2022 Alabama Statewide Freight Plan

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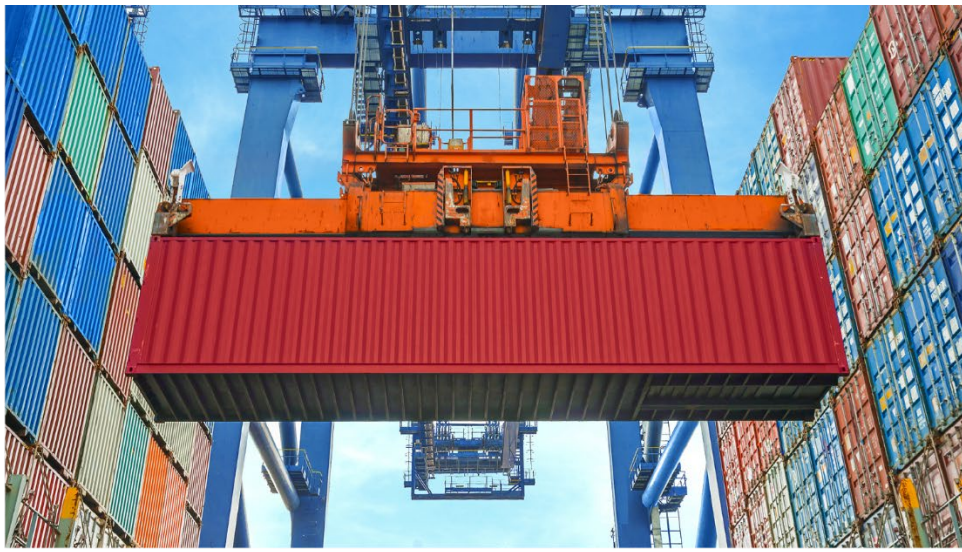

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This document is intended for planning purposes only and relays data and analyses as of the date of this report publication.

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Commonly Used Terms and Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ALDOT	Alabama Department of Transportation
ASAP	Alabama Service and Assistance Patrol
ATMS	Advanced Traffic Management System
BNSF	Burlington Northern Santa Fe Railway Co.
CCTV	Closed-Circuit Television
CN/IC	Canadian National Illinois Central
CPMS	Comprehensive Project Management System
CRFC	Critical Rural Freight Corridor
CSXT	CSX Transportation, Inc.
CUFC	Critical Urban Freight Corridor
DMS	Dynamic Message Sign
EPA	U.S. Environmental Protection Agency
FAC	Freight Advisory Committee
FAF 5.4	Freight Analysis Framework Version 5.4
FAST Act	Fixing America's Surface Transportation Act
FASTLANE	Fostering Advances in Shipping and Transportation for the Long-term Achievement of National Efficiencies
FHWA	Federal Highway Administration
FY	Fiscal Year
HPMS	Highway Performance Monitoring System
IIJA	Infrastructure Investment and Jobs Act
IFTS	Intelligent Freight Transportation Systems
INFRA	Infrastructure for Rebuilding America Grants
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MO	Maintenance and Operations

MPO	Metropolitan Planning Organization
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NMFN	National Multimodal Freight Network
NPMRDS	National Performance Management Research Data Set
NS	Norfolk Southern Corporation
PFN	Primary Freight Network
PHFS	Primary Highway Freight System
RFN	Regional Freight Network
RTMC	Regional Transportation Management Center
STIP	Statewide Transportation Improvement Program
TIP	Transportation Improvement Program
UPWP	Unified Plan Work Program
V/C Ratio	Volume to Capacity Ratio
VMT	Vehicle Miles Traveled

Executive Summary

The ALDOT Statewide Freight Plan Update (FY 2022) serves as an update to the 2017 Alabama Statewide Freight Plan. The plan considers recent trends and projections in truck volume, bottlenecks, and commodity flow. The plan also incorporates new federal requirements established by the latest transportation authorization bill, the Infrastructure Investment and Jobs Act (IIJA), with new sections related to commercial truck parking needs; transportation resilience; freight-related strategies related to intelligent transportation systems (ITS) and safety; and an examination of potential strategies to mitigate the impacts of freight upon the natural environment and environmental justice communities. The outcome is a Freight Investment Plan that highlights specific projects that ALDOT will program to improve freight operations in the state, as well as several strategies to guide freight investment in the future. The projects and strategies outlined in the Freight Investment Plan have been informed by a combination of technical analyses and stakeholder input received from the Freight Advisory Committee (FAC).

Freight Infrastructure

The State of Alabama has a robust network of freight infrastructure, including highways and bridges, railroads, seaports and inland ports, airports, and pipelines, as well as intermodal facilities for the transfer of goods between modes. As the State Department of Transportation, ALDOT has purview over state highways and coordinates with the Federal Highway Administration (FHWA) for the maintenance and programming of projects along the National Highway Freight Network (NHFN), which includes interstate highways. Interstates are critical to the movements of goods by truck among freight-generating facilities, among cities, and between intermodal facilities. The interstates are supplemented by a network of US and state highways, as well as local routes, that provide “first-mile/last-mile” connectivity for the transport of goods.

Commodity Flows

The FHWA Freight Analysis Framework Version 5.4 (FAF 5.4) was used to examine existing commodity flows by mode, project future commodity flows by mode, and assign existing and future truck traffic to the roadway network across the state. Data from the FAF indicate that there will be a substantial increase in the movement of goods across Alabama over the next 30 years, particularly for transport by truck. This underscores the needs to strategically invest in the transportation network, and develop strategies that enhance freight efficiencies while mitigating potential adverse impacts to the natural environment and disadvantaged communities.

Bottlenecks

In 2022, based on the latest Statewide Travel Demand Model, there are nearly 193 miles of bottlenecks along the freight network, including 116 miles on the Interstate system and 76 miles on the highway system. Most of the bottlenecks are concentrated in the Birmingham area, along major interstates such as I-65, I-59, I-20, and I-459, and major highways such as US 78 and US

280. There are also some bottlenecks on interstates and highways between Prattville and Montgomery; in and around Mobile, Tuscaloosa, and Huntsville; and in smaller cities such as Phenix City, Dothan, Anniston, Gadsden, and Decatur.

In 2050, it is projected that the mileage of bottlenecks will increase nearly four-fold from 2022, to nearly 725 miles on Alabama roadways. This includes 392 miles on the interstate system and 333 miles on the highway system. The freight bottlenecks are generally concentrated in the same areas as in 2022, but are more widespread, extending further along interstates and highways outside of cities. This is particularly the case around Birmingham, Montgomery, and Mobile. There are also several bottlenecks along interstates in less urbanized parts of Alabama, including I-65 between Decatur and Birmingham, I-20 east of Birmingham, and on I-85 east of Montgomery and in the Auburn/Opelika area. Freight bottlenecks have also emerged and expanded in more rural parts of Alabama, including Dothan, Phenix City, Troy, Florence, Albertville, and Scottsville.

Freight Investment Plan

There is one project within the fiscally constrained NHFP Freight Investment Plan, which is debt service related to Birmingham's Central Business District (CBD) project. This is an Interstate Interchange project at I-59/I-20 consisting of segmental bridge replacements in the downtown area. There are three additional projects that were included in the last NHFP Freight Investment Plan. These projects are not yet complete, but are now utilizing funds from other federal and state sources, rather than the NHFP. These include a resurfacing of I-65 from US 278 to near Hurricane Creek, the widening of I-10 from east of Bayway Bridge to east of SR 181, and the widening of bridges along I-85 over Choctafaula Creek.

There are several other projects in ALDOT's current work program that address freight bottlenecks. These include nearly three dozen projects to widen roadways as well as a new location roadway, the Birmingham Beltline; numerous resurfacing and pavement rehabilitation projects; bridge replacements; and ITS projects, including corridor management and traffic signal upgrades.

Chapter 1: Introduction and Plan Framework

1.1 Introduction

The Alabama Statewide Freight Plan (Freight Plan) establishes the freight planning and performance monitoring activities to be undertaken throughout the state by the Alabama Department of Transportation (ALDOT). This plan is an update to the 2017 Alabama Statewide Freight Plan, which was completed under guidance set forth in the FAST Act (Fixing America's Surface Transportation Act). The 2022 Freight Plan Update and incorporates new federal requirements at the federal level as established by the latest transportation authorization bill, the Infrastructure Investment and Jobs Act (IIJA). This plan complies with the IIJA, and aligns Alabama's freight policy with current guidance from the Federal Highway Administration (FHWA) Office of Freight Management and Operations. In addition, the plan utilizes the most recent transportation and commodity flow data available, including FHWA's Freight Analysis Framework Version 5.4 (FAF 5.4) commodity flow data.

Key plan elements include:

- An overview of relevant policy that influences freight planning at the statewide level.
- A profile of the Interim National Multimodal Freight Network (NMFN) within the State of Alabama.
- A discussion of existing and projected commodity flows and freight network characteristics, which provide the baseline for identifying needs statewide.
- A summary of freight improvements of statewide significance, which forms the basis for the overall Freight Investment Plan.
- A description of the measures and procedures that will be used by ALDOT to monitor transportation system performance with respect to freight mobility.

An important element of the statewide freight planning process is the engagement of key stakeholders through the Freight Advisory Committee (FAC). As a whole, the FAC membership has direct knowledge of and connections with all freight modal networks (roadway, rail, air and water) and represents users/shippers and policymakers from both the public and private sectors. A summary of the outreach activities undertaken during the development of this plan is provided later in this chapter.

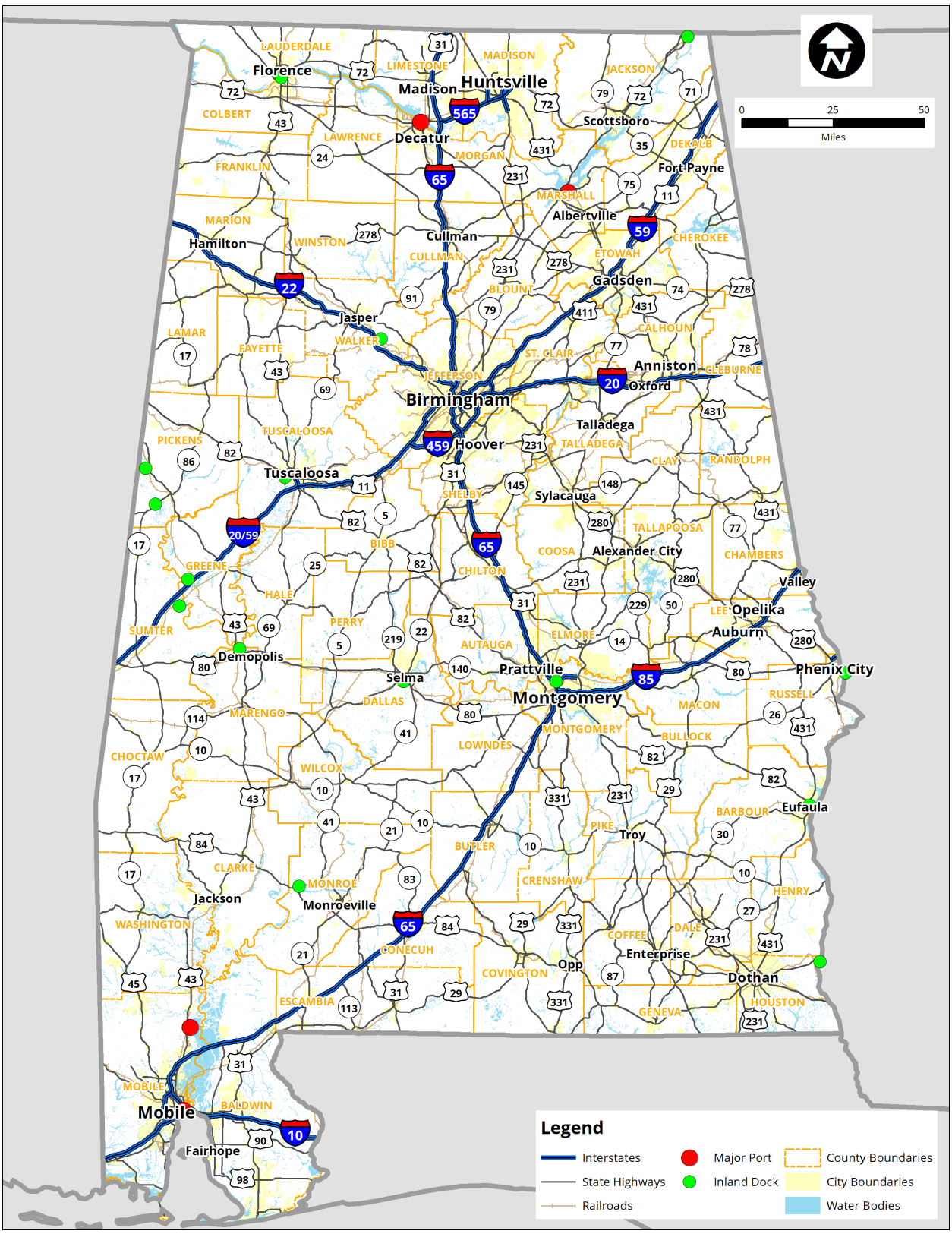

Figure 1. State of Alabama Freight Roadway Network

1.2 National Freight Goals

The United States Code outlines National Multimodal Freight Policy Goals (49 U.S.C. 70101(b)). These goals are summarized as follows.

