MOVE 2046

Connecting Communities – Shaping Our Future

Needs Assessment

March 2022

CRPC
Capital Region Planning Commission
Local Governments Working Together Since 1967

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1.0 Introduction

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

- current and forecasted trends,
- existing plans, and
- public and stakeholder input.

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 Capital Region Planning Commission (CRPC) 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 MPA can experience severe thunderstorms that produce damaging winds. Additionally, there is a risk for tornadoes within the MPA as it is within “Dixie Alley”, an area of the Southern United States 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 region. However, the region has also experienced significant storms such as in August of 2016 that can also cause flooding. 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, such as snow and ice, can have a significant impact on the MPA’s transportation system. For example, road and bridge closures due to icy conditions. Most drivers are also not experienced in driving under these conditions, increasing safety concerns.
- **Temperature Extremes:** The Baton Rouge 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 no reported earthquakes in the MPA between 2015 and 2019.

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.

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

<u>Transportation Related Strategies</u>

- 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 Louisiana has a statewide Stormwater Management Plan that has been published through the Louisiana Department of Transportation (LADOTD). Information about the plan can be found at:

https://stormwaterone.com/louisiana-stormwater-management

Each Parish within the MPA maintains a Stormwater Management Program, with information available at:

East Baton Rouge Parish:

https://stormwater.brla.gov/

West Baton Rouge Parish:

https://www.wbrparish.org/149/Departments

Ascension Parish:

http://www.ascensionparish.net/storm-water/

Iberville Parish:

http://ibervilleparish.com/Services/Environmental

Livingston Parish:

https://resiliency.lsu.edu/case-studies-blog/2017/11/16/livingston-la

The MPO should coordinate with 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.[1] The state welcomed 53.2 million visitors in 2019, representing an increase of 3.8 percent over the 51.3 million visitors, reported by DK Shifflet in 2018[2]. Visitors spent $18.9 billion, and the travel and tourism industry generated $1.92 billion in state and local tax revenue in 2019, an increase of 2.1 percent over 2018. Tax revenue generated through travel and tourism spending saves each household in Louisiana $1,100 a year in taxes that would be needed to maintain current services. At the end of 2019, just over 242,000 people were employed in tourism-related jobs, a 2.3 percent increase over 2018.

There were 11.3 million visitors to Baton Rouge in 2018. Of that total, 7.1 million people spent the day in the city, while the remaining 4.2 million stayed overnight. Additionally, the sales tax on hotels and restaurants produced $118 million in revenue for the city of Baton Rouge[3] and visitors created $471 billion in direct earnings via 17,100 direct jobs.

Louisiana's Capital City highlights the unique music, culture, and outdoors that both visitors to Louisiana and locals alike enjoy. With French, Spanish, Creole and Native American roots, the city is rich in its culture and politics. From traditional meeting and exhibition space, such as the

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

[2] https://www.myneworleans.com/louisiana-welcomed-record-53-2-million-visitors-in-2019/

[3]https://crt.state.la.us/Assets/Tourism/research/documents/2019-2020/Rev%20Louisiana%20Spending%20Parishes%202019%20Report.pdf

Raising Cane's River Center, to unique outdoor venues and historic attractions, Baton Rouge is home to a number of venues.

Baton Rouge Transportation Network

Public Transportation

Capitol Area Transit System (CATS) is the regional transit authority of the Baton Rouge metropolitan region. CATS provides:

- fixed route service,
- paratransit service for disabled passengers,
- contractual service to Southern University, and
- seasonal service for special events[4].

The Capitol Park Trolley Service is a free downtown service operated by CATS, running weekdays from 10:30 am to 2:30 pm[5].

LSU Tiger Trails provides a safe, convenient, and free bus service for LSU students, faculty, staff, and visitors, both on and off campus.

Private Transportation and Ridesharing

Numerous private transportation options are also available including Uber, Yellow Cab Baton Rouge[6], and Reliant Transportation[7].

Gotcha Bike Share is a bike rental service to the downtown area in addition to stations on the LSU and Southern University campuses, including near the LSU lakes and Perkins Road Overpass. The system is integrated and all bicycles, rented on a pay-per-minutes basis, can be docked at any Gotcha station in the region.

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[4] http://www.brcats.com/

[5] https://downtownbatonrouge.org/uploads/docs/printable_trolley_map2015.pdf

[6] http://www.brtaxi.com/

[7] http://www.relianttransportation.com/

Tourism Attractions and Amenities

A list of Baton Rouge Tourism Attractions is provided in Table 2.1. First founded by French explorers in the early 1700s, Baton Rouge was named for a stand of red cypress trees that marked the edge of a hunting ground for local Native American tribes.

Baton Rouge is home to various museums, including:

- Southern Museum of Art
- LSU Museum of Art
- Capitol Park Museum
- Old Governor's Mansion
- River Road African American Museum
- USS Kidd Veterans Museum
- Louisiana Art and Science Museum
- St. Joseph Cathedral
- Capitol Park Museum
- Iberville Museum

The Raising Cane’s River Center is centrally located in Downtown Baton Rouge, with access to several bus routes and I-10. The complex includes a 10,000-seat arena, a 1,900-seat performing arts theater, a grand ballroom, and a 200,000 square feet exhibition hall.

The region also offers high-quality dining and retail, with the highest concentration of restaurants and bars located in Downtown Baton Rouge, close to shopping malls such as Perkins Rowe and the town centers of Corporate Blvd and Perkins Rd. Sufficient hotels and accommodations are an important part of supporting tourism. Third party hotel inventory data indicates that the highest concentration of hotels and motels in the region is Downtown Baton Rouge by the Capitol. A popular hotel destination in Baton Rouge is the L’Auberge Casino & Hotel located ten (10) minutes away from Downtown.

Table 2.1: Baton Rouge Tourism Attractions

Destination Type	Name
Colleges and Universities	Louisiana State University
	Southern University and A&M College
	Franciscan Missionaries of Our Lady University
	Baton Rouge Community College
	Delta College of Arts & Technology, Inc.
	Louisiana Culinary Institute
	ITI Technical College
	Baton Rouge School of Computers
Museums And Cultural Centers	River Road African American Museum
	Baton Rouge Gallery - Center for Contemporary Art
	Capitol Park Museum, A Louisiana State Museum
	USS Kidd
	Knock Knock Children's Museum
	LSU Rural Life Museum
	Louisiana's Old State Capitol
Parks	Baton Rouge City Park
	BREC's Bluebonnet Swamp Nature Center
	Perkins Road Community Park
	Forest Community Park
	Scotlandville Parkway Park
	Greenwood Community Park
	Independence Community Park
Stadiums	Tiger Stadium
	Alex Box Stadium
	Bernie Moore Track Stadium
	LSU Soccer Stadium
	University High Baseball Field
	Pete Maravich Assembly Center
	Tiger Park

Destination Type	Name
Retail	Mall of Louisiana
	Towne Center at Cedar Lodge
	Bluebonnet Parc Shopping Center
	Perkins Rowe
	Siegen Lane Marketplace
	Lake Sherwood Mall
	Sherwood South Shopping Center
	Tanger Outlets Gonzales

Source: Visit Baton Rouge

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/pedestrian paths, along CATS service routes, and to guide drivers or pedestrians to other nearby tourist attractions.
- **Expanded Public Transportation**: There are many attractions located in Downtown Baton Rouge by State Street. Such a concentration of destinations lends itself well to public transit. While CATS 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 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 Baton Rouge 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

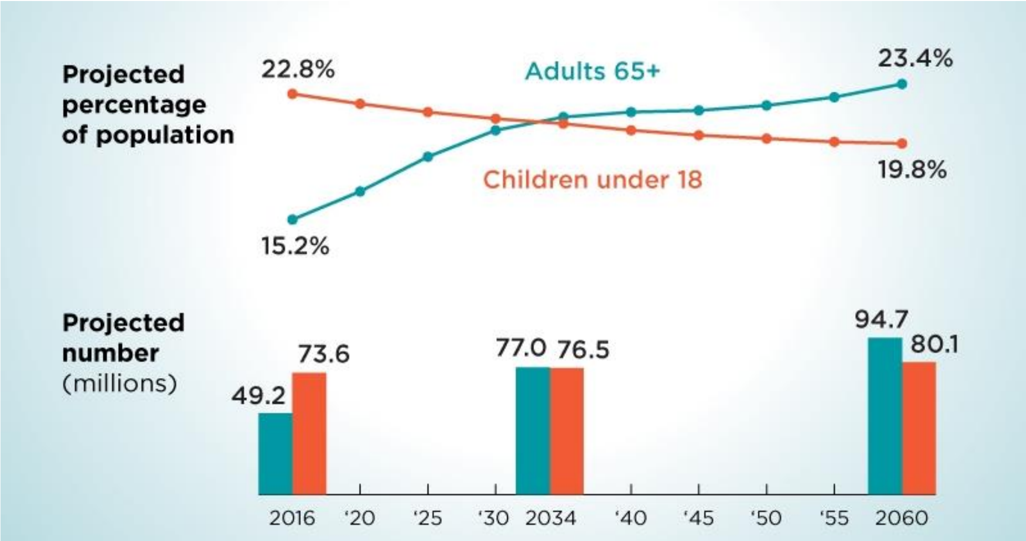
In recent years, travel patterns have changed dramatically due to demographic changes and technological advances. Many of these changes are part of longer-term trends, while others are newer, emerging trends.

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.[8] This growth will increase the demand for alternatives to driving, especially for public transportation for people with limited mobility or disabilities.

Figure 3.1: Growth in Senior Population



Source: U.S. Census Bureau

Most People are Traveling Less

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

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

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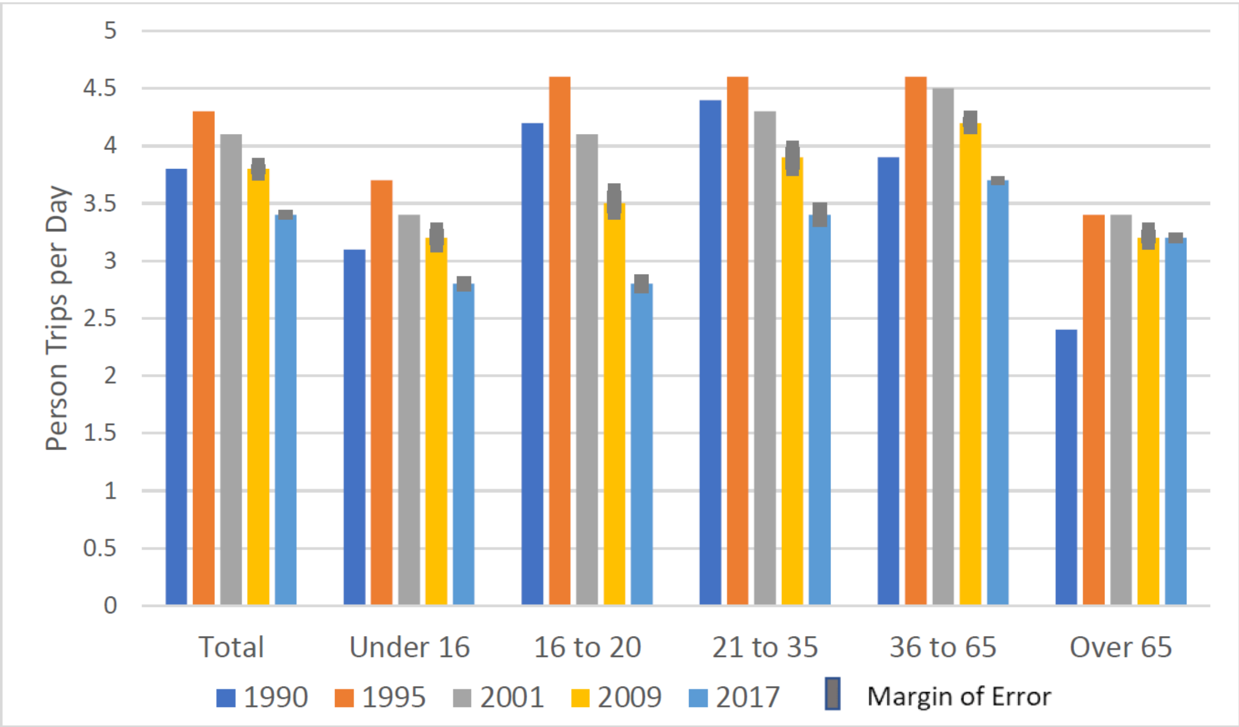
[8] https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html

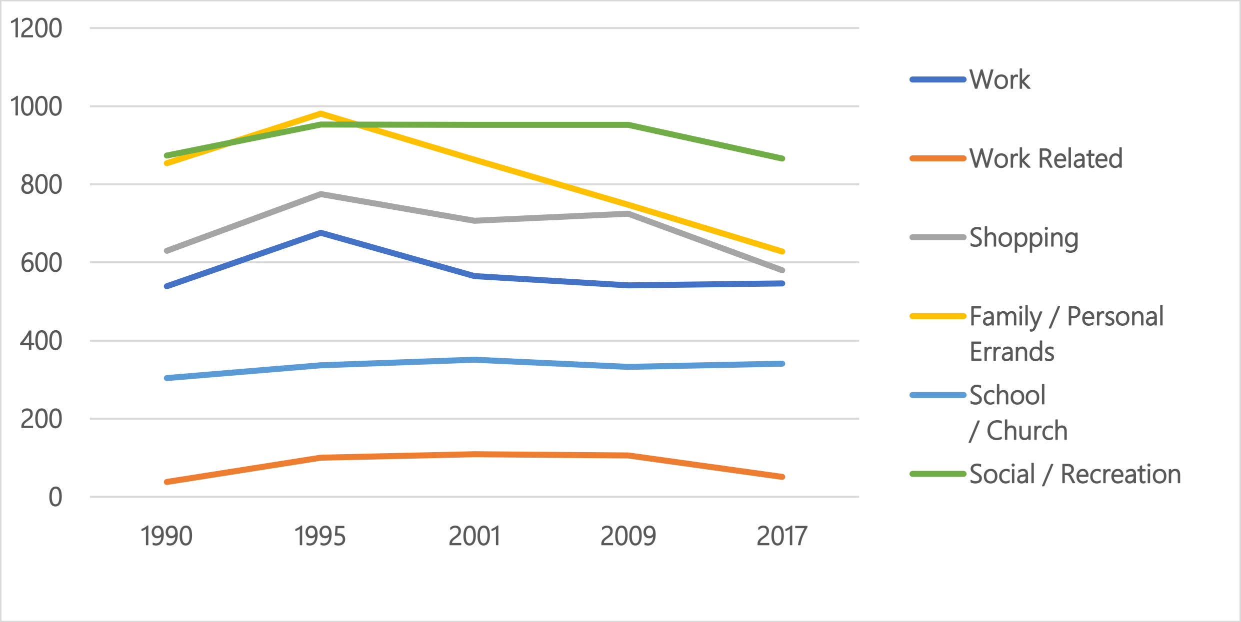
If this trend continues, travel demand may be noticeably impacted. Some major roadway projects may no longer be required and smaller improvements, such as intersection or turn lane improvements, may be sufficient for these needs.

Figure 3.2: Trends in 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 ride-hailing (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/Ride-hailing (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

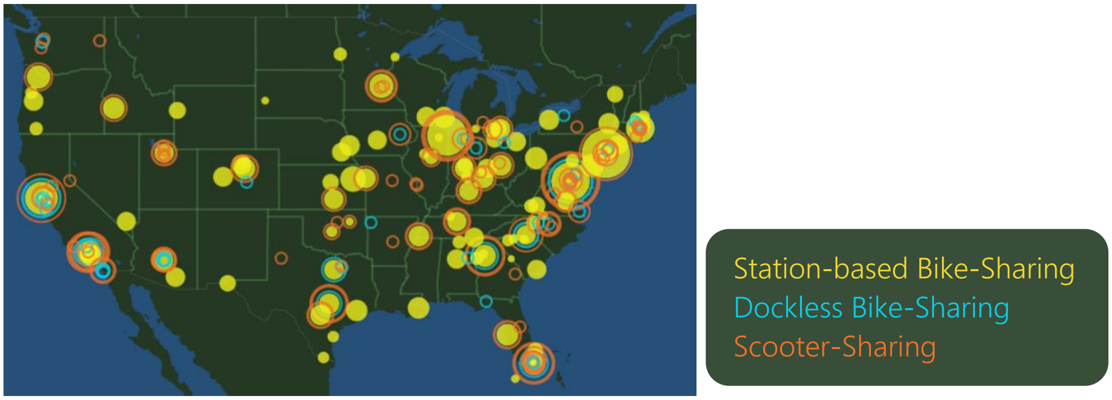
Bike-sharing and scooter-sharing, collectively referred to as micromobility options, are relatively new mobility options and continue to evolve. Modern, station-based bike-sharing emerged around 2010 and dominated the micromobility landscape from 2010 to 2016 until dockless bike-sharing systems, like Gotcha, 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[9]:

- 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.

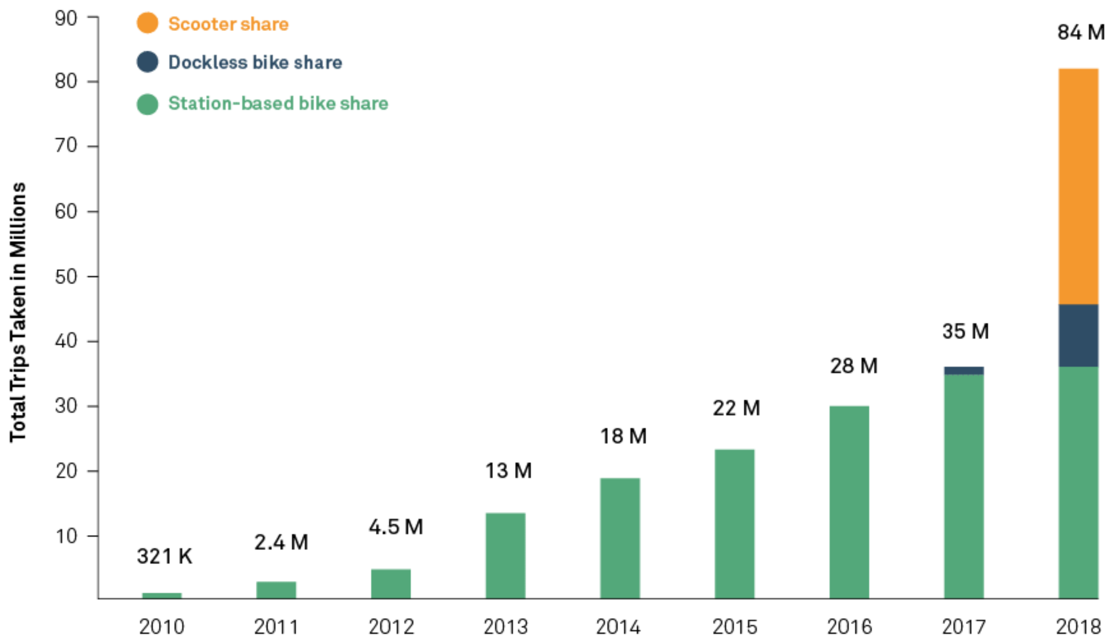
Figure 3.4: Public Bike-Sharing and Scooter-Sharing Systems, 2019



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

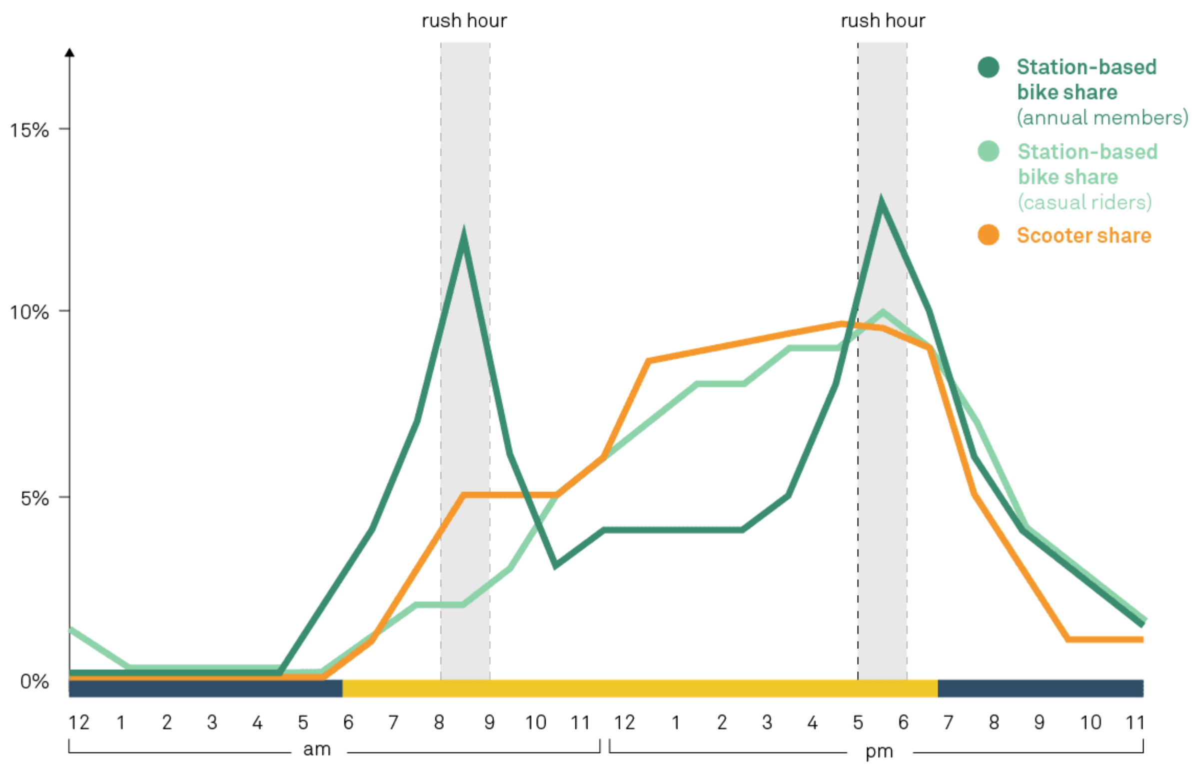
[9] https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf

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



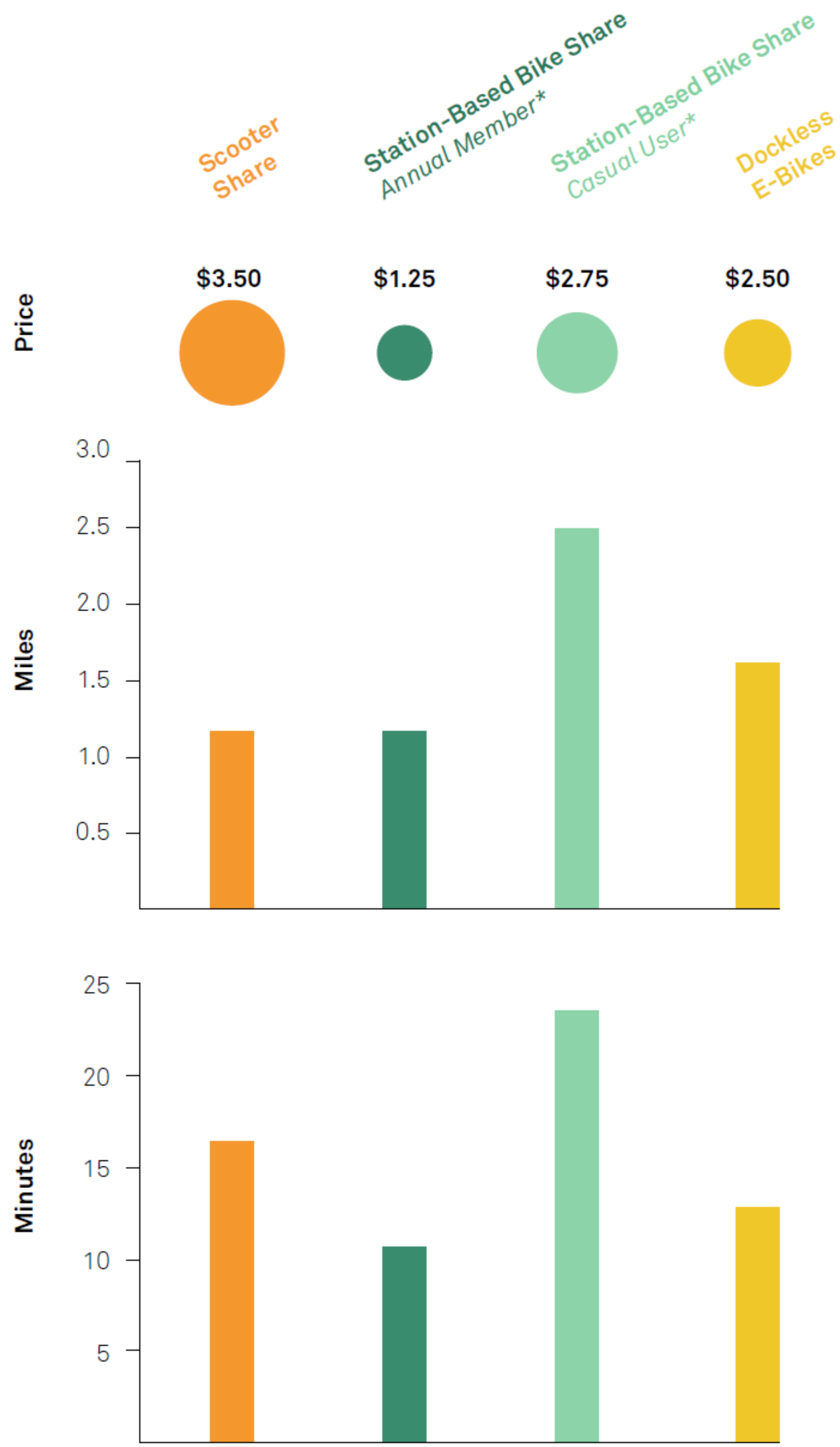
Source: NACTO

Figure 3.6: Average Micromobility Trips by Hour



Source: NACTO

Figure 3.7: Average Micromobility Trip Characteristics



Source: NACTO

Transportation Network Companies

Ride-hailing 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.

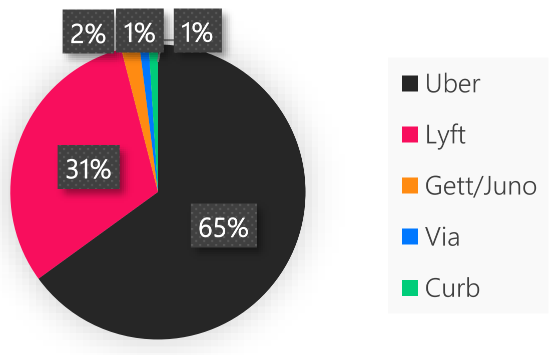
Today, TNCs are operating in most urban areas in the United States, including the Baton Rouge area. However, outside of these urban areas, service is limited or non-existent. Even with the growth into most urban areas, some TNC services are still limited to larger markets (e.g. UberPool and Lyft Shared 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[10]:

- 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 six (6) miles with a duration of twenty to twenty-five (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.

