	15	50%	$12	$16	$4	35%
Within MPA	3	5	2	67%	$1	$2	$1	55%
Total	1,470	2,414	944	64%	$686	$1,367	$681	99%

Source: Freight Analysis Framework 4

Table 5.7 and Table 5.8 show the top ten (10) inbound and outbound domestic trading partners in the MPA by rail tonnage increases between 2016 and 2045, respectively. Most of these partners are located in the Southern or Midwestern United States.

Table 5.7: Top Inbound Rail Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2016	2045		
1	Rest of Illinois	317	447	130	41%
2	Rest of Tennessee	59	117	58	98%
3	Rest of Louisiana	52	109	57	109%
4	Rest of Iowa	47	100	53	113%
5	Rest of Alabama	65	100	36	56%
6	New Orleans, Louisiana	39	66	27	69%
7	Dallas-Fort Worth, Texas	14	38	24	172%
8	Baton Rouge, Louisiana	40	62	21	53%
9	Nashville, Tennessee	10	25	15	152%
10	Rest of Oklahoma	6	21	15	236%

Source: Freight Analysis Framework 4 (FAF4)

Note: "Rest of Illinois", "Rest of Tennessee", "Rest of Louisiana", "Rest of Iowa", "Rest of Alabama", and "Rest of Oklahoma" refer to those areas of those states that are outside the FAF 4 designated metropolitan areas.

Table 5.8: Top Outbound Rail Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2016	2045		
1	Detroit, Michigan	29	107	77	265%
2	Rest of Kentucky	31	81	50	159%
3	Rest of Georgia	34	53	19	55%
4	Rest of Illinois	33	47	13	41%
5	Rest of Tennessee	6	16	10	161%
6	Rest of Arkansas	17	26	9	56%
7	Memphis, Tennessee	2	9	6	275%
8	Chicago, Illinois	6	11	4	69%
9	Rest of Missouri	5	10	4	79%
10	Philadelphia, Pennsylvania	3	7	4	113%

Source: Freight Analysis Framework 4 (FAF4)

Note: "Rest of Kentucky", "Rest of Georgia", "Rest of Illinois", "Rest of Tennessee", "Rest of Arkansas", and "Rest of Missouri" refer to those areas of those states that are outside the FAF 4 designated metropolitan areas.

Table 5.9 and Table 5.10 show the top rail freight commodities by tonnage and value increases between 2016 and 2045, respectively. By tonnage, the largest increase is waste and scrap. By value, the largest increase is motorized vehicles.

Table 5.9: Top Commodities by Rail Tonnage Increase

Rank	Commodity	Tons (thousand)		Change	Percent Change
		2016	2045		
1	Waste and scrap	110	250	140	127%
2	Basic Chemicals	274	406	132	48%
3	Other foodstuffs	276	403	127	46%
4	Cereal Grains	240	343	103	43%
5	Non-Metallic Minerals	29	108	79	277%
6	Fertilizers	76	141	66	87%
7	Plastics and rubber	74	131	57	78%
8	Transportation equipment	9	50	40	434%
9	Other coal	14	44	30	217%
10	Crude Petroleum	6	36	30	482%

Source: Freight Analysis Framework 4

Table 5.10: Top Commodities by Rail Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2016	2045		
1	Motorized vehicles	$80	$282	$202	252%
2	Plastics and rubber	$90	$163	$72	80%
3	Basic Chemicals	$119	$181	$62	52%
4	Other Foodstuffs	$121	$175	$54	44%
5	Waste and scrap	$42	$91	$49	117%
6	Transportation equipment	$6	$33	$27	421%
7	Base Metal	$33	$56	$24	72%
8	Cereal Grains	$55	$77	$22	40%
9	Other Chemicals	$10	$31	$21	209%
10	Other coal	$14	$34	$21	152%

Source: Freight Analysis Framework 4

Rail Capacity and Asset Management

Future rail capacity and needs can be measured in many ways. However, actual volumes and capacities are not known for all rail segments in the Jackson MPA. This makes it difficult 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 *Mississippi Statewide Freight Plan* outlines the future efforts anticipated by the State of Mississippi.

The elements that are assessed to determine physical rail capacity include the number of tracks (single track, double track, etc.), rail line operating speed, and terminal and yard capacity.

Number of tracks

Within the MPA, 121 miles of railroad are single track while the remaining 39 miles are double track. The primary areas with double track or greater are near railroad yards. Single track railroads limit the number of shipments on railroads since passing or overtaking can only take place in areas where there is a siding or double-track section for one train to pull over. In the MPA, this problem is exacerbated on the CN railroad that carries passenger rail service for Amtrak (*City of New Orleans*) since passenger trains must adhere to a stricter schedule, and the difference between operating speeds for freight and passenger service is larger.

Rail Line Operating Speed

The average speed trains move on a corridor impacts capacity and effects the railroad's ability to move higher value, time-sensitive goods. The Mississippi Statewide Freight Plan (MSFP) recommends that all MFN Tier I main line tracks meet or exceed FRA Class 4 standards for freight (greater than 40 MPH). The MSFP also recommends that all MFN Tier II main line tracks meet or exceed FRA Class 3 standards for freight (greater than 25 MPH).

Table 5.11 displays the total railroad crossings by maximum speed. Figure 5.5 illustrates the operating speeds at each crossing within the MPA.

Table 5.11: Maximum Operating Speed at Railroad Crossings in the MPA, 2018

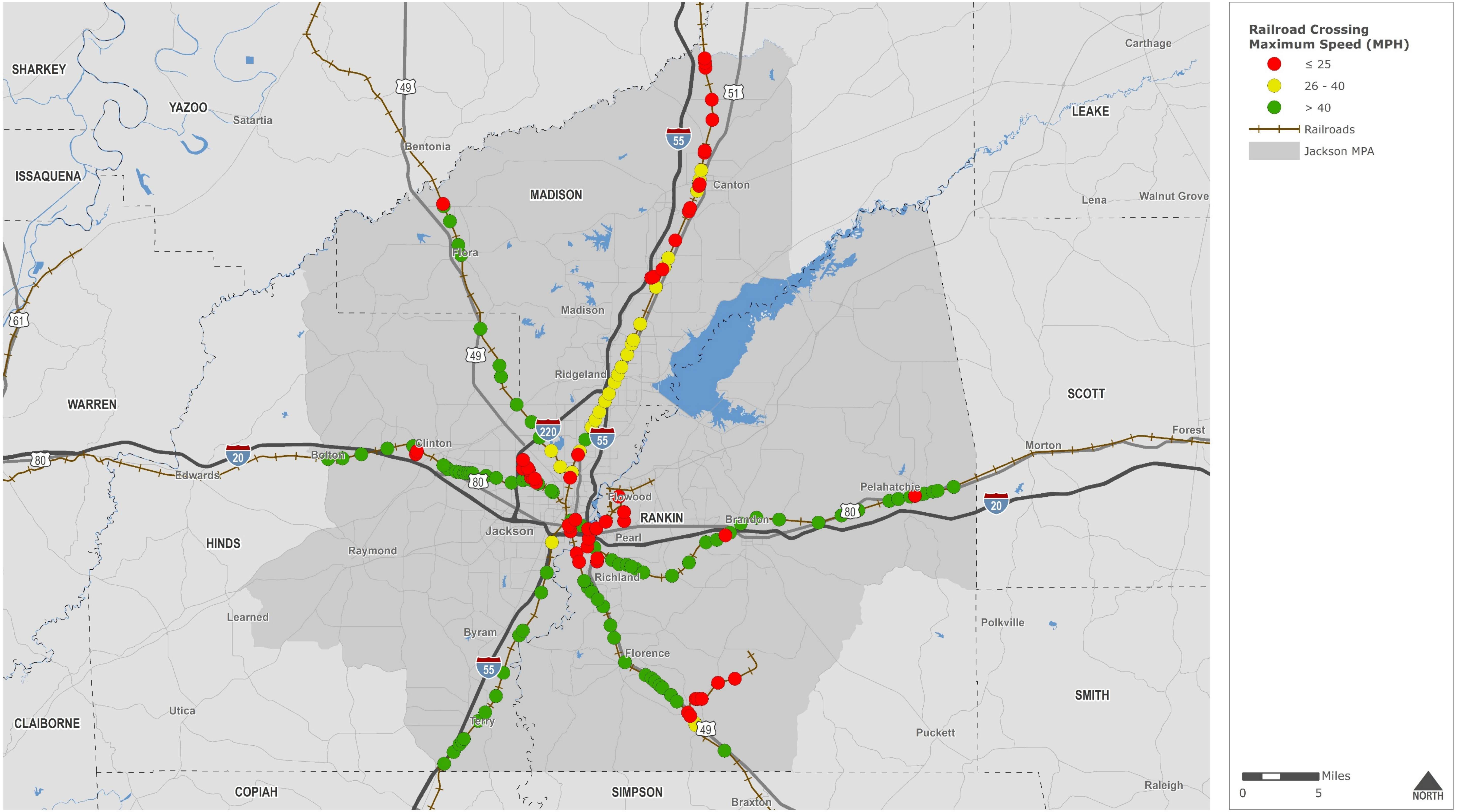
Maximum Operating Speed	Number	Percentage
Less than or equal to 25 MPH	55	31%
26 – 40 MPH	28	16%
Greater than 40 MPH	95	53%
Total	178	100%

Source: Federal Rail Administration

Terminal and yard capacity

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

Figure 5.5: Railroad Crossing Speeds



Data Sources: 2015 National Transportation Atlas; USDOT; MDOT

Disclaimer: This map is for planning purposes only.

Rail assets can also have an impact on rail capacity. Rail assets include vertical clearances of railroad overpasses, railroad weight limits, and railroad traffic control and signaling.

Vertical clearances

With the projected increases in rail commodity flow traffic, removing height restrictions is a critical concern. The *MDOT Bridge Design Manual* has specified that the minimum vertical clearance for bridges crossing over railroads to be 23.5 feet.[14] This clearance allows for unrestricted access for all standard rail car configurations, including double-stacked intermodal cars and trilevel auto carriers. According to data from the NBI, there were 23 bridges crossing over railroads in the MPA that had a vertical clearance that was less than 23.5 feet. Fifteen (15) of these bridges are in "fair" condition, and one (1) is in "poor" condition. As the conditions of these bridges continue to degrade and become more in need of replacement, adequate vertical clearances need to be considered in any future bridge replacements.

Weight limits

Consistent railroad weight capacity is important to maintaining freight rail movement efficiency and cost advantage. Shippers on rail lines that cannot handle standard 286,000-pound gross carloads may either be forced to use trucks or to break loads inefficiently. The mainline railroads in the MPA accommodate the industry standard of 286,000 pounds. No information is available for branch lines off of the main lines.

Traffic control and signaling

A new traffic control system, Positive Train Control (PTC), is designed to automatically stop a train before certain incidents occur. The PTC systems are integrated command, control, communications, and information systems for controlling train movements with safety, security, precision, and efficiency. PTC must be designed to prevent the following:

- Train to train collisions
- Derailments caused by excessive speed
- Unauthorized movements by trains onto sections of track where maintenance activities are taking place
- Movement of a train through a track switch left in the wrong position

According to the *Mississippi State Rail Plan*, PTC will be required on the following MPA railroads:

- The CN Railroad from the Louisiana State Line, through Jackson, to the Tennessee State Line, over which Amtrak's *City of New Orleans* route operates
- Any portions of the KCS and CN main lines that carry poisonous inhalation hazard materials

The Rail Safety Improvement Act of 2008 (RSIA) mandated that PTC be implemented across a significant portion of the Nation's rail industry by December 31, 2015.[15] However, this deadline was extended from 2015 to December 31, 2018. As of Q4 2018, KCS and CN have completed PTC equipment on its locomotives and tracks.[16]

Safety

As shown in *Technical Report #2: Existing Conditions*, there were 24 crashes in the MPA that involved an automobile and a train between 2014 and 2018; three (3) crashes resulted in a fatality, and one (1) crash resulted in a life-threatening injury. Also, there were six (6) train derailments in the MPA between 2014 and 2018. In addition to injuries and fatalities that can result from these safety issues, these incidents can result in significant delays for all road and rail users and increased operational costs for freight. The MPO should work with its local rail partners to improve railroad safety in the MPA.

Highway-Railroad Crossings

Technical Report #2: Existing Conditions shows that there are 127 public highway-rail grade crossings within the MPA. Slightly more than a quarter (37) of those crossings possess only passive warning devices. These include cross bucks, warning signs, regulatory signs, and pavement markings. The CN Railroad at Loflin Rd in Star is the only passive crossing on the MFN that is with a roadway that is functionally classified as a collector or above.