1. Identify infrastructure improvements, policies, and operational innovations that—
    a. Strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States.
    b. Reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network.
    c. Increase productivity, particularly for domestic industries and businesses that create high- value jobs.
2. Improve the safety, security, efficiency, and resiliency of multimodal freight transportation.
3. Achieve and maintain a state of good repair on the National Multimodal Freight Network.
4. Use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network.
5. Improve the economic efficiency and productivity of the National Multimodal Freight Network.
6. Improve the reliability of freight transportation.
7. Improve the short- and long-distance movement of goods that—
    a. Travel across rural areas between population centers.
    b. Travel between rural areas and population centers.
    c. Travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network.
8. Improve the flexibility of States to support multi-State corridor planning and the creation of multi- State organizations to increase the ability of States to address multimodal freight connectivity.
9. Reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network.
10. Pursue the goals described in this subsection in a manner that is not burdensome to State and local governments.

A description of how the Statewide Freight Plan improves the ability of the State of Alabama to meet the national freight goals described above is provided in Table 1.

Table 1. Actions of Statewide Freight Plan to Further National Multimodal Freight Goals

National Freight Goal	Statewide Freight Plan Action
Identify infrastructure improvements, policies, and operational innovations that strengthen the contribution of the National Multimodal Freight Network (NMFN) to the economic competitiveness of the United States.	The ALDOT work program includes several capacity improvements and ITS applications along the NMFN.
Identify infrastructure improvements, policies, and operational innovations that reduce congestion and eliminate bottlenecks on the NMFN.	Several planned investments within the ALDOT work program address locations identified as freight bottlenecks within the state.
Identify infrastructure improvements, policies, and operational innovations that increase productivity, particularly for domestic industries and businesses that create high-value jobs.	Each of the improvements within the Freight Investment Plan, to some degree, provide increased access to employment centers and/or domestic industries throughout the state.
Improve the safety, security, efficiency, and resiliency of multimodal freight transportation.	System resiliency is being considered, including the presence of redundant corridors for freight travel. In addition, several safety projects, rail-crossing improvements, and ITS enhancements are part of the overall Alabama work program through 2050.
Achieve and maintain a state of good repair on the NMFN.	Several resurfacing and bridge projects identified in the ALDOT work program are located along the NMFN.
Use innovation and advanced technology to improve the safety, efficiency, and reliability of the NMFN.	ALDOT continues to enhance ITS infrastructure along its interstate and arterial networks and in urban areas.
Improve the economic efficiency and productivity of the NMFN.	Improvements within the ALDOT work program serve to improve the economic efficiency and productivity of the NMFN.

1.3 Requirements of the Statewide Freight Plan

The Statewide Freight Plan is required to comply with the provisions of the previous transportation reauthorization bill, the Fixing America's Surface Transportation (FAST) Act (H.R. 22, 70202) as well as the latest federal transportation reauthorization bill, the Infrastructure Investment and Jobs Act (IIJA) (U.S.C. 70101(b)).

The FAST Act requires the Statewide Freight Plan to include the following components:

- Identify significant freight system trends, needs, and issues with respect to the State.
- Describe the freight policies, strategies, and performance measures that will guide the freight- related transportation investment decisions of the State.
- When applicable, list—
    - Multimodal critical rural freight facilities and corridors designated within the State under the National Multimodal Freight Network (NMFN).
    - Critical rural and urban freight corridors designated within the State under the National Highway Freight Program (NHFP).
- Describe how the plan will improve the ability of the State to meet the national multimodal freight policy goals described in the FAST Act and the National Highway Freight Program (NHFP) goals described in MAP-21.
- Describe how innovative technologies and operational strategies, including freight intelligent transportation systems (ITS) that improve the safety and efficiency of freight movement were considered.
- In the case of roadways on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, describe improvements that may be required to reduce or impede the deterioration.
- Inventory facilities with freight mobility issues, such as bottlenecks, within the state, and for those facilities that are State owned or operated, describe the strategies the State is employing to address the freight mobility issues.
- Consider any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay.
- Provide a Freight Investment Plan that includes a list of priority projects and describes how funds made available would be invested and matched.
- Consult with the State Freight Advisory Committee (FAC), if applicable.

The IIJA requires the Statewide Freight Plan to include additional components:

- Include the most recent commercial motor vehicle parking facilities assessment conducted by the State.
- Provide the most recent supply chain cargo flows in the State, expressed by mode of transportation.
- Provide an inventory of commercial ports in the State.
- If applicable, consider the findings or recommendations made by any multi-state freight compact to which the State is a party.
- Consider the impacts of e-commerce on freight infrastructure in the State.
- Consider military freight.
- Consider strategies and goals to decrease:
    - The severity of impacts of extreme weather and natural disasters on freight mobility;
    - The impacts of freight movement on local air pollution;
    - The impacts of freight movement on flooding and stormwater runoff; and
    - The impacts of freight movement on wildlife habitat loss.
- In addition to representatives of ports and freight railroads, expand the membership of the FAC to include shippers, carriers, freight-related associations, third-party logistics providers, the freight industry workforce, not-for-profit or community organizations, metropolitan planning organizations, local governments, and State offices, including the transportation department, environmental protection department, air resources board, and economic development agencies, as applicable.

These acts require Statewide Freight Plans to note how these goals are being met. These are summarized in Table 2.

Table 2. Comparison of Statewide Freight Plan Contents to FAST Act and IIJA Requirements

Required Plan Content — FAST Act and IIJA	Statewide Freight Plan Content
FAST Act	
An identification of significant freight system trends, needs, and issues with respect to the State.	Freight trends, issues, and needs are noted throughout the plan and highlighted in Section 1.5.
Description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the State.	Freight goals are provided in Chapter 1. Statewide performance measures and monitoring processes for freight travel are provided in Chapter 7.
When applicable, a listing of: A. Multimodal critical rural freight facilities and corridors designated within the State under section 70103 of this title; and B. Critical rural and urban freight corridors designated within the State under section 167 of title 23	The plan does not identify any Critical Rural Freight Corridors (CRFCs) or Critical Urban Freight Corridors (CUFCs). Supporting documentation is provided in Section 3.3.
A description of how the plan will improve the ability of the State to meet the national multimodal freight policy goals described in Section 70101(b) of this title and the national highway freight program goals described in section 167 of Title 23	This description is provided in Chapter 1.
A description of how innovative technologies and operational strategies, including freight intelligent transportation systems, that improve the safety and efficiency of freight movement, were considered	An inventory of ITS applications and operational improvements along interstates in Alabama is provided in Section 6.6.
In the case of roadways on which travel by heavy vehicles (including mining, agricultural, energy cargo or equipment, and timber vehicles) is projected to substantially deteriorate the condition of the roadways, a description of improvements that may be required to reduce or impede the deterioration	Several maintenance improvements along the NMFN are in the ALDOT work program, as described in Section 6.4.

An inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are State owned or operated, a description of the strategies the State is employing to address the freight mobility issues	An inventory of freight mobility issues is provided in Chapter 5. The overall freight investment strategy is provided in Chapter 6.
Consideration of any significant congestion or delay caused by freight movements and any strategies to mitigate that congestion or delay	An inventory of freight mobility issues is provided in Chapter 5. The overall freight investment strategy is provided in Chapter 6.
A freight investment plan that, subject to subsection (c)(2), includes a list of priority projects and describes how funds made available to carry out section 167 of title 23 would be invested and matched	The Freight Investment Plan consists of a priority list of projects that will be funded through the National Highway Freight Program (NHFP), as well as other improvements in the ALDOT work program that will help facilitate freight movement statewide. These are detailed in Chapter 6.
Consultation with the State freight advisory committee, if applicable	A summary of coordination with the State freight advisory committee is provided in Appendix A.
IIJA	
The most recent commercial motor vehicle parking facilities assessment conducted by the State under subsection (f)	A commercial vehicle parking assessment is provided in Section 5.3.
The most recent supply chain cargo flows in the State, expressed by mode of transportation	The most recent supply chain cargo flows are provided in Chapter 4.
An inventory of commercial ports in the State	An inventory of commercial ports is provided in Chapter 2.
If applicable, consideration of the findings or recommendations made by any multi-State freight compact to which the State is a party under section 70204	This is not applicable to the State of Alabama.
The impacts of e-commerce on freight infrastructure in the State	These impacts are highlighted in Section 2.5.

Consideration of military freight	These considerations are provided in Section 2.6.
Strategies and goals to decrease: A. The severity of impacts of extreme weather and natural disasters on freight mobility B. The impacts of freight movement on local air pollution C. The impacts of freight movement on flooding and stormwater runoff; and D. The impacts of freight movement on wildlife habitat loss	These strategies and goals are included in Chapter 6.
Expand the FAC to include different organizational perspectives, including public, private, and not-for-profit stakeholders with an interest in freight.	A roster of the FAC, including the organizations represented by members, is provided in Appendix A.

1.4 Mission Statement and Goals of the Alabama Statewide Freight Plan

The mission statement and associated goals of the Alabama Statewide Freight Plan guide ALDOT in developing a coordinated freight policy that meets the needs of the State while adhering to FHWA policy. The mission statement and goals below were developed to be consistent with the National Freight Goals detailed in the previous subsection.

Mission Statement: To promote the efficient and safe movement of goods in a manner that increases economic competitiveness and promotes environmental responsibility throughout the State of Alabama.

- Goal 1: Improve reliability and reduce congestion on the National Multimodal Freight Network (NMFN) within the state.
- Goal 2: Improve connectivity between all modes of freight transportation and address supply chain issues throughout the state.
- Goal 3: Coordinate with Metropolitan Planning Organizations (MPOs) and other agencies during the development/update of the Statewide Freight Plan.
- Goal 4: Ensure a state of good repair along freight network facilities throughout the state.
- Goal 5: Improve economic benefits by supporting public and private sector investment on the statewide freight network.
- Goal 6: Promote the safety, security, efficiency, and resiliency of multimodal freight transportation.
- Goal 7: Promote the use of ITS technologies to improve the safety, efficiency, and reliability on the statewide freight network.

- Goal 8: Promote and enhance both the human and natural environment while enhancing the performance of the statewide freight network.

1.5 Key Freight Issues

The Statewide Freight Plan is a multimodal document. However, it is important to remember that the non-roadway modes are largely (if not entirely) controlled by the private sector. The primary freight related considerations and how they are addressed are listed below:

- Congestion Reduction/Mobility Preservation – Comparing the level of traffic and truck percentages to the location of freight chokepoints throughout the state assists to identify the areas in need of freight congestion relief.
- Intermodal Connectivity – With the passage of the previous transportation reauthorization bill, the FAST Act, FHWA guidance shifted from being roadway-centric to having a more multimodal focus. Therefore, access to intermodal facilities such as rail terminals and airport cargo facilities is an important freight mobility consideration.
- Infrastructure Condition – Simply stated, truck traffic generally creates more maintenance needs than average passenger automobiles, primarily due to the greater vehicle weights. Identifying facilities that carry higher levels of truck traffic helps ALDOT and other implementing agencies to prioritize their maintenance needs.
- Economic Competitiveness – Input from public and private sector stakeholders assists in understanding how freight infrastructure and improvements can better facilitate economic vitality and growth in Alabama. Modal analysis also helps in identifying intermodal connectivity opportunities.
- Safety – The identification of potential safety conflicts and congestion chokepoints throughout the state is an important step in improving the overall safety of the roadway network.
- Innovative Operational Improvements – Assessing how new technologies can be integrated into the planning process, combined with an understanding of factors such as intermodal connectivity and freight chokepoints, supports the implementation of ITS strategies.
- Intergovernmental Coordination – The IIJA encourages intergovernmental coordination throughout the planning process. This coordination is important in identifying specific freight significant corridors and developing the overall freight investment strategies.