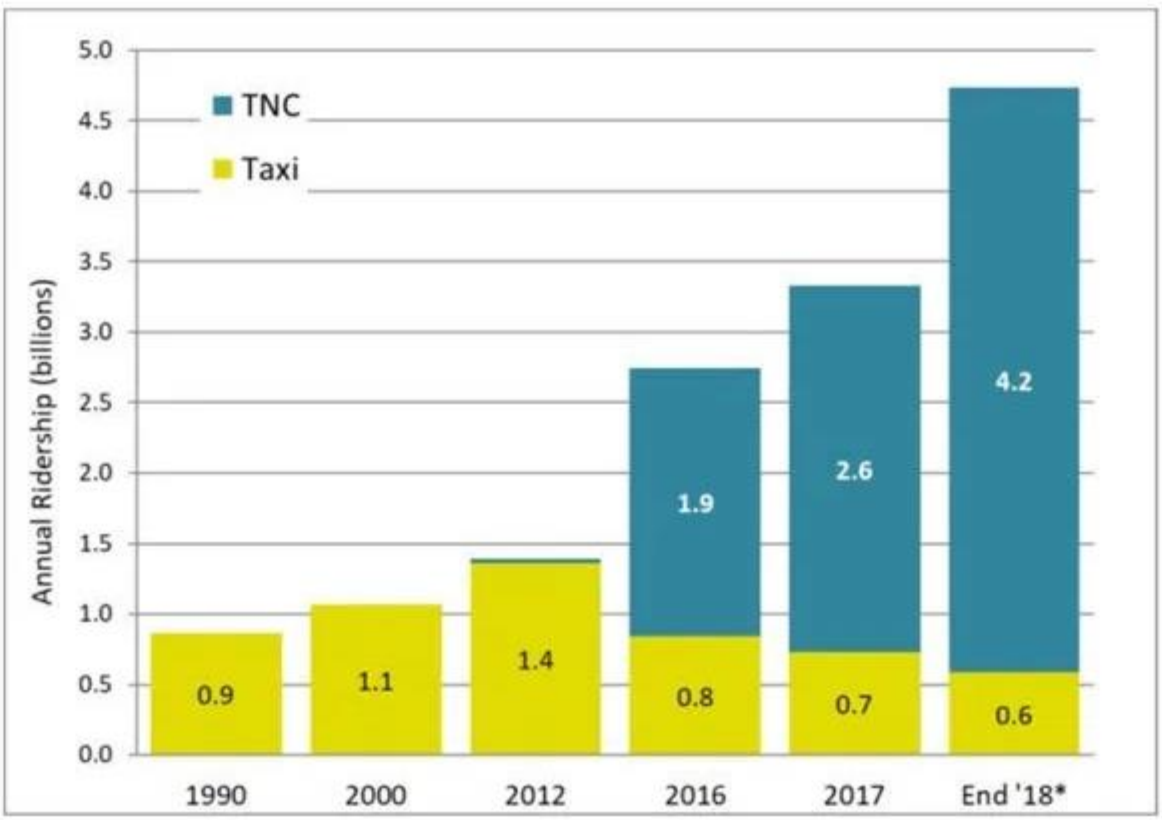
[10] http://www.schallerconsult.com/rideservices/automobility.htm

Figure 3.8: U.S. Ridesharing Market Share



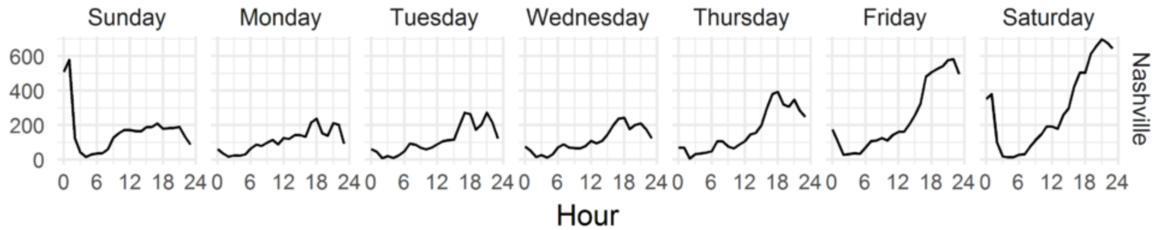
Source: Edison Trends

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.[11]

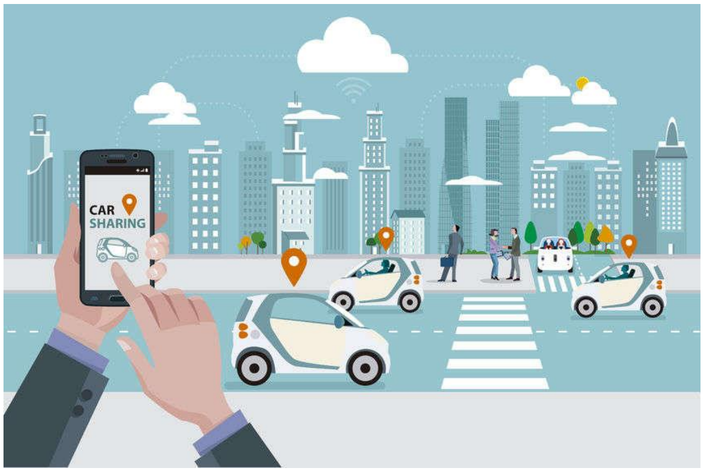
Car-sharing has been around for decades and has continued to evolve in recent years. Today, there are three (3) models of car-sharing:

- **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.

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

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.



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

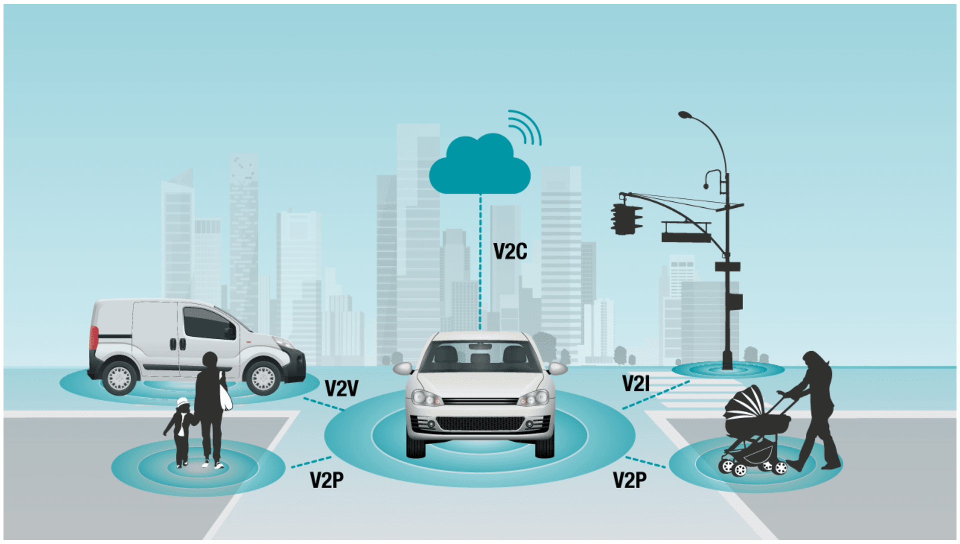
1	• Driver Assistance
2	• Partial Automation
3	• Conditional Automation
4	• High Automation
5	• Full Automation

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



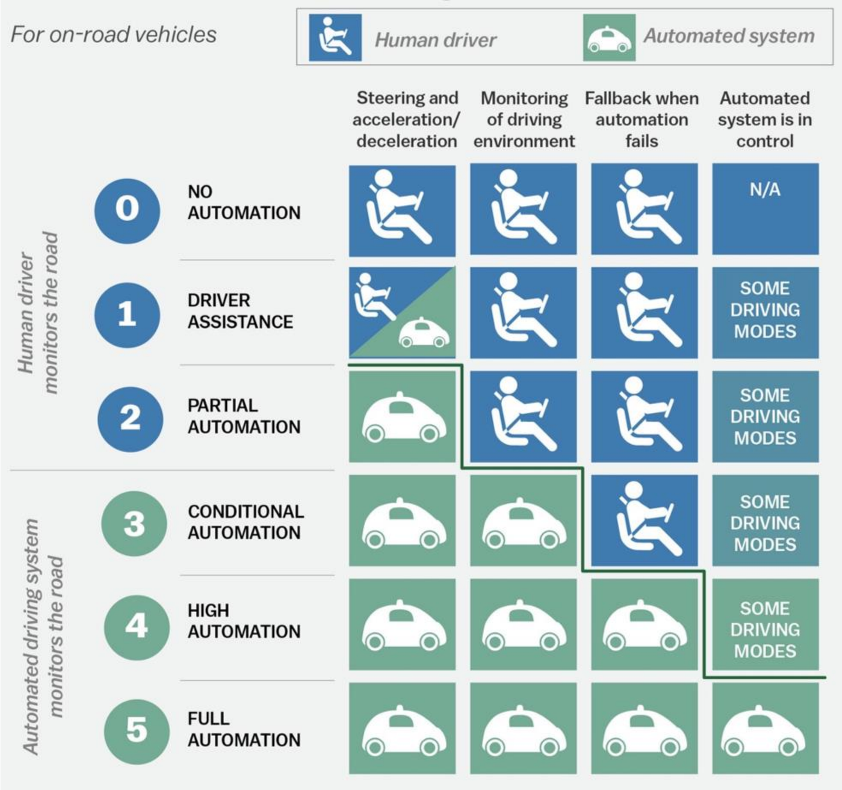
Source: Texas Instruments

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 ADAS can control both steering and braking/accelerating simultaneously under some circumstances. The human driver must continue to always pay full attention 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 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 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. [12][13][14]

- 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.

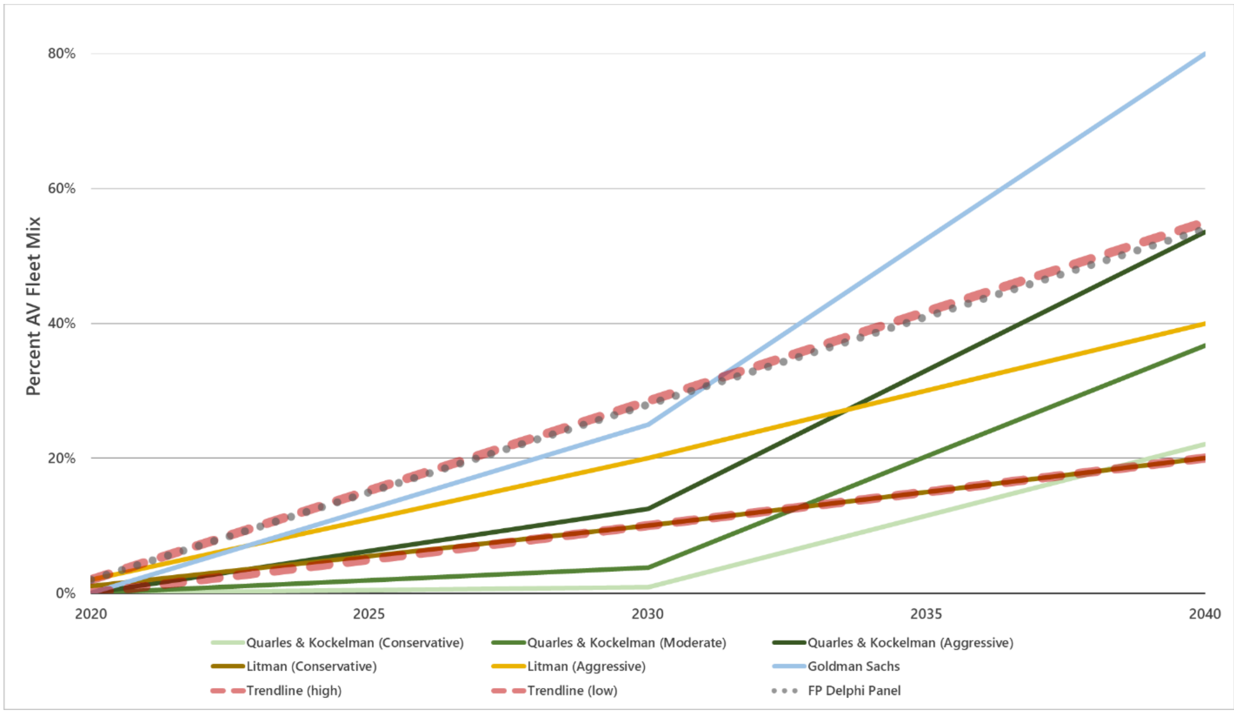
[12] https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[13] http://library.rpa.org/pdf/RPA-New-Mobility-Autonomous-Vehicles-and-the-Region.pdf

[14] https://www.fehrandpeers.com/av-adoption/

- Through 2030, autonomous vehicles will continue to make up a small percentage of all vehicles on the road due to the large number of legacy vehicles and slow adoption rates resulting from higher initial costs, safety concerns, and unknown regulations.
- By 2040, autonomous vehicles are more common, accounting for 20-50% of all vehicles.

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



Source: Fehr and Peers

Potential Impacts

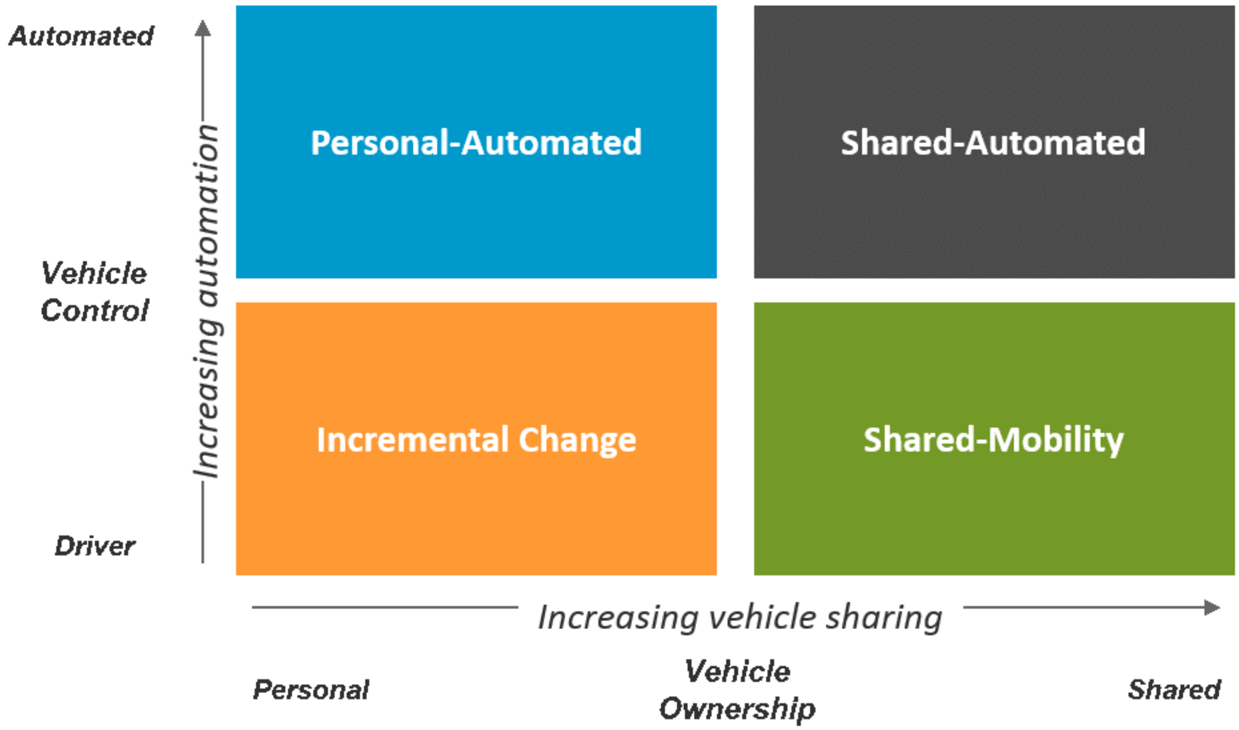
The development of connected and autonomous vehicles will change travel patterns, safety, and planning considerations. Ultimately, the actual impact of these vehicles will depend on how prevalent the technology is and the extent to which vehicles are privately owned or shared.

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

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

- **Shared-Mobility scenario:** vehicles are not highly autonomous and are mostly shared.

Figure 3.14: Future Mobility Scenarios



Source: U.S. Department of Energy/Deloitte

Safety

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

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

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

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

Traffic

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

As a whole, CAVs are likely to increase driving, as measured by Vehicle Miles Traveled (VMT). This increase would come in part from people making longer and potentially more frequent 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 parishes 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 twenty-eight (28) AFV stations in the MPA: twenty-one (21) electric stations, six (6) ethanol stations, and one (1) LNG station.

E85 85% Ethanol

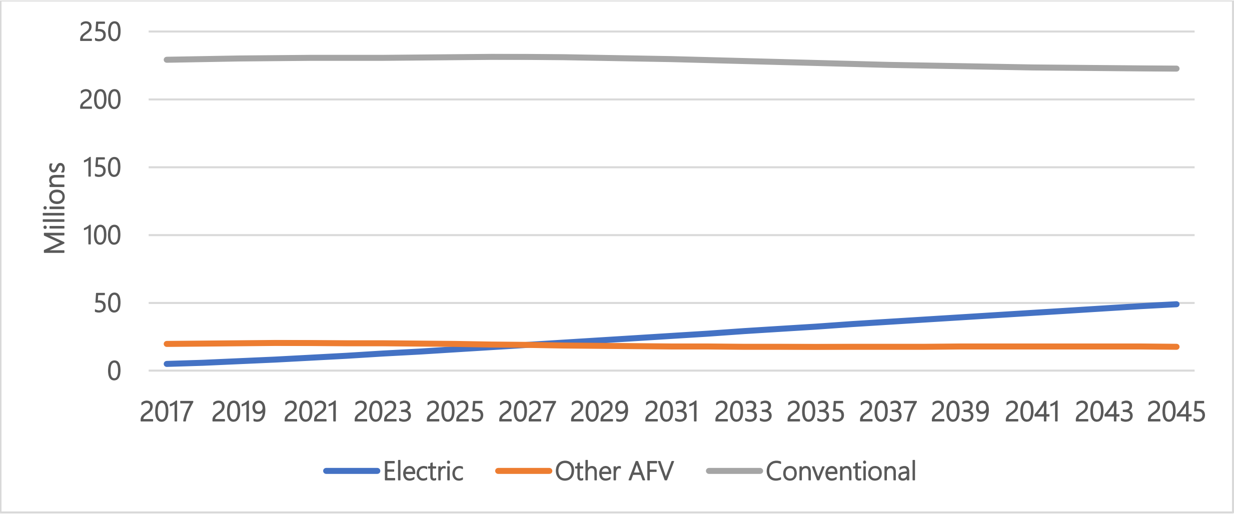
Growth Projections

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.[15] The U.S. Energy Information Administration (USEIA) is more conservative, projecting 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.[16]

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

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15 https://www.iea.org/publications/reports/globalevoutlook2019/

16 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, a key concern within the MPA. While these fuels still have environmental impacts, they can reduce overall lifecycle emissions and direct tailpipe emissions substantially, a major concern for the region as it seeks to maintain air quality conformity.

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

Actions and strategies that can be implemented to improve air quality include:

- **Enforce stricter emission standards**: Air pollution could be greatly reduced by enforcing stricter emission standards on both diesel and petrol cars. Private and public vehicles should be tested more frequently based on real-world, rather than laboratory, emissions. Improved testing regimes will be more likely to catch poorly performing vehicles, leading to a cleaner fleet over time.
- **Reduce unnecessary car trips**: Cities should encourage people to make short trips through cycling or a combination of public transit and walking (otherwise known as active travel). Short car trips heavily impact air quality and must be reduced, along with changes in driving behavior, to have an impact.
- **Focusing on vulnerable populations**: Numerous studies have shown that a driver breathes in higher amounts of pollution than a cyclist or pedestrian on the same road. Children sitting in the back seat of a vehicle are the most vulnerable and likely to be exposed to dangerous levels of pollution. It has also been shown that the health benefits of walking and cycling outweigh the costs of breathing in pollution.
- **Making transit more attractive**: It is generally accepted that increased public transit ridership and making public transport cleaner would greatly improve urban air quality. Shifting trip modes from private vehicles to public transit depends on making it attractive to potential users, especially as mobility and accessibility continue to be a challenge for most urbanized areas.
- **Encourage active travel:** Increasing active travel would not only improve air quality but reduce urban noise pollution as well as encourage healthy habits of leading a more active lifestyle. However, encouragement for such activities requires a combination of actions such as adding bicycle lanes, sidewalks, and trails. To make cycling more appealing for commuting, and not just leisure, cities should take into consideration the

demand for cycling, accessibility of this mode of travel and the locations that can be reached by it, as well as network interruptions such as red lights, traffic, and pedestrians.

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 of alternative fuels increase substantially, gas tax revenues will be reduced and new user fees may need to be considered to replace the lost revenue. 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; one of the primary means that Louisiana uses to fund transportation projects. Because of this, many states have begun imposing fees on these vehicles to recoup lost transportation revenue.[17]

3.5 Emerging Technology

Drones for Parcel and Passenger Transportation

The popularity of unmanned aerial vehicles, commonly known as "drones," has increased in recent years. Drones have the potential to become iconic as they combine three (3) key principles of modern technology: data processing, autonomy, and boundless mobility. Initially, drones were reserved for the military; however, the interest of incorporating drones as surveillance/sensor devices, delivery mechanisms, and passenger transportation has increased in the last few years.

The use of drone delivery has been applied in the healthcare, food, postal, and shipping industries. In the healthcare industry, drones usually transport medicinal products such as blood products, vaccines, pharmaceuticals, and medical samples. Food delivery drones are currently in the United States in states such as Virginia, North Dakota, North Carolina, Alabama, and California. Some of the benefits of drone use in the food delivery industry are the speed of delivery, limited physical contact, extended delivery limits, a reduction in the carbon footprint, and a reduction in traffic congestion. Postal drone service is the most popular drone service to

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

date. Companies in the United States that provide drone delivery service are Wing, Amazon Prime Air, UPS Flight Forward, Flytrex, Wingcopter, Zipline, DHL Parcelcopter, and Boeing.

Passenger drones, also known as “air taxis,” have the potential to offer an innovative mode of personal transportation in megacities where land infrastructure cannot keep up with population growth. Studies have shown that the operation of passenger drones could result in low community noise, improved safety, a better economy, and a reduction in travel time.

Truck Platooning

Truck platooning consists of coupling two or more trucks equipped with cooperative adaptive cruise control (CACC) to allow significantly shorter gaps between them to reduce fuel use and emissions over long trips. Studies have shown that one three-truck CACC platoon cruising at 65 miles per hour (mph) could yield fuel savings between five (5) and six (6) percent depending on the gaps between trucks. Even though truck platooning could potentially improve traffic safety and efficiency, this transportation concept presents some challenges for other drivers: blocking a driver’s view of the roadway and roadside signage; blocking a driver’s ability to change lanes or exit/enter a highway; and providing a feeling of discomfort and risk to drivers near a truck platoon.

Advanced Automatic Collision Notification

Advanced Automatic Collision Notification (AACN) technology consists of real-time crash data that is sent to emergency responders, alerting them of the location and nature of a crash, so they can respond with adequate equipment. Some of the benefits of AACN technology are as follows:

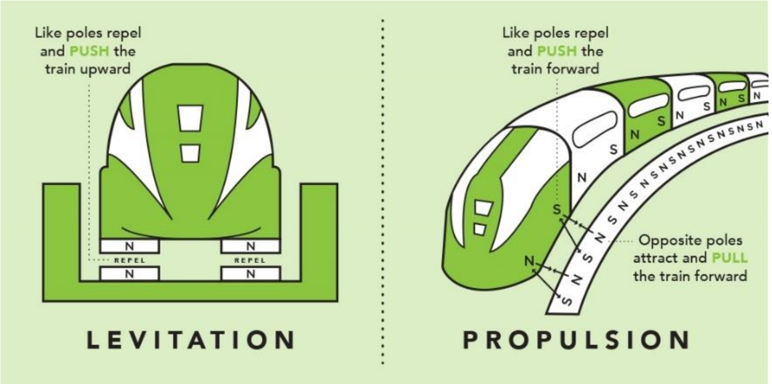
- improves patient outcomes and saves lives through rapid communication and vehicle location;
- predicts injury severity in vehicle crashes; and
- improves real-time patient information through automated sharing of vehicle crash data.

Although AACN technology currently exists, there are limitations on its use and usefulness. Currently, Automated Collision Notification (ACN) technology provides only basic vehicle crash information, such as airbag deployment and location, while AACN includes additional information from vehicle sensors to improve and enhance responses.

Superconducting Maglev

The Superconducting Maglev (SCMAGLEV) is a magnetic levitation (maglev) transportation system based on the principles of magnetic attractions and repulsions between the guideway and the cars. This technology was developed by Central Japan Railroad Company. One of the benefits of the SCMAGLEV is that it consumes 30 percent less energy than other high-speed maglev trains and 50 percent less than commercial airliners.

A federal grant was awarded to the Maryland Department of Transportation to prepare a preliminary engineering and National Environmental Policy Act (NEPA) analysis for an SGMAGLEV train between Baltimore, Maryland, and Washington, DC, in 2016. Currently, this project is going through the Environmental Impact Statement process for Phase 1, which consists of a 40-mile-long, 10-mile-wide study area [17].



Transit X – Podway

Transit X is a public transit service with a sustainable micro-guideway and suspended featherweight vehicles. Transit X is an automated network that could provide high-capacity, non-stop, single-seat travel from origin to destination on an exclusive right-of-way.

A Transit X system consists of a pod with a 22-pound battery that powers electric motors and four (4) polyurethane-coated wheels that run along micro-gauge 12-inch steel rails. The pod's cabin is suspended below the rails. The rails are protected from the elements, inside composite beams supported by steel poles located approximately 75 feet apart. Passengers would enter a pod at ground level, where landing areas would take half the space of a regular parking spot and could be located on the sidewalk or street. Pods would be lifted up and then quickly accelerate to merge onto the main line up to 150 mph until reaching the exit at the passenger's stop.

Currently, Transit X is privately funded without the need for government funding. The capital costs for a podway are approximately $6.4 million per mile, including physical infrastructure and soft costs such as planning, permitting, and environmental impact assessments.

Smart Roads

Smart roads include a set of technological tools that interact with people and nature to provide safer and more efficient transportation. The Internet of Things (IoT) is the foundation of smart-road technology. With the use of IoT, it is possible to help city planners and government officials improve the flow of traffic with real-time processing, reduce congestion and emissions, improve safety, alert first responders of accidents, and help identify problem areas. Studies have shown that smart-road technology could save drivers up to 60 hours per year.