In the MPA, there were three roadway-railroad crossings in the MPA that experienced more than one automobile-train collision between 2014 and 2018. One of these crossings had only passive warning devices. The MPO should work with its local rail partners to add active crossing devices to these locations to improve safety.

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 (10) States with the most highway-rail grade crossing collisions, on average, over the past three (3) years. Those states are required to develop state highway-rail grade crossing action plans.

Section 202 further states that the 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.

[15] https://railroads.dot.gov/train-control/ptc/positive-train-control-ptc-information-rd
[16] https://www.fra.dot.gov/app/ptc/Q4%20Oct.%201%E2%80%94Dec.%2031,%202018

Mississippi was not one of the ten states that was required to develop state highway-rail grade action plans. However, Mississippi was one of the states that was targeted in the National Highway Traffic Safety Administration's "Stop, Trains Can't" safety ad since one of the nation's most dangerous crossings during the last decade was in Mississippi.[17, 18]

Derailments

There were six (6) derailments in the MPA between 2014 and 2018; none of these derailments resulted in injuries. The primary causes of the derailments included switch issues (ran through switches, improperly lined switches, control system switch failures, and worn or broken switches), and broken rail plates. The rail partners should work to ensure that the rail infrastructure is in good condition.

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[17] https://railroads.dot.gov/elibrary/fra-releases-list-railroad-crossings-most-incidents-over-last-decade

[18] https://www.transportation.gov/highlights/stop-trains-can%E2%80%99t-campaign-sends-strong-message-motorists-railroad-crossings

5.3 Air Network Needs

This section summarizes future air freight conditions. Although the amount of freight shipped by air is small, the commodities transported by air tend to be high-value and time-sensitive.

The air freight network is summarized in *Technical Report #2: Existing Conditions*. The airports in the MPA are:

- Jackson-Evers International Airport in Jackson
- Hawkins Field in Jackson
- Bruce Campbell Field in Madison
- John Bell Williams Airport in Raymond

Jackson-Evers International Airport had the most daily aircraft operations, and this airport also serves as the MPA's commercial airport. This airport is also the only airport in the MPA (and statewide) that has cargo data. Approximately 75 million pounds of cargo landed at this airport in 2017.

Capacity Needs

The FAF data can be used to understand the projected growth in freight air commodity flows between 2016 and 2045. This growth in commodity flows, as well as the existing air infrastructure, can have an impact on future airport conditions.

Commodity Flow Growth

As shown in *Technical Report #2: Existing Conditions*, the air mode accounts for approximately 0.02 percent of freight tonnage and approximately four (4) percent of freight value in the MPA in 2016. By 2045, the tonnage share of freight shipped by air is projected to be only 0.04 percent in the MPA, and the value share of air freight is projected to be approximately 6.5 percent. The air tonnage is projected to increase by over 250 percent between 2016 and 2045, and the value of freight shipped by air is projected to increase by over 200 percent between 2016 and 2045.

The following trading partners with the largest increases in inbound and outbound air tonnage being traded with the MPA between 2016 and 2045 are:

Inbound

1. Massachusetts
2. California
3. Pennsylvania
4. South Carolina
5. Georgia

Outbound

1. Pennsylvania
2. California
3. Florida
4. Connecticut
5. New York

Table 5.12 and Table 5.13 show the top air freight commodities by tonnage and value increases between 2016 and 2045, respectively. By tonnage and by value, the largest increase is electronics.

Table 5.12: Top Commodities by Air Tonnage Increase

Rank	Commodity	Tons (hundred)		Change	Percent Change
		2016	2045		
1	Electronics	20	124	104	508%
2	Precision instruments	37	97	60	161%
3	Machinery	4	13	9	221%
4	Transportation equipment	3	12	9	272%
5	Pharmaceuticals	1	9	8	617%
6	Furniture	1	8	6	445%
7	Base metal	3	7	4	132%
8	Motorized vehicles	4	7	2	54%
9	Misc. manufactured	2	4	2	128%
10	Plastics and rubber	1	3	2	147%

Source: Freight Analysis Framework 4

Table 5.13: Top Commodities by Air Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2016	2045		
1	Electronics	$479	$1,711	$1,232	257%
2	Precision instruments	$338	$959	$620	183%
3	Transportation equipment	$172	$467	$294	171%
4	Machinery	$26	$121	$94	361%
5	Pharmaceuticals	$18	$79	$61	341%
6	Furniture	$11	$65	$55	507%
7	Base metal	$9	$24	$15	178%
8	Motorized vehicles	$14	$28	$14	97%
9	Misc. manufactured	$8	$14	$6	70%
10	Non-metallic minerals	$1	$7	$6	420%

Source: Freight Analysis Framework 4

Airport Conditions

Adequate airport runway conditions are important in handling large cargo planes; runway conditions include runway dimensions and pavement condition. The all-cargo carriers use planes such as Airbus (A310 and A320), Boeing (747, 757, and 767), and McDonell Douglas (MD 10 and MD 11) planes. These planes require several thousand feet of runway to land and take off. Additionally, the runway pavement needs to be able to handle the cargo planes' weight. Table 5.14 shows the runway information for the MPA's airports.

Table 5.14: MPA Airport Runway Information

Airport	Runway	Dimensions		Pavement Condition
		Length (feet)	Width (feet)	
Jackson-Evers International Airport[19]	16L/34R	8,500	150	Good
	16R/34L	8,500	150	Fair
Hawkins Field[20]	16/34	5,387	150	Good
	11/29	3,431	150	Good
Bruce Campbell Field[21]	17/35	4,444	75	Good
John Bell Williams Airport[22]	12/30	5,499	100	Good

Source: AirNav

Additionally, airport roadside transportation challenges can have an indirect impact for freight operations at airports, which can include, but are not limited to, getting staff to the airport. The following roadside transportation challenges have been noted at the MPA airports:

- Safety and number of crashes
- Inadequate public transportation
- Traffic congestion and parking difficulties

Airport Projects

Planned updates for Jackson-Evers International Airport and Hawkins Field can be found in their respective master plans.[23, 24] The following upcoming roadside plans at the MPA's airports include:

- Quick turnaround (QTA) for rental cars
- Commercial property development on Metro Aeroplex property

There was no information for planned updates for Bruce Campbell Field or John Bell Williams Airport.

[19] https://www.airnav.com/airport/KJAN
[20] https://www.airnav.com/airport/KHKS
[21] https://www.airnav.com/airport/KMBO
[22] https://www.airnav.com/airport/KJVW
[23] https://jmaa.com/download/jmaa-airport-masterplan-june-2018/?wpdmdl=3928&refresh=5d78054211287156814675 4
[24] https://jmaa.com/download/airport-master-plan-update-2012-hks/?wpdmdl=1047&refresh=5d7805420d2851568146754

5.4 Waterway Network Needs

There are no major port facilities or navigable waterways within the MPA. However, I-20 provides access from the MPA to the Port of Vicksburg on the Mississippi River, and US 49 provides access from the MPA to the Port of Gulfport on the Mississippi Gulf Coast.

5.5 Pipeline Network Needs

This section summarizes future freight pipeline commodity flow movement and needs. Freight projections indicate that the pipeline mode will have the second largest increase in freight tonnage and fourth largest increase in freight value between 2016 and 2045. As shown in *Technical Report #2: Existing Conditions*, the MPA's pipeline network currently consists of approximately 632 miles of pipelines; most of the pipelines by length are crude oil pipelines, and the remainder are natural gas pipelines.

Capacity

Although information on needs and pipeline conditions are not publicly available, the FAF data can be used to understand the projected growth in pipeline commodity flow between 2016 and 2045.

Commodity Flow Growth

The tonnage shipped by pipelines is projected to grow 54 percent between 2016 and 2045. The value of freight shipped by pipelines is projected to grow 40 percent between 2016 and 2045. Although the pipeline is projected to rank second in tonnage in 2045, the value share is projected to drop from second to third.

The area of Arkansas that is outside the FAF designated metropolitan areas ("Rest of Arkansas") is the trading partner with the projected largest inbound tonnage increase, and the area of Alabama that is outside the FAF designated metropolitan areas ("Rest of Alabama") is the trading partner with the projected largest outbound tonnage increase. Coal n.e.c. is projected to be the commodity with the largest tonnage and value increases.

Pipeline Conditions and Needs

Pipelines are typically private investments, and pipeline needs and conditions are not publicly available. Nonetheless, pipelines provide additional freight capacity since they handle liquid bulk, such as crude oil and natural gas, that would need to use other surface transportation modes if pipelines did not carry these commodities.

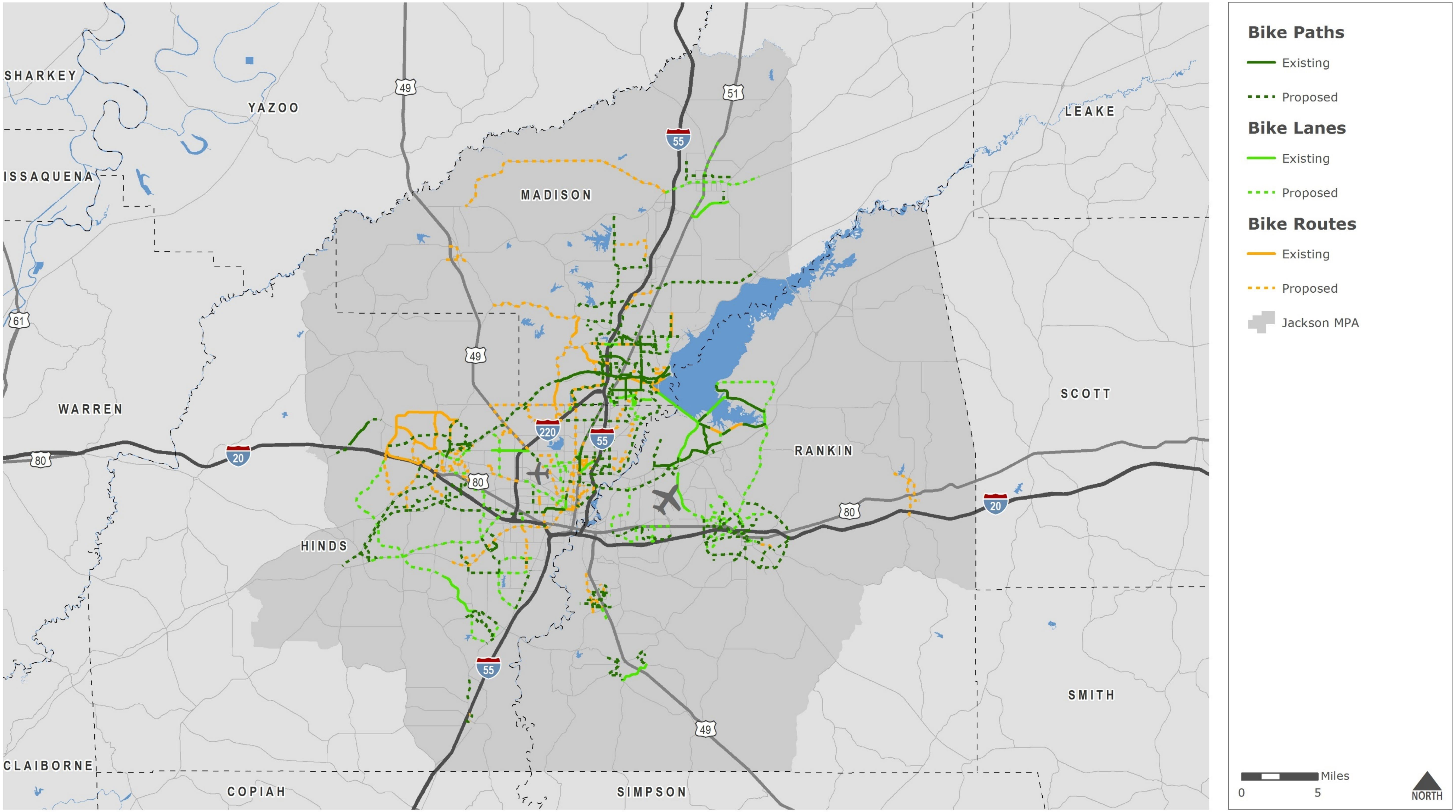
6.0 Bicycle and Pedestrian

6.1 Infrastructure/Facility Needs

Table 6.1 lists all proposed projects identified through meetings with local jurisdictions in the Jackson MPA as those most needed to improve the overall bicycle and pedestrian network. Figure 6.1 illustrates the location of each of these proposed facilities. These projects, once developed, will reduce gaps in the system and improve connectivity to the existing bicycle and pedestrian network, major employment and retail shopping centers, transit system, schools, colleges and parks.