1.6 Projects and Initiatives from Metropolitan Planning Organizations

Much of the freight planning conducted around the state is undertaken by the 14 metropolitan planning organizations (MPOs) in Alabama, which represent major urbanized areas and hubs of freight activity. In order to ensure that the Statewide Freight Plan is considering regional freight projects and initiatives, information from the long-range transportation plans (LRTPs) of Alabama's largest MPOs, including transportation improvement programs (TIPs) and freight plans, as applicable, is summarized as follows.

Birmingham MPO

The Birmingham region is the largest metropolitan area within Alabama according to US Census data, encompassing approximately 22% of the state's population. The Birmingham MPO includes all of Jefferson and Shelby counties, as well as portions of Blount and St. Clair counties, and consists of 2,262 square miles and 55 municipalities. As the largest and most diversified economy within Alabama, many of the goals and proposed projects within the Birmingham MPO focus on safety improvements for all modes of travel, reducing congestion, and supporting economic growth and the efficient movement of freight.

Improving and expanding the existing freight network is of particular importance to the Birmingham area, as discussed within the long-range transportation plan. The region includes several industrial parks, foreign trade zone sites, and numerous private industrial sites, which facilitate regional and nationwide freight operations via road, rail, air, and water.

Two airports, the Birmingham-Shuttlesworth International Airport and Bessemer Municipal Airport, serve air cargo. The 184-acre Port of Birmingham (also known as Birmingport) facilitates the movement of goods on the Black Warrior River, which connects to the Tombigbee River, Alabama River, and Tennessee River for the multi-state movement of freight by water. Regarding rail connectivity, the Birmingham region has three Class I railroads and associated transfer facilities (BNSF, CSX Transportation, and Norfolk Southern Corporation), allowing for access to markets in both the Midwest and West. Additionally, there are also three Class III short line railways operating out of Birmingham (ATN, ABWR, and BHRR).

The Birmingham metropolitan area has an extensive highway network, consisting of national interstates within the Strategic Highway Network (STRAHNET), MAP-21 (Moving Ahead for Progress in the 21st Century Act) principal arterials, and various other arterials and connectors, providing connectivity both through and around the city of Birmingham. The interstates with the highest rates of truck use are I-20, I-22, I-59, I-65, and I-459, each of which has truck volume percentages greater than 20%, generally outside of the main urban area of Birmingham.

The Birmingham Regional Freight Plan, adopted in March 2019, highlights high-priority road, airport, and port projects. The high-priority, fiscally constrained road projects that fall along interstate, US, and state routes include the following:

- Operations and capacity improvements along I-59 from I-459 to Chalkville Road
- Additional lanes and bridge replacement along I-65 from Oxmoor Road to Greensprings Avenue
- Additional lanes and bridge replacement along US 78 from Finley Boulevard to Pratt Highway
- Additional lanes along SR 150 from Morgan Road to Parkwood Road

High-priority aviation projects at Birmingham-Shuttlesworth International Airport include realignment of taxiways, rehabilitation of runways, realignment of Air Cargo Avenue, and construction of a new entrance road. High-priority port projects at the Port of Birmingham include truck-related technology investment, dredging improvements at terminals, rail siding expansion, container on-barge service, and warehouse construction.[1]

In recent years, the Birmingham region has seen increasing congestion, particularly for freight movement. Many of the projects outlined in the Birmingham MPO's fiscally-constrained Transportation Improvement Program (TIP), adopted in September 2019, involve the expansion of the existing network in efforts to improve capacity, including for freight movement. There are a total of 51 roadway capacity projects along several freight routes, including segments of I-65 and I-59, and US-31.[2] The Birmingham Regional Freight Plan does not explicitly identify bottlenecks independently of existing sources. Instead, the plan references the existence of bottlenecks via previous reports and highlights the importance of identifying and mitigating bottlenecks within the Birmingham metropolitan area. That said, the Birmingham Regional Freight Plan draws attention to certain areas and industries that generate large truck volumes. The plan puts a heavy emphasis on segments of I-20, I-59, and I-65, as these contain the top 10 truck volume locations, and highlights the intersection of I-20 and I-65 as a major point of concern given its appearance on the top 100 truck bottleneck locations as reported by the American Transportation Research Institute (ATRI). The plan also notes bottlenecks on other freight modes:

- Rail and truck transload facilities located near 1st Avenue North, Finley Boulevard, I-20/59, Avenue W, and the Finley Boulevard Extension
- At-grade rail crossings with a focus on Blount, Jefferson, St. Clair, and Shelby Counties
- The Birmingham-Shuttlesworth International Airport
- The SR 269 truck access point for Port Birmingham
- The Jones Valley Tank Farm Cluster, which is a tank farm surrounded by a high school and residential properties; trucks must pass through residential areas to access the tank farm.

Huntsville MPO

Huntsville is the largest city within Alabama and has the second-largest metropolitan area population within the state, growing by nearly 20% between 2010 and 2020. While Huntsville has excellent linkages within the city and to surrounding smaller communities via interstate highway spur I-565, and several state highways, it lacks interstate highway access to larger cities such as Chattanooga. Interstate 565 runs east-west through the region and connects to I-65, which runs north-south just west of the MPO area.

In addition to highways, the Huntsville MPO facilitates freight movement through port, aviation, and railway facilities. The Port of Huntsville is an inland port, consisting of the international airport, International Intermodal Center, and the Jetplex Industrial Park, which provide truck, train, and air transport. Rail connectivity via the International Intermodal Center is provided by spur to a main

line of the Norfolk Southern Railroad, while Decatur, located to the southwest, provides cargo waterway service via barge. Three railroads operate within the urbanized area. Huntsville-Madison County Airport Authority operates several miles of industrial switching track, while Huntsville-Madison County Railroad Authority operates a Class III short-line railroad, and Norfolk Southern operates a Class I railroad. The NS railroad transports several major commodities, including coal, chemicals, lumber, and wood products.

The goals of the Huntsville Long-Range Transportation Plan, updated in September 2021, include increasing the accessibility and mobility of people and freight, and enhancing multimodal integration and connectivity.[3] Within the fiscally-constrained TIP, freight-related projects include the construction of a Huntsville Northern Bypass, construction of the Redstone Arsenal East Connector, widening of portions of US 72, and access management and intersection improvements on a portion of US 231.[4]

Mobile MPO

As the site of the only salt-water and deep-water port in the state, Mobile has an extensive freight system, which, in addition to the Port of Mobile, includes two major interstates, several arterial roadways, Class I and Class III railroads, and numerous rivers and intracoastal waterways, including the Intracoastal Canal.

Interstates 65 and 10 provide north-south and east-west connectivity, respectively, to cities within Alabama, as well as in Mississippi and Florida. With over 196 miles of roadway currently experiencing significant congestion, there is a need for increased highway capacity, especially west of I-65. ALDOT's planned expansion of the US 98/SR 158 extension will help meet this need by increasing capacity along the highway from east of Mobile towards the Alabama-Mississippi border.

The Port of Mobile is currently ranked eleventh out of the top 50 ports in the US regarding total tonnage in trade volume, with a 2020 figure of 53.2 million tons. The port's public terminals have direct access to 1,500 miles of inland waterways, as well as the Intercoastal Canal, providing water connectivity to the northern United States. Immediately accessible to these terminals is the interstate system and five Class I railroads, as well as a rail ferry providing service to Veracruz, Mexico. Although coal exports have decreased, and will continue to decrease in total amount exported, the port's McDuffie Terminal remains one of the largest coal exporting terminals in the US, and the largest for importing. An automobile terminal was recently constructed at the Port of Mobile, which will handle up to 160,000 vehicles per year.

The Mobile Regional Airport Authority owns and operates the Mobile Downtown Airport at the Brookley Complex, which serves as a regional cargo hub for FedEx, UPS, Emory, and DHL. Chemical products, electronics, and transportation equipment are the most common outbound cargo commodities, while machinery, transportation equipment, and miscellaneous manufacturing products are the most common inbound commodities.

The LRTP identifies four critical freight needs within the region: improvements to I-10 Mobile River bridge, construction of an intermodal container transfer facility bridge, construction of an Automotive Roll On/Roll Off Terminal, and construction of a new inland port to supplement activities at the Port of Mobile.[5] The fiscally-constrained TIP includes several projects that fall along freight routes, including expansion of portions of I-10 and US 98, and bridge replacements and rehabilitation on state routes.[6]

The LRTP identifies preferred routes as well as freight bottlenecks in the Mobile region. Interstate highways, as well as US 43, US 98, and US 45 are preferred freight routes but are also the corridors that exhibit the most freight traffic congestion:

- I-10 is reported to have three major bottlenecks at the intersections of I-65, SR-181, and along the Bayway beginning at the tunnels.
- US 43 is prone to congestion at various locations due to low-speed limits. Various rail crossings were also reported to generate congestion along US 43.
- US 98 near the Mississippi state line was recognized as in need of additional lanes to alleviate congestion.
- The intersection of Springhill and Mobile Street is also a freight bottleneck.

Montgomery MPO

Montgomery has the fourth-largest metropolitan population within the state, and there are increasing concerns regarding roadway capacity and congestion. Two interstate highways pass through Montgomery. Interstate 65, which runs north south, begins in Mobile, and provides connectivity to Birmingham, crossing the Alabama-Tennessee state line, allowing for direct access to several metropolitan areas in three other states. Interstate 85's southern terminus intersects with I-65, before continuing northeast to Atlanta and northeastward through South Carolina. An extensive network of additional highways provide access to other major cities across the state. US 231/SR 152 circles the city, intersecting with both I-65 and I-85, as well as US 31, which extends south of the city.

Two Class I railroads currently operate in Montgomery: CSX Transportation and Norfolk Southern. CSX transports more than 575,000 carloads of freight within Alabama each year. Norfolk Southern transports more than 6.3 million tons of cargo each year throughout Alabama. Major freight products include coal, corn, limestone, and pulp.

Montgomery Regional Airport carries air cargo and serves several major carriers, including UPS, FedEx, and DHL. There is currently limited air cargo transported via the airport. The Montgomery MPO area is traversed by the Alabama, Coosa, and Tallapoosa rivers. The only navigable waterway in the Montgomery area is the Alabama River. There are numerous smaller inland ports southwest of the region, but only one dock suitable for movement of goods within the MPO. Future dredging of the river south of Montgomery would allow for access to the Gulf of Mexico and an expansion of cargo transported via water.[7]

While the 2040 LRTP did not include specific work programs dedicated to freight improvements, the facilitation and improvement of goods movement was a consideration, with several roadway work programs outlined, including highway capacity improvements and bridge replacement projects along various segments of I-65. While improving freight movement was not specified as a goal in the LRTP, the broader goals of maintaining efficiency of the transportation system and prioritizing maintenance needs will help improve freight operations, especially with anticipated increases in the truck traffic in the region.

The Montgomery MPO Regional Freight Plan (2020) identifies current bottlenecks and projected bottlenecks within the region. Current bottlenecks include the following locations:

- US 80 from Montgomery Regional Airport to I-85
- US 231 from US 80 to SR 152
- I-85 from SR 110 to I-65
- Alabama River Parkway
- US-231 from SR-152 to Wetumpka
- SR-14 from I-65 to Wetumpka
- I-65/I-85 Interchange
- Air Freight Facilities

In the future, it is projected that air freight facilities will no longer be a bottleneck. In addition to the current bottlenecks, additional bottlenecks are forecasted by 2040:

- I-65 from US-80 to SR-152
- US-31 from I-65 to Prattville
- US-82 from I-65 to Prattville

Tuscaloosa Area MPO

Tuscaloosa has the fifth largest metropolitan population in Alabama. The Tuscaloosa MPO has placed an emphasis on freight movement and economic vitality within the goals of its LRTP (adopted in August 2019), adapted from the MAP-21 national goals released in 2012. Specifically, the MPO is seeking to achieve an improved freight and aviation network with enhanced connectivity, maintain its infrastructure, and reduce congestion. The MPO also has two planning factors that focus on freight. The first places emphasis on increasing accessibility and mobility of people and freight, while the second looks to enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.[8]

In the Tuscaloosa region, most freight is transported by trucks. Interstate 20 runs east-west through the southern portion of the city, while I-359, a spur route which runs parallel with SR 69, travels north-south. US 82, a largely rural route which runs east-west through the southern US, provides access on the outer edges of southeast and northwest Tuscaloosa. There are over 70 trucking firms located in Tuscaloosa County.

The Tuscaloosa MPO is served by three railroads: CSX Transportation and Norfolk Southern (Class I), and Alabama Southern Railroad (Class III). Tuscaloosa National Airport provides some freight service via small and large category aircraft. The continued operations of railway and air freight remains a priority to support industrial growth in the region.