Some examples of smart-road technologies are speed sensors, acoustic sensors, Internet Protocol closed-circuit-television cameras, smart traffic lights, condition/weather monitoring systems, and digital signage. These smart-road tools could be used to track vehicles and adjust traffic lights to prevent bumper-to-bumper traffic, resulting in less congested roads. Also, traffic-monitoring solutions by computer vision could be used to detect vehicles, pedestrians, and bicyclists to help enable safety practices.

In addition to helping with daily traffic activities, the collected data from the IoT technologies could be used by cities to make improvements in traffic management, road maintenance, and environmental quality. Data from IoT technologies could be used to identify intersections and other sites with high rates of collisions and/or near misses and help to identify the best countermeasures to improve safety. Additionally, cities could use the road-condition monitoring system to assess pavement conditions and select the best rehabilitation or maintenance technique. Lastly, the smart infrastructure could reduce carbon emissions from daily transportation by avoiding idling engines from daily traffic.

Funding

A Notice of Funding Opportunity for $60 million for the Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) program was published in 2021 by the U.S. Department of Transportation’s Federal Highway Administration (FHWA) to fund new technologies that improve transportation systems. This program has provided more than $256 million for projects in 25 states since 2016. The goal of the ATCMTD program is to provide funding to help states, local governments, transit agencies, and metropolitan planning organizations install advanced technologies on a large scale that can serve as national models and improve safety and reduce travel times for drivers and transit riders [23].

Another grant published by the FHWA is the Accelerated Innovation Deployment (AID) Demonstration Program. This program provides funding as an incentive for eligible entities to accelerate the adoption and implementation of innovation in highway transportation. The AID Demonstration Program is one initiative under the multi-faceted Technology and Innovation

Deployment Program approach, providing funding and other resources to offset the risk of implementing innovations.

Both the ATCMTD program and the AID Demonstration Program are part of the Fixing America's Surface Transportation Act or "Fast Act," which authorizes $305 billion over 5 fiscal years for highway; highway and motor vehicle safety; public transportation; motor carrier safety; hazardous materials safety; rail; and research, technology, and statistics programs.

4.0 Roadways and Bridges

4.1 Roadway Congestion Relief Needs

Given the population and employment growth forecasted to occur by 2046, the Travel Demand Model (TDM) indicates that the number of person trips in the MPA will increase from 3.53 million in 2020 to 4.61 million in 2046. External-Internal Auto and Truck and External-External Auto and Truck are the trip types with highest grow rate, around 64 percent. These changes are summarized in Table 4.1.

30.8%

Growth in person trips in the MPA from 2020 to 2046

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 0.2 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 39.1 percent and the VHT will increase by 56.9 percent. However, during this same period, the VHD will more than double.

Table 4.1: Person Trips by Purpose, 2020 to 2046

Trip Purpose	2020	2046 (E+C)	Change	Percent Change
Home-Based Work	371,343	496,479	125,136	33.7%
Home-Based School	207,499	256,339	48,840	23.5%
Home-Based College	65,388	71,082	5,694	8.7%
Home-Based Other	1,145,473	1,446,271	300,798	26.3%
Other to Work	142,037	183,561	41,524	29.2%
Work to Other	205,299	267,105	61,806	30.1%
Other to Other	733,910	906,934	173,024	23.6%
Truck-Medium	250,981	343,841	92,859	37.0%
Truck-Heavy	86,199	118,684	32,485	37.7%
External-Internal Auto	248,001	405,883	157,882	63.7%
External-Internal Truck-Medium	12,277	19,518	7,241	59.0%
External-Internal Truck-Heavy	17,603	29,110	11,507	65.4%
External-External Auto	25,639	42,428	16,789	65.5%
External-External Truck-Medium	3,175	5,632	2,457	77.4%
External-External Truck-Heavy	12,820	20,443	7,623	59.5%
Total	3,527,645	4,613,310	1,085,665	30.8%

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

Source: Baton Rouge MPO Travel Demand Model, NSI

Table 4.2: Travel Demand Impact of Growth and Existing and Committed Projects, 2020 to 2045

Classification	2020 (Existing)	2046 (E+C Projects)	Change	Percent
Centerline Miles of Roadwavs				
Interstate	264	265	1	0.4%
Principal Arterial	317	317	0	0.0%
Minor Arterial	329	329	0	0.0%
Collector	972	972	0	0.0%
Local	262	266	4	1.5%
Total	2,144	2,149	5	0.2%
Daily Vehicle Miles Traveled (VMT)				
Interstate	4,805,733	6,511,360	1,705,627	35.5%
Principal Arterial	2,477,262	3,395,368	918,106	37.1%
Minor Arterial	1,249,892	1,654,294	404,402	32.4%
Collector	1,132,344	1,844,626	712,282	62.9%
Local	99,205	181,331	82,126	82.8%
Total	9,764,436	13,586,978	3,822,542	39.1%
Daily Vehicle Hours Traveled (VHT)				
Interstate	98,657	162,075	63,418	64.3%
Principal Arterial	63,988	92,606	28,618	44.7%
Minor Arterial	32,538	46,181	13,643	41.9%
Collector	27,162	47,067	19,905	73.3%
Local	2,766	5,295	2,529	91.4%
Total	225,111	353,224	128,113	56.9%
Daily Vehicle Hours of Delay (VHD)				
Interstate	28,044	66,728	38,684	137.9%
Principal Arterial	11,654	22,123	10,469	89.8%
Minor Arterial	5,054	10,153	5,099	100.9%
Collector	2,828	7,593	4,765	168.5%
Local	113	437	324	286.7%
Total	47,693	107,035	59,342	124.4%

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

Source: Baton Rouge MPO Travel Demand Model, NSI

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.

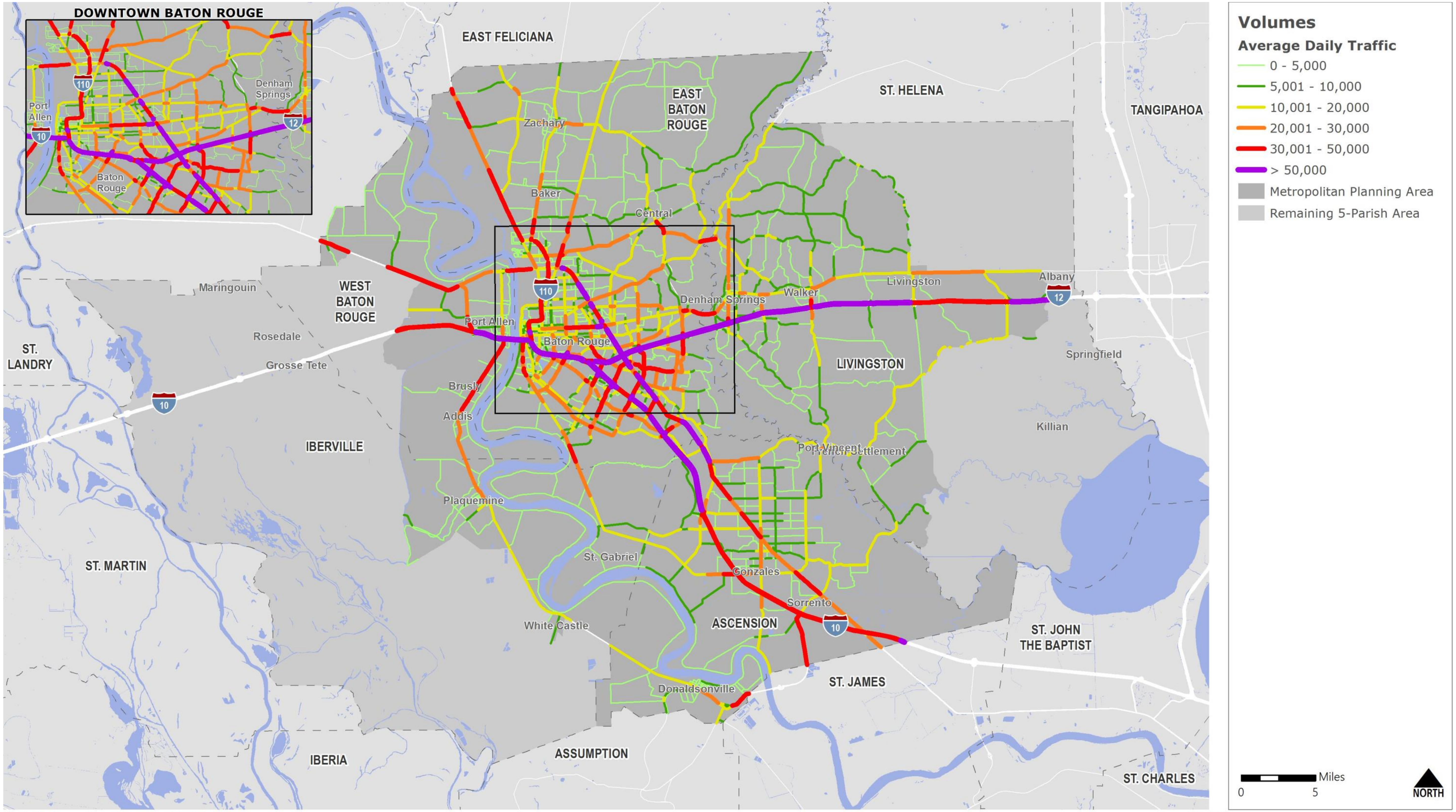
Table 4.3: Roadway Corridors with Volumes Exceeding Capacity, 2045

Roadway	Location	Length (miles)
Lee Dr NB/SB	Arrowhead St to Boone Dr	1.11
Nicholson Dr	W Lee Dr to Ben Hur Rd	0.31
Dalrymple Dr SB	I-10 to E State St	0.56
College Dr NB/SB	I-10 to Corporate Blvd	0.24
I-10 EB On Ramp	College Dr EB to I-10	0.18
I-10 EB On Ramp	S Arcadian Dr EB to I-10	0.18
I-10 WB/EB	LA 1 to Bridge	0.62
I-10 EB On Ramp	LA 1 to I-10 EB	0.18
I-10 WB Off Ramp	I-10 to LA 1 SB	0.15
I-10 WB On Ramp	St Ferdinand St to I-10 WB	0.17
LA Scenic Bayou Bywy	South Blvd to Europe St	0.12
I-10 EB On Ramp	LA 415 On Ramp to I-10 EB	0.24
I-10 WB Off Ramp	I-10 WB Off Ramp to LA 415	0.26
Old Scenic Hwy NB	Port Hudson Pride Rd to Ligon Rd	0.53
I-10 EB Off Ramp	I-10 EB Off Ramp to Essen Ln	0.29
Airline Rd NB	US 61 Interchange Weave Section	0.09

Roadway	Location	Length (miles)
US 61 NB/SB	I-12 interchange	0.1
US 61 SB On Ramp	Florida EB to US 61 SB	0.04
Florida WB On Ramp	US 190 SB to Florida WB Ramp	0.03
Florida WB	US 61 Interchange	0.06
Florida EB On Ramp	US 61 NB to Florida EB On Ramp	0.05
I-12 EB On Ramp	LA 3245 NB On Ramp to I-12 EB	0.21
I-12 EB Off Ramp	I-12 WB Off Ramp to LA 3245	0.24
LA 3254 NB/SB	Florida Blvd intersection	0.01
Florida Blvd WB	Burgess Ave to Eden Church Rd	1.02
LA 1019 NB	LA 64 to Amite Church Rd	0.52
LA 447 NB	I-12 Interchange	0.33
I-12 EB/WB	LA 63 to Satsuma Rd	2.97
I-12 EB/WB	LA 63 to LA 441	5.75
I-12 EB/WB	LA 441 to LA 43	3.31
LA 22 SB	I-10 to LA 70	0.21
LA 30 WB	S Darla Ave to I-10	0.4
LA 30 WB	S Robert Williams Rd to W Robert Williams Rd	0.94
LA 42 EB	LA 431 to LA 16	0.17
I-10 SB Off Ramp	I-10 SB Off-Ramp to LA 73	0.3
I-10 NB On-Ramp	LA 73 On-Ramp to I-10 NB	0.19
LA 73 NB	Heroman Rd to C Braud Rd	0.42
LA 73 SB	Rivergate Ave to S Jackson Oaks Rd	0.19
LA 61 NB	LA 427 to County line (river)	0.4
LA 427 NB	Santa Maria Pkwy to LA 42	0.89
I-10 NB On Ramp	LA 42 to On Ramp to I-10 NB	0.24
LA 42 WB	Perkins Rd to Foundera	0.31
LA 1248 WB	I-10 interchange	0.08

Source: Baton Rouge MPO Travel Demand Model

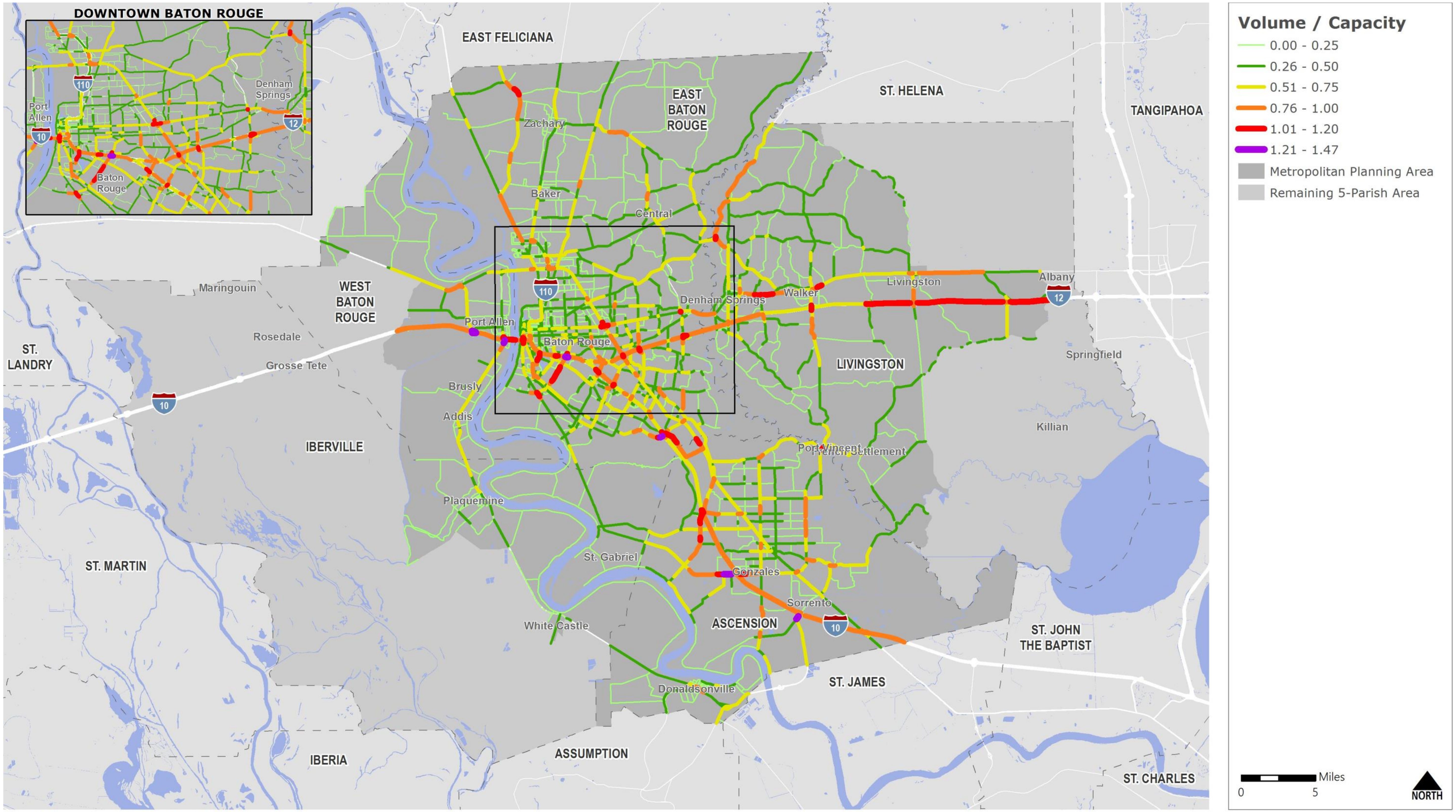
Figure 4.1: Average Daily Traffic on Roadways, 2045



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.

- Airline Highway
- Florida Boulevard
- Government Street
- I-110
- I-12
- LA 30
- Sherwood Forest Boulevard
- US 61

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/Interchange Improvement Projects

Location	Traffic Control Type	Observed Issues	Short-term Solution	Long-term Solution
US 190 @ LA 415	Interchange	Improper Interchange Geometry and Railroad Tracks	Corridor Study	Interchange Improvement
US 190 @ LA 1	Interchange	Lack of proper access from US 190 to LA 1	Corridor Study	Interchange Improvements
I-10 @ LA 30	Interchange	Traffic backs up along I-10 off-ramp to LA 30 due to lack of direct ramp to LA 30	Corridor Study	Interchange study for possible improvements and providing direct ramp
LA 73 and LA 426	Signalized Intersection	Turning lane backs up to through lanes.	Improve signal timing	Intersection improvements such as turning lane extensions.
I-10 (Mississippi Bridge to I-10/I-12 split)	Segment	Traffic backs up along I-10 due to high volume traffic on peak hours.	Corridor Study	Increase capacity of the segment. Improve access management. Improve Mississippi River Bridge.
US 61 (Florida Blvd to I-110)	Segment	Traffic backs up along US 61 due to high volume traffic on peak hours.	Improve signal timing along the corridor	Increase capacity of the corridor by adding an additional lane and conduct access management study.
LA 30 (Burbank Dr to Parish limits)	Segment	Traffic backs up along LA 30 around LSU campus. Also, there is a heavy traffic along LA 30.	Improve signal timing along the corridor	Increase capacity of the corridor from 2-lanes to 4-lanes.
Lee Dr/College Dr (Highland Rd to I-10)	Segment	Traffic backs up along Lee Dr/College Dr due to high volume traffic on peak hours.	Improve signal timing along the corridor	Increase capacity of the corridor. Also, implement turning improvements along the corridor such as RIRO.

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. The freeway and non-freeway roadways that are ranked in the top 50 by Vehicle Hours of Delay based on the Probe Data Analytics (PDA) *Bottleneck Ranking Tool* are considered to experience extensive congestion.

The freeway and non-freeway roadways experiencing existing congestion, based on the Vehicle Hours of Delay, are shown in Table 4.1 and Table 4.2 of *Technical Report: Congestion Management Process*, respectively. Many of these roadways also experience either existing or future congestion, based on the V/C ratios, as shown in Figure 4.2 in this Technical Report and Figure 2.4 in *Technical Report: Existing Conditions*. The expected change in Vehicle Hours of Delay for the freeway and non-freeway segments currently experiencing congestion based on the CMP analysis are shown in Table 8.1 and Table 8.2 of *Technical Report: Congestion Management Process*, respectively. Table 4.5 shows those segments that are expected to experience the highest percent increases in congestion.

Table 4.5: CMP Segments with Highest Congestion Increases

Roadway	Segment
I-10 Westbound	LA 22 On-Ramp to LA 44 Off-Ramp
I-10 Westbound	LA 415 On-Ramp to LA 77 Off-Ramp
I-10 Eastbound	LA 77 On-Ramp to LA 415 Off-Ramp
I-12 Eastbound	LA 441 On-Ramp to LA 43 Off-Ramp
I-12 Eastbound	LA 63 On-Ramp to LA 441 Off-Ramp
I-110 Northbound	At US 61 (Scenic Hwy) Interchange
I-12 Westbound	LA 63 On-Ramp to Satsuma Rd Off-Ramp
I-10 Eastbound	LA 73 On-Ramp to LA 30 Off-Ramp
LA 22 Northbound	Between I-10 Ramps
LA 42 Westbound	LA 73 (Jefferson Hwy) to US 61 (Airline Hwy)
LA 30 Westbound	Between I-10 Ramps (Ascension Parish)
I-10 Eastbound	LA 1 On-Ramp to Nicholson Dr Off-Ramp
I-10 Westbound	Nicholson Dr On-Ramp to LA 1 Off-Ramp
I-12 Eastbound	Between Satsuma Rd Ramps
LA 42 Eastbound	US 61 (Airline Hwy) to LA 73 (Jefferson Hwy)
I-12 Westbound	Between LA 3002 (Range Rd) Ramps
LA 1026 (Juban Rd) Southbound	Between I-12 Ramps

Roadway	Segment
I-10 Eastbound	College Dr Off-Ramp to I-12 Eastbound
US 61 (Airline Hwy) Southbound	At LA 42 East JCT
O'Neal Ln Southbound	At George O'Neal Rd

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: Congestion Management Process*.

4.2 Roadway Maintenance Needs

Pavement Maintenance

Many 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. Figures 2.7 and 2.8 in *Technical Report: Existing Conditions Analysis* display the pavement conditions of the NHS monitored roadways within the MPA. Particular attention should be given to:

- I-10 from West of LA 1 to Washington St
- I-110 from North of the I-10 interchange to US 61 interchange
- I-10 from Arcadian Ave to College Dr
- I-12 from US 61 to LA 3245
- LA 3245 from I-12 to LA 1019
- LA 67 from Florida Blvd to LA 64
- LA 415 from I-10 to US 190
- LA 1 from LA 75 to US 190
- Burbank Drive from Nicholson Dr to LA 3246
- LA 3246 from I-10 to Burbank Dr
- Bluebonnet Blvd from I-10 to Burbank Dr
- Perkins Dr from Essen Ln to Stafford Ave
- US 190 from LA 1 to LA 61
- LA 37 from US 190 to N Sherwood Forest Dr
- LA 408 from LA 67 to LA 410
- LA 44 from I-10 to US 61

- US 61 from Florida Blvd to LA 3246

These roadways have continuous lengths of poor pavement conditions; should be a priority for roadway maintenance and repaving.

Bridge Maintenance

The existing conditions analysis revealed that there are currently 161 bridges in Poor condition within the MPA, 19 of which are on the National Highway System. Table 4.6 displays the MPA's bridges in Poor condition. Addressing the needs of these bridges will improve safety, reduce maintenance costs, and avoid future bridge shutdowns. Bridges are rated by the NBIS based on the conditions of the following categories:

- Decks
- Superstructure
- Substructure
- Stream Channel and Channel Protection

A bridge is 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 LADOTD should prioritize these bridges for improvements as funding becomes available.

Table 4.6: Bridges in Poor Condition

Structure Id	Intersection	Roadway	Score	Year Built
610300070703802	BAYOU FRANCOIS	US0061	3	1956
610302670209481	VILLAR CANAL	LA0431	4	1971
610304070900461	BELLE TERRE CANAL	LA0308	4	1963
610308030106391	BAYOU MCCALL	LA0943	4	1972
610308030302161	BAYOU MCCALL	LA0944	4	1972
610308030800951	BAYOU GOUDINE	LA0621	4	1971
610308030804031	BLACK BAYOU	LA0621	4	1971
610308031200611	BLACK BAYOU	LA0934	3	1971
610308031800901	HENDERSON BAYOU	LA0933	3	1969
610308031901201	CREEK	Joe Sevario Rd	3	1969

Structure Id	Intersection	Roadway	Score	Year Built
610308031902001	CREEK	Joe Sevario Rd	4	1969
610308032102161	BLACK BAYOU	LA0935	3	1974
610330137905141	DRAINAGE BAYOU	Beco Rd	4	1994
610330139905301	NEW RIVER CANAL	E Lanoux Rd	4	1994
610330146910041	DRAINAGE BAYOU	Louis White Rd	4	1989
610330157905631	BAYOU NARCISSE	Babin Rd	3	1970
610330160905681	BAYOU NARCISSE	K C Rd	4	1970
610330164905171	DRAINAGE BAYOU	Harry Savoy Rd	4	1993
610330177905631	DRAINAGE BAYOU	Braud Rd	4	1980
610330178905301	HENDERSON BAYOU	Henderson Bayou Rd	4	1990
610330193905081	LAKE VILLARS	Summerfield Rd	3	1975
610330193905091	LAKE VILLAKS	Summerfield Rd	3	1975
610330199905541	MUDDY CREEK	Muddy Creek Rd	4	1978
610330202905711	MANCHAC ACRES BR	Manchac Acres Rd	3	1970
610330204905221	DRAINAGE BAYOU	H H Wilson Rd	3	1989
611700000610346	CREEK	US0190	4	1960
611700070800001	BAYOU MANCHAC	US0061	3	1953
611700070800002	BAYOU MANCHAC	US0061	3	1953
611700071000001	MISSISSIPPI RIVER	US0190	3	1939
611700079000442	LA 73 NORTH	US0061	3	1953
611700079010821	US 190 OVER US 61-SCENIC	US0190	3	1940
611700079010822	US 190 OVER US 61-SCENIC	US0190	3	1940
611700190205372	BATON ROUGE BAYOU	US0061	4	1961
611700600104171	MONTE SANO BAYOU	LA0067	4	1956
611700770400001	BAYOU MANCHAC	LA0073	4	1931
611702500110141	WHITE BAYOU	LA0019	4	1951
611702540211781	HUBS BAYOU	LA0037	4	1972
611702570304171	BAYOU FOUNTIAN	LA 327 Spur	4	1968
611704140103931	STREAM NO NAME	LA0030	3	1961
611708170401581	LITTLE SANDY CREEK	LA0409	4	1955
611708170406691	SANDY CREEK	LA0409	4	1979

Structure Id	Intersection	Roadway	Score	Year Built
611708170501841	BLACKWATER BAYOU	LA0410	4	1957
611708172300001	BAYOU MANCHAC	LA0427	4	1972
611730215911031	ELBOW BAYOU	Ben Hur Rd	4	1960
611730225911011	DRAINAGE BAYOU	Ben Hur Rd	3	1960
611730232905871	DRAINAGE BAYOU	S Tiger Bend Rd	4	1965
611730232910741	DRAINAGE CANAL	LOCAL ROAD	4	1960
611730234905871	DRAINAGE BAYOU	Tiger Bend Rd	4	1965
611730234911041	BAYOU FOUNTAIN	Bob Pettit Blvd	3	1969
611730240910341	CLAY CUT BAYOU	LOCAL ROAD	4	1970
611730247910791	DAWSON CREEK	LOCAL ROAD	4	1960
611730248910411	CLAY CUT BAYOU	LOCAL ROAD	3	1965
611730248911031	CORPORATION CANAL	S Campus Dr	3	1955
611730249910811	DAWSON CREEK	Congress Blvd	3	1970
611730251911041	CORPORATION CANAL	LOCAL ROAD	4	1960
611730252910411	WEINER CREEK	CEDARCREST AVE.	4	1965
611730254910221	JONES CREEK	LOCAL ROAD	3	1966
611730256911101	CORPORATION CANAL	Buchanan St	4	1960
611730258911111	CORPORATION CANAL	LOCAL ROAD	2	1955
611730262910591	W.BRANCH N.FORK WARD CR.	Chevelle Dr	3	1965
611730262910991	DAWSON CREEK	Claycut Rd	3	1964
611730267910561	N. BRANCH WARDS CREEK	Connells Village	4	1988
611730268910211	LIVELY BAYOU	S.FLANNERY RD.	4	1965
611730269910441	JONES CREEK	GOODWOOD BLVD.	4	1960
611730271910001	DRAIN BAYOU	Centurion Ave	4	1977
611730273910021	DRAINAGE CANAL	Strain Rd	3	1974
611730279910521	JONES CREEK	MONTERREY BLVD	4	1960
611730279910532	JONES CREEK	MONTERREY BLVD	4	1960
611730280910201	LIVELY BAYOU	N. FLANNERY RD	3	1965
611730292910641	HURRICANE CREEK	LOCAL ROAD	4	1965
611730294910331	ENGRS. DEPOT CANAL	LOCAL ROAD	3	1965
611730297910051	DRAUGHAN CREEK	Frenchtown Rd	3	1960