Though this plan includes multiple bicycle and pedestrian project types, it does not include individual sidewalk projects. This is due to the fact that though not everyone is a bicyclist, everyone, regardless of his or her ability, is a pedestrian. Taking this into consideration, improving sidewalk accessibility, connectivity, and maintenance should be regarded with a similar precedence level as improving accessibility, connectivity and maintenance for streets and highways. Recognizing the importance of pedestrian facilities, the Jackson MPO supports development of pedestrian focused facilities along all existing and proposed roadways. To accomplish this end, Local Public Agencies (LPAs) should begin annually setting aside funding to improve and bring up to ADA compliance existing sidewalk infrastructure while “filling in the gaps” with new infrastructure. Improving and expanding infrastructure in these high priority areas is essential in providing pedestrians greater access to medical services, retail centers, and public facilities and services.

Figure 6.1: Proposed Bicycle and Pedestrian Facilities Map



Data Sources: MPO Staff

Disclaimer: This map is for planning purposes only.

Table 6.1: Proposed Bicycle and Pedestrian Facilities

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Big Creek Greenway	Terry Rd	Davis Rd & Siwell Rd	Hinds	Byram	Path
Byram Pkwy	Siwell Rd	Terry Rd	Hinds	Byram	Lane
Davis Rd	Siwell Rd	Davis Road Park	Hinds	Byram	Path
Gary Rd	Davis Rd	Terry Rd	Hinds	Byram	Lane
Siwell Rd	Byram Pkwy	Davis Rd	Hinds	Byram	Path
Terry Rd	Byram Pkwy	Gary Rd	Hinds	Byram	Path
Arlington St	Lindale St	Post Rd	Hinds	Clinton	Route
Arrow Dr	Clinton High School	Pinehaven Rd	Hinds	Clinton	Path
Baseball Alley	Cynthia Rd	Dead End	Hinds	Clinton	Route
Baseball Alley Connector	Baseball Alley	Laurelwood Dr	Hinds	Clinton	Path
Bellevue St	Berkshire St	Dunton Rd	Hinds	Clinton	Route
Belmont St	Monroe St	Jefferson St	Hinds	Clinton	Route
Berkshire St	Northside Dr	Bellevue St	Hinds	Clinton	Route
Beverly Dr	Dogwood Dr	Pineview Dr	Hinds	Clinton	Route
Camp Garraway Rd	Longwood Dr	Clinton-Raymond Rd	Hinds	Clinton	Route
Church St	Masonic Dr	Morrison Dr	Hinds	Clinton	Route
Clinton Blvd	Easthaven Dr	College St	Hinds	Clinton	Lane
Clinton Business Park Dr	Industrial Park Dr	Old US 80	Hinds	Clinton	Route
Clinton Utility Route 1	W. Sproles St	W. College St	Hinds	Clinton	Path
Clinton Utility Route 2	Arrow Dr	Pinehaven Rd	Hinds	Clinton	Path
Clinton Utility Route 3	Hwy 80	Clinton-Raymond Rd	Hinds	Clinton	Path
Clinton Utility Route 4	Clinton Utility Route 3	Woodchase Park Dr	Hinds	Clinton	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Clinton Utility Route 5	Clinton Utility Route 3	Sherry Cv.	Hinds	Clinton	Path
Clinton Utility Route 6	Clinton Utility Route 3	Grand Oak Blvd	Hinds	Clinton	Path
Clinton Utility Route 7	Brighton Park Dr	Natchez Trace Pkwy	Hinds	Clinton	Path
Clinton Utility Route 8	St Thomas Pkwy	Arrow Dr	Hinds	Clinton	Path
Clinton-Raymond Rd	College St	Brighton Park Dr	Hinds	Clinton	Route
Clinton-Raymond Rd	Brighton Park Dr	Midway Rd	Hinds	Clinton	Lane
Clinton-Raymond Rd	Midway Rd	S. Norrell Rd	Hinds	Clinton	Route
College St/Old Hwy 80	Lasseter St	Natchez Trace Pkwy	Hinds	Clinton	Route
Cynthia Rd	Arrow Dr	Northside Dr	Hinds	Clinton	Lane
Dogwood Dr	Tanglewood Dr	Beverly Dr	Hinds	Clinton	Route
Dunton Rd	Bellevue St	Clinton Pkwy	Hinds	Clinton	Route
Easthaven Dr	Clinton Blvd	Church St	Hinds	Clinton	Route
Hampstead Blvd	Existing Terminus	Hwy 80	Hinds	Clinton	Lane
Hester St	Dunton Rd	E. Leake St	Hinds	Clinton	Route
Hester St	E. Leake St	Oakwood Dr	Hinds	Clinton	Route
Huntcliff Way	Pinehaven Rd	Tanglewood Dr	Hinds	Clinton	Route
I-20 Frontage Rd	St Thomas Pkwy	S. Norrell Rd	Hinds	Clinton	Route
Industrial Park Dr	W. Northside Dr	Clinton Business Park Dr	Hinds	Clinton	Route
Jefferson St	Belmont St	College St	Hinds	Clinton	Route
Laurel Wood Dr	Pineview Dr	Tanglewood Dr	Hinds	Clinton	Route
Leake St	Hester St	Hester St	Hinds	Clinton	Route
Leake St	Clinton Pkwy	Jefferson St	Hinds	Clinton	Route
Lindale Cir.	Lindale St	Parker Dr	Hinds	Clinton	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Lindale St	Arlington St	Lindale Cir.	Hinds	Clinton	Route
Live Oak Dr	Tanglewood Dr	Northside Dr	Hinds	Clinton	Route
Longwood Dr	Royal Oak Dr	Camp Garraway Rd	Hinds	Clinton	Route
Masonic Dr	Church St	Hwy 80	Hinds	Clinton	Route
McRaven Rd	Midway Rd	Clinton City Limits	Hinds	Clinton	Route
Midway Rd	Clinton-Raymond Rd	McRaven Rd	Hinds	Clinton	Route
Monroe St	W. Sproles St	Belmont St	Hinds	Clinton	Route
Morrison Dr	Church St	Clinton Blvd	Hinds	Clinton	Route
N. Frontage Rd	College St	Natchez Trace Pkwy	Hinds	Clinton	Route
Neal St	Northside Dr	W. Sproles St	Hinds	Clinton	Route
Northside Dr	Park Place	Clinton-Tinnin Rd	Hinds	Clinton	Lane
Oakwood Dr	Hester St	Clinton Blvd	Hinds	Clinton	Route
Old U.S. 80	Clinton Business Park Dr	Natchez Trace Pkwy	Hinds	Clinton	Route
Parker Dr	Lindale Cir.	Clinton Blvd	Hinds	Clinton	Route
Pebble Brook Dr	Willow Brook Dr	Royal Oak Dr	Hinds	Clinton	Route
Pinehaven Rd	Arrow Dr	Williamson Rd	Hinds	Clinton	Path
Pineview Dr	Beverly Dr	Laurelwood Dr	Hinds	Clinton	Route
Post Rd	Arlington St	Bellevue St	Hinds	Clinton	Route
Railroad Route	Eastern City Limits	Western City Limits	Hinds	Clinton	Path
Royal Oak Dr	Pebble Brook Dr	Longwood Dr	Hinds	Clinton	Route
S. Norrell Rd	I-20 Frontage Rd	Clinton-Raymond Rd	Hinds	Clinton	Route
Soccer Row	Cynthia Rd	Dead End	Hinds	Clinton	Route
Soccer Row Connector	Soccer Row	Cynthia Rd	Hinds	Clinton	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Springridge Rd	McRaven Rd	Clinton Center Dr	Hinds	Clinton	Lane
St Thomas Pkwy	W. Northside Dr	I-20 Frontage Rd	Hinds	Clinton	Route
Tanglewood Dr	Huntcliff Way	Dogwood Dr	Hinds	Clinton	Route
Tanglewood Dr	Laurelwood Dr	Arlington St	Hinds	Clinton	Route
W. Sproles St	Neal Ave.	Monroe St	Hinds	Clinton	Route
Willow Brook Dr	Springridge Rd	Pebble Brook Dr	Hinds	Clinton	Route
Beasley Rd	State St	Hilda Dr	Hinds	Hinds County	Path
Clinton-Raymond Rd	Clinton City Limits	Raymond City Limits	Hinds	Hinds County	Path
Ellis Ave.	Capitol St	Robinson Rd	Hinds	Hinds County	Path
Hanging Moss Rd	Beasley Rd	Northside Dr	Hinds	Hinds County	Path
Hinds County Pkwy	I-20	Sam Herring Rd	Hinds	Hinds County	Path
Hinds County Pkwy	Sam Herring Rd	Parks Rd	Hinds	Hinds County	Path
Railroad Route	Airport Rd	Clinton City Limits	Hinds	Hinds County	Path
Ridgewood Rd	Eastover Dr	Old Canton Rd	Hinds	Hinds County	Path
Terry Rd	Wynndale Rd	Lebanon-Pinegrove Rd	Hinds	Hinds County	Path
West Northside Dr	Bolton City Limits	Clinton City Limits	Hinds	Hinds County	Path
Adkins Blvd	I-55	Colonial Cir.	Hinds	Jackson	Path
Anna Lisa Dr	Castle Hill Dr	Shady Lane Dr	Hinds	Jackson	Route
Avondale St	Kings Hwy	Wooddale Dr	Hinds	Jackson	Route
Bailey Ave.	Woodrow Wilson Ave.	W Monument St	Hinds	Jackson	Lane
Beasley Rd	NW Industrial Pkwy	Watkins Dr	Hinds	Jackson	Route
Beasley Rd	Watkins Dr	I-55	Hinds	Jackson	Path
Bellevue Place	North St	Jefferson St	Hinds	Jackson	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Briarfield Rd	River Thames Rd	Briarwood Dr	Hinds	Jackson	Route
Briarwood Dr	Briarfield Rd	Carolwood Dr	Hinds	Jackson	Path/Route
Brookwood Dr	W. McDowell Rd	Glen Erin St	Hinds	Jackson	Route
Buckley Dr	Old Canton Ln.	Meadowbrook Rd	Hinds	Jackson	Route
Capitol St	Boling St	Gallatin St	Hinds	Jackson	Lane
Carolwood Dr	Briarwood Dr	Stanton Dr	Hinds	Jackson	Route
Castle Hill Dr	Raymond Rd	Raymond Rd	Hinds	Jackson	Route
Cedars of Lebanon Rd	Manhattan Rd	Keele St	Hinds	Jackson	Path
Charles Tillman Bridge	Corner of Pleasant & Maple St	Mill St	Hinds	Jackson	Path
Clinton Blvd	Magnolia Rd	I-220	Hinds	Jackson	Route
Coleman Ave.	Sunset Dr	Delta Dr	Hinds	Jackson	Route
Colonial Cir.	Adkins Blvd	Old Canton Rd	Hinds	Jackson	Path
Concord Dr	Stanton Dr	Plantation Blvd	Hinds	Jackson	Route
Cooper Rd	Forest Hill Rd	Terry Rd	Hinds	Jackson	Lane
County Line Rd	Highway 49	Highland Colony Pkwy	Hinds	Jackson	Route
County Line Rd	Hanging Moss Rd	State St	Hinds	Jackson	Path
Decelle St	Northview Dr	Oxford Ave.	Hinds	Jackson	Route
E. Manor Dr	Quail Run Rd	Wedgeworth St	Hinds	Jackson	Route
Eastover Dr	I-55	Ridgewood Rd	Hinds	Jackson	Path
Eastover Dr	Ridgewood Rd	Meadowbrook Rd	Hinds	Jackson	Route
Echelon Pkwy	Watkins Dr	County Line Rd	Hinds	Jackson	Lane
Forest Hill Rd	Raymond Rd	McCluer Rd	Hinds	Jackson	Path
Forest Hill Rd	McCluer Rd	Terry Rd	Hinds	Jackson	Lane