The Black Warrior River flows northeast to the southwest through the region, and a 9' x 200' channel allows for the transport of bulk items such as coal, crude petroleum, metallic ores, nonmetallic minerals, and forest products. Additionally, there are several locks/dams on the river, as well as a state dock, which has infrastructure appropriate for the transfer and storing of materials and products.

Within the Tuscaloosa Area MPO's fiscally-constrained TIP, there are several projects that when implemented, will enhance the local freight network. These include several bridge replacements on state routes and over railroads; intersection/interchange improvements and widening of state routes; the realignment and construction of several roundabouts along state and US routes in the region; at-grade railroad crossing improvements; and preservation of right-of-way for the future Tuscaloosa East Bypass.[9]

1.7 Stakeholder Outreach

Engaging stakeholders who represent the diversity of freight interests in Alabama is important to help fully understand freight conditions statewide and convey existing freight operations throughout the state. Input from stakeholders is critical to accurately assess existing conditions and develop a feasible plan for future implementation. In accordance FHWA guidance, ALDOT invited stakeholders representing key elements of the freight transportation community to form a Freight Advisory Committee (FAC) at the outset of the original (2017) Alabama Statewide Freight Plan development. Members were selected to reflect an FAC with knowledge of and connections with all freight modal networks (roadway, rail, air and water), representing users/shippers and policymakers from both the public and private sectors. The role of the FAC is to advise ALDOT on freight-related issues and priorities, provide a forum for freight-related discussions, and promote communication, coordination and the exchange of information. The FAC is an "ongoing" committee that ALDOT will continue to engage on freight-related issues into the future.

As a part of the update for the Freight Plan, and to adhere to new requirements of the IIJA, the FAC membership was reviewed and expanded to include additional freight-related organizations and representatives. The updated FAC includes the state trucking and railway associations; numerous airport and port authorities; the Southeast Association of Rail Shippers; state agencies, including the Alabama Department of Commerce and Alabama Law Enforcement Agency; the non-partisan Alabama League of Municipalities; representatives from MPOs; tribal governments; federal agencies, including FHWA and the Federal Motor Carrier Safety Administration; and representatives from several ALDOT bureaus, regions, and offices. ALDOT has reached out to the FAC at key points during the plan update. At the start of the effort, a welcome email was sent to re-engage the FAC and invite them to participate in upcoming FAC meetings. During two

subsequent FAC meetings, FAC members provided insights on significant freight generators, destinations, corridors and intermodal connectors within their geographic and/or modal focus. In addition, ALDOT shared findings related to freight bottlenecks, existing and projected commodities and flows, and how ALDOT's work program is anticipated to meet future needs. ALDOT also solicited input from the FAC regarding freight system resilience and maritime considerations.

ALDOT has also reached out to state departments of transportation in Tennessee, Mississippi, and Georgia, as well as the Emerald Coast Regional Council in Florida, to determine whether there are any transportation projects or freight-generating developments that may impact freight operations in or around Alabama. Similarly, ALDOT conducted discussions with the Mobile, Huntsville, Tuscaloosa, and Birmingham MPOs to understand any shifts in truck travel or new development that may impact freight operations at the regional level.

Stakeholder comments have been incorporated into the final document as appropriate.

Appendix A provides the current ALDOT FAC membership list.

Chapter 2: Existing and Projected Network Characteristics

This chapter provides an overall profile of Alabama's multimodal freight network, existing and projected freight flows, and congested areas of concern throughout the state. The information presented supports the subsequent identification of key improvements to facilitate freight mobility statewide.

2.1 Overall Statewide Freight Infrastructure

The multimodal freight network consists of major roadways, railways, waterways, marine ports, airports and pipelines. Of these modes, the vast majority of commodities are transported by truck and rail in Alabama.

Roadway Network

Functional classification is a system that categorizes each roadway as a function of the mobility and access it provides. Interstates provide for the greatest mobility with the least access, while local roadways offer extensive access at the expense of quicker mobility. Sixty-seven percent of roadway miles in Alabama consists of local roads. Thirty-two percent of roadways are arterials or collectors, and less than one percent of roadway mileage consists of interstate highways. ALDOT maintains all of the interstate highways and nearly all of the arterials in the state, but just a small portion of collector and local roads. Alabama's major roadway network, consisting of Interstate highways and an extensive network of US Routes and State Routes, is illustrated in Figure 2. A breakdown of Alabama's roadway mileage by functional classification is provided in Table 3.

Table 3. Alabama Roadway Network by Functional Classification

Functional Classification	All Roads	ALDOT-Maintained Network	
	Miles	Miles	Percent of All Roads
Interstate	1,003.66	1,003.66	100.0%
Principal Arterial - Other Fwy/Expressway	32.96	32.96	100.0%
Principal Arterial - Other	3,347.14	3,229.12	96.47%
Minor Arterial	6,339.79	4,593.74	72.46%
Major Collector	15,873.59	2,041.73	12.86%
Minor Collector	6,111.41	32.07	<1.0%
Local	67,462.35	7.83	<1.0%
TOTAL	**100,170.90**	**10,941.11**	**10.92%**

Source: ALDOT Highway Performance Monitoring System (HPMS) Data, 2020

FHWA has designated all of the Interstate miles within Alabama as part of the National Highway Freight Network (NHFN), along with several intermodal connectors. The remaining portion of the NHFN consisted of corridors critical to freight movement, as designated by ALDOT. Specific railways, waterways, port facilities, airports and other facilities were also designated, which together with the NHFN comprise an overall National Multimodal Freight Network (NMFN), which is currently considered by FHWA as the "Interim NMFN." More information on the NHFN, critical freight corridors, and Interim NMFN facilities in Alabama is provided in Chapter 3.

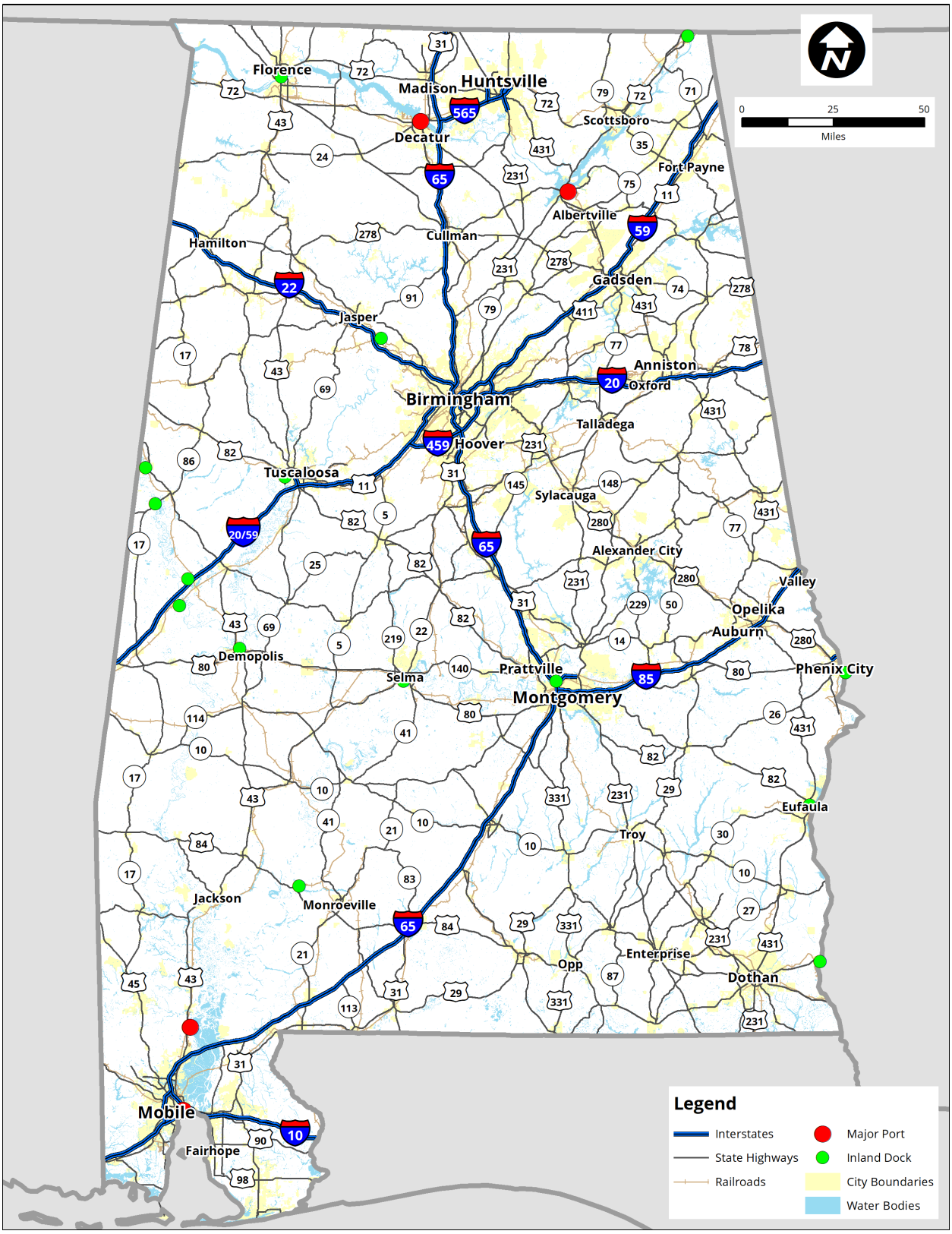

Figure 2. Alabama's Major Roadway Network

Bridge Facilities

Bridge conditions are rated based on a variety of factors such as age, structural deficiency, deck conditions, and need for repairs. Bridges in a state of disrepair along a major freight corridor could cause potential disruptions to freight movement.

The ALDOT Transportation Asset Management Plan (TAMP), completed in 2020, includes an inventory of bridge conditions on interstate highways, other NHS roads, and non-NHS roads. These are presented in Table 4.

Table 4. Bridge Condition Ratings by NHS Group

	Good Condition		Fair Condition		Poor Condition		Totals
Roadway Type	Deck Area	Percent	Deck Area	Percent	Deck Area	Percent	Deck Area
Interstate highways	5,955,000	17.0%	28,081,388	80.3%	931,481	2.7%	34,967,871
Other NHS roads (state-owned)	10,900,910	44.1%	13,997,670	54.4%	260,263	1.5%	25,158,842
Other NHS roads (non-state-owned)	346,494	64.6%	189,052	35.3%	0	0.0%	535,546
Non-NHS roads (state-owned)	10,390,020	45.2%	12,256,746	53.3%	334,110	1.5%	22,980,876
Non-NHS roads (non-state-owned)	15,175,741	52.3%	12,604,045	43.4%	1,252,095	4.3%	29,031,880
Total	42,768,165	38.0%	67,128,901	59.5%	2,777,949	2.5%	112,675,014
NHS Bridges	17,202,404	28.4%	42,268,111	69.7%	1,191,743	2.0%	60,662,258
State-Owned	27,245,930	32.8%	54,335,804	65.4%	1,525,854	1.8%	83,107,588

Source: ALDOT Transportation Asset Management Plan (2020)

This assessment shows that most bridges in Alabama are in good or fair condition; only 2.5% are in poor condition. Likewise, 98.0% of bridges the bridges that fall along the NHS are good or fair condition.

Railway Network

Rail is an efficient and cost-effective method to transport goods. Nationwide, 28% of freight movement by ton-miles (the length and weight that freight travels) is transported by rail.[10] Alabama's freight rail network is composed of nearly 3,300 freight rail miles operated by 26 railroads.[11]

Five of the nation's seven Class I railroads have a presence in Alabama—Burlington Northern Santa Fe (BNSF), Canadian National Illinois Central (CN/IC), CSX Transportation (CSXT), Kansas City Southern Railway Company (KCS), and Norfolk Southern (NS)— and account for approximately 69% of track mileage in Alabama.[12]

- Burlington Northern Santa Fe (BNSF) operates 231 miles of Class I rail line which connects Memphis to Birmingham.
- Canadian National Illinois Central (CN/IC) operates 22 miles of Class I rail line in southwestern Alabama connecting Mississippi to Mobile.
- CSX Transportation (CSXT) operates 1,012 miles of Class I rail line in Alabama which connects major cities including Mobile, Montgomery, Dothan, Opelika, Birmingham, and Decatur.
- Norfolk Southern (NS) is the largest Class I rail operator in the state with 1,304 miles of Class I rail line connecting cities such as Florence, Decatur, Huntsville, Gadsden, Birmingham, Tuscaloosa, Demopolis, Mobile, Anniston, and Opelika.