Structure Id	Intersection	Roadway	Score	Year Built
611730298910091	BEAVER BAYOU	Frenchtown Rd	3	1963
611730306910921	DRAIN TO MONTE SANO BAYO	Monte Sano Ave	4	1980
611730308910991	DRAINAGE CANAL	LOCAL ROAD	4	1963
611730310913531	WHITE BAYOU	Bentley Dr	4	1970
611730314910311	SHOE CREEK	Pecos Ave	3	1975
611730331910821	DRAIN BAYOU	Troy St	4	1975
611730335910501	BLACKWATER BAYOU	Talmadge Crumholt	3	1965
611730337910351	DRAINAGE BAYOU	Gurney Rd	3	1966
611730337910411	DRAINAGE CANAL	Gurney Rd	4	1966
611730342910501	BLACKWATER BAYOU	Carey Rd	3	1960
611730347910731	WHITE BAYOU	Pettit Rd	3	1965
611730352910311	DRAIN BAYOU	Country Estate Ave	3	1980
611730352910901	BRUSHY BAYOU	LOCAL ROAD	4	1975
611730352910921	BRUSHY BAYOU	Daniels St	4	1967
611730353910151	BEAVER BAYOU	Pinewood Dr	4	1980
611730355910301	DRAINAGE CANAL	McCullough Rd	4	1967
611730356910321	DRAINAGE BAYOU	McCullough Rd	4	1967
611730357910651	SOUTH BAYOU	Dyer Rd	4	1960
611730358910491	BLACKWATER BAYOU	Dyer Rd	4	1960
611730364911001	DRAINAGE BAYOU	Old Baker Zachary	2	1960
611730368911031	CYPRESS BAYOU	Heck Young Rd	3	1965
611730369910891	BAKER CANAL	Mchugh Rd	4	1960
611730373905891	BEAVER POND BAYOU	Alphonse Forbes Rd	1	1965
611730373911231	BAYOU BATON ROUGE	Carney Rd	4	1965
611730374911281	DRAINAGE BAYOU	LOCAL ROAD	4	1965
611730375905901	DRAINAGE BAYOU	LOCAL ROAD	4	1965
611730375910981	DRAINAGE BAYOU	Old Baker Zachary	4	1960
611730376910461	SAUNDERS BAYOU	Arleen Rd	4	1969
611730381910721	WHITE BAYOU	LOCAL ROAD	4	1970
611730383910721	WHITE BAYOU	LOCAL ROAD	4	1970
611730384910901	DRAINAGE BAYOU	LOCAL ROAD	4	1970

Structure Id	Intersection	Roadway	Score	Year Built
611730385905681	DRAINAGE BAYOU	Stoney Point Burch	4	1965
611730388910491	DRAINAGE BAYOU	Buck Horn Dr	4	1985
611730388910671	DRAINAGE CANAL	LOCAL ROAD	4	1966
611730389905281	SANDY CREEK	Stoney Point Burch	4	1965
611730389910041	DRAINAGE BAYOU	Black Rd	4	1988
611730395910911	ROADSIDE DITCH	LOCAL ROAD	4	1978
611730396911721	DRAINAGE BAYOU	Port Hickey Rd	3	1960
611730396911731	DRAINAGE BAYOU	Milldale Rd	4	1959
611730397911141	W. BRANCH CYPRESS BAYOU	LOCAL ROAD	4	1976
611730398910001	DRAINAGE CANAL	Milldale Rd	3	1959
611730398910031	LITTLE SANDY CREEK	Milldale Rd	3	1959
611730399910051	DRAINAGE BAYOU	Milldale Rd	4	1959
611730399911251	DRAINAGE BAYOU	E Flanacher Rd	4	1968
611730402911541	DRAINAGE CANAL	E Flanacher Rd	4	1968
611730407905901	WIND BAYOU	Chaney Rd	4	1972
611730409910611	REDWOOD CREEK	Port Hudson-Pride	4	1963
611730409910811	INDIAN BAYOU	Port Hudson-Pride	4	1965
611730410910951	COPPER MILL BAYOU	LOCAL ROAD	3	1970
611730411905721	MILL CREEK	Carson Rd	4	1970
611730416905331	WHITTEN CREEK	Pride-Baywood Rd	2	1965
611730416911211	DRAINAGE BAYOU	Brian Rd	4	1965
611730418905711	MILL CREEK	Pride-Baywood Rd	3	1960
611730419905361	KIDDS CREEK	Pride-Baywood Rd	3	1960
611730425905201	WHITTEN CREEK	Lee Price Rd	2	1980
611730425905921	FLANAGAN BAYOU	Robinson Rd	4	1980
611730425910791	DRAINAGE BAYOU	Lemon Rd	4	1965
612400500614452	PLAQUEMINE BRIDGE	LA0001	3	1950
612402570101101	LA75-BAYOU BREAUX	LA0075	4	1973
616100080102931	LA 415/M P RR @ LOBDELL	US0190	3	1940
616100130104371	STREAM NO NAME	LA0076	2	1930
616100500708321	PORT ALLEN CANAL	LA0001	3	1960

Structure Id	Intersection	Roadway	Score	Year Built
616100500708322	PORT ALLEN CANAL	LA0001	3	1960
616100500711951	MO PACIFIC RR	LA0001	4	1952
616104500810112	I-10 OVER LA 415-WESTOVE	I0010	4	1969
616108610304131	TIGER BAYOU	LA0983	4	1983
616130199911661	BAYOU BOURBEAUX	LOCAL ROAD	4	1970
616130324912451	BAYOU POYDRAS	LOCAL ROAD	4	1973
623202620100861	SLOUGH	LA0016	4	1974
623202620101601	WILLIS BAYOU	LA0016	4	1982
623202620111891	CANAL	LA0016	4	1955
623202730302941	CREEK	LA1026	3	1961
623202730306021	WEST COLYELL CR	LA1027	4	1952
623208320205031	CREEK	LA1019	4	1998
623208321000831	CREEK	LA1024	4	1962
623208321002851	CREEK	LA1024	4	1956
623208321008101	CREEK	LA1024	4	1942
623208321800761	PALMETTO CREEK	LA0444	4	1955
623230238904891	COLYELL CREEK	LOCAL ROAD	4	1960
623230251905491	GRAYS CREEK BRIDGE	LOCAL ROAD	3	1968
623230261905721	ALLEN BAYOU	LOCAL ROAD	4	1988
623230267905421	CREEK BRIDGE	LOCAL ROAD	4	1978
623230267905651	MILLERS CANAL	CITY STREET	4	1978
623230288903901	CAT BRANCH	LOCAL ROAD	4	1982
623230295905141	DUMPLIN CREEK BRIDGE	LOCAL ROAD	3	1990
623230300905331	BEAVER BRANCH	LOCAL ROAD	4	1975
623230300908461	HORNSBY CREEK	LOCAL ROAD	4	2000
623230306905611	DRAINAGE DITCH	LOCAL ROAD	3	1982
623230364905561	CANAL	LOCAL ROAD	4	1995

Source: NBI

4.3 Roadway Safety Needs

Within the MPA, over 157,000 crashes occurred between 2015 and 2019. During that timeframe, there were:

- 498 fatal crashes
- 918 life-threatening crashes
- 39,155 crashes with injuries or possible injuries.

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

As traffic continues to increase from 2020 to 2046, 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 several 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 several 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 speed was a contributing factor. 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. 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 several 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 lane 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: 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 number of crashes in general, or a large number of crashes for the roadway volume it carries.

The locations listed in those tables, and shown in Table 4.7, should be high priority locations for the MPO to address 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
Devall Rd	LA 932 to Tigery E Stone Ave	Segment	Crash Frequency
I-10	I-12 Interchange to College Dr	Segment	Crash Frequency
I-10	LA 427 to Dalrymple Dr	Segment	Crash Frequency
College Dr	LA 427 to I-10	Segment	Crash Frequency
Sherwood Forest Blvd	Mead Rd to I-12	Segment	Crash Frequency
W Lee Dr	LA 30 to Etta St	Segment	Crash Frequency
Siegen Ln	Kinglet Dr to I-10	Segment	Crash Frequency
LA 3002	Rushing Rd to I-12	Segment	Crash Frequency
Siegen ln	Riegar Rd to I-10	Segment	Crash Frequency
College Dr	Corporate Blvd to Bankre Ave	Segment	Crash Frequency
Walker South Rd	Vera McGowan Rd to I-12	Segment	Crash Frequency
College Dr	Constantine Ave to I-10	Segment	Crash Frequency
Juban Rd	I-12 Frontage Rd South to I-12 Frontage Rd North	Segment	Crash Frequency
I-10	LA 1 to Nicholson Dr	Segment	Crash Frequency
O'Neal Rd	I-12 Frontage Rd South to I-12 Frontage Rd North	Segment	Crash Frequency
Perkins Rd	LA 3064 to Camelia Trace Dr	Segment	Crash Frequency
E Brittany Hwy	S Tanger Blvd to I-10	Segment	Crash Frequency
Perkins Rd	YMCA Plaza Dr to Siegen Ln	Segment	Crash Frequency
I-10	LA 1 to Nicholson Dr	Segment	Crash Frequency
Old Hammond Hwy	US 61 to Marilyn Dr	Segment	Crash Frequency
Pass Bro Blvd	Sac-au-Lait Ln to S Range Ave	Segment	Crash Rate
Daradele Ave	Dawandele Ave to I-12 Interchange	Segment	Crash Rate
Alvin Dark Ave	Bright Side Dr to Bob Petit Blvd	Segment	Crash Rate
E Industrial Ave	S Choctaw Dr to Greenway Spring Rd	Segment	Crash Rate
Essen Park Ave	Essen Ln to One Calais Ave	Segment	Crash Rate
Palaza Americana Dr	Emmend Bourgeois Rd to US 61	Segment	Crash Rate
N 38th St	Choctaw Dr to Brady St	Segment	Crash Rate
Green Oak Dr	US 190 to Rad Oak Dr	Segment	Crash Rate

Route	Location	Type	Issue
Devall Rd	Joe Sevario Rd to Timberstone Dr	Segment	Crash Rate
Pembroke St	75th Ave to Hardin Blvd	Segment	Crash Rate
I-12 Frontage Rd WB (Off-Ramp)	I-12 to Walker South Rd	Segment	Crash Rate
I-10 Frontage Rd EB (On-Ramp)	S Burnside Ave to I-10	Segment	Crash Rate
I-10 Frontage Rd WB (Off-Ramp)	I-10 to John Lebianc Blvd	Segment	Crash Rate
Main St	Gottieb St To N Arcadian Thwy	Segment	Crash Rate
Rodeo Dr	Marylin St to Petes Hwy	Segment	Crash Rate
Bradock St SB ON-Ramp	Bradock St to I-10 SB	Segment	Crash Rate
Fountainbkeau	Old Hammond Rd to S Bolivar Dr	Segment	Crash Rate
Renoir Ave	N Ardenwood Dr to Rodin Dr	Segment	Crash Rate
Broussard St	Richard Ave to S Arcadian Thwy	Segment	Crash Rate
Hyacinth Ave	Stanford Ave to Stephen Ave	Segment	Crash Rate
US 190	LA 447	Intersection	Crash Frequency
LA 30	Brightside	Intersection	Crash Frequency
LA 3002	LA 3003	Intersection	Crash Frequency
LA 3246	Rieger	Intersection	Crash Frequency
LA 447	I-12	Intersection	Crash Frequency
LA 30	LA 44	Intersection	Crash Frequency
I-10	Bazaar	Intersection	Crash Frequency
US 61	LA 67	Intersection	Crash Frequency
US 190	LA 16	Intersection	Crash Frequency
LA 30	Bob Pettit	Intersection	Crash Frequency
LA 447	Pendarvis	Intersection	Crash Frequency
US 61	LA 44	Intersection	Crash Frequency
LA 427	LA 3064	Intersection	Crash Frequency
LA 427	College	Intersection	Crash Frequency
LA 73	St. Ferdinand	Intersection	Crash Frequency
LA 42	Boyd	Intersection	Crash Frequency
LA 19	LA 64	Intersection	Crash Frequency

Route	Location	Type	Issue
US 190	LA 1032	Intersection	Crash Frequency
LA 73	Foster	Intersection	Crash Frequency
LA 427	LA 3246	Intersection	Crash Frequency
US 190	LA 447	Intersection	Crash Frequency
LA 30	Brightside	Intersection	Crash Frequency
LA 3002	LA 3003	Intersection	Crash Frequency
LA 42	Boyd	Intersection	Crash Rate
LA 30	Bob Pettit	Intersection	Crash Rate
US 190	LA 447	Intersection	Crash Rate
LA 30	Brightside	Intersection	Crash Rate
LA 447	I-12	Intersection	Crash Rate
LA 3002	LA3003	Intersection	Crash Rate
LA 30	LA 44	Intersection	Crash Rate
LA 73	St. Ferdinand	Intersection	Crash Rate
US 61	LA 67	Intersection	Crash Rate
US 190	LA 16	Intersection	Crash Rate
LA 42	BOYD	Intersection	Crash Rate
LA 30	Bob Pettit	Intersection	Crash Rate
US 190	LA 447	Intersection	Crash Rate
LA 30	Brightside	Intersection	Crash Rate

Source: LADOTD, 2019;

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.

- Airline Highway
- Florida Boulevard
- Government Street
- I-110
- I-12
- LA 30
- Sherwood Forest Boulevard
- US 61

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 2020 to 2045, leading to an increase in freight traffic on the MPA freight network. This increase in freight traffic will lead to increased congestion and a degrading of the freight network. However, projects in the MPA that address freight needs can improve the region's safety and economic competitiveness.

5.1 Freight Truck Needs

This section summarizes future freight truck movement and needs. Freight projections indicate that the truck mode will have an increase in freight tonnage and value between 2017 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 Louisiana Freight Network, which include:

- I-10 East-West Corridor
- US-190 East-West Corridor
- US-61 Northwest-Southeast Corridor
- LA-1 North-Southeast Corridor
- I-110 North-South Corridor

Mobility

The Freight Analysis Framework (FAF) data can be used to understand the projected growth in freight truck commodity flows between 2017 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.

Commodity Flow Growth

As shown in *Technical Report: Existing Conditions*, the truck mode accounts for 21 percent of the freight truck tonnage and 30 percent of freight value moved into, out of, and within the MPA in 2017. By 2045, the freight truck tonnage share is projected to increase to 22 percent, while the freight truck value share is projected to increase to 34 percent.

Table 5.1 shows the growth in freight tonnage and freight value for trucks in the MPA between 2017 and 2045, as projected by the Freight Analysis Framework (FAF).[18] The following observations emerge in the MPA:

- The Outbound (Interstate)movement tonnage is projected to be the largest tonnage increase, increasing by approximately 12,366 million tons.
- The Outbound (Interstate)movement value is projected to be the largest value increase, increasing by approximately $13,963 billion.
- The Inbound and Outbound intrastate tonnage is projected to increase by 4,460 million tons and 12,520 million tons by 2045 (total of 16,980 million tons). The intrastate freight value increase was 10,899 million.
- A total of 41,454 million increase in value are projected from 2017 to 2045 (increase of 88 percent.
- Outbound tonnage percent growth is projected to be larger (increase of 93 percent) than inbound tonnage percent growth (increase of 30 percent).
- Between 2017 and 2045, the total truck tonnage is projected to increase by 58 percent, and the total truck freight value is projected to increase by 88 percent.

Table 5.1: Changes in Commodity Flows by Truck, 2017 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2017	2045	Change	Percent Change	2017	2045	Change	Percent Change
Inbound (Interstate)	6,153	9,842	3,689	60%	11,514	21,621	10,108	88%
Inbound (Intrastate)	21,380	25,839	4,460	21%	7,064	11,865	4,801	68%
Outbound (Interstate)	9,149	21,516	12,366	135%	11,303	25,266	13,963	124%
Outbound (Intrastate)	17,626	30,147	12,520	71%	6,788	12,887	6,098	90%
Within MPA	21,075	31,593	10,517	50%	10,638	17,123	6,484	61%
Total	75,384	118,936	43,553	58%	47,307	88,761	41,454	88%

Source: Freight Analysis Framework 5.

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 2017 and 2045, respectively. Most of the

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

partners with the largest increases are New Orleans and Rest of Louisiana. The partner with the largest tonnage increase is New Orleans.

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

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2017	2045		
1	New Orleans LA-MS (LA Part)	6,386	9,377	2,992	46.9%
2	Rest of LA	14,627	15,397	770	5.3%
3	Lake Charles-Jennings LA	367	1,065	698	190.2%
4	Houston TX	769	1,457	688	89.5%
5	Mississippi	1,041	1,341	300	28.8%
6	Beaumont TX	235	529	293	124.7%
7	Cincinnati OH-KY-IN (OH Part)	579	807	228	39.4%
8	Dallas-Fort Worth TX-OK (TX Part)	337	555	217	64.4%
9	Rest of KY	119	270	150	126.1%
10	Rest of FL	152	301	150	98.7%

Source: Freight Analysis Framework 5

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

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2017	2045		
1	New Orleans LA-MS (LA Part)	11,432	18,261	6,829	59.7%
2	Rest of LA	5,387	9,574	4,187	77.7%
3	Houston TX	2,029	4,990	2,961	145.9%
4	Beaumont TX	1,221	3,188	1,967	161.1%
5	Lake Charles-Jennings LA	808	2,312	1,504	186.1%
6	New York NY-NJ-CT-PA (NJ Part)	757	2,026	1,269	167.6%
7	Mississippi	806	1,458	652	80.9%
8	Rest of AL	289	793	504	174.4%
9	Arkansas	337	824	487	144.5%
10	Rest of TX	528	981	453	85.9%

Source: Freight Analysis Framework 5

Table 5.4 and Table 5.5 show the top freight truck commodities by tonnage and value increases between 2017 and 2045, respectively. By tonnage, the largest increase is Basic chemicals. By value, the largest increase is Basic chemicals.

Table 5.4: Top Commodities by Truck Tonnage Increase

Rank	Commodity	Tons (thousand)		Change	Percent Change
		2017	2045		
1	Basic chemicals	11,949	32,500	20,551	172.0%
2	Nonmetal min. prods.	5,836	8,740	2,904	49.8%
3	Plastics/rubber	1,551	4,031	2,480	159.9%
4	Gravel	2,882	4,881	1,999	69.4%
5	Fertilizers	1,321	3,235	1,913	144.8%
6	Chemical prods.	1,209	2,866	1,657	137.1%
7	Other foodstuffs	2,271	3,814	1,543	67.9%
8	Fuel oils	6,433	7,878	1,445	22.5%
9	Other ag prods.	17,181	18,330	1,149	6.7%
10	Logs	1,955	3,085	1,130	57.8%

Source: Freight Analysis Framework 5

Table 5.5: Top Commodities by Truck Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2017	2045		
1	Basic chemicals	4,509	11,954	7,445	165.1%
2	Pharmaceuticals	3,711	10,228	6,517	175.6%
3	Plastics/rubber	3,111	7,843	4,732	152.1%
4	Chemical prods.	2,996	7,130	4,135	138.0%
5	Misc. mfg. prods.	1,641	4,107	2,466	150.3%
6	Mixed freight	3,172	5,631	2,459	77.5%
7	Motorized vehicles	2,858	5,078	2,220	77.7%
8	Electronics	1,676	3,161	1,485	88.6%
9	Machinery	2,738	4,190	1,452	53.0%
10	Other foodstuffs	1,549	2,541	991	64.0%

Source: Freight Analysis Framework 5

Roadway Capacity

Roadways that have the highest freight truck traffic in 2020 are shown in *Technical Report: Existing Conditions*. These roadways are expected to see an increase in truck traffic between 2020 and 2046. Figure 5.1 illustrates where growth in freight truck traffic is anticipated to be the highest while Figure 5.2 shows the estimated 2046 truck volumes on the MPA's roadway network.

The largest increases in freight truck traffic are on:

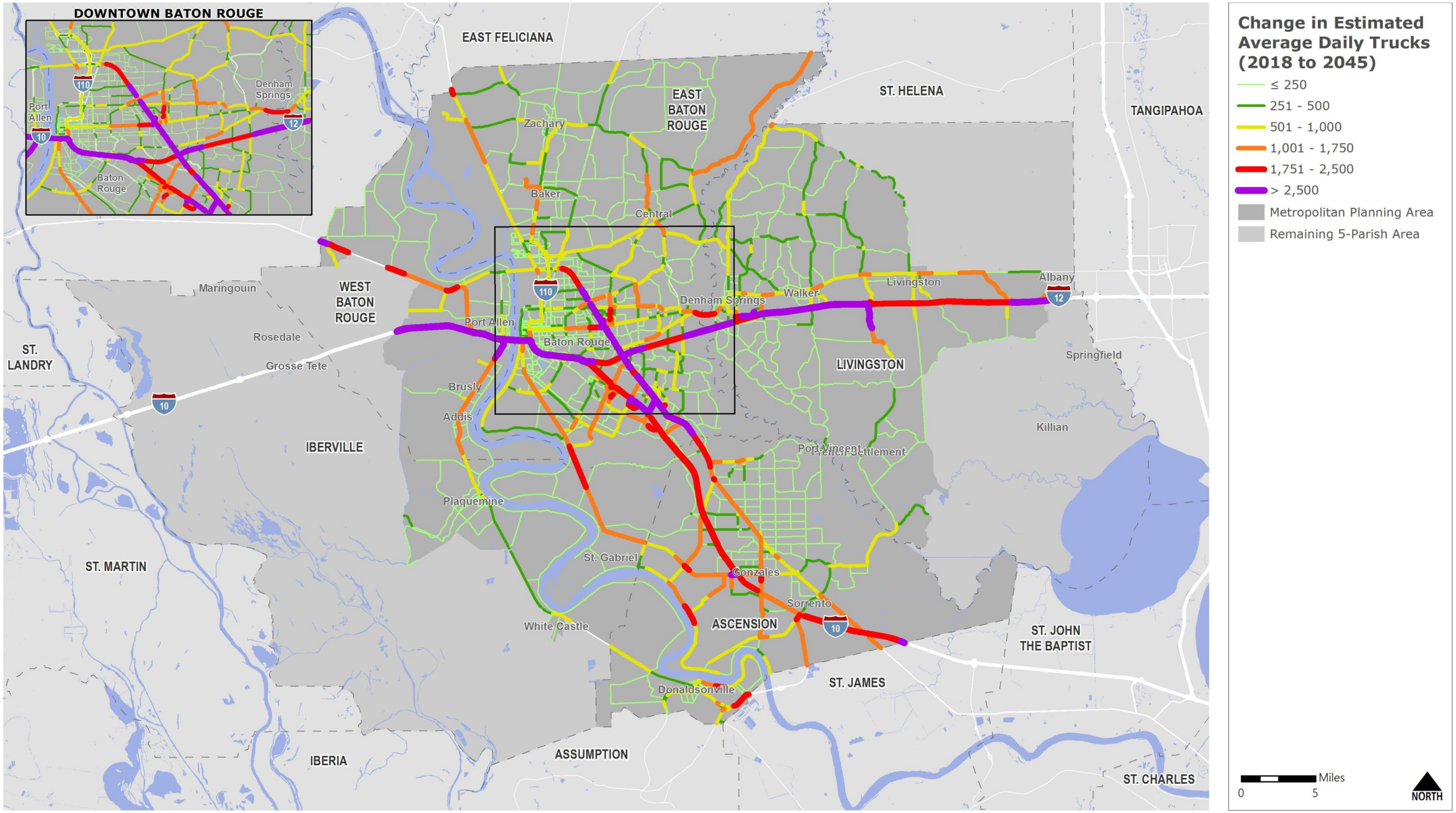
- I-10 from I-12 interchange I-110 interchange
- I-10 from LA 1 to I-110 interchange
- US 61 from LA 73 to Florida Blvd
- LA 415 Sun Plus Pkwy to I-10
- US 61 from Pecue Ln to LA 73

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: Existing Conditions*. Although future TTTR cannot be estimated, the Interstates that currently experience reliability issues are projected to experience increased 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.