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Fortification St	Martin Luther King Jr. Dr	Jefferson St	Hinds	Jackson	Route
Franklin D. Roosevelt Dr	Flag Chapel Rd	Presidential Dr	Hinds	Jackson	Route
Gallatin St	Capitol St	Pearl St	Hinds	Jackson	Route
Greymont St	Pinehurst St	Myrtle St	Hinds	Jackson	Route
Hanging Moss Rd	County Line Rd	Northside Dr	Hinds	Jackson	Route
Hwy 49	Northside Dr	County Line Rd	Hinds	Jackson/MDOT	Route
Jefferson St	Poplar Blvd	Mississippi St	Hinds	Jackson	Route
John F Kennedy Blvd	Presidential Dr	Hwy 49	Hinds	Jackson	Route
Katherine Blvd	Wild Valley Dr	Northside Dr	Hinds	Jackson	Route
Kaywood Dr	Old Canton Rd	River Thames Rd	Hinds	Jackson	Route
Keele St	Cedars of Lebanon Rd	Briarwood Dr	Hinds	Jackson	Path
Kings Hwy	Warrior Trail	Avondale St	Hinds	Jackson	Route
Kristen Dr	Plantation Blvd	Pear Orchard Rd	Hinds	Jackson	Route
Lakeland Dr	Cool Papa Bell/Museum Blvd	Ridgewood Rd	Hinds	Jackson	Path
Lakeland Dr	Old Canton Rd	I-55 Frontage Rd	Hinds	Jackson	Path
Livingston Ln.	Livingston Rd	Watkins Dr	Hinds	Jackson	Route
Livingston Rd	Beasley Rd	County Line Rd	Hinds	Jackson	Route
Livingston Rd	Northside Dr	W. Woodrow Wilson Ave.	Hinds	Jackson	Lane
Lynch St	Maddox Rd	Wiggins St	Hinds	Jackson	Path
Maddox Rd	Raymond Rd	Hwy 18	Hinds	Jackson	Path
Maddox Rd	Hwy 18	McRaven Rd	Hinds	Jackson	Lane
Magnolia Rd	John Hopkins Rd	Clinton Blvd	Hinds	Jackson	Route
Manhattan Rd	Meadowbrook Rd	Cedars of Lebanon Dr	Hinds	Jackson	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Maple St	Martin Luther King Jr. Dr	Pleasant Ave.	Hinds	Jackson	Route
Martin Luther King Jr. Dr	W Ridgeway St	Bailey Ave.	Hinds	Jackson	Route
Mayes St	Livingston Rd	Northview Dr	Hinds	Jackson	Lane
McCluer Rd	Siwell Rd	Forest Hill Rd	Hinds	Jackson	Path
McCluer Rd	Forest Hill Rd	Terry Rd	Hinds	Jackson	Lane
McDowell Rd	Hwy 18	Raymond Rd	Hinds	Jackson	Path
McFadden Rd	Dardanelle Dr	W McDowell Rd	Hinds	Jackson	Route
McRaven Rd	Jackson City Limits	Maddox Rd	Hinds	Jackson	Path
Meadow Ln.	Woody Dr	McClure Rd	Hinds	Jackson	Route
Meadowbrook Rd	West St	Ridgewood Rd	Hinds	Jackson	Path
Meadowbrook Rd	Ridgewood Rd	Pearl River water line trail	Hinds	Jackson	Route
Medgar Evers Blvd	Northside Dr	Sunset Dr	Hinds	Jackson	Path
Mill St	W. Mitchell Ave.	Taft St	Hinds	Jackson	Lane
Mississippi St	Congress St	Jefferson St	Hinds	Jackson	Route
Mitchell Ave.	Booker Washington St	Mill St	Hinds	Jackson	Lane
Mitchell Ave.	Mill St	State St	Hinds	Jackson	Lane
Monticello Dr	Glen Erin St	Woody Dr	Hinds	Jackson	Route
Montrose Cir.	Wood Dale Dr	I-55 Frontage Rd	Hinds	Jackson	Route
Monument St	Capitol St	Mill St	Hinds	Jackson	Lane
Museum to Market Trail	Jefferson St	Lakeland Dr	Hinds	Jackson	Path
Myrtle St	Riverside Dr	Greymont St	Hinds	Jackson	Route
N. Canton Club Cir.	Old Canton Rd	Sedgwick Dr	Hinds	Jackson	Route
N. Flag Chapel Rd	Cynthia Rd	Clinton Blvd	Hinds	Jackson	Lane

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Natchez Trace Pkwy Connector Trail	Natchez Trace	County Line Rd @ NW Industrial Pkwy	Hinds	Jackson	Path
North St	Mississippi St	Bellevue Place	Hinds	Jackson	Path
Northbrook Dr	Meadowbrook Rd	Northside Dr	Hinds	Jackson	Route
Northpointe Pkwy	Old Canton Rd	County Line Rd	Hinds	Jackson	Lane
Northtown Dr	Old Canton Rd	River Oaks Blvd	Hinds	Jackson	Lane
Northview Dr	Meadowbrook Rd	Mayes St	Hinds	Jackson	Path
Northview Dr	Mayes St	Decelle St	Hinds	Jackson	Route
NW Industrial Pkwy	Beasley Rd	County Line Rd	Hinds	Jackson	Route
Old Canton Ln.	Old Canton Rd	Buckley Dr	Hinds	Jackson	Route
Old Canton Rd	River Oaks Blvd	Northpointe Pkwy	Hinds	Jackson	Path
Old Canton Rd	I-55 Frontage Rd	Kaywood Dr	Hinds	Jackson	Path
Old Canton Rd	State St	Meadowbrook Rd	Hinds	Jackson	Path
Oxford Ave.	Decelle St	Mitchell Ave.	Hinds	Jackson	Route
Parkway Ave.	Utah St	W. Ridgeway St	Hinds	Jackson	Route
Peachtree St	Woodrow Wilson Ave.	Riverside Dr	Hinds	Jackson	Path
Peachtree St	Riverside Dr	Poplar Blvd	Hinds	Jackson	Route
Pear Orchard Rd	Old Canton Rd	County Line Rd	Hinds	Jackson	Path
Pearl River Water Line Trail	Lakeland Dr	Lake Harbour Dr	Hinds	Jackson	Path
Pinehurst St	Peachtree St	Greymont St	Hinds	Jackson	Route
Plantation Blvd	Concord Dr	Kristen Dr	Hinds	Jackson	Route
Poplar Blvd	Jefferson St	Peachtree St	Hinds	Jackson	Route
Presidential Dr	Franklin D. Roosevelt Dr	Hwy 49	Hinds	Jackson	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Quail Run Rd	Meadowbrook Rd	E. Manor Dr	Hinds	Jackson	Route
Raymond Rd	Jackson City Limits	Terry Rd	Hinds	Jackson	Route
Raymond Rd	Will-O-Wood Blvd	Maddox Rd	Hinds	Jackson	Path
Ridgeway St	Northview Dr	State St	Hinds	Jackson	Route
Ridgeway St	Medgar Evers Blvd	Livingston Rd	Hinds	Jackson	Lane
Ridgeway St	Livingston Rd	Tougaloo St	Hinds	Jackson	Route
Ridgewood Rd	Lakeland Dr	Eastover Dr	Hinds	Jackson	Path
Ridgewood Rd	Eastover Dr	Old Canton Rd	Hinds	Jackson	Path
River Oaks Blvd	Northtown Dr	Old Canton Rd	Hinds	Jackson	Lane
River Thames Rd	Kaywood Dr	Briarfield Rd	Hinds	Jackson	Route
Riverside Dr	State St	Peachtree St	Hinds	Jackson	Route
Riverside Dr	Peachtree St	Myrtle St	Hinds	Jackson	Path
Rose St	Capitol St	Pearl St	Hinds	Jackson	Route
Sedgwick Dr	N. Canton Club Cir.	Westbrook Rd	Hinds	Jackson	Route
Shady Lane Dr	Anna Lisa Ln.	Dardanelle Dr	Hinds	Jackson	Route
Shaw Rd	Hwy 80	Wiggins Rd	Hinds	Jackson	Path
Siwell Rd	Hwy 18	McCluer Rd	Hinds	Jackson	Path
Smith Robinson St	W Ridgeway St	Stonewall St	Hinds	Jackson	Route
Stanton Dr	Carolwood Dr	Concord Dr	Hinds	Jackson	Route
State St	County Line Rd	Sheppard Rd	Hinds	Jackson	Path
State St	Sheppard Rd	Taylor St	Hinds	Jackson	Route
State St	Taylor St	Woodrow Wilson Ave.	Hinds	Jackson	Path
Stonewall St	Smith Robinson St	Booker Washington St	Hinds	Jackson	Lane