A map of Alabama's freight rail network is provided in Figure 3.

The ALDOT State Rail Plan was last completed in 2014 and is currently being updated.

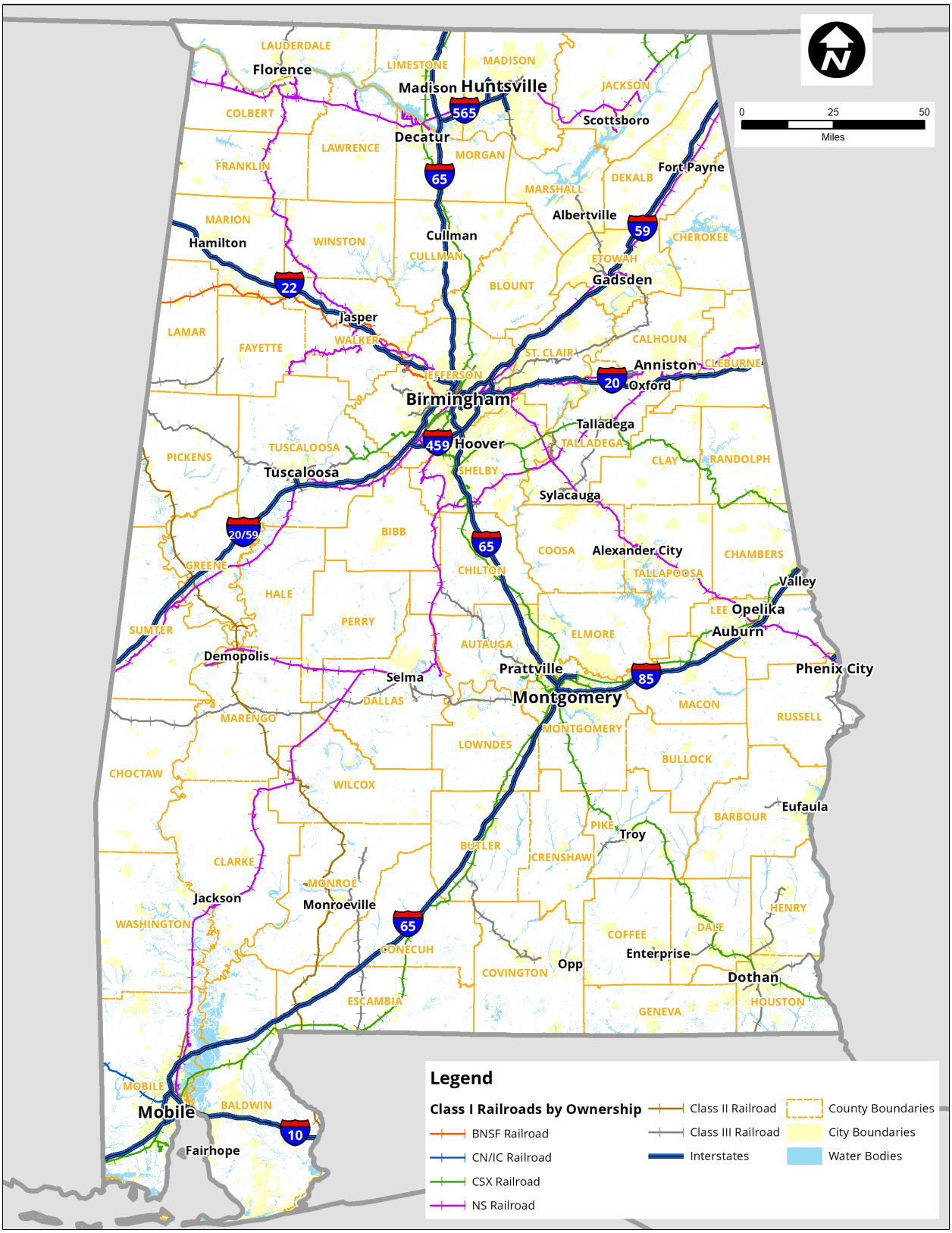

Figure 3. Railroad Network in Alabama

Maritime Network

Alabama is well-served by several navigable waterways for freight traffic, facilitating connectivity throughout and outside the state. These include the Mobile River (which empties into the Mobile Bay on the Gulf of Mexico), the Tombigbee and the Alabama rivers (the confluence of which forms the Mobile River), the Chattahoochee River, and the Tennessee River. In addition to the Port of Mobile, Alabama also has 15 smaller, inland ports throughout the state, including Florence, Montgomery, Selma, and Tuscaloosa. This section presents an overview of major waterways and ports.

Tennessee River and Ports

The Tennessee River is the largest tributary of the Ohio River, with approximately 200 miles that flow through the northern portion of Alabama. The river flows southwest into Alabama from Chattanooga and continues west through Huntsville and Decatur, flowing into the Ohio River where it connects to the Mississippi River at Cairo, Illinois. The channel has an average depth of 9 feet and is 1.5 miles wide at its widest point. There are four locks along the Tennessee River in Alabama, at Guntersville Dam, Wheeler Dam, Wilson Lock and Dam, and Colbert Shoals.

According to the Tennessee Valley Authority (TVA) , some of the commodities carried on the Tennessee River include bulk goods such as, "coal, chemicals, grains, ores, minerals and aggregates such as sand, gravel and slag." The TVA also says the river traffic accounts for "over 28,000 barges carrying 45 to 50 million tons of goods… annually."[13]

The Tennessee River is important to the Alabama freight network because it connects northern Alabama to the Mississippi River to the west and to the Gulf of Mexico via the Tombigbee Waterway. This facilitates the movement of goods among industries and manufacturers more economically than if they were shipped by other modes. In northern Alabama, for example, automobile manufacturers rely on base metals that are shipped via waterways.

Ports of Florence and Decatur – The Tennessee River facilitates freight movement via the Ports of Florence and Decatur. Both ports, which are two of the larger inland ports, offer regional and national connectivity via the inland waterway system, as well as proximity to the US Highway system. The harbor at the Port of Florence is about 3,000 feet long and carries ships from 300 to 500 feet in width.[14] The Port of Decatur has over 2,000 feet of riverfront, 12 acres of storage, and 90 spots for fleeting ships.[15] Inbound commodities include coal, grains, scrap iron, and petroleum products, and outbound commodities include chemicals and flattened steel rolls.

Black Warrior River and Ports

The Black Warrior River is the primary tributary of the Tombigbee River and flows from west of Birmingham at the confluence of the Mulberry Fork and Locust Fork Rivers, southwest through Tuscaloosa, and into the Tombigbee River at Demopolis. The Black Warrior River has four locks: the Bankhead Lock, the Holt Lock, the Oliver Lock, and the Selden Lock.

According to the USACE, the Black Warrior has a nine-foot navigational channel and is maintained to a width of 200 feet.[16] It is used by transport commercial commodities such as coal, coke, steel, wood, and chemicals."[17]

Given its location, the Black Warrior provides a significant connection to the inland waterway system in west-central Alabama, making it an important linkage to transport goods to and from Tuscaloosa and other destinations in western Alabama.

Port of Cordova – Located on the Black Warrior River and part of the Mobile Bay River System near Cordova, Alabama, the Port of Cordova is owned by the Alabama State Port Authority. The 60-acre facility has docks located near local businesses such as BAE Systems, an aerospace company, and Cordova Gas.[18]

Port of Demopolis – The Port of Demopolis is located on the Black Warrior River, just east of the city of Demopolis in Marengo County, near the confluence with the Tombigbee River. The Port of Demopolis is a 16-acre facility which offers rail service by BNSF, Norfolk Southern, and Alabama and Gulf Coast Railways. It also has easy access to US 80 and US 43 for ground service.[19] The Port of Demopolis provides access to the Tennessee-Tombigbee, Ohio, and Tennessee Rivers, as well as the Great Lakes and the Gulf of Mexico.

Tennessee Tombigbee Waterway and Tombigbee River

The Tennessee-Tombigbee Waterway is an artificial waterway in Alabama that connects the Tennessee River to the Tombigbee River in Alabama. The waterway runs south through western Alabama until it merges with the Tombigbee River. This man-made waterway was constructed to connect the Tennessee River to the Black Warrior-Tombigbee River System near Demopolis. Developed to reduce the navigation distance in Alabama (as well as Tennessee and Mississippi) from the Gulf of Mexico, it consists of an almost 200-foot channel, and ten locks and dams. This waterway allows for reduced costs in transportation freight, while still providing extensive access to numerous ports, terminals, and intermodal facilities within the region. According to the US Army Corp of Engineers (USACE), the Tennessee-Tombigbee Waterway/Tombigbee River is 300 feet wide by nine feet deep[20] in the river section and 12 feet in the canal and divide sections.[21]

The Tombigbee River is significant to the Alabama Maritime Freight network because it connects Western Alabama to the inland waterway system, thus shortening shipping distances throughout the region. It is estimated that the Tennessee-Tombigbee Waterway contributed $16.4 billion dollars and nearly 20,000 jobs to Alabama between 1996 and 2008, and $278.5 million in tax revenue for Alabama in that same timeframe.[22] Some of the commodities shipped on the Tombigbee River include forest products, such as timber and wood chips, as well as petroleum byproducts, crushed rock, and grains.

Coosa-Alabama River and Ports

The Coosa River is a tributary of the Alabama River and flows southwest from the Alabama-Georgia state line through Gadsden to its confluence into the Alabama River just north of Montgomery. There are several dams along the river for hydroelectric generation.

The Alabama River flows from just north of Montgomery, Alabama and is formed by the Tallapoosa and Coosa Rivers. The river flows southwest into the Tombigbee River and empties into the Gulf of Mexico at Mobile. The Alabama River has three locks and dams between Montgomery and Mobile: the Robert F. Henry Lock and Dam at river mile 236.2, the Millers Ferry Lock and Dam at river mile 133.0, and the Claiborne Lock and Dam at river mile 72.5. According to the Coosa-Alabama River Improvement Association, the Alabama River has an authorized channel depth of nine feet and authorized channel width of 200 feet. [23] This was recently confirmed during a Freight Advisory Committee meeting by staff at the Coosa-Alabama River Improvement Association. While the Alabama River does not currently serve a major freight asset, the development of an intermodal facility in Montgomery and the recent depth improvements to the Coosa River could provide more incentive to utilize this river system for freight purposes. Additional freight traffic could provide both economic and employment benefits to the region.

Port of Montgomery – Located on the Alabama River, the Port of Montgomery is owned by the Alabama State Port Authority. It was reported by the City of Montgomery in early 2022 that the Alabama Port Authority has plans to build an Inland Intermodal Transfer Facility in Montgomery. This facility will be serviced by the CSX railway, connecting the Montgomery region to the marine terminal and additional Class I railroads at the Port of Mobile. The purchase of 272 acres would extend intermodal rail service from the container intermodal terminal at the Port of Mobile to help support growth in manufacturing, retail, distribution, and agribusiness in the Montgomery area. Once complete, the project is projected to generate 2,618 direct and indirect jobs, $340 million in business revenues and over $14.2 million in state and local taxes. [24]

Port of Selma – Located on the Alabama River, this small port near the town of Selma, Alabama is owned by the Alabama State Port Authority. The facility has access to two main railroads, including M&B Railroad and Norfolk Southern, which provides connections throughout the southeastern US. Other multimodal connections include nearby US 80 which connects to I-65 and I-85. The Port of Selma is also located within an hour of the Montgomery Regional Airport.[25] These multimodal connections provide easy freight access to not only the rest of Alabama, but out-of-state destinations as well.

Gulf of Mexico Intracoastal Waterway

The Gulf Coast portion of the Intracoastal Waterway stretches from Texas to Florida and consists of just over 1,000 miles of navigable waterway used primarily for barge transportation. The southern border of Alabama and the Mobile Bay are an integral part of the Intracoastal Waterway and provide a key connection for goods moving east and west along the Intracoastal Waterway.

The waterway is also a key part of the USDOT Maritime Administration (MARAD) M-10 Corridor, which designates it as one of America's Marine Highways.

Chattahoochee River and Ports

The Chattahoochee River in Alabama forms the eastern border between Alabama and Georgia and runs south from just north of West Point to the southern border of Alabama and Florida. The river consists of a channel nine feet in depth and 100 feet wide.[26] The Chattahoochee River has four locks and dams in Alabama: West Point, WF George Lock and Dam, GW Andrews Lock and Dam, and Jim Woodruff Lock and Dam. The Chattahoochee River facilitates freight traffic at the Port of Eufaula and Port of Columbia.