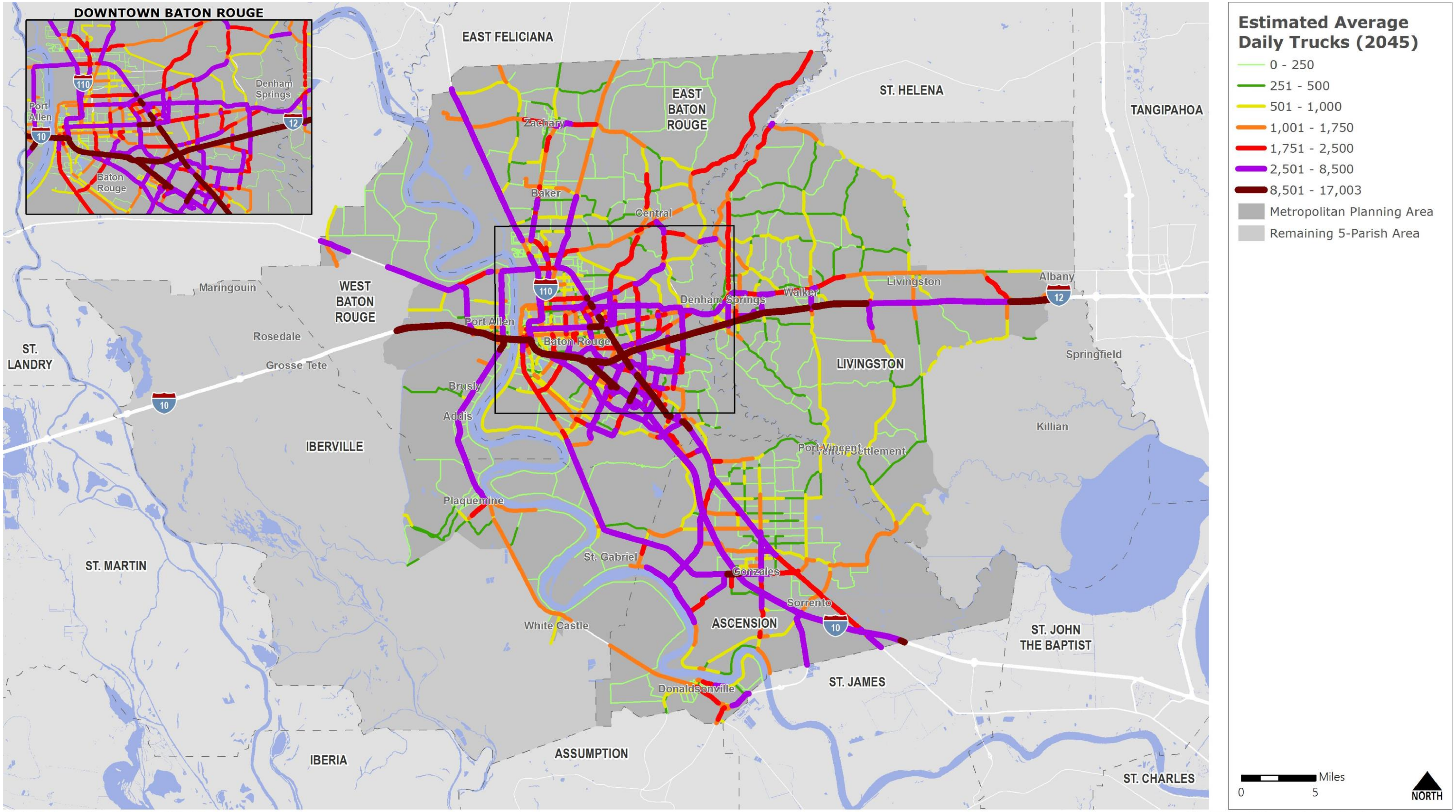
Figure 5.1: Freight Truck Growth, 2020 to 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

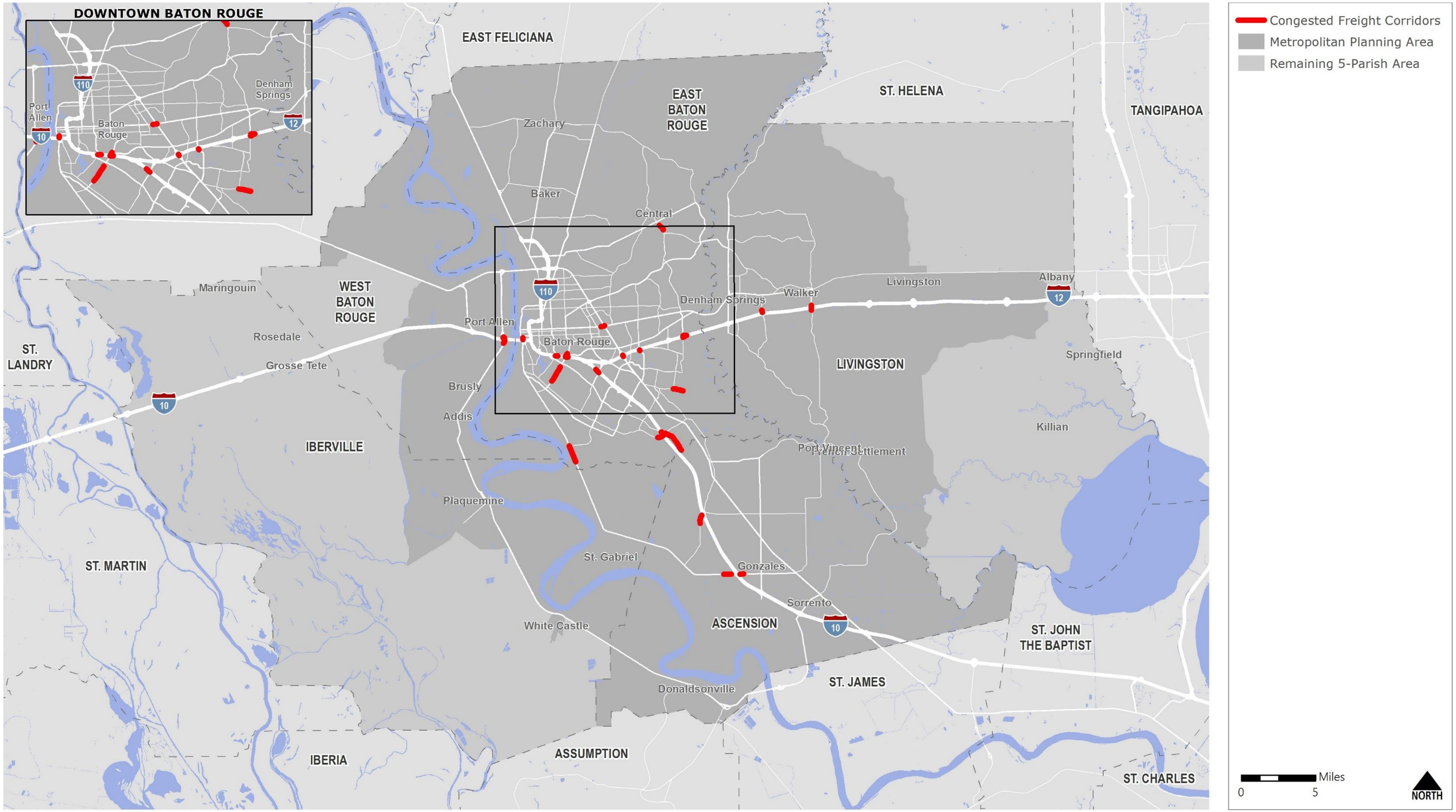
Figure 5.2: Freight Truck Traffic, 2045



Data Sources: Travel Demand Model

Disclaimer: This map is for planning purposes only.

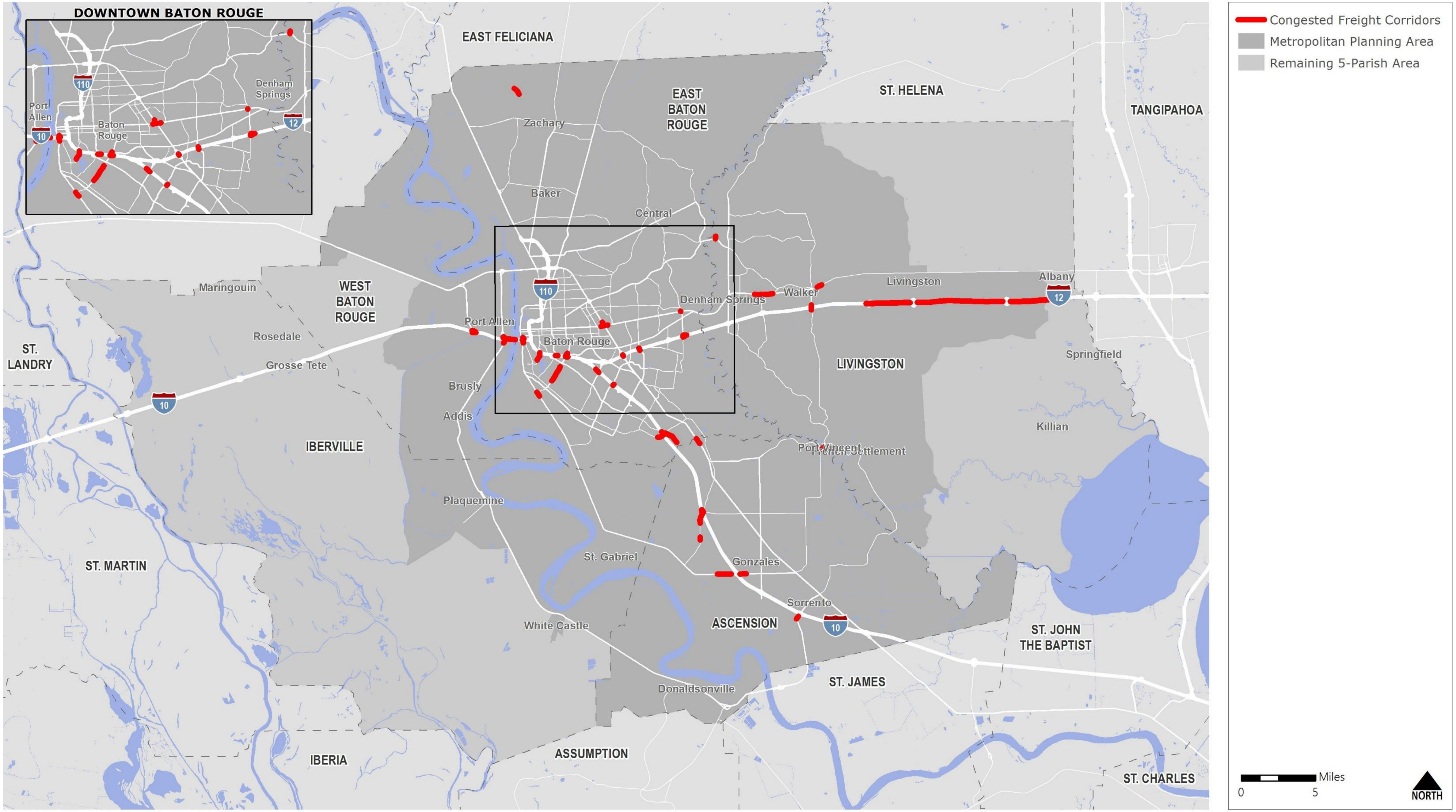
Figure 5.3: Congested Freight Truck Corridors, 2020



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 Technical Report: Existing Conditions and in Section 4.2 of this report. There are 19 bridges in "Poor" condition are on the Baton Rouge MPA NHS system. 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 “LADOTD BRIDGE DESIGN AND EVALUATION MANUAL” has specified that the minimum vertical clearance for bridges crossing over Freeways and Arterials is 16.5 feet. There are currently 73 bridges over freeways/arterials in the MPA that have a vertical clearance of less than 16.5 feet.

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 *Technical Report: Existing Conditions* and in Section 4.2 of this report. The Baton Rouge MPA network roadways in the MPA with "Poor" pavement conditions exist throughout the entire MPA and cover an extensive area. 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: Existing Conditions*. Eight (8) intersections experienced more than ten (10) heavy vehicle crashes during the study period (2015-2019). Furthermore, there were five (5) segments in the MPA that experienced most of the heavy vehicle crashes between 2015 and 2019.

5.2 Freight Rail Needs

This section summarizes future freight rail movement and needs. Increases in freight rail commodity flows will lead to an increase in rail traffic on railroads. Most railroads in the MPA are on the state freight network., which include the following Tier I railroads:

- The Kansas City Southern Railroad, running alongside the I-10 and US-61 corridors
- The Canadian Northern Railroad, running alongside the US-190 and Choctaw Street
- The Canadian Northern Railroad, running North/South alongside the Mississippi River (East Side)
- The Unition Pacific Railroad, running North/South alongside the Mississippi River (West Side)
- The Royal Gorge Route Railroad, running North alongside LA-19 North of Baton Rouge
- The Acadiana Railway Co runs on a short segment south of the MPO connecting to the Union Pacific Railways

Mobility

The FAF data can be used to understand the projected growth in freight rail commodity flows between 2017 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: Existing Conditions, the rail mode accounts for approximately 10 percent of freight tonnage and 8 percent of freight value in the MPA in 2017. By 2045, the freight truck tonnage share is projected to 12 percent, while the freight truck value share is projected to 12 percent.

Table 5.6 shows the growth in freight tonnage and freight value for rail in the MPA between 2017 and 2045, as projected by the Freight Analysis Framework 5 (FAF5). The following observations emerge in the MPA:

- The Outbound (Interstate) movement is projected to be the largest tonnage increase, by approximately 11,100 thousand tons.
- The Outbound (Interstate) movement is projected to be the largest value increase, increasing nearly $7,100 million.

- The increase in interstate tonnage is projected to be 11,320 thousand tons and $8,078 million while the increase in intrastate tonnage and value are 7,207 thousand tons and $1,209 million.
- The Outbound tonnage increase (11,594 thousand tons) is projected to be greater than the Inbound tonnage increase (6,933 thousand tons).
- Between 2017 and 2045, the truck tonnage is projected to increase by 76 percent, and the truck freight value is projected to increase by 140 percent.

Table 5.6: Changes in Commodity Flows by Rail, 2017 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2017	2045	Change	Percent Change	2017	2045	Change	Percent Change
Inbound (Interstate)	7,761	7,933	173	2%	1,804	2,785	980	54%
Inbound (Intrastate)	14,607	21,368	6,761	46%	385	1,023	637	165%
Outbound (Interstate)	7,128	18,276	11,148	156%	4,677	11,774	7,097	152%
Outbound (Intrastate)	233	680	447	192%	313	884	572	183%
Within MPA	6,438	15,329	8,891	138%	5,838	14,745	8,907	153%
Total	36,167	63,586	27,418	76%	13,017	31,211	18,194	140%

Source: Freight Analysis Framework 5

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 2017 and 2045, respectively. Most of these partners are located in the New Orleans or Houston.

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

Rank	Trading Partner	Tons (Thousand) 2017	Tons (Thousand) 2045	Change	Percent Change
1	New Orleans LA-MS (LA Part)	14,367	20,654	6,287	43.8%
2	North Dakota	1,166	2,599	1,433	122.9%
3	Lake Charles-Jennings LA	240	713	472	196.7%
4	Houston TX	329	782	453	137.7%
5	Cleveland OH	981	1,361	380	38.7%
6	Rest of TX	146	331	185	126.7%
7	Philadelphia PA-NJ-DE-MD (DE Part)	60	179	119	198.3%
8	Rest of AL	86	202	116	134.9%
9	Mobile AL	73	174	101	138.4%
10	Tampa FL	11	111	100	909.1%

Source: Freight Analysis Framework 5

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

Rank	Trading Partner	Tons (Thousand) 2017	Tons (Thousand) 2045	Change	Percent Change
1	Houston TX	1,770	4,794	3,023	170.8%
2	Charleston SC	564	1,622	1,057	187.4%
3	Cincinnati OH-KY-IN (KY Part)	551	1,336	785	142.5%
4	St. Louis MO-IL (IL Part)	358	1,085	727	203.1%
5	Rest of TX	442	1,153	711	160.9%
6	Mississippi	388	1,060	672	173.2%
7	Detroit MI	274	574	300	109.5%
8	New Orleans LA-MS (LA Part)	110	338	228	207.3%
9	Chicago IL-IN-WI (IL Part)	128	348	219	171.1%
10	Rest of GA	94	270	176	187.2%

Source: Freight Analysis Framework 5

Table 5.9 and Table 5.10 show the top rail freight commodities by tonnage and value increases between 2017 and 2045, respectively. By tonnage and by value, the largest increase is Basic Chemicals.

Table 5.9: Top Commodities by Rail Tonnage Increase

Rank	Commodity	Tons (thousand)		Change	Percent Change
		2017	2045		
1	Basic chemicals	5,387	15,113	9,725	180.5%
2	Plastics/rubber	5,943	14,128	8,185	137.7%
3	Gravel	14,293	20,452	6,160	43.1%
4	Fertilizers	1,568	3,872	2,305	147.0%
5	Chemical prods.	770	1,828	1,058	137.4%
6	Crude petroleum	2,443	3,178	734	30.0%
7	Other ag prods.	992	1,473	481	48.5%
8	Wood prods.	302	683	381	126.2%
9	Coal-n.e.c.	254	433	180	70.9%
10	Animal feed	247	348	101	40.9%

Source: Freight Analysis Framework 5

Table 5.10: Top Commodities by Rail Value Increase

Rank	Commodity	Value ($ million) 2017	Value ($ million) 2045	Change	Percent Change
1	Basic chemicals	4,557	12,898	8,342	183.1%
2	Plastics/rubber	4,581	10,920	6,339	138.4%
3	Chemical prods.	1,468	3,555	2,086	142.1%
4	Fertilizers	351	852	501	142.7%
5	Crude petroleum	788	1,025	237	30.1%
6	Coal-n.e.c.	242	427	185	76.4%
7	Other ag prods.	347	529	182	52.4%
8	Wood prods.	76	162	86	113.2%
9	Machinery	48	95	46	95.8%
10	Gravel	79	114	35	44.3%

Source: Freight Analysis Framework 5

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 within the 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 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.

<u>Number of tracks</u>

Within the MPA, two hundred and eight (218) miles of railroad are single track while the remaining two (2) 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 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

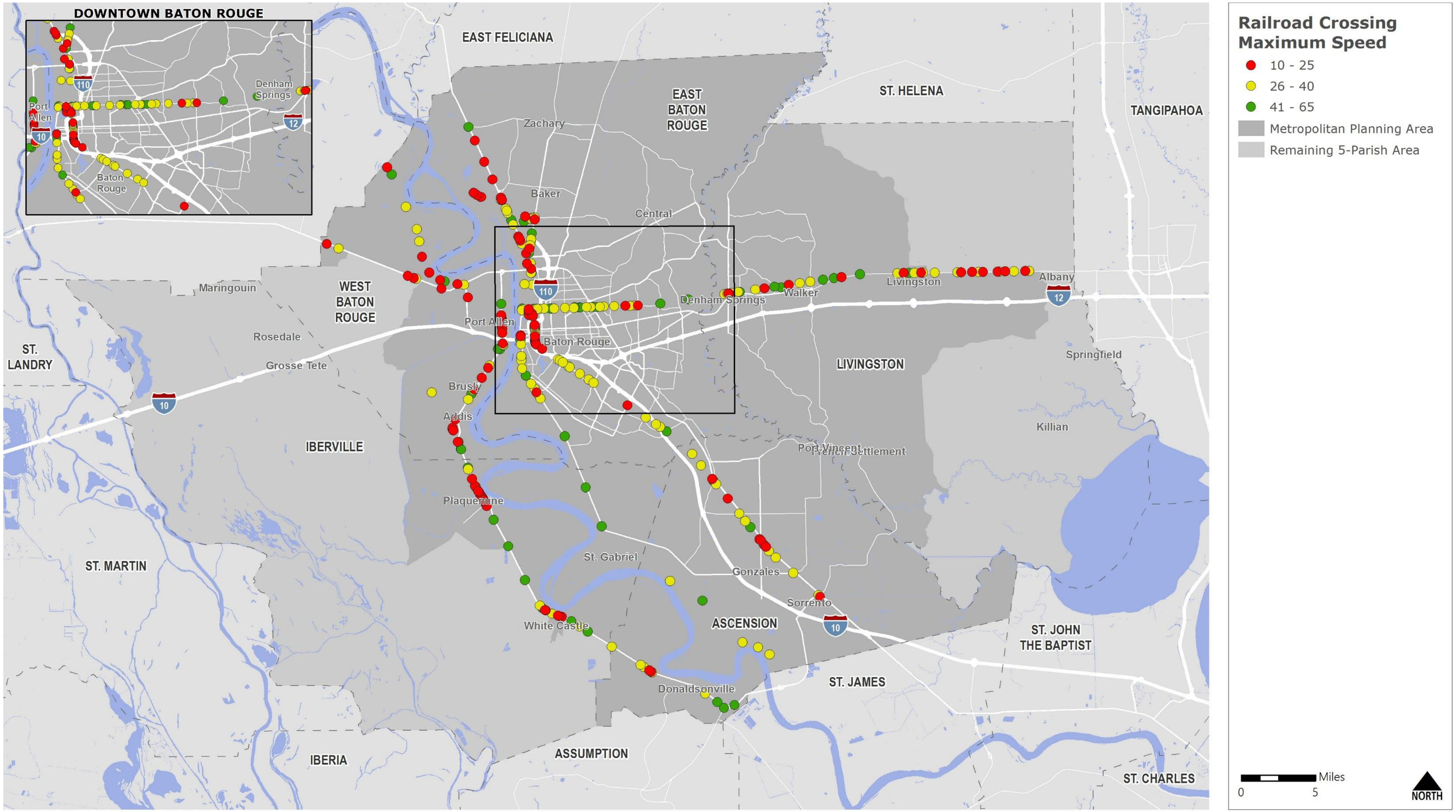
The average speed trains move on a corridor impacts capacity and effects the railroad's ability to move higher value, time-sensitive goods. Table 5.11 displays the total railroad crossings by maximum speed. Figure 5.5 illustrates the operating speeds at each crossing within the MPA.

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	117	39%
26 – 40 MPH	129	43%
Greater than 40 MPH	56	19%
Total	302	100%

Source: Federal Rail Administration

Figure 5.5: Railroad Crossing Speeds



Data Sources: Federal Rail Administration

Disclaimer: This map is for planning purposes only.

Rail assets can also have an impact on rail capacity and 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 "*LADOTD BRIDGE DESIGN AND EVALUATION MANUAL*" has specified that the minimum vertical clearance for bridges crossing over railroads is equal to the amount of vertical clearance provided shall be the stated vertical clearance provided by the railroad owner plus six (6) inches[19]. According to data from the NBI, there were 7 bridges crossing over railroads in the MPA that had a vertical clearance that was less than 23.5 feet. One (1) 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 lines that branch from 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

[19]http://www.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Bridge_Design/BDEM%20New%20Manual/Parts,%20Volumes%20and%20Chapters/Part%20II%20-%20Design%20Specifications%20-%20Vol%201%20-%20Bridge%20Design/02%20Ch%202%20-%20Gen%20Design_Location%20Features.pdf

According to the *Louisiana State Rail Plan*[20], PTC will be required on the following railroads within Louisiana that pass through the MPA:

- **BNSF** – That portion of track between New Orleans and Lake Charles over which Amtrak's Sunset Limited operates thrice weekly out of New Orleans and thrice weekly into New Orleans, particularly portions of track that carry poisonous-inhalation-hazardous materials. The increase in rail efficiency from PTC will contribute to climate change adaptation by streamlining locomotive operations, reducing time spent in emitting GHGs.
- **KCS** – No passenger trains operate over KCS lines in Louisiana. However, all portions of track that carry poisonous-inhalation-hazardous materials are subject to implementation of PTC. The increase in rail efficiency from PTC will contribute to climate change adaptation by streamlining locomotive operations, reducing time spent in emitting GHGs.

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.[21] However, this deadline was extended from 2015 to December 31, 2018. As of Q4 2018, KCS has completed PTC equipment on its locomotives and tracks.[22]

Safety

As shown in *Technical Report: Existing Conditions*, there were 78 crashes in the MPA that involved an automobile and a train between 2015 and 2019. Three (3) of those crashes resulted in a fatality and one (1) resulted in a life-threatening injury. Additionally, there were 33 train derailments in the MPA between 2015 and 2019.

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.

[20] http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Marine_Rail/Misc%20Documents/2020%20Louisiana%20Rail%20Plan.pdf

[21] https://railroads.dot.gov/train-control/ptc/positive-train-control-ptc-information-rd

[22] https://www.fra.dot.gov/app/ptc/Q4%20Oct.%201%E2%80%94Dec.%2031,%202018

Highway-Railroad Crossings

Technical Report: Existing Conditions shows that there are 106 public highway-rail grade crossings within the MPA. Of those crossings, 46 possess only passive warning devices. These include cross bucks, warning signs, regulatory signs, and pavement markings.

Within the MPA there were three (3) roadway-railroad crossings that experienced more than one (1) automobile-train collision between 2015 and 2019, one(1) of which 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.

Louisiana was one of the ten (10) states that was required to develop state highway-rail grade action plans.

Derailments

There were thirty-three (33) derailments in the MPA between 2015 and 2019; none of which 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.

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: Existing Conditions*. The airports in the MPA are:

- Baton Rouge Metropolitan Airport
- Louisiana Regional Airport

Baton Rouge Metropolitan 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 that has cargo data.

Capacity Needs

The FAF data can be used to understand the projected growth in freight air commodity flows between 2017 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: Existing Conditions*, the air mode accounts for approximately zero percent of freight tonnage and approximately zero percent of freight value in the MPA in 2017. By 2045, the tonnage share and the corresponding projected values to remain at zero percent. The air tonnage is projected to increase by over 7 thousand tons between 2017 and 2045, and the value of freight shipped by air is projected to increase by $618 million between 2017 and 2045.

The following trading partners with the largest increases in inbound and outbound air tonnage being traded with the MPA between 2017 and 2045 are:

Inbound

1. Houston TX
2. Memphis TN-MS-AR (TN Part)
3. Atlanta GA
4. Dallas-Fort Worth TX-OK (TX Part)
5. Vermont

Outbound

1. Houston TX
2. Dallas-Fort Worth TX-OK (TX Part)
3. Miami FL
4. Chicago IL-IN-WI (IL Part)
5. Memphis TN-MS-AR (TN Part)

Table 5.12 and Table 5.13 show the top air freight commodities by tonnage and value increases between 2017 and 2045, respectively. By tonnage and by value, the largest increase is almost 207 percent.

Table 5.12: Top Commodities by Air Tonnage Increase

Rank	Commodity	Tons (hundred)		Change	Percent Change
		2017	2045		
1	Machinery	2.21	4.04	1.83	82.8%
2	Precision instruments	0.82	1.77	0.94	114.6%
3	Plastics/rubber	0.67	1.44	0.76	113.4%
4	Textiles/leather	0.29	0.89	0.6	206.9%
5	Articles-base metal	0.47	0.96	0.49	104.3%
6	Electronics	0.37	0.83	0.46	124.3%
7	Animal feed	0.17	0.5	0.33	194.1%
8	Misc. mfg. prods.	0.2	0.48	0.27	135.0%
9	Chemical prods.	0.41	0.61	0.2	48.8%
10	Pharmaceuticals	0.1	0.28	0.17	170.0%

Source: Freight Analysis Framework 5

Table 5.13: Top Commodities by Air Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2017	2045		
1	Precision instruments	132.89	291.02	158.13	119.0%
2	Machinery	148.63	263.45	114.83	77.3%
3	Transport equip.	61.02	129.55	68.52	112.3%
4	Misc. mfg. prods.	51.09	117.53	66.43	130.0%
5	Pharmaceuticals	34.46	93.34	58.88	170.9%
6	Electronics	35.75	79.25	43.5	121.7%
7	Animal feed	20.02	50.6	30.59	152.8%
8	Basic chemicals	18.15	34.73	16.58	91.3%
9	Textiles/leather	8.06	23.85	15.8	196.0%
10	Plastics/rubber	12.62	25.75	13.13	104.0%

Source: Freight Analysis Framework 5

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)	
Baton Rouge Metropolitan Airport	4L/22R	7,500	150	Excellent
	13/31	7,005	150	Good
	4R/22L	3,799	75	Fair
Louisiana Regional Airport	17/35	5003	100	Excellent

Source: AirNav

Baton Rouge Metropolitan Airport is slightly smaller than might be expected for a city and metro area of its size due in part to its proximity to New Orleans Armstrong International Airport. Despite advertising campaigns encouraging catchment area residents to utilize the airport, passenger numbers are in the FAA's small-hub classification (slightly over 800,000 passengers per year). However, the airport is the second largest in Louisiana by passenger volume and is served by the major network airlines: American, Delta, and United. With service to some of largest hub airports in the U.S., connections are available to and from destinations worldwide.