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Sunset Dr	Utah St	Coleman Ave.	Hinds	Jackson	Route
Sunset Dr	Medgar Evers Blvd	Ivanhoe Ave.	Hinds	Jackson	Path
Sykes Park Trail	Cooper Rd @ Sykes Park	Leavellwoods Park	Hinds	Jackson	Path
Terry Rd	Hwy 80	Raymond Rd	Hinds	Jackson	Route
Terry Rd	McCluer Rd	Forest Hill Rd	Hinds	Jackson	Path
Timber Falls Pkwy	Forest Hill Rd	Existing Path	Hinds	Jackson	Path
Tougaloo St	Mayes St	W. Ridgeway St	Hinds	Jackson	Route
University Blvd	Pascagoula St/Pearl St	Hwy 80	Hinds	Jackson	Route
Utah St	Sunset Dr	Parkway Ave.	Hinds	Jackson	Route
Valley St	Lynch St	Hwy 80	Hinds	Jackson	Route
Valley St	Hwy 80	Raymond Rd	Hinds	Jackson	Path
Walter Dutch Welch Dr	Parkway Ave.	Livingston Rd	Hinds	Jackson	Route
Warrior Trail	State St	Kings Hwy	Hinds	Jackson	Route
Watkins Dr	Livingston Ln.	Echelon Pkwy	Hinds	Jackson	Route
Wedgeworth St	E. Manor Dr	Wild Valley Dr	Hinds	Jackson	Route
West Highland Dr	Lynch St	Raymond Rd	Hinds	Jackson	Lane
West St	Capitol St	Meadowbrook Rd	Hinds	Jackson	Route
Westbrook Rd	Sedgwick Dr	Proposed Pearl River Water Line Path	Hinds	Jackson	Route
Wiggins Rd	Shaw Rd	McRaven Rd	Hinds	Jackson	Lane
Wild Valley Dr	Wedgeworth St	Katherine Blvd	Hinds	Jackson	Route
Will-O-Wood Blvd	N. Siwell Rd	Raymond Rd	Hinds	Jackson	Route
Wood Dale Dr	Avondale St	Montrose Cir.	Hinds	Jackson	Route
Woodrow Wilson Ave.	Bailey Ave.	State St	Hinds	Jackson	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Woody Dr	Monticello Dr	Meadow Ln.	Hinds	Jackson	Route
Hwy 18	Raymond City Limits	Lynch St	Hinds	MDOT	Shoulder/Route
Natchez Trace Pkwy	Livingston Rd	Osburn Stand	Hinds	National Park Service	Path
Natchez Trace Pkwy	Osburn Stand	Arrow Dr	Hinds	National Park Service	Path
Natchez Trace Pkwy	Arrow Dr	Clinton Wayside	Hinds	National Park Service	Path
Clinton Rd	Raymond City Limits	Hinds Blvd	Hinds	Raymond	Path
Hinds Blvd	Clinton Rd	Hwy 18	Hinds	Raymond	Path
Main St	Hwy 18	Railroad St	Hinds	Raymond	Path
Railroad Route	Hwy 18	Airport Rd	Hinds	Raymond	Path
Claiborne St	Raymond St	Proposed School Connector	Hinds	Terry	Route
Morgan Dr	Frontage Rd	Park	Hinds	Terry	Route
Proposed Path	Morgan Dr	Claiborne St	Hinds	Terry	Path
Proposed School Connector	Claiborne St	Terry High School	Hinds	Terry	Path
George Washington Ave.	King Ranch Rd	MLK Dr	Madison	Canton	Path
Hwy 51	Canton City Limits	Canton Pkwy	Madison	Canton	Lane
King Ranch Rd	Hwy 22	Heindl Rd	Madison	Canton	Path
MLK Dr	George Washington Ave.	North St	Madison	Canton	Path
Peace St	Virlilia Rd	Canton City Limits	Madison	Canton	Lane
Woodland Dr	E. Dinkins St	Canton Pkwy	Madison	Canton	Path
Yandell Ave.	Saab Park	Hwy 43	Madison	Canton	Path
1st St	Cox Ferry Rd	Peach St	Madison	Flora	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Cox Ferry Rd	Flora City Limits	1st St	Madison	Flora	Route
Peach St	1st St	SW 4th St	Madison	Flora	Route
Pocahontas Rd	Hwy 22	Flora City Limits	Madison	Flora	Route
Hwy 22	Pocahontas Rd	1st St	Madison	MDOT	Route
Hwy 22	SW 4th St	Flora City Limits West	Madison	MDOT	Route
Breezy Hills Dr	Kingsbridge Rd	Rice Rd	Madison	Madison	Route
Cobblestone Dr	Rockwood Dr	Hwy 51	Madison	Madison	Path
Cotton Hill Rd	Madison Ave.	Madison City Limits	Madison	Madison	Path
Crawford St	Hwy 463	Madison Ave.	Madison	Madison	Path
Drainage Bed Path	St Augustine Dr	Madison Ave Elementary School	Madison	Madison	Path
Galleria Pkwy	Main St - Madison	Fontanelle Blvd	Madison	Madison	Path
Grandview Blvd	Madison Ave.	Main St - Madison	Madison	Madison	Path
Highland Colony Pkwy	Main St – Madison	Madison City Limits	Madison	Madison	Path
Highwoods Blvd	Rice Rd	Woodberry Place	Madison	Madison	Route
Hoy Rd	Old Canton Rd	Madison City Limits	Madison	Madison	Path
Hwy 463	Old Mannsdale Rd	Madison Middle School	Madison	Madison/MDOT	Path
Kingsbridge Rd	Wrights Mill Dr	Wrights Mill Dr	Madison	Madison	Route
Lake Castle Rd	Madison City Limits	Berry Ln.	Madison	Madison	Path
Madison Ave.	I-55	Hwy 51	Madison	Madison	Path
Madison Middle School Path	Carmichael Blvd	Madison Middle School	Madison	Madison	Path
Main St – Madison	Welcome Center	Old Canton Rd	Madison	Madison	Path
Main St - Madison	Galleria Pkwy	Bozeman Rd	Madison	Madison	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
North Bay Dr	Hoy Rd	St Augustine Dr	Madison	Madison	Lane
North Old Canton Rd	Hoy Rd	Green Oak Lane	Madison	Madison	Path
Old Canton Rd	Nichols Dr	St Augustine Dr	Madison	Madison	Path
Old Mannsdale Rd	Bozeman Rd	Hwy 463	Madison	Madison	Path
Railroad Path	Main St - Madison	Brentwood Dr	Madison	Madison	Path
Reunion Pkwy	Bozeman Rd	Hwy 463	Madison	Madison	Path
Rice Rd	Wellington Way	North Ridge Blvd	Madison	Madison	Path
Rice Rd / Tisdale Rd	Madison Ave.	Wellington Way	Madison	Madison	Path
Ridgecrest Dr	Old Canton Rd	Madison City Limits	Madison	Madison	Path
River Bed Path	Sumac Dr	Tidewater Lane	Madison	Madison	Path
Rockwood Dr	McClellan Dr	Cobblestone Dr	Madison	Madison	Path
St Augustine Dr	Church St	Madison City Limits	Madison	Madison	Path
Sycamore Ln.	Woodberry Place	Proposed River Bed Path	Madison	Madison	Route
Woodberry Place	Highwoods Blvd	Sycamore Ln.	Madison	Madison	Route
Woods Crossing Blvd	Rice Rd	Proposed River Bed Path	Madison	Madison	Route
Wrights Mill Dr	Kingsbridge Rd	Rice Rd	Madison	Madison	Route
Bozeman Rd	Gluckstadt Rd	Hwy 463	Madison	Madison County	Path
Calhoun Station Pkwy	Church Rd	Germantown Middle School	Madison	Madison County	Path
Calhoun Station Pkwy	Germantown Middle School	Stout Rd	Madison	Madison County	Route
Catlett Rd	Hwy 22	Gluckstadt Rd	Madison	Madison County	Path
Church Rd	Stribling Rd Ext.	Calhoun Station Pkwy	Madison	Madison County	Path
Lake Castle Rd	N. Livingston Rd	Richardson Rd	Madison	Madison County	Route
N. Livingston Rd	Madison City Limits	Ridgeland City Limits	Madison	Madison County	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Parkway East	Weisenberger Rd	Galleria Pkwy	Madison	Madison County	Route
Reunion Pkwy Phase 2	Bozeman Rd	Parkway East	Madison	Madison County	Path
Reunion Pkwy Phase 3	Parkway East	Hwy 51	Madison	Madison County	Path
Robinson Springs Rd	Pocahontas Rd	Hwy 463	Madison	Madison County	Route
Stout Rd	Catlett Rd	Calhoun Station Pkwy	Madison	Madison County	Route
Stribling Rd Ext.	Catlett Rd	Church Rd	Madison	Madison County	Path
Virlilia Rd	Hwy 22	Livingston-Vernon Rd	Madison	Madison County	Route
Weisengberher Rd	Hwy 51	Parkway East	Madison	Madison County	Path
W. County Line Rd	Highland Colony Pkwy	Hwy 51	Madison	Madison County	Path
Yandell Rd	Hwy 51	Hwy 43	Madison	Madison County	Path
Arlington Cir.	Woodrun Dr	Dead End	Madison	Ridgeland	Route
Brashear Creek Connector	Arlington Cir.	Brashear Creek Run	Madison	Ridgeland	Path
Brashear Creek Run	Old Canton Rd	McClellan Dr	Madison	Ridgeland	Path
Entergy Line Route	Wheatley St	Hwy 51	Madison	Ridgeland	Path
Harbor Dr	Spillway Rd	Rice Rd	Madison	Ridgeland	Path
Highland Colony Pkwy	Steed Rd	Ridgeland City Limits	Madison	Ridgeland	Path
Highland Colony Pkwy	Ridgeland City Limits	Old Agency Rd	Madison	Ridgeland	Path
Jessamine Dr	E. Jackson St	Woodrun Dr	Madison	Ridgeland	Path
Lake Harbor Dr Connector	Existing Path	Existing Path	Madison	Ridgeland	Path
Landsdowne Ln.	William Blvd	Lincolnshire Blvd	Madison	Ridgeland	Lane
Northpark Dr	Pear Orchard Rd	Lake Harbor Dr	Madison	Ridgeland	Route
Northpark Mall Connections	Multiple	Multiple	Madison	Ridgeland	Path
O.B. Curtiss Dr Connector	Lincolnshire Blvd	O.B. Curtiss Dr	Madison	Ridgeland	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Old Agency Rd	Dinsmoor Entrance	Highland Colony Pkwy	Madison	Ridgeland	Path
Old Canton Rd Connector	School Creek Run	William Blvd	Madison	Ridgeland	Path
Pear Orchard Rd	Town Center Blvd	Northpark Dr	Madison	Ridgeland	Path
Purple Creek Run	S. Wheatley St	Lake Harbor Dr	Madison	Ridgeland	Path
Railroad Route	Lake Harbor Dr Ext.	Colony Park Blvd	Madison	Ridgeland	Path
Rice Rd	Trailhead	Craft Center Parking Lot	Madison	Ridgeland	Path
Richardson Rd	Steed Rd	Old Agency Rd	Madison	Ridgeland	Route
Ridgewood Rd	E. Centre St	Hwy 51	Madison	Ridgeland	Lane
School Creek Run	Lake Harbour Dr	Old Canton Rd	Madison	Ridgeland	Path
Spillway Rd	Old Canton Rd	Breakers Ln.	Madison	Ridgeland	Path
Steed Rd	Highland Colony Pkwy/Steed Rd Conector	Red Eagle Cir.	Madison	Ridgeland	Path
Steed Rd Ext.	Sunnybrook Rd	N. Wheatley St	Madison	Ridgeland	Path
Sunnybrook Rd	Steed Rd	Proposed Colony Park Blvd	Madison	Ridgeland	Path
W. Ridgeland Ave.	Sunnybrook Rd	N. Wheatley St	Madison	Ridgeland	Path
William Blvd	Hawthorn Green Dr	Landsdowne Ln.	Madison	Ridgeland	Lane
Woodrun Dr	Jessamine Dr	Arlington Cir.	Madison	Ridgeland	Route
Boyce Thompson Dr	Hwy 18	Marquette Rd	Rankin	Brandon	Lane
Busick Pond Rd	Hwy 18	Overby St	Rankin	Brandon	Path
Crossgates Blvd	Old Brandon Rd	I-20	Rankin	Brandon	Path
Crossgates Dr	Crossgates Blvd	Woodgate Dr	Rankin	Brandon	Lane
Crossgates Greenway	Eastgate Dr	Luckney Rd	Rankin	Brandon	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Crossgates to Luckney Connector	Hwy 80/Eastgate Dr	Luckney Rd	Rankin	Brandon	Path
Dining St	Mary Ann Dr	College St	Rankin	Brandon	Lane
Downtown Connector	Jasper St	Dining St	Rankin	Brandon	Path
East Brandon Bypass	Hwy 18	Hwy 80	Rankin	Brandon	Path
East Mark Dr/Old US 80/College St	Marquette Rd	Tamberline St	Rankin	Brandon	Path
East Metro Corridor	Cooper Rd	Old Brandon Rd	Rankin	Brandon/Flowood	Lane/Sidewalk
Eastgate Dr	Hwy 80	Thorngate Dr	Rankin	Brandon	Lane
Felicity St	Dining St	Hwy 80	Rankin	Brandon	Lane
Felicity St	Hwy 80	Tamberline St	Rankin	Brandon	Path
Frontage Rd Connector	Woodgate Dr	Brandon Park	Rankin	Brandon	Path
Gas Easement – East Brandon	Shiloh Rd	Proposed Hwy 18 Ext.	Rankin	Brandon	Path
Gas Easement – Southeast Brandon	Hwy 18	Louis Wilson Dr	Rankin	Brandon	Path
Gateway Dr	Hwy 80	Woodgate Dr	Rankin	Brandon	Lane
Grants Ferry Pkwy	Hwy 80	Highway 471	Rankin	Brandon	Path
Hwy 468	W. Jasper St	Brandon City Limits	Rankin	Brandon/MDOT	Path
Hwy 80	Woodgate Dr	Crossgates Blvd	Rankin	Brandon/MDOT	Path
Jasper St	College St	Pleasant St	Rankin	Brandon	Lane
Jasper St/Shiloh Rd Connector	Pleasant St	Shiloh Rd	Rankin	Brandon	Path
Kennedy Farm Pkwy	Louis Wilson Dr	Shiloh Rd	Rankin	Brandon	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Lakeland Dr	Old Hwy 471	North St	Rankin	Brandon	Path
Luckney Rd	Hwy 471	Brandon City Limits	Rankin	Brandon	Lane
Marquette Rd	Hwy 18	Hwy 80	Rankin	Brandon	Lane
Mary Ann Dr	Louis Wilson Dr	Dining St	Rankin	Brandon	Lane
North St	Tamberline St	East Value Ext.	Rankin	Brandon	Path
Old 471 to Downtown	Hwy 471	Lakeland Dr	Rankin	Brandon	Path
Overby St	School Connector	Busick Pond Rd	Rankin	Brandon	Path
Proposed Road Connector Path	Hwy 18	Brandon City Limits	Rankin	Brandon	Path
Rankin Trails Connector/Maxey Dr/Municipal Dr	Marquette Rd	Brandon Park	Rankin	Brandon	Path
Rankin Trails to Crossgates	Hwy 18	Eastgate Dr	Rankin	Brandon	Path
School Connector	College St	Overby St	Rankin	Brandon	Path
Shiloh Pkwy	Hwy 80	Shiloh Rd	Rankin	Brandon	Path
Shiloh Rd	Shiloh Park	Gas Easement – East Brandon	Rankin	Brandon	Route
Stonegate Dr	Hwy 80	Crossgates Dr	Rankin	Brandon	Lane
Tamberline St	College St	North St	Rankin	Brandon	Path
Thorngate Dr	Eastgate Dr	Woodgate Dr	Rankin	Brandon	Lane
Value Rd Connector	Hwy 80	Proposed Grants Ferry Rd	Rankin	Brandon	Lane
Woodgate Dr	Hwy 80	Crosswoods Rd	Rankin	Brandon	Path
Woodgate Dr	Crosswoods Rd	Summit Ridge Dr	Rankin	Brandon	Lane
Butler Creek Connector	Lexington Dr	Williams Rd	Rankin	Florence	Path
Dogwood Hill Dr Connector	Dogwood Hill Dr	Hemphill Park Connector	Rankin	Florence	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Hemphill Park Connector	S. Church St	White Rd	Rankin	Florence	Path
Hwy 469	Lexington Dr	Williams Rd	Rankin	Florence	Path
Main St - Florence	Shadow Creek Dr	Hwy 469	Rankin	Florence	Path
N. Church St	Middle Ridge Dr	Main St - Florence	Rankin	Florence	Path
S. Church St	Eagle Post Rd	Hemphill Park	Rankin	Florence	Path
White Rd	Stonebrook Dr	Hwy 469	Rankin	Florence	Path
Williams Rd	Hwy 469	Eagle Post Rd	Rankin	Florence	Path
East Metro Corridor	Airlane	Old Brandon Rd	Rankin	Flowood/Brandon	Lane/Sidewalk
Grants Ferry Rd	Manship Rd	Hwy 25	Rankin	Flowood	Lane
Hugh Ward Pkwy	Manship Rd	Hwy 25	Rankin	Flowood	Path
Lakeland Commons Connector	Flowood Dr	Lakeland Dr	Rankin	Flowood	Lane
Lakeland Dr	Old Fannin Rd	R.R. Bridge Crossing	Rankin	Flowood	Path
Lakeland Dr	R.R. Bridge Crossing	East Metro Access Rd	Rankin	Flowood	Path
Old Fannin Rd	North of Winner's Circle	Flowood Dr	Rankin	Flowood	Lane
Old Fannin Rd	Flowood Dr	Lakeland Dr	Rankin	Flowood	Path
Proposed Rd	Liberty Rd	To be determined	Rankin	Flowood	Path
Hwy 18	I-20	Louis Wilson Dr	Rankin	MDOT	Lane/Shoulder
Hwy 43	Shiloh Rd	Lake Rd	Rankin	MDOT	Route
Hwy 469	Eagle Post Rd	Hemphill City Park	Rankin	MDOT	Lane
Hwy 471	Spillway Rd	Hwy 80	Rankin	MDOT	Lane/Shoulder
Center City Dr	Pearl City Park	Center City Park	Rankin	Pearl	Path
Country Place Pkwy	Pirates Cove Rd	Airport Rd	Rankin	Pearl	Path