Port of Eufaula – Located in Barbour County on the Chattahoochee River, the Port of Eufaula is owned and operated by the Alabama State Port Authority. The facility is 13 acres and includes Chewalla Creek Marina, a full-service boatyard, marine engine repair service, and a 15-ton travel lift, and a US Coast Guard office.[27]

Port of Columbia – The Port of Columbia is located on the Chattahoochee River and is owned by the Alabama State Port Authority. The 59-acre facility is part of a grain elevator facility operated by Alabama Farmers' Cooperative, Inc. The port is in close proximity to SR 52 and SR 95 and offers both highway and railway access.[28]

Mobile River and Ports

Located in southern Alabama, the Mobile River is formed at the confluence of the Alabama and Tombigbee Rivers and flows south into the Mobile Bay and ultimately the Gulf of Mexico. The Mobile River connects to the Gulf of Mexico and the Intracoastal Waterway is the home of the Port of Mobile, one of the nation's largest ports by tonnage. The Mobile River has a variable depth of approximately 14 to 45 feet, while the shipping lanes of the Mobile Bay range from 45 to 75 feet deep.[29]

Because of the Mobile River and Mobile Bay connection between the inland water system and the Gulf of Mexico, this network serves as a conduit for interstate and international goods passing through Mobile that are destined to or from Alabama. The river and bay have depths capable of supporting operations at the Port of Mobile, making the network highly significant to Alabama's freight network.

Port of Mobile – As the largest and only deep-water port within the state, the Port of Mobile has the greatest connectivity, with multiple intermodal transportation options available for the movement of freight, both within and outside the state. The port has access to five Class I railroads, four short-line railroads, accompanying switching services, and rail ferry service dedicated to transportation cargo between Mobile and Veracruz, Mexico. The Port also has connectivity to the extensive inland waterway network within Alabama, as well as the interior U.S. and the Canadian border, allowing for barge and ship cargo movement. As the most utilized mode of freight transportation, trucks have interstate access via I-10 and I-65, which run east-west and

north-south respectively. This allows for extensive connectivity not only within the state, but in the U.S. Additionally, the cities of Selma and Montgomery are located on the Alabama River. While there is currently very little freight movement along the Alabama River within the Montgomery MPO, the Montgomery metropolitan area is well situated to take advantage of its location and waterway access to supplement its rail and truck freight conveyance.

In 2021, the Port of Mobile handled a record 528,490 Twenty-foot Equivalent Units (TEUs), the measurement of a standard 20-foot shipping container that determines cargo capacity for container ships and terminals.[30] With both public and private terminals, the port handles several types of commodities. The public terminals, which are owned and operated by the Alabama State Port Authority, handles the following commodities:

- Containerized: The predominant form of export cargoes, in which commodities are stored in shipping containers
- Bulk: Commodities transported unpackaged and in large quantities, including liquid, granular, particulate form, and includes petroleum/crude oil, grain, coal, or gravel products
- Break bulk: goods that are stored in individually counted units
- Roll on/roll off: Wheeled cargo, including cars, trucks, and trailers
- Heavy-lift: Cargo that is generally over 100 tons and are more than 100 meters, including generators, turbines, and reactors

The private terminals include the shipyards, and handle some dry bulk commodities, but also handle limestone, coal, and fuels (liquid bulk).

The Port of Mobile is undergoing a major expansion of its facilities that is projected to increase the volume of cargo that it handles. Thirty-two acres are being added to the Choctaw Marine Terminal, to be completed by 2025. There will also be two new ship-to-shore super post-panamax cranes, which allow for increased docking of TEUs. In addition, the harbor will be both deepened and widened, which will allow for the passage of larger vessels, creating potential for more international services. This project is estimated to be completed by 2045.

Port facilities in Alabama are shown in Figure 4.

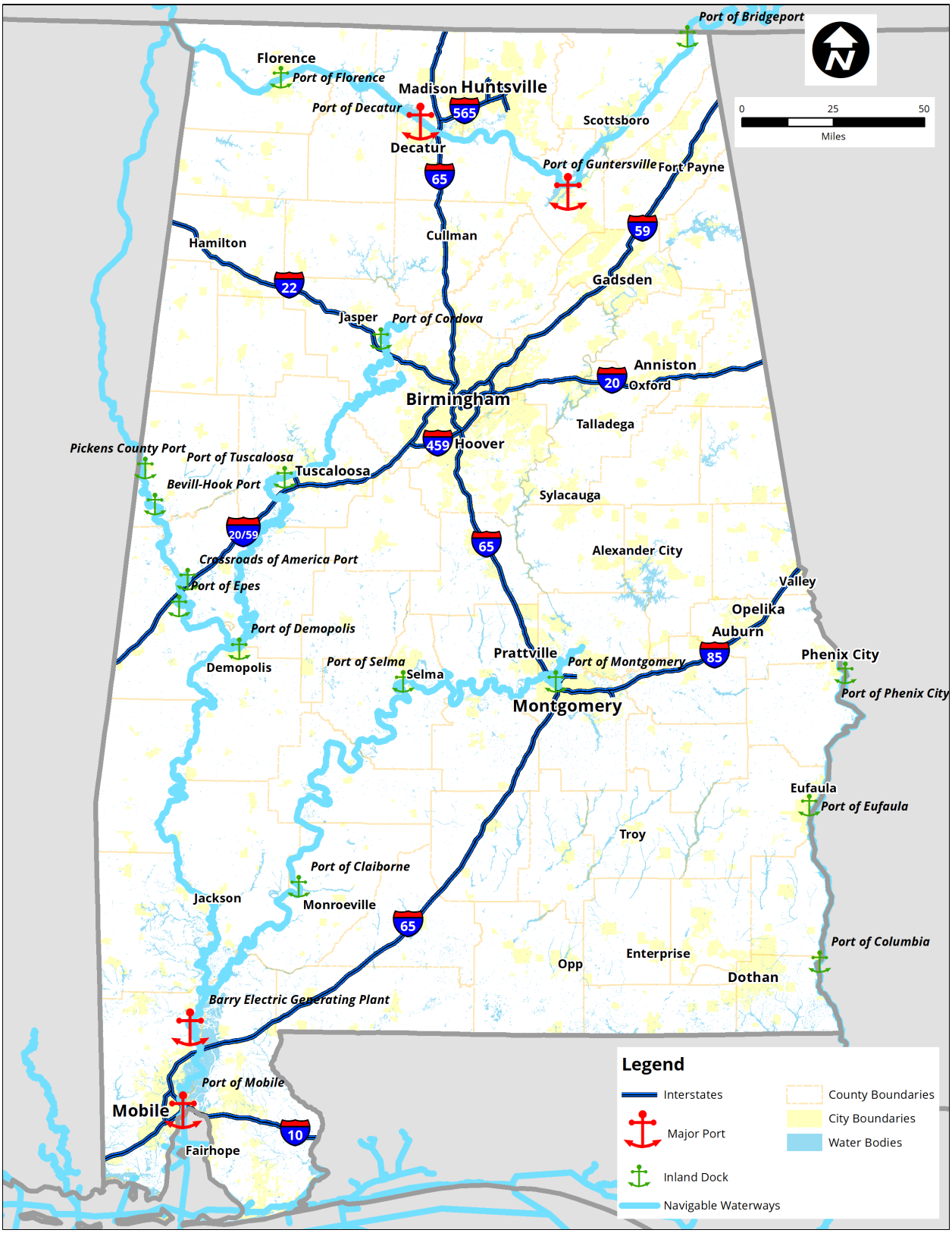

Figure 4. Port Facilities in Alabama

Airport Facilities

There are 11 major airports in Alabama. Most air freight within Alabama is transported via the state's major airports in Huntsville, Birmingham, Mobile, Montgomery, and Tuscaloosa. Three of these airports – Huntsville International Airport, Birmingham-Shuttlesworth International Airport, and Mobile International Airport – are included in the list of airports with the highest all-cargo landed weights in the US.[31]

Huntsville International Airport (HSV) – HSV is home to the International Intermodal Air Cargo Center. It provides two parallel runways of over 10,000 feet in length and has over 1 million square feet of air cargo ramp space. It is served by domestic and international carriers with weekly non-stop service to Europe, Hong Kong, Shanghai, and Brazil.

Birmingham-Shuttlesworth International Airport (BHM)- This is the busiest airport by passenger volume in Alabama. The airport is located just northeast of the heart of Birmingham and offers connectivity to other regions of Alabama due to its proximity to many interstate routes such as I-20, I-65, I-459, and I-59. Moreover, as BHM Airport is in the geographical heart of Alabama, freight and trucks going to and from the airport can easily access all locations within Alabama within a relatively short driving distance.

Montgomery Regional Airport (MGM) – MGM, while a regional airport, provides some freight cargo services for the Montgomery Area.

Air cargo for the Huntsville, Birmingham, and Montgomery airports are shown in Table 5.

Table 5. Cargo Volumes (2020-2021) for Top Air Cargo Airports in Alabama

Airport	Nationwide Rank	2021 Landed Weight (millions of pounds)	2020 Landed Weight (millions of pounds)	% Change (2020-2021)
Huntsville International Airport	88	306.3	302.5	1.24%
Birmingham-Shuttlesworth International Airport	109	172.9	173.2	-0.17%
Mobile International Airport	111	169.4	166.2	1.89%

Source: CY 2021 Air Carrier Activity Information System (ACAIS), Federal Aviation Administration

Huntsville International Airport carries nearly twice the air cargo volume of Birmingham-Shuttlesworth International and Mobile International Airport. The airports at Huntsville and Mobile saw modest increases in air cargo between 2020 and 2021, with a slight decrease in air cargo volume at the Birmingham airport between the two years.

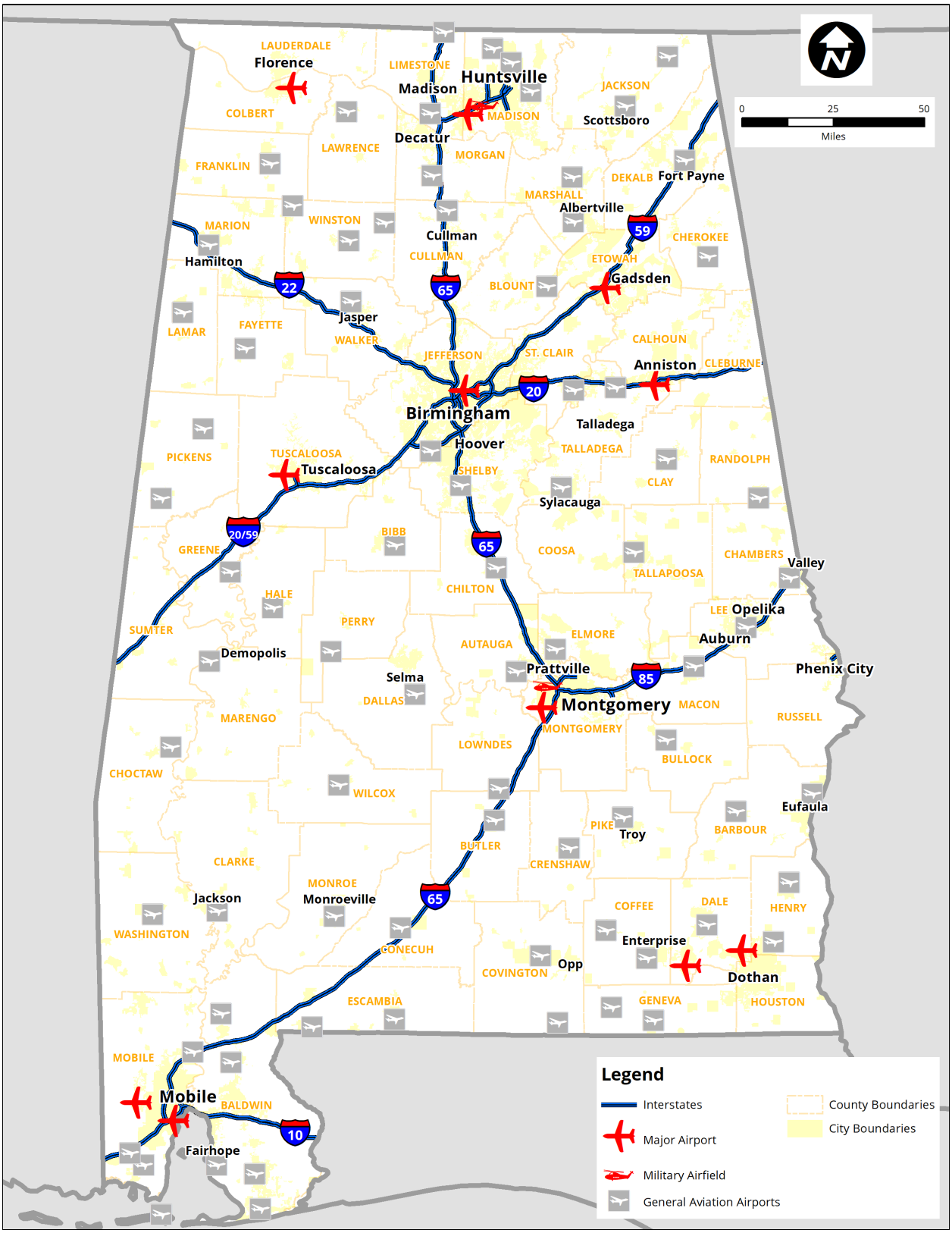

Figure 5. Airport Facilities in Alabama

Pipeline Facilities

Pipelines, which are wholly controlled by the private sector, are concentrated near the Port of Mobile and also traverse the central and northern portions of the state. These pipelines carry natural gas, and liquid petroleum (oil), which includes crude oil, gasoline, diesel fuel, jet fuel and other refined products. The pipelines play an important role in the transmission and distribution of energy products, which are transported between facilities such as offshore wells, refineries, airports, and truck depots.