Airport Projects

Planned updates for Baton Rouge Metropolitan Airport and Louisiana Regional Airport can be found in their respective master plans. The following funded projects in the MPA's airports reported by the LADOTD[23]:

- Baton Rouge Metropolitan Airport
  - Runway 13-31 Runway Safety Area and Protection Zone Improvements - Phase IV
  - Runway 4L/22R Rehabilitation - Phase II

[23] http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Aviation/Pages/Construction_Development.aspx

- Runway 13-31 Runway Safety Area and Protection Zone Improvements - Phase V (Threshold Recovery)
  - North General Aviation Development - Area I Apron Phase I (Design)
  - North General Aviation Development - Area I Apron Phase I (Design)
  - Northwest General Aviation Taxi-lane Lighting
- Louisiana Regional Airport
  - Aviation Fuel System Rehabilitation
  - Terminal Apron Reconstruction - Phase I (Preliminary Engineering Report)
  - Terminal Apron Reconstruction - Phase II (Design)
  - Terminal Apron Reconstruction - Phase III (Construction)
  - Drainage Improvements - Phase I (Design)
  - Box Hangar Development - Phase II (Construction)

5.4 Waterway Network Needs

This section summarizes future waterway freight conditions. Although the amount of freight shipped through waterways. Table 5.16 and Table 5.17 show the top ten (10) inbound and outbound domestic trading partners in the MPA by waterways tonnage increases between 2017 and 2045, respectively.

Table 5.15: Changes in Commodity Flows by Waterways, 2017 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2017	2045	Change	Percent Change	2017	2045	Change	Percent Change
Inbound (Interstate)	19,945	26,902	6,957	35%	5,995	10,640	4,644	77%
Inbound (Intrastate)	17,047	28,946	11,898	70%	4,584	7,588	3,003	66%
Outbound (Interstate)	13,031	26,110	13,079	100%	4,476	10,259	5,784	129%
Outbound (Intrastate)	28,460	47,844	19,384	0%	7,891	13,190	5,299	0%
Within MPA	4,538	7,902	3,365	0%	1,631	2,644	1,013	0%
Total	83,021	137,704	54,683	66%	24,578	44,321	19,743	80%

Source: Freight Analysis Framework 5

This section summarizes future waterway freight conditions. Although the amount of freight shipped through waterways. Table 5.16 and Table 5.17 show the top ten (10) inbound and outbound domestic trading partners in the MPA by waterways tonnage increases between 2017 and 2045, respectively.

Table 5.16: Top Inbound Waterway Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2017	2045		
1	New Orleans LA-MS (LA Part)	8,028	14,613	6,585	82.0%
2	St. Louis MO-IL (IL Part)	4,681	10,498	5,818	124.3%
3	Rest of LA	6,646	10,793	4,147	62.4%
4	Baton Rouge LA	4,538	7,902	3,365	74.2%
5	Lake Charles-Jennings LA	2,374	3,540	1,166	49.1%
6	Tulsa OK	1,195	1,980	784	65.6%
7	Rest of TX	1,428	1,942	514	36.0%
8	Beaumont TX	248	649	401	161.7%
9	Mississippi	428	790	363	84.8%
10	Rest of IN	804	1,150	346	43.0%

Source: Freight Analysis Framework 5

Table 5.17: Top Outbound Waterway Trading Partners with Largest Increases in Trading Activity with MPA

Rank	Trading Partner	Tons (Thousand)		Change	Percent Change
		2017	2045		
1	New Orleans LA-MS (LA Part)	22,616	38,419	15,803	69.9%
2	Houston TX	4,105	9,092	4,988	121.5%
3	Baton Rouge LA	4,538	7,902	3,365	74.2%
4	Beaumont TX	1,894	3,787	1,893	99.9%
5	Lake Charles-Jennings LA	3,802	5,600	1,798	47.3%
6	Rest of LA	2,042	3,825	1,783	87.3%
7	Chicago IL-IN-WI (IL Part)	875	2,582	1,707	195.1%
8	Mississippi	3,252	4,587	1,336	41.1%
9	Miami FL	933	1,725	792	84.9%
10	Cleveland OH	773	1,315	542	70.1%

Source: Freight Analysis Framework 5

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 largest increase in freight tonnage and largest increase in freight value between 2017 and 2045. As shown in *Technical Report: Existing Conditions*, the MPA's pipeline network currently consists of approximately 946 miles of pipelines; most of the pipelines by length are natural gas, petroleum products, and crude oil 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 2017 and 2045.

Commodity Flow Growth

The tonnage shipped by pipelines is projected to grow 24 percent between 2017 and 2045. The value of freight shipped by pipelines is projected to grow 10 percent between 2017 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. A summary of inbound and outbound trade changes from 2017 to 2045 is provided is in Table 5.18.

Table 5.18: Changes in Commodity Flows by Pipeline, 2017 to 2045

Direction	Tons (Thousand)				Value ($ million)			
	2017	2045	Change	2017	2045	2045	2017	2045
Inbound (Interstate)	36,139	54,874	18,735	51.8%	9,346	13,626	4,280	45.8%
Inbound (Intrastate)	42,625	48,117	5,492	12.9%	17,669	17,563	-106	-0.6%
Outbound (Interstate)	30,110	30,130	20	0.1%	13,003	12,025	-978	-7.5%
Outbound (Intrastate)	1,732	2,083	351	20.3%	469	501	31	6.7%
Within MPA	25,022	32,615	7,593	30.3%	10,367	12,367	2,000	19.3%
Total	135,628	167,819	32,191	23.7%	50,855	56,082	5,227	10.3%

Source: Freight Analysis Framework 5

The following trading partners with the largest increases in inbound and outbound pipeline tonnage being traded with the MPA between 2017 and 2045 are:

Inbound

1. Rest of LA
2. Rest of TX
3. Mississippi
4. Arkansas
5. Laredo TX

Outbound

1. Mississippi
2. Dallas-Fort Worth TX-OK (TX Part)
3. Houston TX
4. Rest of PA
5. Rest of OH

Table 5.19 and Table 5.20 show the top pipeline freight commodities by tonnage and value increases between 2017 and 2045, respectively. By tonnage and by value, the largest increase is Coal-n.e.c.

Table 5.19: Top Commodities by Pipeline Tonnage Increase

Rank	Commodity	Tons (hundred)		Change	Percent Change
		2017	2045		
1	Coal-n.e.c.	37,417	68,014	30,597	81.8%
2	Basic chemicals	2,126	6,305	4,179	196.6%
3	Crude petroleum	22,647	26,174	3,527	15.6%
4	Fuel oils	31,974	32,103	129	0.4%

Source: Freight Analysis Framework 5

Table 5.20: Top Commodities by Pipeline Value Increase

Rank	Commodity	Value ($ million)		Change	Percent Change
		2017	2045		
1	Coal-n.e.c.	7,752	14,137	6,385	82.4%
2	Crude petroleum	7,268	8,402	1,134	15.6%
3	Basic chemicals	450	1,334	884	196.4%
4	Fuel oils	14,415	14,426	11	0.1%

Source: Freight Analysis Framework 5

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

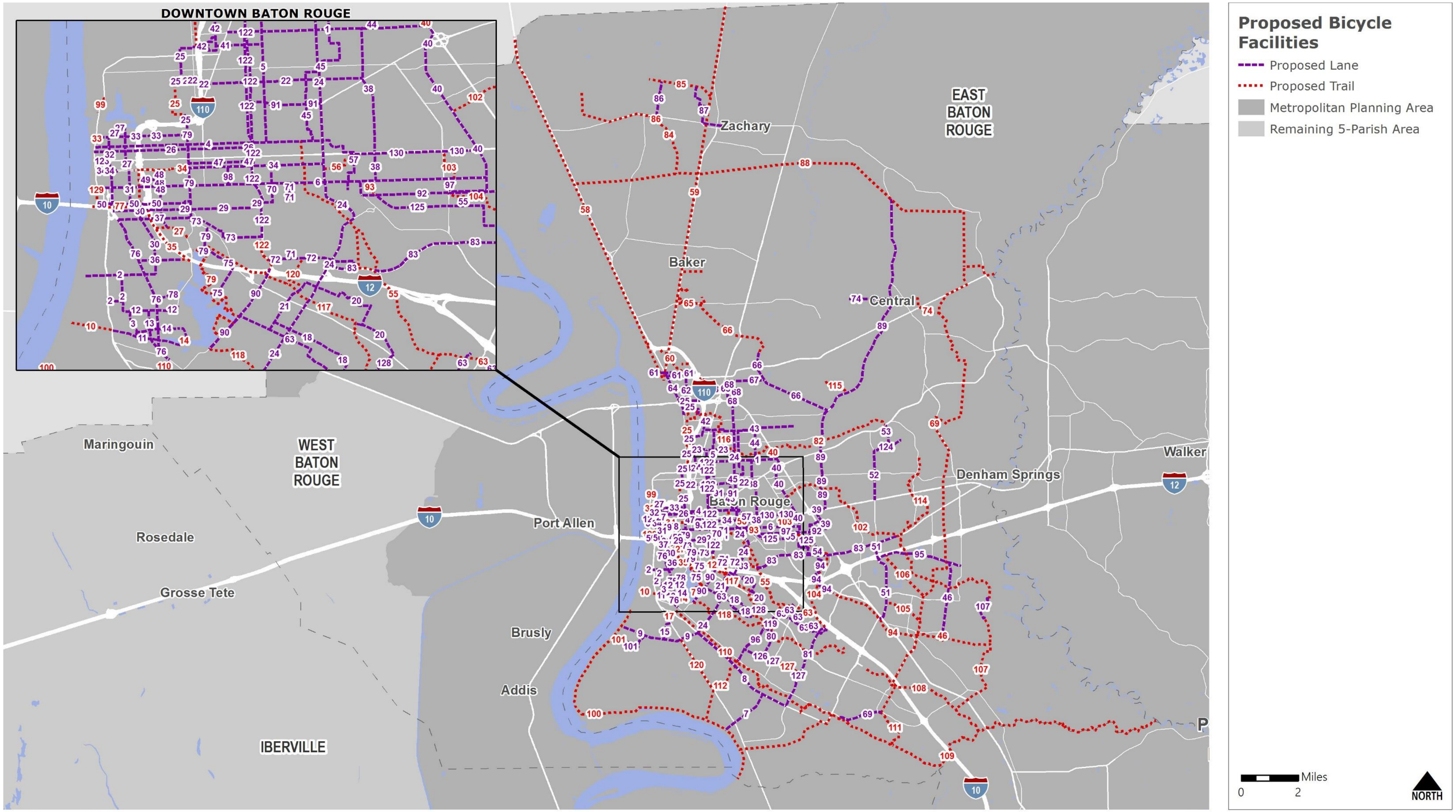
6.1 Infrastructure/Facility Needs

Table 6.1 lists all proposed projects identified through meetings with local jurisdictions in the Baton Rouge 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 a result of the fact that not everyone is a bicyclist but 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 Baton Rouge 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: CRPC

Disclaimer: This map is for planning purposes only.

Table 6.1: Proposed Bicycle and Pedestrian Facilities

Project ID	Street	Beginning Termini	Ending Termini	Bikeway Facility Type
1	Winbourne Avenue	Plank Road	Airline Highway	Separated Bike Lane
1	Winbourne Avenue	Plank Road	Airline Highway	Buffered Bike Lane
2	Multiple Streets	LSU	LSU	Bike Boulevard
3	Field House Drive	Dalrymple Drive	South Stadium Drive	Bike Lane
4	North Street	North River Road	North Foster Drive	Sidepath
4	North Street	North River Road	North Foster Drive	Separated Bike Lane
5	North Street	North River Road	North Foster Drive	Bike Boulevard
5	North Street	North River Road	North Foster Drive	Bike Lane
6	Government Street	South River Road	East Airport Avenue	Separated Bike Lane
7	Gardere Lane	River Road	Burbank Drive	Separated Bike Lane
8	Burbank Drive	West Lee Drive	Gardere Lane	Separated Bike Lane
9	Brightside Drive and West Lee Drive	River Road	Fountain Bayou	Sidepath
9	Brightside Drive and West Lee Drive	River Road	Fountain Bayou	Separated Bike Lane
10	Skip Bertman Drive	River Road	Nicholson Drive	Trail
11	South Stadium Drive	Nicholson Drive	Tower Drive	Bike Boulevard
11	South Stadium Drive	Nicholson Drive	Tower Drive	Bike Lane
12	Dalrymple Drive	Cubs Circle	Field House Drive	Buffered Bike Lane
13	Tower Drive	Dalrymple Drive	Highland Road	Bike Boulevard
14	Trail	West Lakeshore Drive	South Campus Drive	Trail
14	Trail	West Lakeshore Drive	South Campus Drive	Bike Boulevard
14	South Campus Drive	Field House Drive	West Lakeshore Drive	Bike Boulevard
15	Alvin Dark Avenue	Brightside Drive	Nicholson Drive	Sidepath
17	Trail	Nicholson Drive	Burbank Drive	Trail
18	Multiple Streets	Stuart Avenue	South Pollard Parkway	Bike Boulevard
20	Multiple Streets	Perkins Road	Ferrett Street	Bike Boulevard
21	Stuart Avenue	Hyacinth Avenue	Ferrett Street	Bike Boulevard
22	Fairfields Avenue	North 18th Street	North Ardenwood Drive	Bike Boulevard
22	Fairfields Avenue	North 18th Street	North Ardenwood Drive	Bike Lane
23	Mohican Street	Powhatan Street	Beechwood Drive	Separated Bike Lane
24	Foster Drive, College Drive, Lee Drive	Highland Road	Airline Highway	Buffered Bike Lane

24	Foster Drive, College Drive, Lee Drive	Highland Road	Airline Highway	Separated Bike Lane
24	Foster Drive, College Drive, Lee Drive	Highland Road	Airline Highway	Bike Lane
25	North-South Connector	Fuqua Street	Monte Sano Avenue	Trail
25	North-South Connector	Fuqua Street	Monte Sano Avenue	Bike Boulevard
26	Main Street	River Road	North Acadian Thruway	Bike Boulevard
26	Main Street	River Road	North Acadian Thruway	Separated Bike Lane
27	Downtown Greenway	Spanish Town Road	Dalrymple Drive	Trail
27	Downtown Greenway	Spanish Town Road	Dalrymple Drive	Bike Boulevard
27	Downtown Greenway	Spanish Town Road	Dalrymple Drive	Bike Lane
28	72nd Avenue	Scotlandville Parkway	Plank Road	Sidepath
29	Myrtle Avenue	Highland Road	South Acadian Thruway	Bike Lane
29	Myrtle Avenue	Highland Road	South Acadian Thruway	Bike Boulevard
30	Thomas Delpit Drive	South Boulevard	West McKinley Street	Bike Lane
31	Saint Joseph Street	North Boulevard	South Boulevard	Bike Boulevard
32	North 4th Street and South Ferdinand Street	Main Street	South Boulevard	Bike Lane
33	Spanish Town Road, Trail	North River Road	North 19th Street	Trail
33	Trail	North River Road	North 3rd Street	Trail
33	Spanish Town Road, Trail	North River Road	North 19th Street	Bike Boulevard
33	Spanish Town Road	North 3rd Street	North 19th Street	Bike Boulevard
34	North Boulevard	South River Road	North Foster Drive	Trail
34	North Boulevard	South River Road	North Foster Drive	Bike Boulevard
34	North Boulevard	South River Road	North Foster Drive	Separated Bike Lane
35	Trail	Louise Street	East Polk Street	Trail
36	East Polk Street	Highland Road	East Polk Street Park	Bike Boulevard
37	Terrace Avenue	Highland Road	Park Boulevard	Bike Lane
38	North Ardenwood Drive	Winbourne Avenue	Government Street	Bike Boulevard
38	North Ardenwood Drive	Winbourne Avenue	Government Street	Separated Bike Lane
39	Multiple Streets	Cortana Mall	Goodwood Boulevard	Bike Boulevard
40	Wooddale Boulevard, Trail	Howell Park	Goodwood Boulevard	Trail
40	Wooddale Boulevard, Trail	Howell Park	Goodwood Boulevard	Sidepath
40	Wooddale Boulevard	Winbourne Avenue	Goodwood Boulevard	Sidepath
40	Wooddale Boulevard	Winbourne Avenue	Goodwood Boulevard	Separated Bike Lane

41	Ontario Street	Cononicus Street	North 38th Street	Bike Boulevard
41	Ontario Street	Cononicus Street	North 38th Street	Bike Lane
42	Multiple Streets	Pocahontas Street	Monte Sano Bayou	Bike Boulevard
43	Sycamore Street, Byron Avenue, Hanks Drive	Longfellow Drive	Dickens Drive	Bike Boulevard
44	East Brookstown Drive	Byron Avenue	Winbourne Avenue	Sidepath
44	East Brookstown Drive	Byron Avenue	Winbourne Avenue	Bike Boulevard
45	Multiple Streets	Byron Avenue	North Street	Bike Boulevard
46	Jones Creek Road	Clay Cut Bayou	South Harrells Ferry Road	Trail
46	Jones Creek Road	Clay Cut Bayou	South Harrells Ferry Road	Buffered Bike Lane
47	Convention Street	North 19th Street	North Acadian Thruway	Bike Boulevard
48	East Robinson Drive	North Boulevard	Louise Street	Bike Boulevard
49	Louisiana Avenue	East Boulevard	Eddie Robinson Drive	Bike Boulevard
50	South Boulevard and South Street	South River Road	Park Boulevard	Bike Boulevard
50	South Boulevard and South Street	South River Road	Park Boulevard	Bike Lane
50	South Boulevard and South Street	South River Road	Park Boulevard	Separated Bike Lane
51	Sherwood Forest Road	Old Hammond Highway	Siegen Lane	Sidepath
52	Sherwood Forest Drive	Catalina Avenue	Florida Avenue	Sidepath
53	Monticello Boulevard	Greenwell Springs Road	Catalina Avenue	Buffered Bike Lane
54	Tara Boulevard	Goodwood Boulevard	Old Hammond Highway	Buffered Bike Lane
55	Trail	North Street	Dijon Drive	Trail
55	Cyril Avenue	North Street	Dijon Drive	Bike Boulevard
56	Trail	South Foster Drive	South Fairfax Drive	Trail
57	Multiple Streets	North Foster Drive	Capital Heights Avenue	Bike Boulevard
58	Trail	Harding Boulevard	LA 68	Trail
59	Trail	Meadowwood Drive	South of Harding Boulevard	Trail
60	Trail	Scotlandville Parkway	Highway 110	Trail
61	Multiple Streets	Farm Road	Emile Street	Bike Boulevard
62	Goudchaux Street and Pembroke Street	Scenic Highway	Fairchild Street	Bike Boulevard
63	Health Loop	Health Loop	Health Loop	Trail
63	Health Loop	Health Loop	Health Loop	Bike Lane
63	Health Loop	Health Loop	Health Loop	Sidepath
63	Health Loop	Health Loop	Health Loop	Bike Boulevard

64	Scenic Highway	Swan Avenue	Monte Sano bayou	Sidepath
65	Trail	Greenwood Community Park	Greenwood Community Park	Trail
66	Trail	Thomas Road	Joor Road	Trail
66	Mickens Road	Thomas Road	Joor Road	Sidepath
66	Cedar Glen Drive	Thomas Road	Joor Road	Bike Boulevard
67	Ford Street	Plank Road	Mickens Road	Separated Bike Lane
68	Multiple Streets	Plank Road	Airline Highway	Bike Boulevard
69	Trail	Greenwell Springs	River Road	Trail
69	Sidepath	Greenwell Springs	River Road	Sidepath
70	Steele Boulevard	North Boulevard	South Acadian Thruway	Bike Boulevard
71	Glenmore Avenue	Government Street	Bawell Street	Bike Boulevard
72	Bawell Street	South Acadian Thruway	Corporate Boulevard	Bike Boulevard
73	Magnolia Drive, Belmont Avenue, Hundred Oaks Avenue	Dalrymple Drive	South Acadian Thruway	Bike Boulevard
74	Trail and Gurney Road	Blackwater Road	Beaver Bayou	Trail
74	Trail and Gurney Road	Blackwater Road	Beaver Bayou	Sidepath
75	Hillsdale Drive, Christian Street	East Lakeshore Drive	East Lakeshore Drive	Bike Boulevard
76	Highland Road	Terrace Avenue	West Parker Boulevard	Sidepath
77	Trail	Levee Trail	East Boulevard	Trail
78	East State Street	Highland Road	Dalrymple Drive	Bike Boulevard
79	North-South Connector	Fuqua Street	Stanford Avenue	Trail
79	North-South Connector	Fuqua Street	Stanford Avenue	Buffered Bike Lane
79	North-South Connector	Fuqua Street	Stanford Avenue	Bike Boulevard
79	North-South Connector	Fuqua Street	Stanford Avenue	Bike Lane
80	Walden Road	Kenilworth Parkway	Boone Avenue	Bike Boulevard
81	Bluebonnet Boulevard	Burbank Drive	Mall of Louisiana	Sidepath
82	Trail	Elm Drive	Greenwell Springs Road	Trail
83	Corporate Boulevard	College Drive	Boulevard de Province	Sidepath
83	Corporate Boulevard	College Drive	Boulevard de Province	Separated Bike Lane
84	Trail	Flanacher Road Park	Comite Diversion Canal	Trail
85	Rollins Road	Old Scenic Highway	East Central Avenue	Trail
86	Fenwood Drive	Rollins Road	Zachary Youth Park Trail	Trail
86	Fenwood Drive	Rollins Road	Zachary Youth Park Trail	Bike Boulevard

87	Multiple Streets	Rollins Road	Church Street	Bike Boulevard
88	Trail	Samuel Road	Greenwell Springs Road	Trail
89	Sidepath, Separated Bike Lane	Comite Diversion Canal	Florida Boulevard	Sidepath
89	Trail, Sidepath, Separated Bike Lane	Comite Diversion Canal	Florida Boulevard	Sidepath
89	Sidepath, Separated Bike Lane	Comite Diversion Canal	Florida Boulevard	Separated Bike Lane
90	Stanford Avenue	West Lakeshore Drive	I-10	Sidepath
90	Stanford Avenue	West Lakeshore Drive	I-10	Buffered Bike Lane
91	Gus Young Avenue	North Acadian Thruway	North Foster Drive	Bike Lane
92	Goodwood Avenue	Jefferson Highway	Airline Highway	Sidepath
92	Goodwood Avenue	Jefferson Highway	Airline Highway	Separated Bike Lane
93	Winn Avenue	Government Street	Goodwood Avenue	Trail
94	Trail, Bike Boulevard	Old Hammond Highway	Elliot Road	Trail
94	Sidepath, Bike Boulevard	Old Hammond Highway	Elliot Road	Sidepath
94	Trail, Bike Boulevard	Old Hammond Highway	Elliot Road	Bike Boulevard
95	South harrell's Ferry Road	South Sherwood Forest Boulevard	O'Neal Lane	Sidepath
96	Kenilworth Parkway	Highland Road	Perkins Road	Separated Bike Lane
97	Sidepath	Lobdell Avenue	East Airport Avenue	Sidepath
98	South Eugene Street	North Boulevard	Government Street	Bike Lane
99	North River Road	Casino	Dort Street	Trail
100	Levee Trail	Farr Park Equestrian Center	Parish Line	Trail
101	Farr Horse Park Road	Levee Trail	Brightside Drive	Trail
101	Farr Horse Park Road	Levee Trail	Brightside Drive	Bike Boulevard
102	Trail	Wooddale Boulevard	St. Michael School	Trail
103	Trail	Florida Boulevard	Independence Boulevard	Trail
104	Trail	Goodwood Avenue	Ward Creek	Trail
105	Trail	South Sherwood Forest Boulevard	Cedar Ridge Avenue Park	Trail
106	Trail	South Harrell's Ferry Road	Tollway Drive	Trail
107	Trail, Bike Boulevard	Jones Creek	Ward Creek	Trail
107	Trail, Bike Boulevard	Jones Creek	Ward Creek	Bike Boulevard
108	Trail	South Mall Drive	East Baton Rouge Parish - Ascension Parish Line	Trail

109	Trail	Bluebonnet Boulevard	Galvez Town	Trail
110	Trail	West Parker Boulevard	Bluebonnet Boulevard	Trail
111	Trail	Highland Road	Trail	Trail
112	Trail	Highland Road	Levee Trail	Trail
114	Trail	Waddill Wildlife Refuge	Jones Creek	Trail
115	Trail	Joor Road	Cypress Bayou	Trail
116	Trail	Scenic Highway	Elm Drive	Trail
117	Trail	East Lakeshore Drive	Quail Drive	Trail
118	Trail	Stanford Avenue	Dawson Creek	Trail
119	Perkins Road Park Road	Perkins Road	Kenilworth Parkway	Bike Boulevard
120	Nicholson Drive	West Lee Drive	GSRI Avenue	Trail
122	Acadian Thruway	Winbourne Avenue	Dawson Creek	Trail
122	Acadian Thruway	Winbourne Avenue	Dawson Creek	Sidepath
122	Acadian Thruway	Winbourne Avenue	Dawson Creek	Separated Bike Lane
123	Florida Street	River Road	North 4th Street	Bike Lane
124	Catalina Avenue	Sherwood Forest Drive	Norwich Drive	Bike Boulevard
125	Multiple Streets	Goodwood Avenue	Tara Boulevard	Bike Boulevard
126	Boone Avenue	Kenilworth Parkway	Staring Lane	Bike Boulevard
127	Boone Drive, Trail, Sidepath	Baird Drive	Bluebonnett Boulevard	Sidepath
127	Boone Drive, Trail, Sidepath	Baird Drive	Bluebonnett Boulevard	Trail
127	Boone Drive, Trail, Sidepath	Baird Drive	Bluebonnett Boulevard	Bike Boulevard
128	Quail Drive	Perkins Road	Dawson Creek Trail	Bike Boulevard
129	South River Roda	Government Street	South Boulevard	Trail
130	Florida Boulevard	South Fairfax Drive	Lobdell Avenue	Sidepath

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 Baton Rouge MPA's transportation network. Though a large amount of the facilities in the Baton Rouge 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 Baton Rouge 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. 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

The amount of non-motorized fatalities and serious injuries is one of the five (5) 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 Baton Rouge MPA averaged 8.8 bicycle crashes per year that resulted in a serious injury and 3.8 crashes per year that resulted in fatalities. However, the MPO averaged 43.2 serious injury and

20.6 fatal crashes per year for pedestrians. Year 2017 of the planning period saw the highest total of combined non-motorized fatalities and serious injuries involving a motor vehicle, at 82.

As previously mentioned, there was a much higher number 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 several 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 a phone or device,
- eating and drinking,
- talking to people in a vehicle,
- “rubber necking”,
- operating entertainment, or
- navigation systems

Studies have shown that drivers who use handheld devices are four (4) 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 are a known danger, but distracted walking results in more injuries per mile than distracted driving. Consequences include bumping into walls, falling downstairs, 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.