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Hwy 80	Airport Rd	Mary Ann Dr	Rankin	Pearl	Lane/Shoulder
Mary Ann Dr	Hwy 80	Old Brandon Rd	Rankin	Pearl	Lane
Old Brandon Rd	Mary Ann Dr	Pemberton Dr	Rankin	Pearl	Lane
Old Brandon Rd	Pemberton Dr	Pearson Rd	Rankin	Pearl	Path
Pearl City Park Connector 1	Mary Ann Dr	Center City Dr	Rankin	Pearl	Path
Pearl City Park Connector 2	Center City Dr	Pearl Upper Elementary	Rankin	Pearl	Path
Pearl City Park Connector 3	Center City Dr	Pirates Cove Rd	Rankin	Pearl	Path
Pearson Rd	Old Brandon Rd	Hwy 80	Rankin	Pearl	Path
Pemberton Dr	Old Brandon Rd	Robert Michael Dr	Rankin	Pearl	Lane
Pirates Cove Rd	Hwy 80	Pearl High School	Rankin	Pearl	Lane
Robert Michael Dr	Pemberton Dr	Old Country Club Dr	Rankin	Pearl	Lane
S. Bierdeman Rd	Old Country Club Rd	Old Brandon Rd	Rankin	Pearl	Lane
West Rankin Pkwy	Hwy 80	Hwy 468	Rankin	Pearl	Lane/Shoulder
Brooks St	Lake Rd	Grimes St	Rankin	Pelahatchie	Route
Grimes St	Hwy 43	Warren Ave.	Rankin	Pelahatchie	Route
Lake Rd	Yogi Bear Park	Brooks St	Rankin	Pelahatchie	Route
Park Connector	Grimes St	City Park	Rankin	Pelahatchie	Route
Fannin Landing Cir.	Hwy 471	Existing Path	Rankin	Rankin County	Lane
Grants Ferry Rd	Spillway Rd	Manship Rd	Rankin	Rankin County	Lane
Hwy 471	Northshore Pkwy	Fannin Landing Cir.	Rankin	Rankin County/MDOT	Lane
Brandon Ave.	Industrial Dr	Old Hwy 49	Rankin	Richland	Path
Cleary Rd	Industrial Dr	Old Hwy 49	Rankin	Richland	Route

Location	Beginning Termini	Ending Termini	County	Municipality or Responsible Jurisdiction	Bikeway Facility Type
Harper St	Old Hwy 49	Richland Community Center	Rankin	Richland	Path
Industrial Dr	Scarborough St	Cleary Rd	Rankin	Richland	Route
Lake Connector Path	Harper St	Southwind Dr	Rankin	Richland	Path
Lowe Cir./Richland Cir.	Southwind Dr	Parkview Dr	Rankin	Richland	Path
Monterey Rd	City Limits	Hwy 49	Rankin	Richland	Path
Old Hwy 49	North of Allendale Dr	Scarborough St	Rankin	Richland	Route
Old Hwy 49	Cleary Rd	Richland City Limits	Rankin	Richland	Lane
Old Hwy 49	Brandon Ave.	North of Cleary Rd	Rankin	Richland	Path
Parkview Dr	Richland Cir.	Dead End	Rankin	Richland	Lane
Railroad Path	Harper St	Scarborough St	Rankin	Richland	Path
Richland High School Connector	Richland Eastside Park	Monterey Rd	Rankin	Richland	Path
Richland Westside Park Connector	Richland Westside Park	Plainview Cir.	Rankin	Richland	Path
Scarborough St	Old Hwy 49	Industrial Dr	Rankin	Richland	Route
Scarborough St	Industrial Dr	Richland High School	Rankin	Richland	Path
Sloan Dr	Old Hwy 49	Richland City Limits	Rankin	Richland	Path
Southwind Dr	Harper St	Connection with Path on lake	Rankin	Richland	Route
Spell Dr	Old Hwy 49	Elementary School	Rankin	Richland	Path
Town Square Dr	Old Hwy 49	Scarborough St	Rankin	Richland	Path
Westside Dr	Brandon Ave.	Richland Westside Park	Rankin	Richland	Path

6.2 Maintenance

Maintenance is, and will always be, a major concern for any type of transportation infrastructure. However, it is incumbent upon all jurisdictions responsible for these facilities to ensure their functional viability. Each year, more and more bicycle and pedestrian facilities are added to the Jackson MPA's transportation network. Though a large amount of the facilities in the Jackson MPA primarily used by bicyclists are fairly new, a large portion of pedestrian designed facilities such as sidewalks are old and in need of immediate repair and updating to be brought into compliance with ADA requirements.

Multiple jurisdictions in the MPA have maintenance schedules in place as it relates to existing roadway infrastructure. However, very few have similar schedules specifically for bicycle and pedestrian facilities. This can be attributed to the fact that there are a relatively small amount of bicycle and pedestrian facilities in multiple jurisdictions in the Jackson MPA, and the facilities that are in place are rather new. Thus, a need to develop these types of maintenance schedules has not been a priority. In addition, most jurisdictions maintain bicycle and pedestrian facilities as part of ongoing scheduled maintenance of other roadway infrastructure or on an "as needed" basis. In order to maintain these facilities in a state of good repair and also extend their useful life, it is recommended that each jurisdiction begin developing routine maintenance schedules similar to those currently in place for other infrastructure.

In addition to developing maintenance schedules, local jurisdictions should begin identifying funding sources for annual maintenance of these facilities. Failure to have dedicated funding sources in place for maintenance of existing and future infrastructure can result in degradation of these facilities to the point of rendering them unusable, and thus, useless to the traveling public who depend on them as their sole means of accessing everyday needs. If local jurisdictions determine there is a lack of available funding for maintenance, they should explore alternative means for maintenance of these facilities through partnerships with other organizations and the creation of maintenance programs, such as "Adopt-a-Trail". Adopt-a-Trail programs allow groups such as bicycling/running clubs and homeowner associations to be responsible for the maintenance of an identified segment of a bicycle or pedestrian facility.

6.3 Safety and Security Needs

Safety

Reducing the amount of non-motorized fatalities and serious injuries is one of the five Federal Safety Measures that States and MPOs are required to set targets for and report progress toward their achievement annually. Over the five (5) year safety planning period (2014-2018), the Jackson MPA averaged 1.2 bicycle crashes per year that resulted in a serious injury and 0.6 crashes per year that resulted in fatalities. However, the MPO averaged 7.8 serious injury and 11.6 fatal crashes per year for pedestrians. The final year of the safety planning period saw the highest total of combined non-motorized fatalities and serious injuries involving a motor vehicle, at 30.

As mentioned in the previous paragraph, there was a much higher amount of pedestrian fatalities and serious injuries than those involving bicyclists. This is common since pedestrian activity is typically much higher than bicycle activity. Nationally, pedestrians account for over 17.5 percent of all fatalities in motor vehicle traffic crashes, and most of these deaths occur at uncontrolled crossing locations, such as mid-block or un-signalized intersections. These are among the most common locations for pedestrian fatalities generally because of inadequate or inconvenient pedestrian crossing opportunities, all of which create barriers to safe, convenient, and complete pedestrian networks.

> Sending or receiving a text takes a driver's eyes from the road for an average of 4.6 seconds, the equivalent - at 55MPH - of traveling the length of an entire football field, blind.

Traffic accidents between motorists and non-motorized users of the transportation system can be caused by a number of issues related to a lack of effective safety infrastructure. However, distracted driving in most cases plays an even more significant role in these types of accidents. Distracted driving is any activity that diverts attention from driving, including talking or texting on your phone, eating and drinking, talking to people in your vehicle, rubber necking, operating entertainment or navigation systems—anything that takes your attention away from the task of safe driving. Studies have shown that drivers who use handheld devices are four times more likely to be involved in a crash resulting in serious injury. In most cases addressing driver inattentiveness could have a more profound impact on reducing automobile accidents than infrastructure improvements.

Distracted walking has also been found to be a major factor in several accidents involving pedestrians. Texting and driving is a known danger, but distracted walking results in more injuries per mile than distracted driving. Consequences include bumping into walls, falling down stairs, tripping over clutter, or stepping into traffic. Though injuries from car accidents involving texting are often more severe, physical harm resulting from texting and walking occurs more frequently. While motorists should not use their cell phones when driving due to the increased probability of a traffic accident, pedestrians have an equal responsibility to pay attention to their surroundings to reduce their chances of being involved in an accident as well.

In order to improve the safety for both bicyclists and pedestrians, local jurisdictions within the Jackson MPA should reach out to MDOT and local police departments to obtain detailed crash records to aid in identifying high crash locations and to identify safety measures that, when implemented, will have the greatest impact on reducing the total amount of crashes and the severity of those crashes as well. In areas identified as high crash locations between motorists and bicyclists /pedestrians, assessments should be made to determine the primary causes for the repeated incidents, and appropriate safety countermeasures should be implemented to address the underlying cause of the problem, whether it is through traffic calming measures such as road diets or raised crosswalks, improved signage, pavement markings, signalization at intersections, or education programs designed to prevent these accidents from occurring in the future.

Security

In addition to the safety concerns discussed in the previous section, there are also numerous security concerns to a bicycle and pedestrian network as well. These include, but are not limited to, the possibility of criminal attack, theft, and vandalism, especially along portions of shared use bicycle and pedestrian paths that are isolated from the roadway right of way. To provide a greater sense of security for users of shared use paths, project engineers and managers should strongly consider incorporating additional security features in the development of all new facilities which can include increased lighting, cameras, and emergency phone boxes placed at strategically located areas throughout each facility.

Priority should also be placed on consulting with local law enforcement agencies to request that officers periodically patrol these facilities as well. Increasing law enforcement presence is a major factor in deterring crime before it happens. Local advocates willing to participate should consider the feasibility of organizing bicycle and pedestrian safety watch groups to intermittently patrol the facilities. Even if law enforcement officials periodically patrol shared use facilities, there is no way to guarantee they will always be available in case of emergency. A safety watch group provides a secondary deterrent to crime when law enforcement officials are unavailable.

Implementing prevention measures which would aid in reducing theft and vandalism of support facilities along bicycle and pedestrian corridors is also a need. Installing Closed Circuit Television (CCTV) systems to constantly monitor high value support facilities would greatly diminish the potential of these assets from being stolen or vandalized. Additionally, providing physical barriers such as fencing limits access to these areas and serves as an additional security deterrent.

Figure 6.2: Bicycle and Pedestrian Safety Countermeasure Examples

Road Diets

- Can reduce vehicle speeds and the number of lanes pedestrians cross, and they can create space to add new pedestrian facilities. This also allows for the delineation of bicycle lanes through the use of pavement striping.

Rectangular Rapid Flash Beacon (RRFB)

- RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system.