Beyond pipelines themselves, the state also has numerous processing plants, compressor stations, and pipeline terminals. This includes 27 pipeline terminals, including 12 in the Birmingham area and six in the Montgomery area. There are 29 natural gas compressor stations which are spread out around the state, including eight in the Mobile area. There are a total of 16 natural gas processing plants, most of which are in southern portions of the state in communities such as Atmore and Coden.

A map of these pipeline facilities, including crude oil, petroleum, hydrocarbon, and natural gas pipelines, as well as processing plants and terminal facilities, is shown in Figure 6. Further information on the commodities carried by pipelines is presented in Chapter 4.

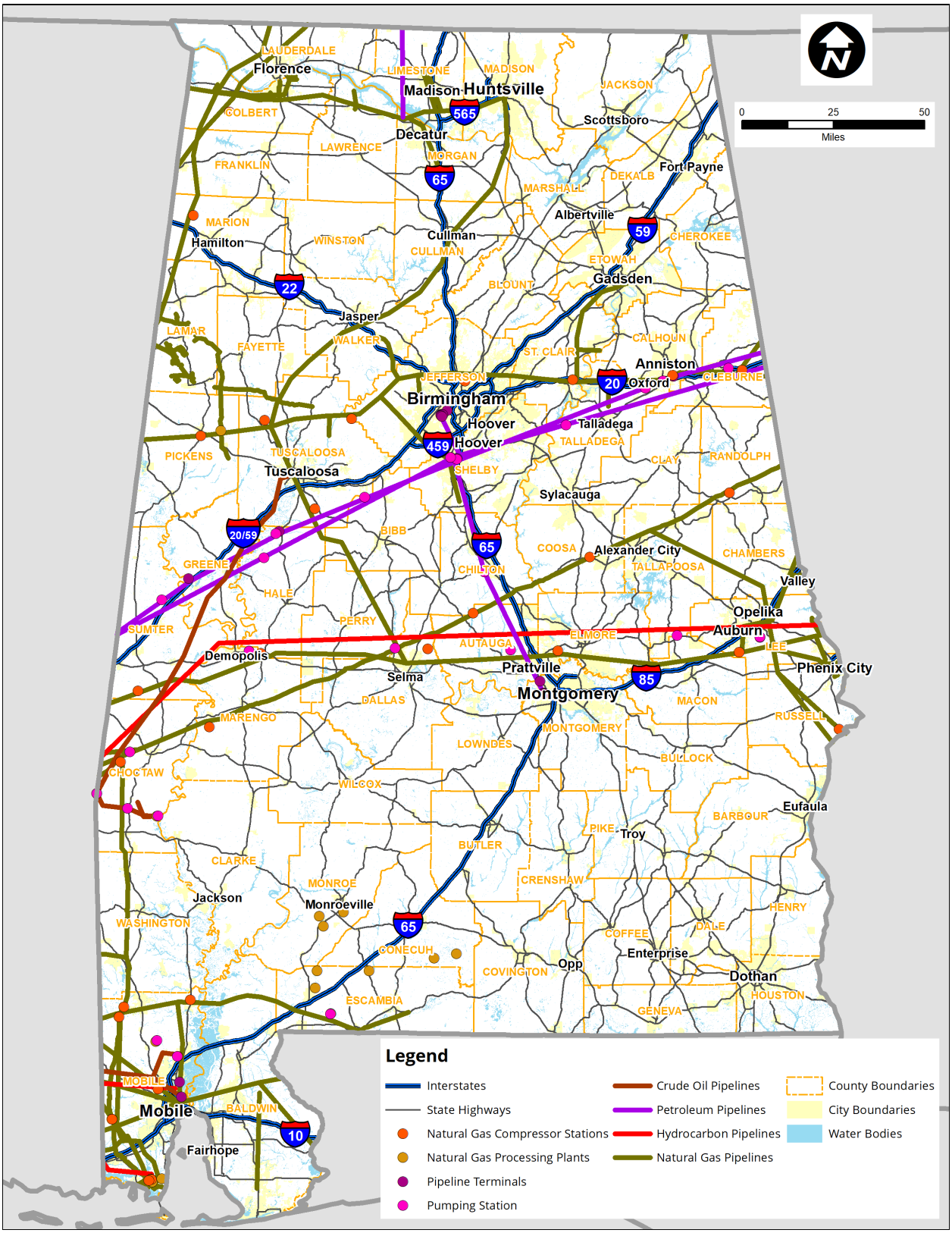

Figure 6. Pipeline Infrastructure in Alabama

2.2 Intermodal Connectivity

Figure 7 displays known intermodal connectors, including major roads, railways, ports and airports. As the map shows, the intermodal network has a high level of connectivity. Specifically:

- Most of the rail lines and port facilities are in close proximity to or directly served by major roadway facilities (Interstates, US Routes and State Routes).
- The major airports are in close proximity to major roadways.
- Connectivity exists between the rail lines and airports; however, the need for intermodal transfers between these modes is limited by the highly time-sensitive nature of air freight as compared to rail freight.

Key Intermodal Facilities

An overview of major intermodal facilities in Alabama includes the following.[32]

- **Port of Mobile (Alabama State Port Authority)**—The 3,700-acre, deep-water Port of Mobile is one of the largest intermodal facilities in the state of Alabama and handles container, bulk and general cargo services for a variety of commodities including coal, liquid bulk, forest products, iron, and steel products. The Port's immediate access to two interstates, nine railroad lines, inland waterways, and several interstate highways and arterial roads makes it an optimal site for extensive intermodal operations. The Port generates an estimated $26.8 billion in total economic value and has created over 161,000 direct and indirect employment opportunities.[33] Expansion at the Choctaw Marine Terminal, the installation of new cranes, and the future widening and deepening of the Alabama River are projected to vastly increase the number of containers that the Port of Mobile will handle each year.
- **Port of Huntsville (International Intermodal Center)**—Comprised of the Huntsville International Airport, the International Intermodal Center, and the Jetplex Industrial Park, the International Intermodal Center located in the Port of Huntsville Global Logistics Park provides a single hub location specializing in receiving, transferring, storing, and distributing international and domestic cargo via air, rail, and highway. The Huntsville-Madison County Airport Authority owns and operates industrial switching track off the Norfolk Southern spur into the International Intermodal Center, with the capability to extend rail southward to a potential riverport facility. The International Intermodal Center also features a US Customs & Border Protection Port of Entry, facilitating enhanced trade with foreign countries.
- **Norfolk Southern Birmingham Regional Intermodal Facility**- This 316-acre site in Birmingham, Alabama accommodates the loading of shipping containers from truck to rail. It is located near I-20 and I-459, which provides easy truck access.
- **BNSF Finley Boulevard Yard**- Also located in Birmingham, Alabama, this rail yard is located near the center of the city, providing easy access to I-20 and I-65. It is also located in close proximity to Birmingham-Shuttleworth International Airport. The facility handles the shipment of automobiles and a mix of carload freight.

- **CSX Boyles Yard** – This rail yard is located near the center of Birmingham, providing easy access to I-20 and I-65. It is also located just down the road from Birmingham-Shuttleworth International Airport. The facility offers TRANSFLO terminal services (for transferring liquid and dry products between transportation modes) and provides logistics management of rail shipments nationwide.
- **CSXT Central Alabama Intermodal Container Transfer Facility**- Located in Bessemer, Alabama, this facility serves both national and international freight. It provides rail-to-truck services, facilitating the movement of goods between the facility and the Ports of Charleston and Savannah.
- **Port of Birmingham**- Operated by the Birmingham-Jefferson County Port Authority, the Port of Birmingham is comprised of five terminals located west of the city. The port facilitates the transfer of goods between the Locust Fork of the Black Warrior River and several rail lines and interstate highways, including I-20, I-59, I-22, I-65, and I-459. Alabama Power operates an intermodal facility, James H. Miller Steam Plant, on the Locust Fork for coal receipt/delivery.
- Several additional independent rail and truck transload facilities are located in Birmingham. Most of these intermodal facilities are clustered around 1st Avenue North, Finley Boulevard, I-20/59, Avenue W, and along the path of the planned Finley Boulevard extension.

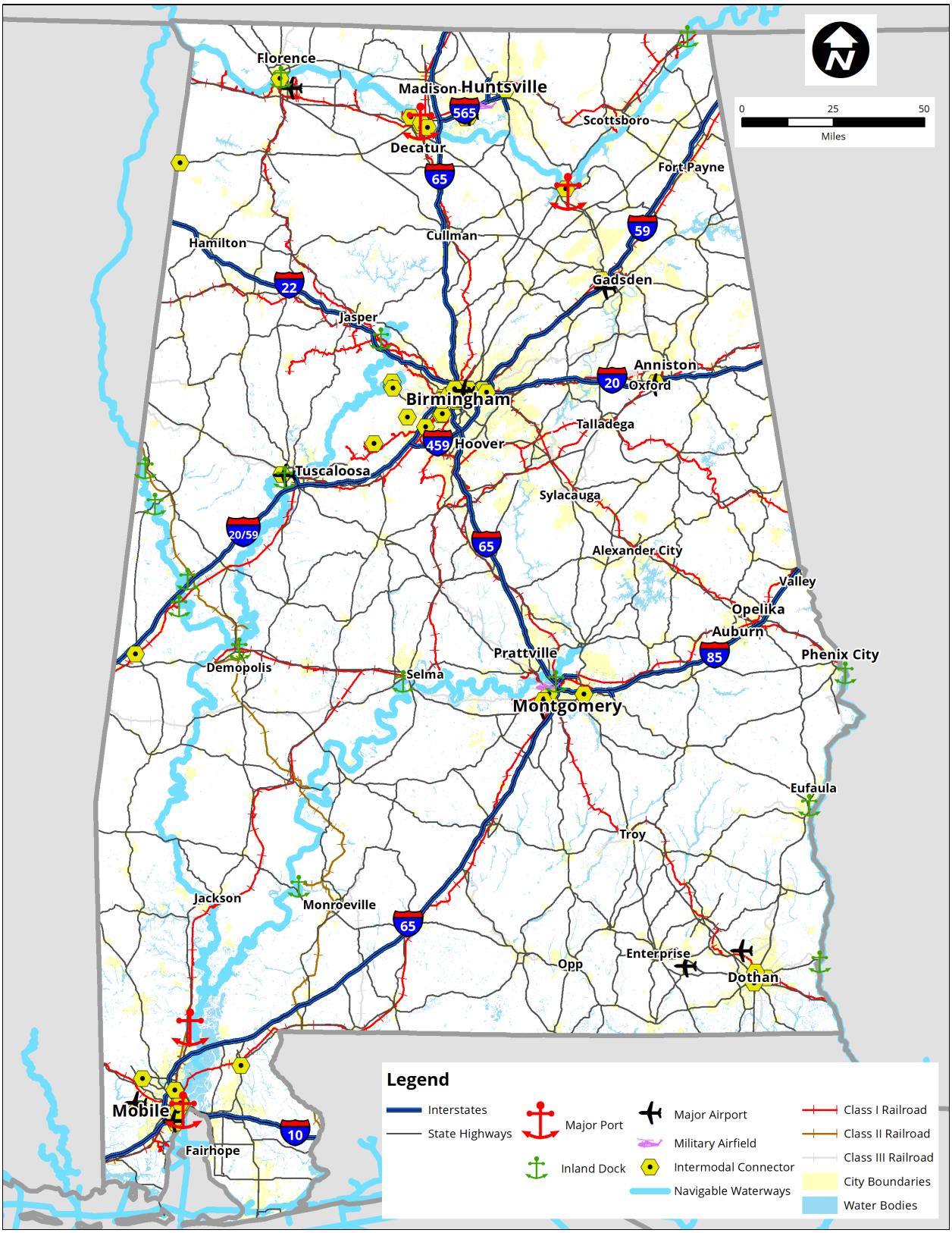

Figure 7. Intermodal Connectors in Alabama

2.3 Freight Generators

There are a number of key freight generators and destinations beyond the major intermodal facilities noted above, such as large industrial and manufacturing uses throughout the state. The identification of these generators was necessary to validate employment data and truck generation factors reflected in the statewide commodity flow assessment.