To improve the safety for both bicyclists and pedestrians, local jurisdictions within the Baton Rouge MPA should reach out to LADOTD 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 previously, 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: 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 and demographic conditions. Methodology details can be found in *Technical Report: 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; this is where 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 and future growth, the following needs can be observed:

- The highest needs are in the southern part of East Baton Rouge Parish.
    - There is high demand for transit service around major activity centers such as Downtown, LSU, Southern University and the BR Health District.
    - There is high demand for transit service along major corridors like Government St/Florida Blvd, Nicholson Dr, Foster Dr, Perkins Rd, and Sherwood Forest Blvd.
- Regional or commuter transit services could be supported between Baton Rouge and suburban areas in East Baton Rouge Parish and surrounding parishes.
- Smaller, more locally serving transit service could be supported in places such as Addis, Baker, Brusly, Denham Springs, Donaldsonville, Gonzales, Livingston, Plaquemine, Port Allen, and Walker.

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:

- Introducing public transportation between Livingston Parish and East Baton Rouge Parish;
- Improving public transportation between Southern University and Downtown Baton Rouge; and
- Introducing public transportation from Donaldsonville to Gonzales/Sorrento.

Existing Plans

CATS Strategic Plan (2021)

The Capital Area Transit System adopted a new Strategic Plan in 2021 focused on four strategic priorities: Mobility and Ridership, Management and Financial Sustainability, Capital Investment, and Community Stewardship. This five year plan identifies the steps CATS must take to improve Baton Rouge's transit system, including developing key strategic partnerships and investing in the agency's human and physical capital.

The goals of the plan are organized under the four priorities and include the following:

- Goal #1: Improve Service Reliability
- Goal #2: Optimize Investments In Service And Continue To Monitor Existing And Emerging Markets
- Goal #3: Enhance Customer Satisfaction
- Goal #4: Expand Transit Services Across The Region
- Goal #5: Continue To Improve Planning And Management Of Budgetary Resources And Expenditures
- Goal #6: Increase Funding Streams And Revenue Diversity, And Ensure Long-Term Financial Stability
- Goal #7: Advance Employee Hiring And Performance Evaluation Processes To Support An Effective And Stable Workforce
- Goal #8: Further Advance Staff Development And Engagement

- Goal #9: Establish The Five-Year Capital Improvements And Investments Plan (CIP) As A Vehicle To Achieve Goals Outlined In The Strategic Plan
- Goal #10: Enhance Community's Perception Of CATS
- Goal #11: Encourage Environmental Responsibility

The Strategic Plan recommends developing a Comprehensive Operations Analysis (COA) to establish a short-term plan for CATS service and operations.

Plank-Nicholson Bus Rapid Transit (BRT)

This project is a joint effort between the City of Baton Rouge/Parish of East Baton Rouge, CATS, and Build Baton Rouge to introduce Bus Rapid Transit service along Plank Road and Nicholson Drive in Baton Rouge from the CATS North Transfer center to Downtown to LSU.

This project is planned to open to the public by the end of 2024 and will connect many neighborhoods, employment centers, medical facilities, and major destinations. It will be the first BRT line in the area and will offer fast, frequent, and reliable transit service using the following features that are typical of BRT service:

- Enhanced stations with improved lighting;
- Unique branding;
- Improved pedestrian and bicycle connections;
- Fewer stops;
- Specialized vehicles;
- Real-time arrival information displays;
- Fare collection;
- Level boarding; and
- Traffic Signal Priority (TSP).

Ascension Parish Transportation Master Plan (2020)

The Ascension Parish Transportation Master Plan has several recommendations related to public transportation, including the following priorities:

- Exploring the feasibility of an I-10 commuter express bus route and associated park and ride lots that connect the parish with major employment areas in East Baton Rouge Parish;

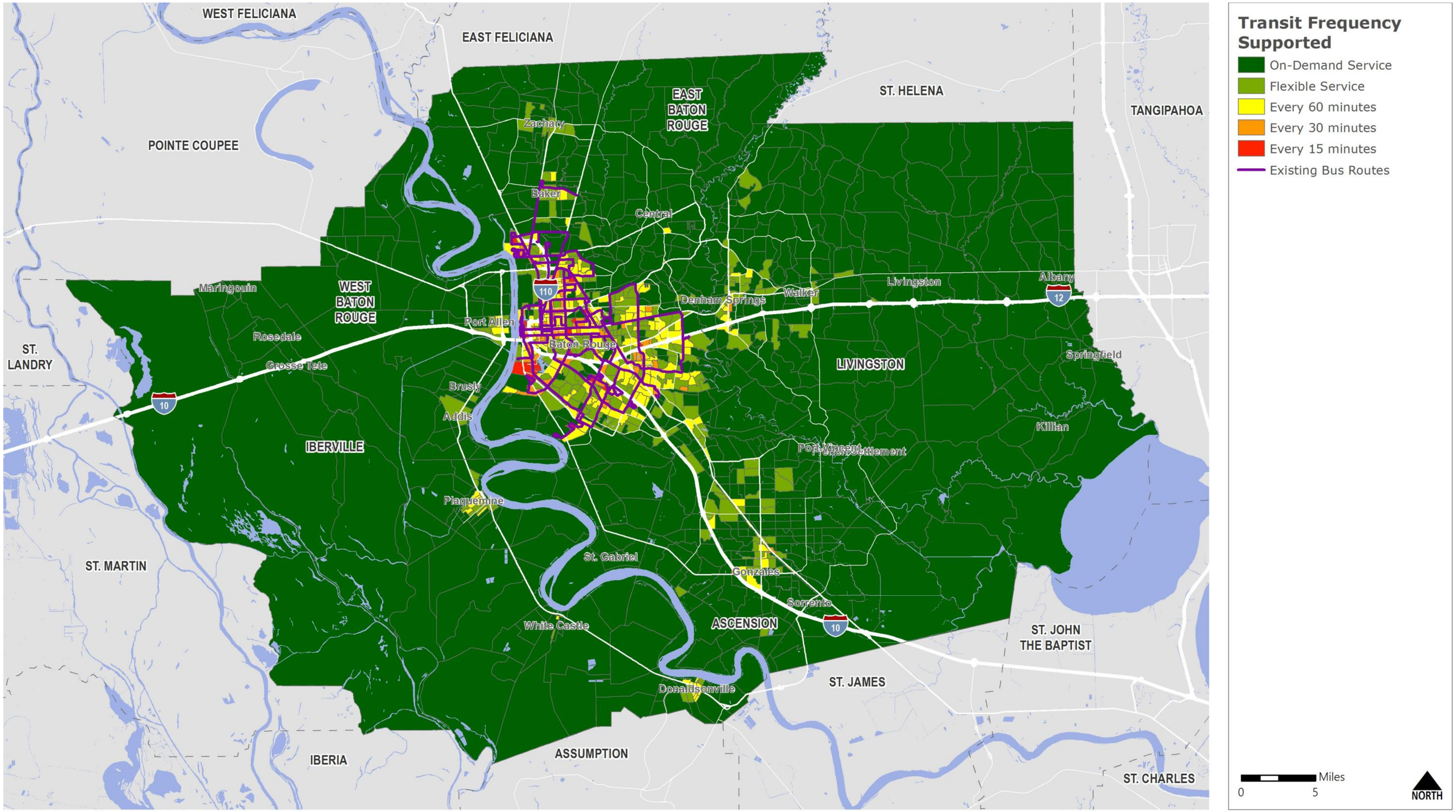
- Introducing local shared ride shuttle or vans in three key corridors (Northwest, Industry, and Sorrento/Donaldsonville);
- Introducing passenger rail between New Orleans and Baton Rouge with a station in Downtown Gonzales; and
- Exploring technology-based transportation solutions like demand response routes, microtransit, partnerships with Transportation Network Companies (TNCs), and autonomous vehicle shuttles.

Baton Rouge – New Orleans Passenger Rail and Station Area Plans

This project envisions twice daily trips with stops in Downtown Baton Rouge, the BR Health District, Gonzales, LaPlace, Louis Armstrong New Orleans International Airport and the Union Passenger Terminal next to the Superdome in New Orleans. This project would provide attractive and reliable inter-city public transportation between Baton Rouge and New Orleans and serve as a catalyst for economic development.

This project is still in the planning and design phase. Most recently, detailed station area plans were developed for stations in Baton Rouge, Gonzales, and LaPlace. Securing funding for capital costs and operating costs are the net major step for this project.

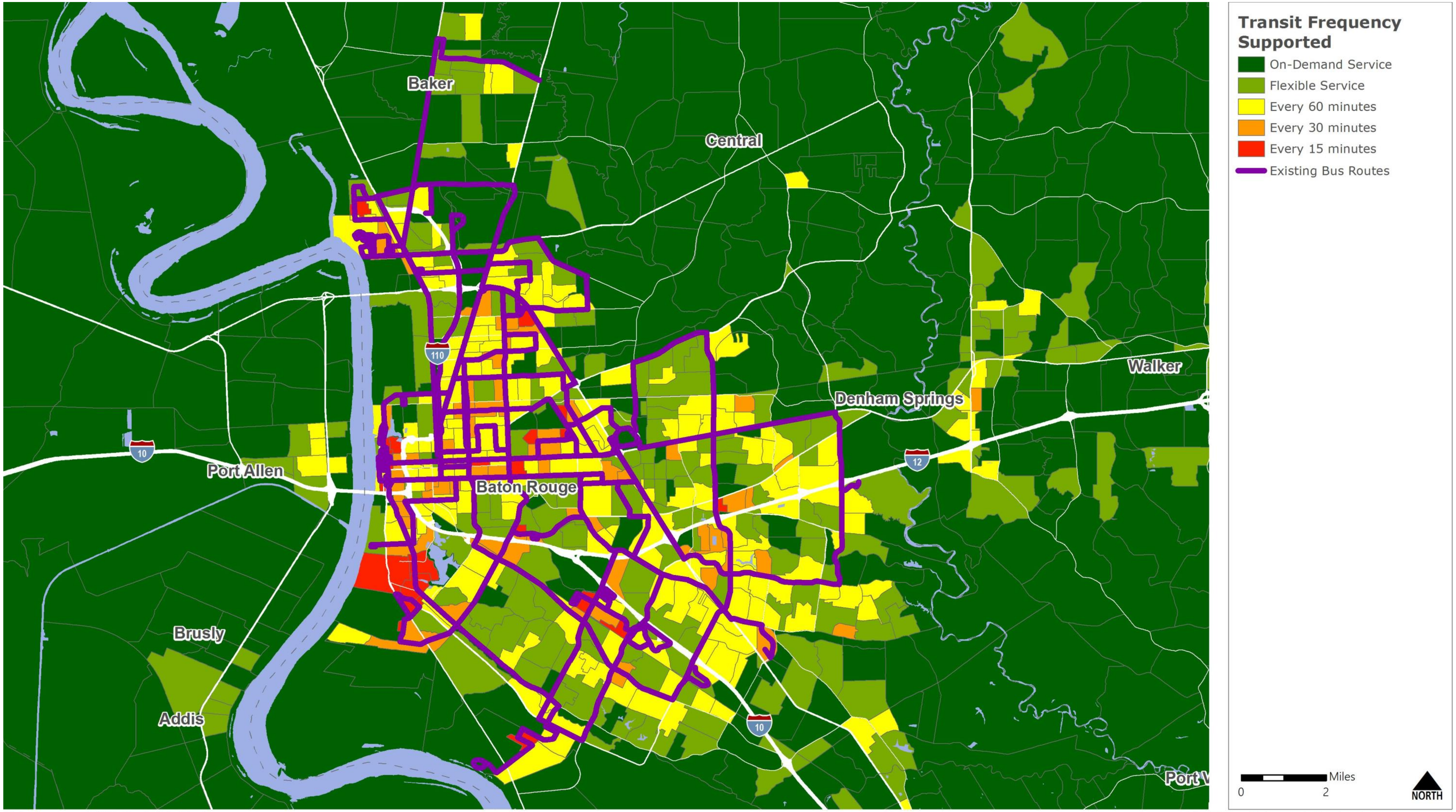
Figure 7.1: Existing Transit Demand



Data Sources: CATS; Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

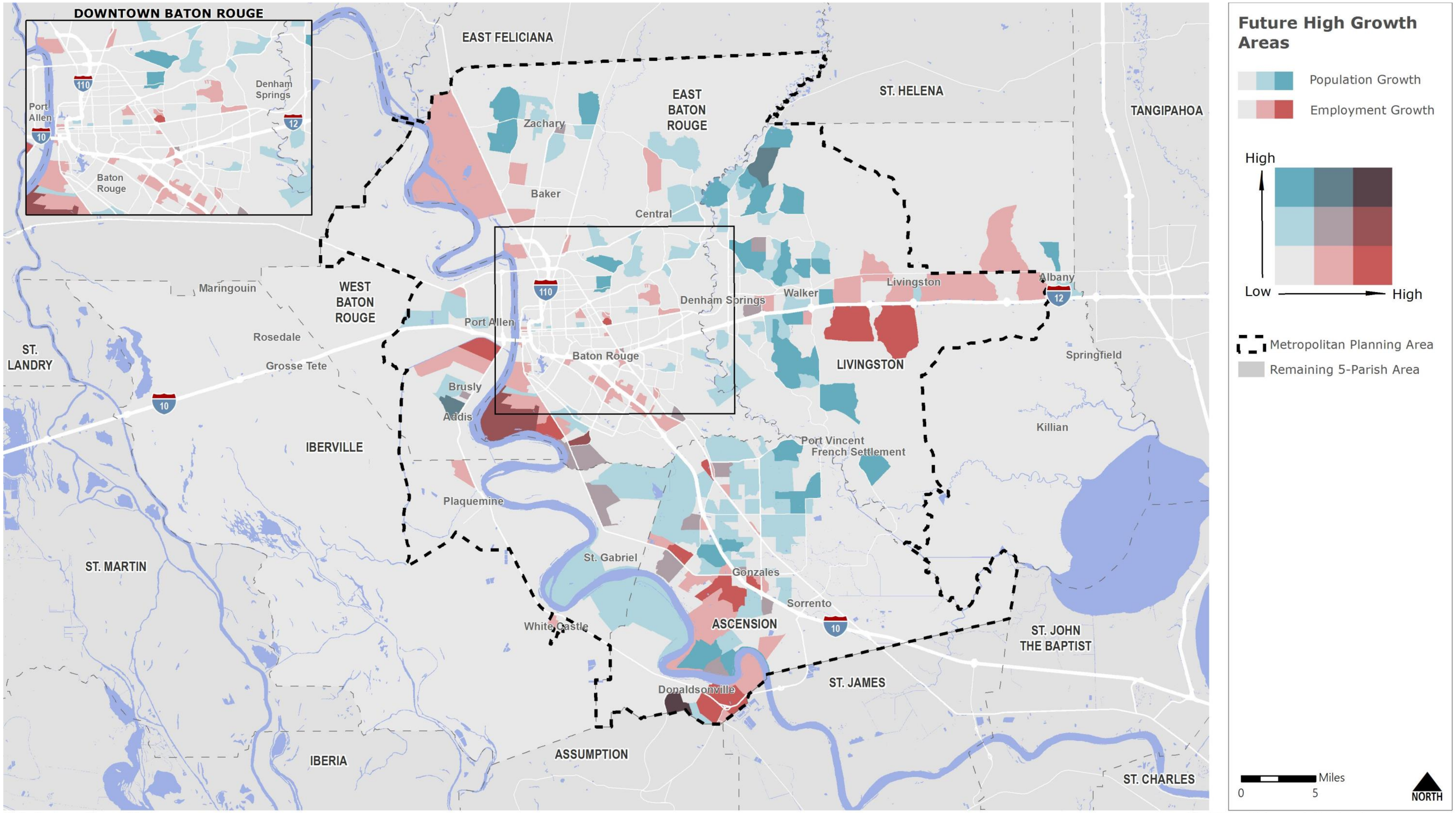
Figure 7.1 (Urban Core): Existing Transit Demand



Data Sources: CATS; Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

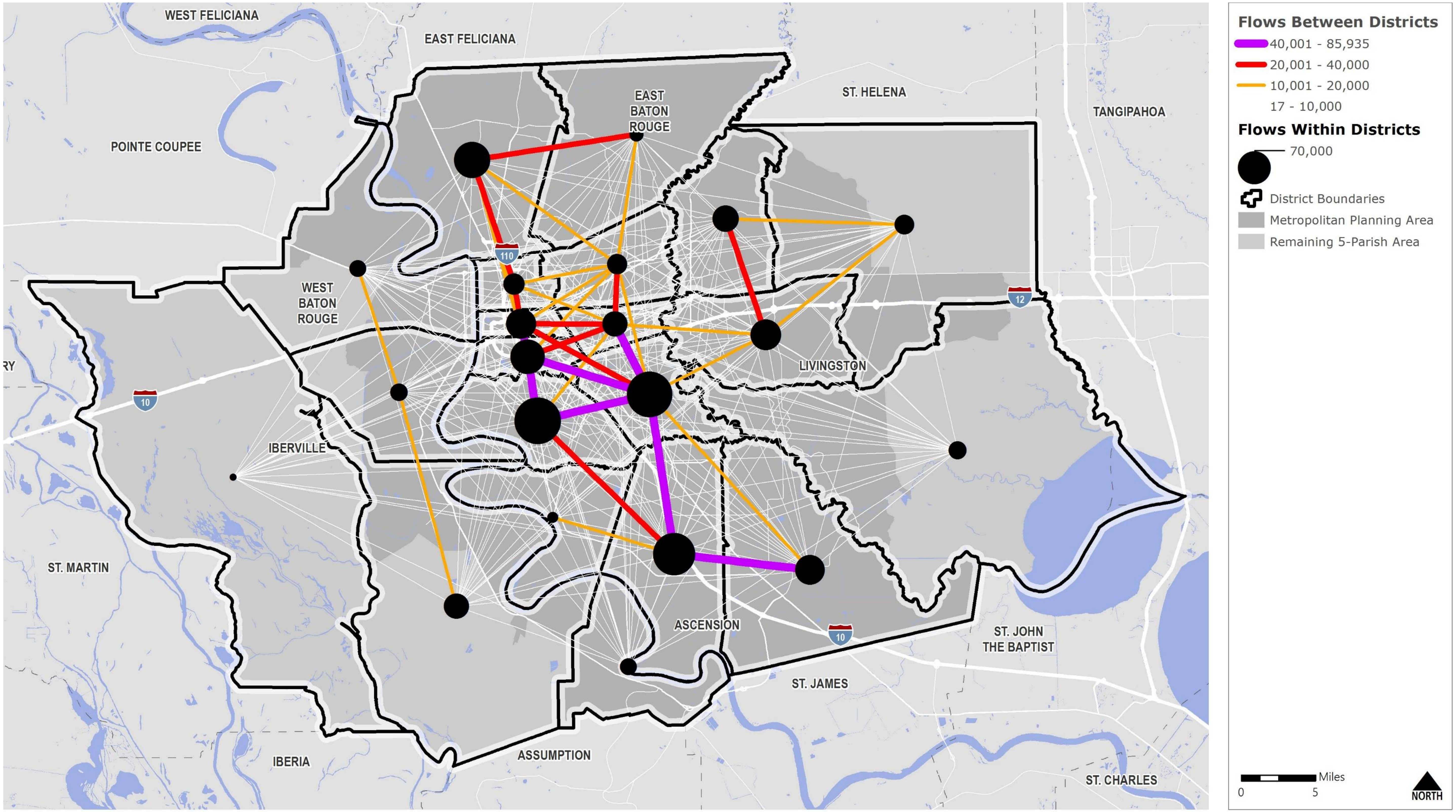
Figure 7.2: Future High Growth Areas



Data Sources: Census Bureau

Disclaimer: This map is for planning purposes only.

Figure 7.3: Regional Travel Flows by District



Data Sources: Neel-Schaffer, Inc.

Disclaimer: This map is for planning purposes only.

7.2 Maintenance and Capital Needs

Maintaining Existing Assets

The existing CATS fleet has many vehicles 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, a process that CATS has begun. Understanding that funding is limited, efforts should be made to extend vehicle lifespans beyond their ULB through preventative maintenance.

CATS will need to carefully monitor the frequency of vehicle breakdowns and other road calls. It may become necessary to revisit standard operating procedures.

Maintenance of facilities should also be carefully monitored. CATS maintains one (1) administration building, one (1) maintenance facility, one (1) service building and one (1) passenger facility as part of its system. Of these four (4) facilities, none of these rate below 3.0 on the Transit Economic Requirements Model (TERM) scale. To maintain this performance, CATS should continue performing regular maintenance and upgrades as needed.

New Assets

As CATS maintains and expands its services and upgrades its stop amenities, new capital assets will be required. CATS 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.

The overall age of transit vehicles operated by CATS exceeds the Useful Life Benchmark (ULB) targets established within the MPA. In addition to the rolling stock vehicles, the truck and car equipment vehicles also exceed their ULB targets. To improve its rolling stock and equipment performance targets CATS must continue to upgrade its fleet by incorporating newer vehicles and phasing out older vehicles.

7.3 Safety Needs

CATS has a higher rate of safety and security events than other urban transit systems in the state or country, averaging 19 events per year. However, CATS incidents resulting in fatalities has been zero in the last five (5) years. This reflects that incidents with CATS, while frequent, have not been severe. To address this, CATS should maintain a Safety Management System (SMS) 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.

CATS should also implement its Agency Safety Plan (ASP), as well as document all tasks related to the ASP and SMS. CATS must also document the results of the SMS processes and activities as required by the FTA. Additionally, CATS should review its ASP annually and update the plan as necessary to satisfy the performance targets.

8.0 Use and Leveraging of the Region's Existing ITS

8.1 Introduction and Existing ITS

Within the MPA, LADOTD has already deployed and maintains Intelligent Transportation Systems (ITS). These systems include a regional traffic management center (TMC) as well as many ITS field devices such as closed-circuit television (CCTV) cameras, vehicle detectors, dynamic message signs (DMS), and traffic signal systems with communications to help manage traffic. Table 8.1 provides a summary of the existing ITS field devices within the MPA. In addition to the Baton Rouge TMC, the statewide TMC is in Baton Rouge and provides after-hours coverage.

The Phase 3 project is currently under construction, which will deploy sixteen (16) CCTV cameras, thirty (30) BlueToad devices, travel-time message signs, and five (5) Dynamic Message Signs (DMS). There are also eight (8) ramp metering systems currently in the design phase to be deployed on I-10 between Dalrymple Drive and Siegen Lane. Table 8.2 displays the recently completed or ongoing ITS projects within the region.

Table 8.1: ITS Field Device Count

ITS Equipment	Description	Stakeholder	Element Name
CCTV Camera	There are 119 CCTV cameras. Cameras are deployed along the interstate freeway system and major arterials; they are used for surveillance and incident detection and verification.	LADOTD	DOTD District 61 ITS Field Devices DOTD District 62 ITS Field Devices
DMS	There are 14 DMS devices used for traveler information.	LADOTD	DOTD District 61 ITS Field Devices
Radar Vehicle Detector (RVD)	There are 60 RVD devices used for vehicle detection.	LADOTD	DOTD District 61 ITS Field Devices

ITS Equipment	Description	Stakeholder	Element Name
Statewide 511/ Twitter/Way to Geaux App	The statewide 511 is used for traveler information about construction, major incidents, and traffic speeds. Periodic traffic messages are tweeted to travelers to inform them of congestion levels in the Baton Rouge area. Way to Geaux is an app that can be downloaded onto smartphones, allowing travelers to receive alerts for incidents entered into the system by TMC operators. This is a hands-free, eyes-free app that provides real-time traffic and road-condition updates.	LADOTD	Statewide
Signal Systems	District 61 has approximately 524 active traffic signals. Within East Baton Rouge Parish, 268 of these signals are maintained by the Parish and 9 are maintained by the State. Additionally, there are 90 signals in Ascension Parish, 24 in Iberville Parish, and 20 in West Baton Rouge Parish.	LADOTD	DOTD District 61 ITS Field Devices
	District 62 has 33 signals in Denham Springs and Walker.	LADOTD	DOTD District 62 ITS Field Devices
	The East Baton Rouge Parish Department of Public Works TED maintains a total of approximately 497 signals. 227 of these are City-owned signals, and 270 are State-owned signals.	City of Baton Rouge/Parish of East Baton Rouge	City-Parish ITS Field Devices

Table 8.2: Existing and Ongoing ITS Projects

State Project Number	Description	Status
H.011511	US 190 ITS Deployment	Completed
H.012381	Fiber Optic Mapping	EBR Completed
H.013261	I-110 ITS Deployment	Under Construction
H.012381	I-12 ITS Ramp Meter Upgrades	Under Design
H.012749	Signal Communications Upgrade Phase 1	Completed
H.013245	Motorist Assistance Patrol (MAP)	Ongoing
H.013710	I-10 US61 to Laplace or Sorrento to LaPlace	Under Construction
H.013482	I-10 Queue Warning System in West Baton Rouge	Under Design

Advanced Traffic Management and Emergency Operation Center

The Advanced Traffic Management and Emergency Operation Center is the center for operations of the advanced transportation management system for the Baton Rouge area (Baton Rouge TMC).

The facility is occupied by the following agencies:

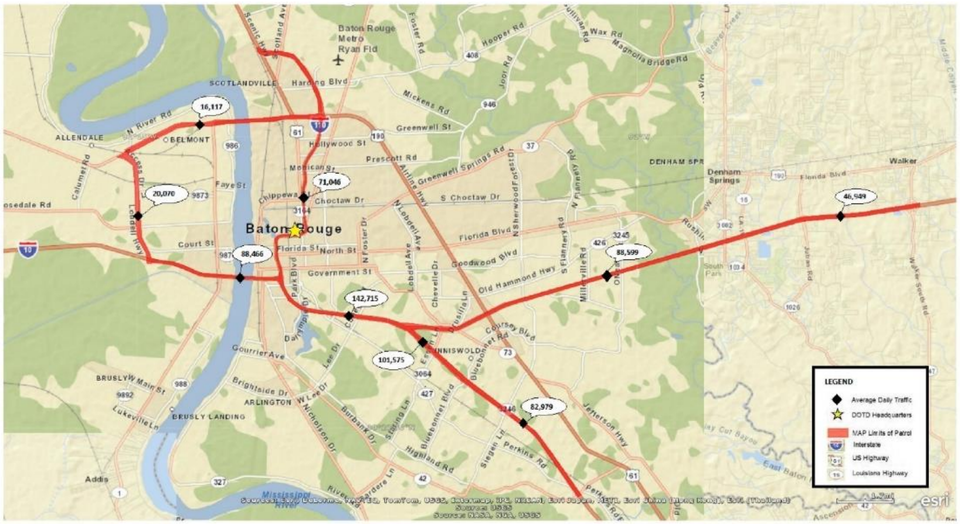
- LADOTD (District 61 Operations Engineer, TMC),
- the City of Baton Rouge (311),
- City Police,
- Fire Department,
- Emergency Medical Services,
- Mayor’s Office of Homeland Security and Emergency Preparedness, and
- the Parish of East Baton Rouge (St. George Fire Department, Sheriff’s Office).

The Department of Public Works 311 Call Center and East Baton Rouge Parish Sheriff’s Office are new additions to the facility.