Pedestrian Hybrid Beacons (PHBs)

- The PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane, reducing vehicle delay.

Pedestrian Refuge Islands

- Provides bicyclists and pedestrians with a safe place to stop at the midpoint of a roadway before crossing the remaining distance.

Raised Crosswalks

- Can reduce vehicle speeds.

Crosswalk Visibility Enhancements

- Such as crosswalk lighting and enhanced signing and marking, help drivers detect bicyclists and pedestrians—particularly at night.

Reduce Posted Speed Limits

- Bicyclists and pedestrians are at greater risk of being involved in accidents along roadways with higher posted speed limits. Reducing speeds provides motorists, bicyclists and pedestrians each additional reaction time to avoid conflict.

7.0 Public Transit

7.1 Service Needs

As documented in *Technical Report #2: Existing Conditions Analysis*, transit service in the region generally lags that of peer regions. This section discusses high-level service needs identified in the planning process.

Existing and Future Regional Transit Demand

Figure 7.1 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 Analysis*.

In addition to existing demand, future demand must also be considered. Figure 7.2 highlights areas forecasted to experience high rates of population and/or employment growth over the next 25 years. In these areas, there will be increased demand for public transit services.

In addition to identifying the concentration of high demand areas, travel flows should also be considered when assessing transit demand. Travel flows, which represent the "route" between trip origins and destinations, can help determine where transit should prioritize direct service or easy connections. Figure 7.3 shows travel flows between Traffic Analysis Districts in the region, for all trip purposes (e.g. work, shopping, school, etc.) and modes of transportation (driving, carpooling, transit, etc.).

Based on existing demand and travel flows, the following needs can be observed:

- The highest needs are in the City of Jackson.
    - There is high demand for locally serving transit service (e.g. frequent service and/or circulator service) in the district that includes Downtown Jackson and the Medical Corridor.
    - There is high demand for transit service from suburban neighborhoods in the City of Jackson into Downtown Jackson and the Medical Corridor. Transit service is currently oriented for these types of trips, but they may still require modifications and improvements to the overall rider experience to effectively capture this market.
- There are also moderately high transit needs in Madison and Rankin counties.
    - There is moderate demand for locally serving public transit (e.g. frequent service and/or circulator service) in the suburban districts centered around Ridgeland, Madison, Canton, Pearl, and Flowood.
    - The largest potential markets for regional transit corridors are from Downtown Jackson to Madison (via Ridgeland), from Downtown Jackson to Brandon (via Pearl), and from Downtown Jackson to Flowood.

Public and Stakeholder Input

During outreach, the general public and stakeholders frequently mentioned the need for better public transit. The following needs were most commonly mentioned:

- Extend transit across county lines, especially into Madison and Rankin Counties.
- Add Park and Ride lots in the suburbs to then connect to Downtown Jackson.
- Improve accessibility for the elderly and disabled. Some specific examples include bus drivers being unable to operate lifts for disabled passengers and poor sidewalk conditions by bus stops for walkers and wheelchairs.
- Improve existing bus service, particularly consistent schedules, timeliness, increased service hours, and routes that provided better access to destinations of interest like the hospitals and airport.

Existing Plans

City of Jackson ONELINE Project

The City of Jackson is in the process of implementing its ONELINE project, a 5-mile multi-modal corridor that aims to connect neighborhood nodes, institutions, and economic centers. The project, illustrated in Figure 7.4, is centered around a dynamic BRT (Bus Rapid Transit) system that extends from the Fondren area through Downtown to Jackson State University. This project will provide new infrastructure that prioritizes pedestrians, bicycles, bikeshare, carshare, electric scooters, and the bus rapid transit system. Smart street infrastructure is also deployed throughout the corridor which will include public WiFi, smart cameras, streetlights, traffic signals, and digital display panels.

ONELINE has the potential to create new waves of investment in reshaping the development of the corridor and take advantage of pent-up demand for walkable-transit oriented urban spaces. The development of a BRT will catalyze development and increase employment opportunities for the residents of Jackson. In 2019, the City of Jackson was awarded a $1 million planning grant through the Federal Transit Administration's (FTA's) Pilot Program for Transit-Oriented Development (TOD) Planning. This grant will further flesh out how transit-supportive development and infrastructure can be implemented and encouraged along the ONELINE corridor.

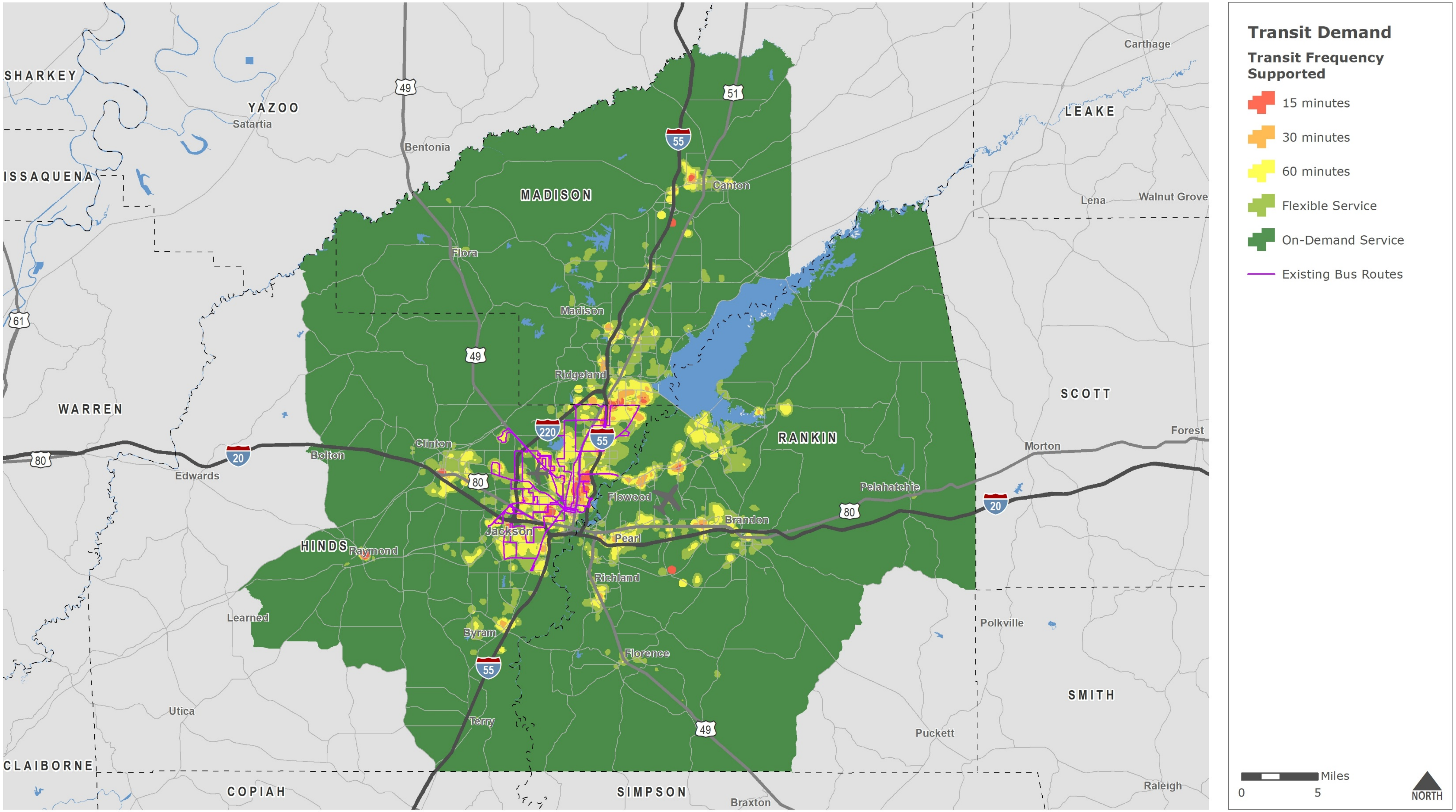
The MPO will coordinate with the City during the planning process and support implementation.

City of Jackson Transportation Plan Study

In the summer of 2020, the City of Jackson plans to begin a planning process that will provide a long-range transportation vision for the City aimed at reshaping its public transit network, supporting a multitude of mobility options, enhancing major public transportation corridors, and integrating land-use policies with a well-connected transportation system.

The MPO will coordinate with the City during the planning process and support implementation.

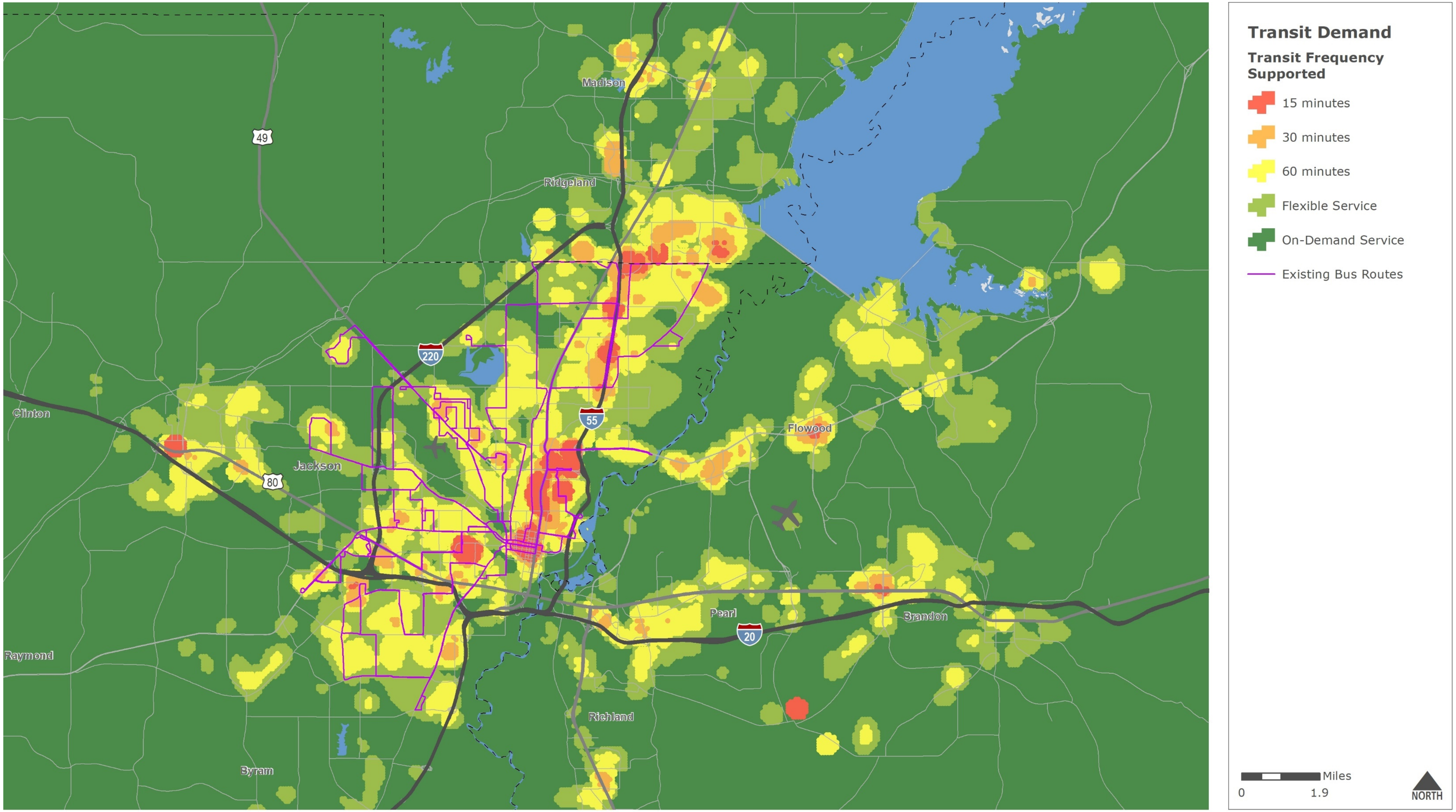
Figure 7.1: Existing Transit Demand



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

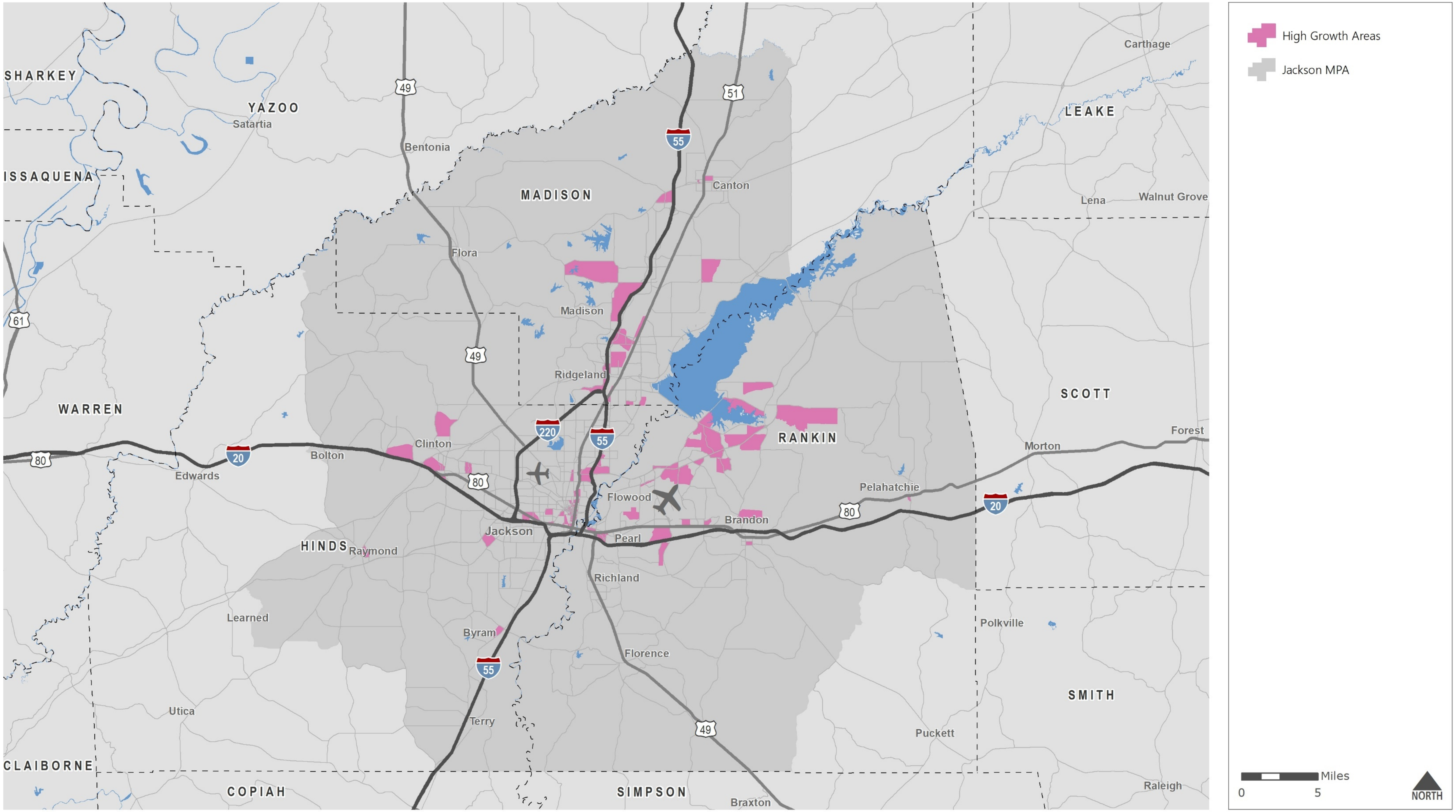
Figure 7.1 (Urban Core): Existing Transit Demand



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

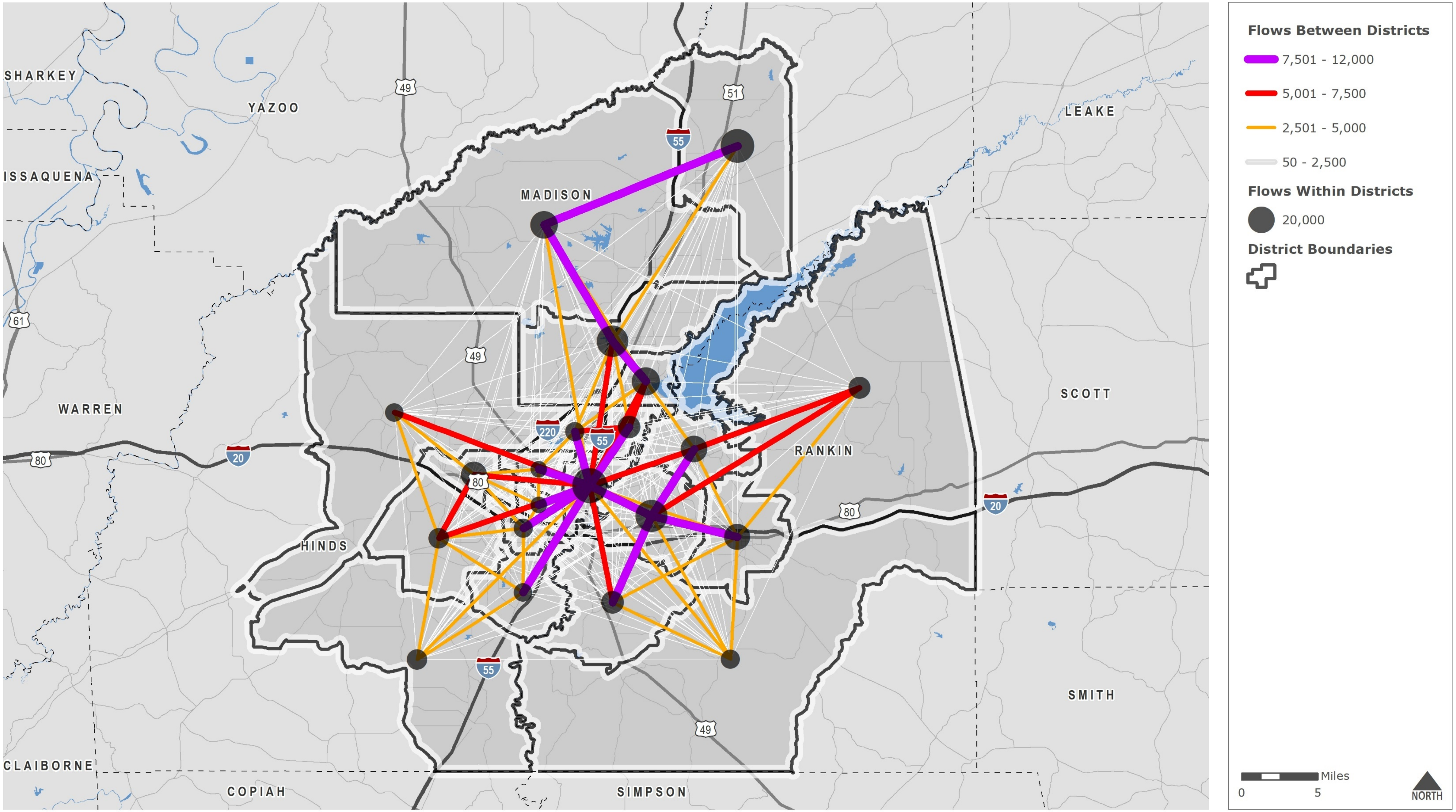
Figure 7.2: Future High Growth Areas



Data Sources: Neel-Schaffer

Disclaimer: This map is for planning purposes only.

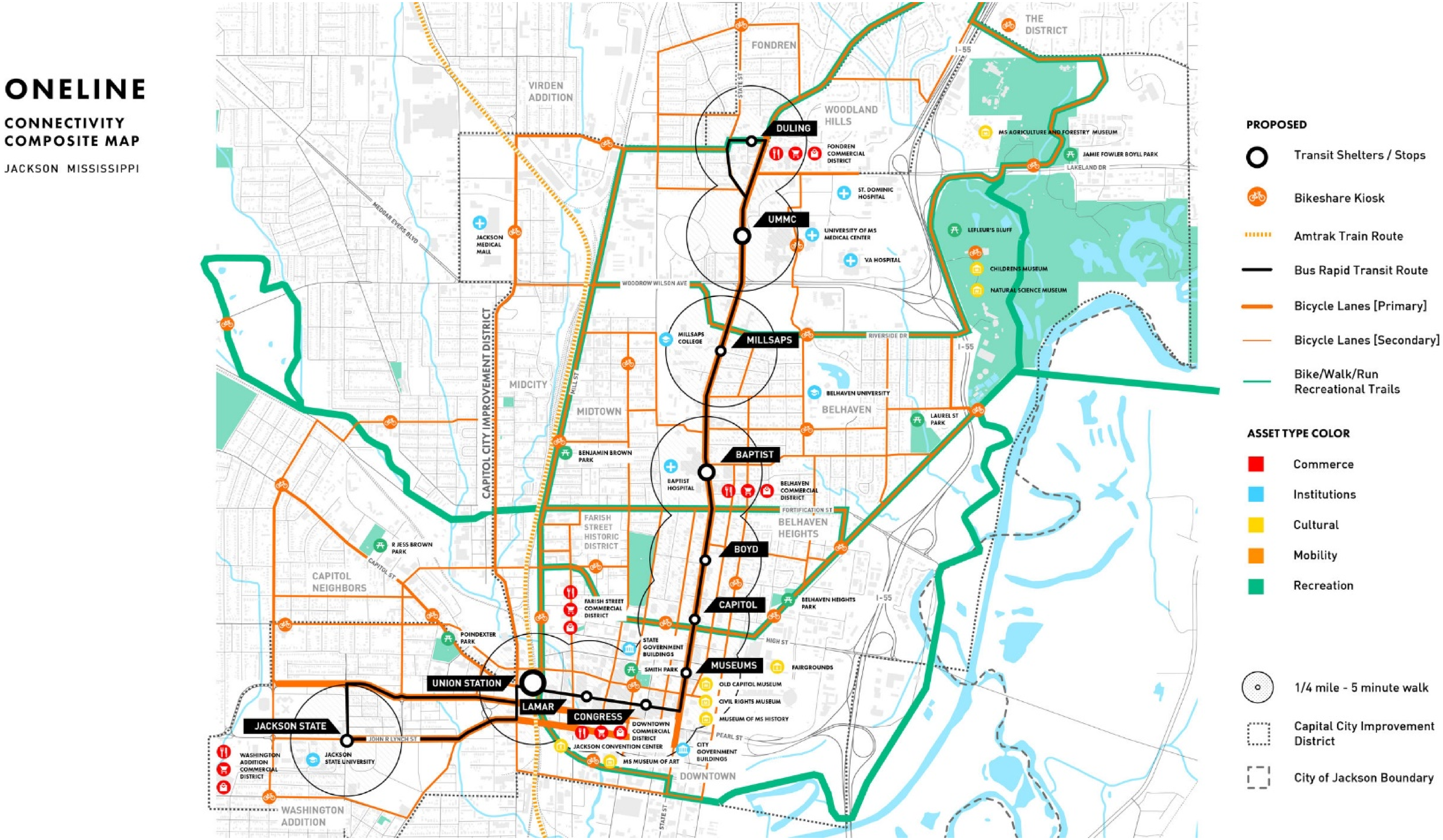
Figure 7.3: Regional Travel Flows by District



Data Sources: Regional Travel Demand Model

Disclaimer: This map is for planning purposes only.

Figure 7.4: ONELINE Project Map



7.2 Maintenance and Capital Needs

Maintaining Existing Assets

The existing fleet for JTRAN has many vehicles that are past their Useful Life Benchmark (ULB), as defined by their age and the default ULB established by the FTA. While actual vehicle lifespans may extend beyond the default ULB based on local roadway and environmental conditions, older vehicles will still need to be replaced on a regular basis over the next 25 years. Understanding that funding Is limited, efforts should be made to extend vehicle lifespans beyond their ULB through preventative maintenance.

JTRAN 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.

Maintenance of facilities should also be carefully monitored. There are many passenger facilities (transfer center and bus shelters) that are not in good condition and an old administrative facility that is in need of repairs.

New Assets

As JTRAN expands its services and upgrades its stop amenities, new capital assets will be required. JTRAN should ensure that the acquisition of these new assets is done in a sustainable manner so that they may be maintained in a state of good repair in the future.

7.3 Safety Needs

While no specific safety needs are identified, JTRAN has a higher rate of safety and security events than other urban transit systems in the state or country. However, its overall number of these events is low, averaging between three and four per year, and its incidence of events resulting in fatalities is below state and national averages for urban transit systems.

JTRAN should continue to measure and monitor its safety performance, per its standard operating procedures for operations and maintenance. This will ensure that any safety needs are identified and that mitigation measures are implemented as needed. It should also continue to develop an Agency Safety Plan and implement recommendations from this plan.