Motorist Assistance Patrol

The Baton Rouge area has a Motorist Assistance Patrol (MAP), which is funded by LADOTD, operating in the region. The general services currently provided by the MAP program are:

- Change tires
- Inflate tires
- Provide fuel
- Perform first aid
- Clear travel lanes
- Control traffic
- Provide cell phones for use
- Support incident management



Benefits of Existing ITS

The existing infrastructure can be leveraged by the MPO to achieve the following goals:

- **Enhance mobility and accessibility:** The MPO can enhance mobility and accessibility by relieving traffic congestion and decreasing travel time; designing roadways for multimodal use; enhancing availability, attractiveness, and efficiency of public transportation; ensuring equity in transportation development; improving rural/urban connectivity for roadways and transit; pursuing integrated development of corridors; improving regional access to community facilities; facilitating intermodal goods movement; improving bicycle and pedestrian mobility and accessibility; and optimizing available resources.
- **Enhance connectivity:** The MPO can pursue the goal of enhancing connectivity by improving regional connectivity and mobility within the metropolitan area; maximizing the economic development potential through an increased arterial share of regional highway mileage; providing a balanced transportation system compatible with future plans to support economic vitality.
- **Enhance environmental quality and public safety:** The MPO can enhance environmental quality and public safety by proving adequate roadway mileage and capacity to assist with hurricane and emergency evacuation; promoting the safety of users of all modes of travel both motorized and non-motorized; upgrading grade-

crossing protection and warning systems for rail lines; enhancing air quality by reducing mobile-source emissions; promoting access management and maximizing safety for all road users; designing safer intersections for all users; promoting traffic calming where needed; using context-sensitive design in the project development process; considering environmental impacts of transportation project alternatives.

- **Develop a transportation planning process that is equitable and all inclusive:** This goal will be achieved by engaging the public in regional transportation planning; encouraging stakeholder participation in the development of long-range transportation plans; providing adequate public input for decision making; and devising policies that are equitable and take into consideration all demographics.
- **Develop a financially viable long-range transportation plan:** This goal will be achieved by ensuring long-range plans meet federal highway and federal transit requirements.

8.2 Future Development of Regional ITS Architecture

A major development within transportation is connected and automated vehicles, discussed in Chapter 3. To prepare for these, each region should have a CAV plan. The main goal of the CAV plan is to deploy CAV infrastructure in a progressive manner; deploying CAV infrastructure in stages and proportional to the self-driving technology introduced by car manufacturers.

Advancing the Baton Rouge metropolitan region's CAV infrastructure is critical with regard to the deployment of emerging transportation technologies such as CAVs and should be part of the region's ITS architecture that will help the region best leverage these technologies to the greatest benefit of road users.

The following are opportunities in which the ITS program can help in enhancing CAV technology:

- Developing a data collection and storage plan. Data exchange and storage will be a key feature of efficient CAV technology.
- Establishing CAV contacts/ambassadors in each of the LADOTD regions in addition to subject-matter experts.
- Integrating a CAV system unit with signals and ITS in the Baton Rouge MPO.
- Obtaining direction from LADOTD management to have each work area work openly with the CAV group to share data, information, and interoperability.

- Coordinating with the Transportation Systems Management and Operations data working group to identify relevant systems, data elements, and opportunities for CAV data inclusion and use.

8.3 Incident Management and ITS Strategy

Traffic incidents cause approximately 25 percent of traffic congestion. Traffic Incident Management (TIM) is an important tool in lessening the impact of non-recurring congestion from crashes and providing a safer environment for drivers. TIM is a planned and coordinated process to detect, respond to, clear traffic incidents, and restore traffic capacity as safely and quickly as possible. This coordinated process involves a number of public and private sector partners, including:

- Law Enforcement,
- Fire and Rescue,
- Emergency Medical Services,
- Transportation,
- Public Safety Communications,
- Emergency Management,
- Towing and Recovery,
- Hazardous Materials Contractors, and
- Traffic Information Media.

The Instant Tow Dispatch Program and Heavy-Duty Tow Incentive Program currently use municipal police to instantly dispatch a tow truck to respond to an incident. If there is no tow involved in the incident, the towing company receives a predetermined compensation. This program is intended to be used for major incidents that close the roadway (e.g., truck roll-over) but not for hazardous-materials events or trucks that are stalled.

Future TIM Initiatives

Some of the impediments to TIM improvement efforts are:

- Agency relations;
- Training;
- Communications;
- Technology;
- Performance measurement;
- Program resources and funding.

Potential strategies and tools that can be considered to overcome these impediments include:

- Encouraging local law enforcement to increase their participation in TIM meetings.
    - A TIM team DVD will be prepared to support agency outreach to increase their participation.

- Assigning on-site support through a part-time representative that rotates to each district to provide support during major incidents.
    - This person would represent LADOTD in coordination with other emergency responders and would communicate with the TMC and Public Information Office. Typically, the Public Information Office receives real-time updates on incidents from TMC Operations.
- Developing Quick to define the maximum time threshold to clear an incident.
- Assigning a Louisiana State Police unit to respond to incidents involving hazardous materials; however, cleanup is provided by others.
    - The RSIP will support this effort by providing traffic control assistance.
- Coordinating multi-agency “after action reviews”, led by LADOTD and the Louisiana State Police.
    - These reviews would be used to improve incident response, management, and clearance among the various agencies.
- Developing an open roads policy, memoranda of understanding, and specific joint operating policies to implement revised procedures to improve TIM performance measures.
- Developing diversion-route signal timing plans and increasing the use of DMS messages during road closures.
- Integrating a computer-assisted dispatch, such as the 911 dispatch system, into the statewide ATMS software, where possible.

9.0 ECommerce

9.1 Introduction

According to salesforce.com:

"Ecommerce (electronic commerce) refers to all online activity that involves the buying and selling of products and services. In other words, ecommerce is a process for conducting transactions online. "

Source: https://www.salesforce.com/products/commerce-cloud/resources/what-is-ecommerce/)

Within the last two years, economies worldwide have shown notable increases in online retail sales; the United States shows a 14 percent increase from 2018 to 2020.

Online retail sales, selected economies, 2018-2020

Economy	Online retail sales ($ billions)			Retail sales ($ billions)			Online share (% of retail sales)		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Australia	13.5	14.4	22.9	239	229	242	5.6	6.3	9.4
Canada	13.9	16.5	28.1	467	462	452	3.0	3.6	6.2
China	1,060.4	1,233.6	1,414.3	5,755	5,957	5,681	18.4	20.7	24.9
Korea (Rep.)	76.8	84.3	104.4	423	406	403	18.2	20.8	25.9
Singapore	1.6	1.9	3.2	34	32	27	4.7	5.9	11.7
United Kingdom	84.0	89.0	130.6	565	564	560	14.9	15.8	23.3
United States	519.6	598.0	791.7	5,269	5,452	5,638	9.9	11.0	14.0
Economies above	**1,770**	**2,038**	**2,495**	**12,752**	**13,102**	**13,003**	**14**	**16**	**19**

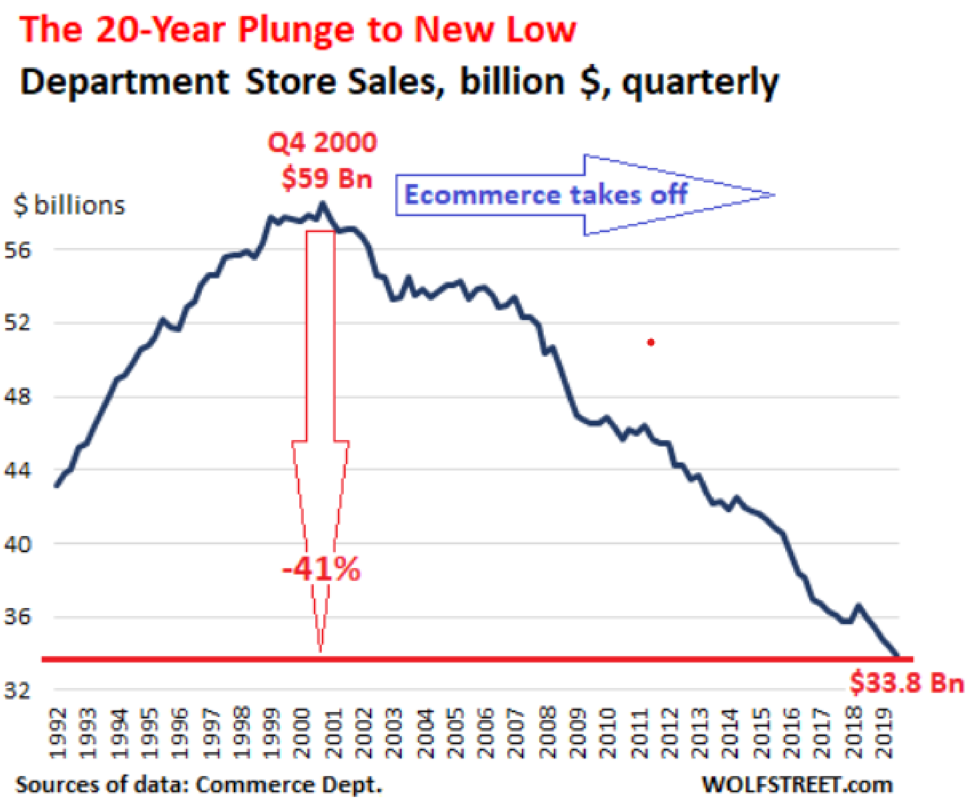
Source | UNCTAD, based on national statistics offices.

Source: https://news.un.org/en/story/2021/05/1091182

Historic United States growth in online sales, as documented by the United States Department of Commerce, is displayed below.

Source: United States Department of Commerce; [U.S. E-Commerce Sales 1999-2021 - Marketplace Pulse]

Concurrent with the growth of ecommerce sales, traditional "brick-and-mortar" sales have plunged as follows, reflecting how the shift to ecommerce has affected local businesses.



Source: [Brick & Mortar Melts Down as Ecommerce Jumps by Most Ever | Wolf Street]

United States ecommerce sales in 2021 by product category are provided below.

US Retail Ecommerce Sales, by Product Category, 2021

billions, % change, % of total retail ecommerce sales and % of total retail sales

	Retail ecommerce sales	% change	% of total retail ecommerce sales	% of total retail sales
Computer and consumer electronics	$194.94	9.1%	21.5%	53.2%
Apparel and accessories	$183.52	18.9%	20.2%	37.9%
Furniture and home furnishings	$105.93	12.3%	11.7%	31.3%
Health and personal care and beauty	$85.67	16.1%	9.4%	14.9%
—Pet products	$16.28	7.1%	1.8%	30.1%
—Cosmetics and beauty	$12.98	9.7%	1.4%	17.8%
Toys and hobby	$64.74	13.1%	7.1%	45.4%
Auto and parts	$62.73	13.5%	6.9%	4.8%
Books/music/video	$53.85	12.5%	5.9%	69.1%
Food and beverage	$53.42	18.1%	5.9%	4.8%
Office equipment and supplies	$18.53	8.5%	2.0%	39.9%
Other	$85.42	13.4%	9.4%	6.1%
Total	**$908.73**	**13.7%**	**100.0%**	**15.5%**

Note: includes products or services ordered using the internet via any device, regardless of the method of payment or fulfillment; excludes travel and event tickets, payments (such as bill pay, taxes, or money transfers), food services and drinking place sales, gambling and other vice goods sales
Source: eMarketer, Feb 2021

264718 eMarketer | InsiderIntelligence.com

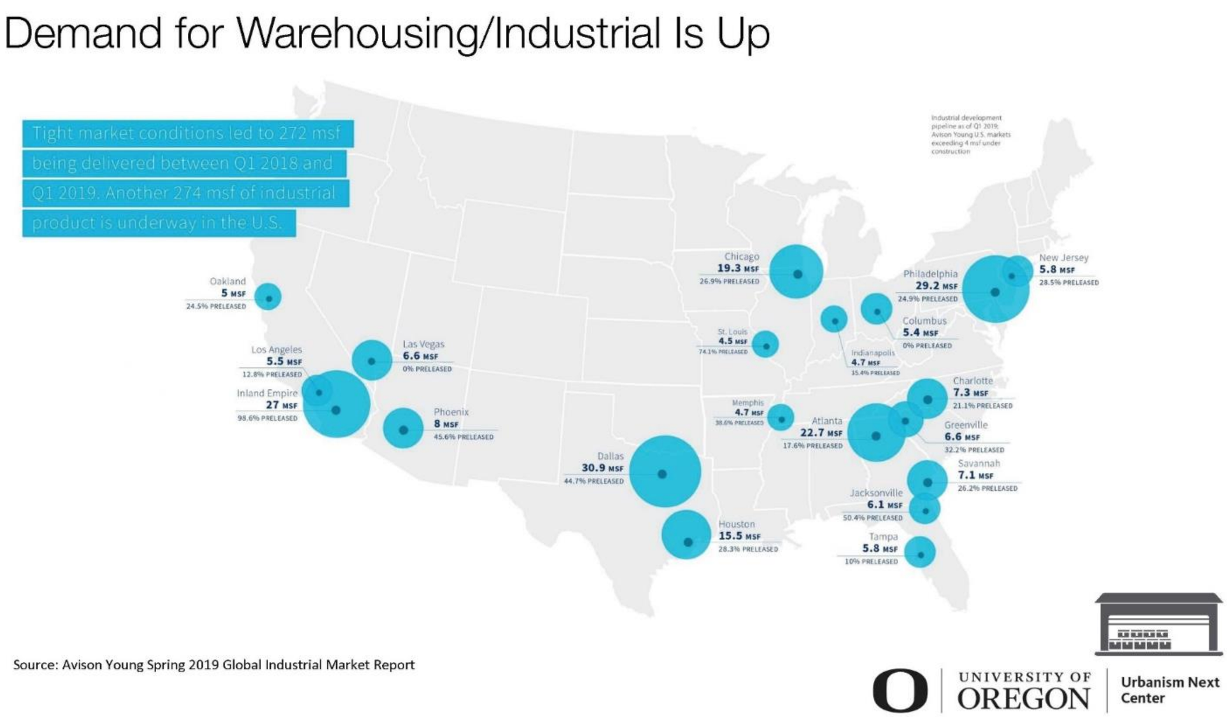
Source: US Ecommerce by Category 2021 - Insider Intelligence Trends, Forecasts & Statistics (emarketer.com)

The above-noted trends have accelerated during the COVID-19 pandemic as governments across the country have responded to COVID peaks with requirements for various mitigation measures that have reinforced remote sales by shoppers seeking groceries, restaurant and other food services, and additional convenience items. Additionally, communication by online social media has replaced in-person contact, further reinforcing the trend toward reliance on digital information sources and shopping.

Amazon is the leader in the ecommerce marketplace.

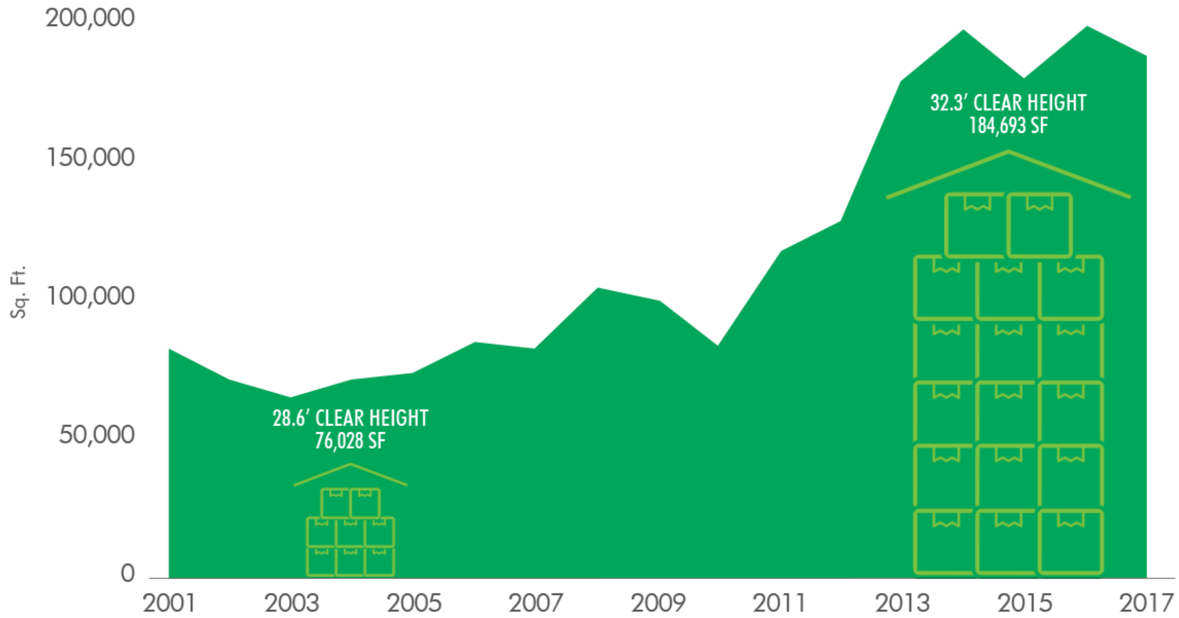
9.2 Land-Use Impacts of ECommerce

The consistent growth in online retailing is changing the shopping patterns of consumers who are also taxpayers, voters, and drivers. These consumers are mainly choosing shorter delivery cycles to receive their goods within hours rather than days. Ecommerce and last-mile logistics are continuously driving the demand for space as retailers seek further supply-chain efficiencies. Sellers are impacting market dynamics with their demand for large facilities near major cities, which is resulting in changes in warehousing logistics and increasing land and development costs in many areas.



Source: Avison Young Spring 2019 Global Industrial Market Report

Additionally, the average size of new warehouse developments has been increasing, as shown below.



Source: [CBRE Research, CBRE Econometric Advisors, 2017]

9.3 Transportation Impacts of ECommerce

As ecommerce increases, local roadway systems will become impacted by changes to urban logistics. As previously discussed, further expansion of ecommerce will increase warehousing needs. These facilities will require Interstate highway access to accommodate more frequent daily truck traffic. These centers will also require greater workforces than the current warehouses, even with increased automation, resulting in more trips by employees coming from areas with limited transit service options and those working multiple shifts.

Growth in the use of personal vehicles for express deliveries will affect traffic patterns and may increase the number of non-peak-period trips into residential areas. The current regional travel demand model that helps to forecast system needs may not represent these trips, and therefore, planners need to make changes in their models to ensure that those needs are more accurately projected.

9.4 Ecommerce in Louisiana

Act 216 of the 2020 Regular Session of the Louisiana Legislature ("Act 216") was signed on June 11, 2020 and became effective July 1, 2020. Act 216 requires marketplace facilitators to register with the Louisiana Sales and Use Tax Commission for Remote Sellers (the "Commission") and collect and remit applicable use taxes for sales of products delivered in Louisiana. An exception provides that marketplace facilitators with fewer than 200 sales or less than $100,000 of gross sales into Louisiana for the prior or current calendar year are exempt.

The monthly report from the Commission showing the growth of sales tax in Louisiana from July 2020 through August 2021 is provided below. Collections increased approximately 50 percent, from $20.6 million to $30.6 million, during the reporting period. The report provides insight into the level of ecommerce activity flowing into Louisiana. Assuming $30 million in taxes collected per month and a tax rate of 5 percent, over $600 million of activity occurs within a given month.

Louisiana Sales and Use Tax Commission for Remote Sellers Collection and Distribution Report

Period	Collection Month	Distribution Date	Total Collected	1% Commission Fee	Total Distributed	State Portion (Distributed)	Local Portion (Distributed)	Total Returns	Total Returns > 0	Total Open Accounts
Jul-20	Aug-20	9/11/2020	$ 20,653,150.26	$ 206,531.45	$ 20,446,618.81	$ 9,834,491.56	$ 10,612,127.25	580	433	1331
Aug-20	Sep-20	10/9/2020	$ 20,253,297.24	$ 202,532.93	$ 20,050,764.31	$ 9,708,297.61	$ 10,342,466.70	787	654	1570
Sep-20	Oct-20	11/10/2020	$ 22,375,834.89	$ 223,758.66	$ 22,152,076.23	$ 10,575,259.83	$ 11,576,816.40	1080	925	1757
Oct-20	Nov-20	12/9/2020	$ 24,151,167.24	$ 241,512.05	$ 23,909,655.19	$ 11,479,794.59	$ 12,429,860.60	1249	1069	2030
Nov-20	Dec-20	1/11/2021	$ 27,761,459.91	$ 277,614.48	$ 27,483,845.43	$ 13,355,017.16	$ 14,128,828.27	1395	1170	2216
Dec-20	Jan-21	2/9/2021	$ 35,222,240.58	$ 352,222.29	$ 34,870,018.29	$ 16,726,031.04	$ 18,143,987.25	1534	1308	2539
Jan-21	Feb-21	3/9/2021	$ 27,950,194.50	$ 279,501.96	$ 27,670,692.54	$ 13,248,401.71	$ 14,422,290.83	1794	1538	2762
Feb-21	Mar-21	4/9/2021	$ 24,262,499.34	$ 242,625.13	$ 24,019,874.21	$ 11,444,817.30	$ 12,575,056.91	1957	1649	3009
Mar-21	Apr-21	5/7/2021	$ 35,346,757.19	$ 353,467.97	$ 34,993,289.22	$ 16,759,134.28	$ 18,234,154.94	2117	1806	3210
Apr-21	May-21	6/8/2021	$ 28,646,775.91	$ 286,467.91	$ 28,360,308.00	$ 13,612,746.93	$ 14,747,561.07	2278	1904	3402
May-21	Jun-21	7/8/2021	$ 33,927,808.61	$ 339,278.55	$ 33,588,530.06	$ 15,987,845.25	$ 17,600,684.81	2433	2052	3606
Jun-21	Jul-21	8/6/2021	$ 32,361,722.76	$ 323,617.83	$ 32,038,104.93	$ 15,240,951.51	$ 16,797,153.42	2598	2163	3855
Jul-21	Aug-21	9/9/2021	$ 30,097,561.37	$ 300,976.03	$ 29,796,585.34	$ 14,273,170.26	$ 15,523,415.08	2766	2286	4030
Aug-21	Sep-21	10/6/2021	$ 30,602,109.60	$ 306,022.13	$ 30,296,087.47	$ 14,451,708.36	$ 15,844,379.11	2912	2418	4242
TOTAL TO DATE			**$ 393,612,579.40**	**$ 3,936,129.37**	**$ 389,676,450.03**	**$ 186,697,667.39**	**$ 202,978,782.64**			

Source: *Copy of Distribution Data by Month.xlsx (louisiana.gov)*

As most of the sales nowadays are transacted on Amazon-owned sites, this report also details some published work that explains Amazon's approaches to logistics. The Commission does not provide information on taxes collected by marketplace facilitators. However, using 50 percent as the Amazon portion of the collections to gauge Amazon activity as part of the transportation demand, Amazon would account for approximately $300 million of sales activity into Louisiana within a given month.

The distribution summary below presents taxes collected within CRPC Parishes from July 2020 through June 2021. Taxes collected represent approximately ten (10) percent of the state total.

SALES AND USE TAX COMMISSION FOR REMOTE SELLERS

Distribution Summary

Batch Status: **Closed** | Deposit From: **7/1/2020** | Deposit To: **6/30/2021**

Code	Parish Name	Collections	Commission 1% Fee	ACH Deposit Amount
0300	Ascension Parish	$4,828,508.45	$48,285.12	$4,780,223.33
1700	East Baton Rouge Parish	$17,963,083.98	$179,630.78	$17,783,453.20
1900	East Feliciana Parish	$556,184.97	$5,561.89	$550,623.08
2400	Iberville Parish	$962,606.11	$9,626.05	$952,980.06
3200	Livingston Parish	$4,796,843.65	$47,968.95	$4,748,874.70
3900	Pointe Coupee Parish	$610,824.99	$6,108.05	$604,716.94
4600	St. Helena Parish	$286,107.75	$2,861.06	$283,246.69
5300	Tangipahoa Parish	$3,350,917.54	$33,509.03	$3,317,408.51
5900	Washington Parish	$1,187,257.96	$11,872.79	$1,175,385.17
6100	West Baton Rouge Parish	$1,069,461.05	$10,694.59	$1,058,766.46
6300	West Feliciana Parish	$430,242.47	$4,302.48	$425,939.99
	TOTAL FOR ALL DOMICILES	**$36,042,038.92**	**$360,420.79**	**$35,681,618.13**

The Amazon distribution network encompasses the following types of facilities:

- Amazon Pantry and Fresh Distribution Center: Facilities that service dry grocery merchandise (Pantry) or perishables or frozen merchandise (Fresh).
- Amazon Prime Now: Facilities that stock a limited line of products that are in high demand and can be delivered within 1 to 2 hours of order placement.
- Amazon Whole Foods Retail Distribution Center: A facility that services Whole Foods grocery products.
- Delivery Station: Facilities where packages are sorted and then dispatched directly to the customer. These facilities represent the last leg of the delivery network.
- Distribution Center (or Fulfillment Center): A building designed specifically to receive, store, and redistribute goods and to provide rapid turnaround for ecommerce and similar "just in time" product deliveries.
- Sortation Center: Facilities generally used to sort packages for a geographical region that have originated from one or more fulfillment centers within the Amazon network. Packages are usually shipped to delivery stations.

Source: Amazon Distribution Network Strategy | MWPVL International

Amazon currently uses a range of logistic methods/types of facilities in Louisiana, as summarized in Table 9.1.

Table 9.1: Amazon Logistics Methods and Facility Types in Louisiana

Logistics Center	Purpose	Average Size (square feet)	Opening Date/Year	Louisiana Locations
Distribution Center or Fulfillment Center	Fill orders generally.	1,000,000	4th Quarter 2021	Lafayette
		855,000	December 2022	Baton Rouge
		650,000	4th Quarter 2022	Shreveport
Sortation Center	Aggregate shipments by zip code from one or more fulfillment centers.	235,000	4th Quarter 2021	Port Allen
Delivery Station	Sort packages for outbound routes for last-mile delivery.	21,300	November 2018	Baton Rouge
		111,900	September 2020	Baton Rouge
		120,000	2022	Slidell
		100,000	2018	New Orleans
		183,000	June 2020	Elmwood
		80,200	May 2021	St. Rose

Source: Amazon Distribution Network Strategy | MWPVL International

9.5 Future Ecommerce Needs

Ecommerce activities are begging to change the historic model for how the transportation network serves the community. The impacts associated with the location of hub/distribution sites need to be studied and accounted for in future modeling and planning efforts.

Ecommerce services require changes to how parking along streets is used. Within public areas, studies of on-street parking should be encouraged to determine the appropriate parking geometry to support ecommerce activities.

Private commercial parking areas typically reflect local zoning requirements. Changes to commercial parking areas within shopping centers, office parks, and residential complexes that support ecommerce may require private properties to deviate from site plans approved as part of the initial building permit approval. Local governments should review their regulatory structures to allow for changes to existing facilities in support of ecommerce and to accommodate these activities as part of future developments.