Top Industrial and Manufacturing Employers

Industrial and manufacturing plants provide much-needed products and services to the state of Alabama. These facilities also generate significant freight traffic and often act not only as origins for developed products, but also as destinations for large shipments of raw materials.

As shown in Figure 8, some of the top industrial and manufacturing employers within the State of Alabama include:[34]

Honda Manufacturing of Alabama, LLC – Honda Manufacturing of Alabama is in Lincoln, Alabama. This car factory builds vehicles for sale in North America.

Austal USA – Austal is an aluminum and steel ship manufacturer located in Mobile, Alabama. It is also a contractor for various defense programs in the United States. According to its 2022 Annual Report[35], Austal generated $1.43 billion in revenue and employed 5,000 people.

Hyundai Motor Manufacturing Alabama, LLC – Hyundai Motor Manufacturing Alabama is a plant located in Montgomery, Alabama. The plant opened in May of 2005, and currently produces vehicles such as the Hyundai Sonata, Elantra, Santa Fe, and Tucson.

Mercedes-Benz US International, Inc. – The Mercedes-Benz U.S. International manufacturing plant is located near Birmingham, Alabama. This car plant also has its own test tracks and sits on approximately 1,000 acres of land.

Dynetics, Inc. – Dynetics is an applied science and IT company based in Huntsville, Alabama. The company primarily contracts for the Department of Defense, and NASA.

The Boeing Co.- Also located in Huntsville, Alabama, Boeing is a large aerospace company with facilities that primarily focus on missiles, global services, and research and technology.

Maples Industries, Inc. – Maples Industries, located in Scottsboro, Alabama, creates textiles such as rugs.

Calderys – Calderys is a refractory and professional services company located in Jacksonville, Alabama. The company offers a wide range of services including engineering, design, logistics, management, installation, and maintenance.

Buffalo Rock Co. – Buffalo Rock Co. is a food and beverage company located in Birmingham, Alabama. The company bottles numerous beverages such as Pepsi.

Polaris Industries, Inc. – Polaris Industries has a manufacturing plant in Huntsville, Alabama. Polaris builds numerous types of vehicles such as ATVs, snowmobiles, and quadbikes.

Mazda Toyota Manufacturing USA, Inc. – Mazda Toyota Manufacturing is in Huntsville, Alabama. This large manufacturing plant produces Mazda as well as Toyota vehicles.

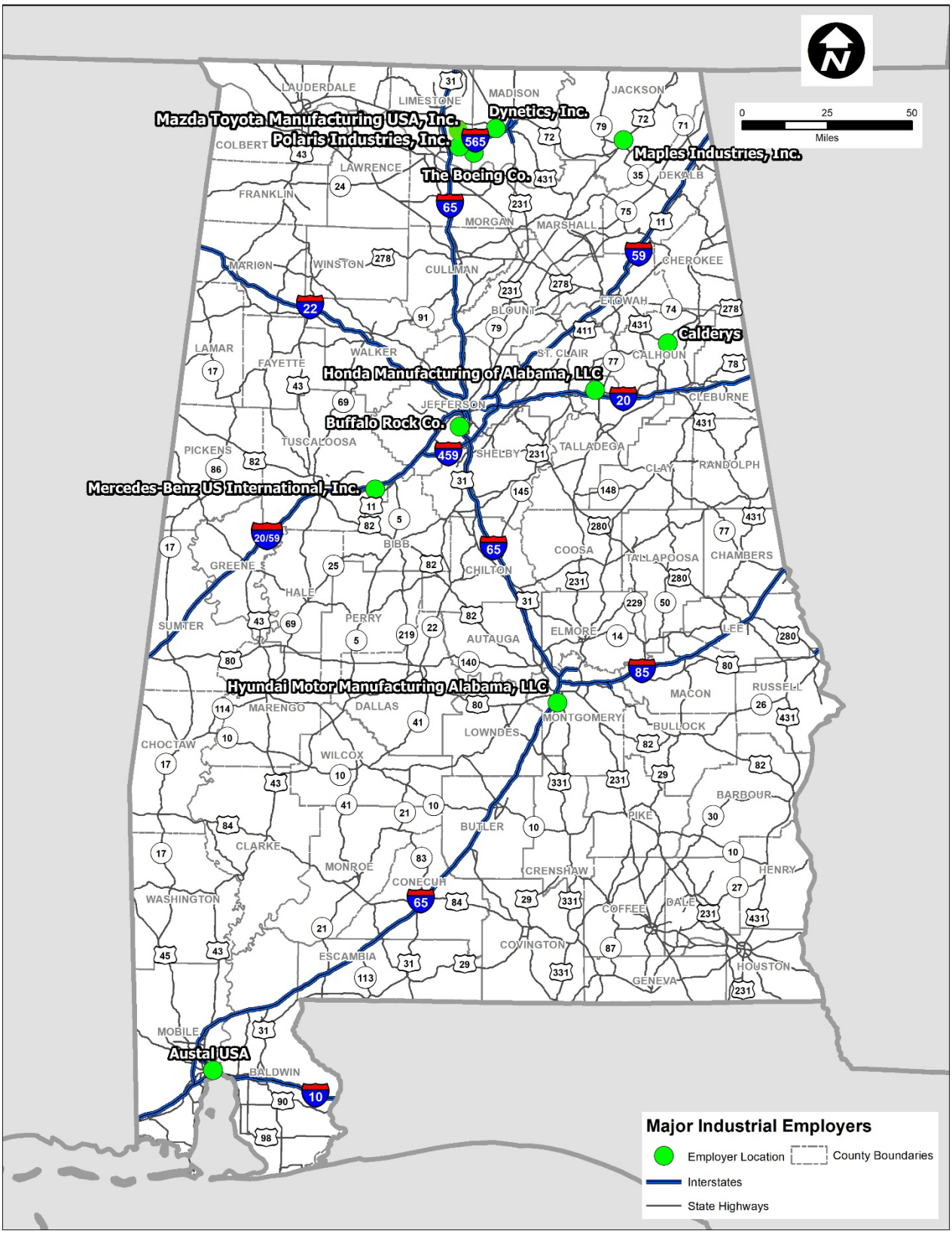

Figure 8. Top Industrial and Manufacturing Employers in Alabama

2.4 Freight-Reliant Businesses

The data presented in this section was derived from the Longitudinal Employer-Household Data (LEHD) and illustrates the density of freight-reliant activities within the state of Alabama. The LEHD is a US Census Bureau product that characterizes workforce dynamics and delineates employment data into specific categories from the Residence Area Characteristics (RAC) File Structure. To better understand potential last-mile destinations for freight activity, the following categories were identified as categories that rely heavily on freight activity.

- Agriculture
- Utilities
- Construction
- Manufacturing
- Wholesale Trade
- Retail Trade
- Administrative and Waste Management Services

Figure 9 presents a summary of all freight-reliant categories in order to provide a holistic view of freight-reliant jobs throughout the state of Alabama. Most of these are concentrated around the urbanized areas and along interstates and major highways, which help to facilitate access among ports, airports, manufacturing/distribution facilities, and sites where finished products are used or sold. The top five freight-reliant businesses in Alabama are displayed in Table 6 and Figure 10. Collectively, these represent over 805,000 jobs in the state.

Appendix B presents a series of maps illustrating the density of jobs for individual freight-reliant business categories across the state of Alabama, as well as a brief narrative analyzing the category.

Table 6. Top Freight-Reliant Industries in Alabama

Rank	Industry	Number of Jobs
1	Manufacturing	271,911
2	Retail Trade	236,659
3	Administrative and Waste Services	128,341
4	Construction	94,420
5	Wholesale Trade	74,156

Regarding the symbology displayed on the maps for this analysis, points are aggregated into patches based on the number of points within an area. This point density reflects the concentration of freight-reliant jobs within each category. The concentrations range from “sparse” to “dense.” Areas with fewer points are more purple in color, while areas with more points will be more yellow in color. A reddish color indicates a moderate number of points. The underlying map highlights the location of the freight-reliant businesses relative to interstate highways and expressways, US and State highways, railroads, and navigable waterways.

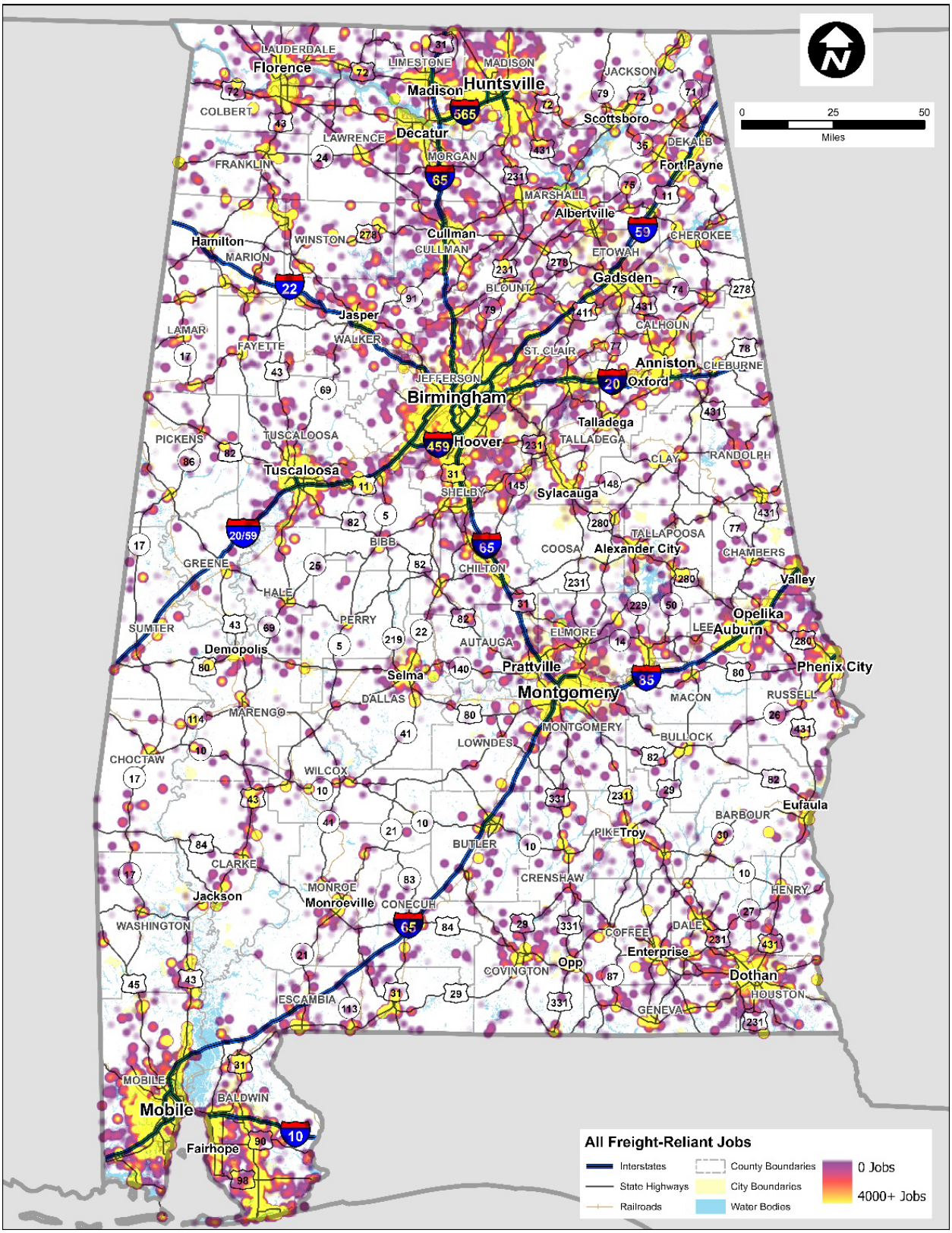

Figure 9. All Freight-Reliant Jobs in Alabama

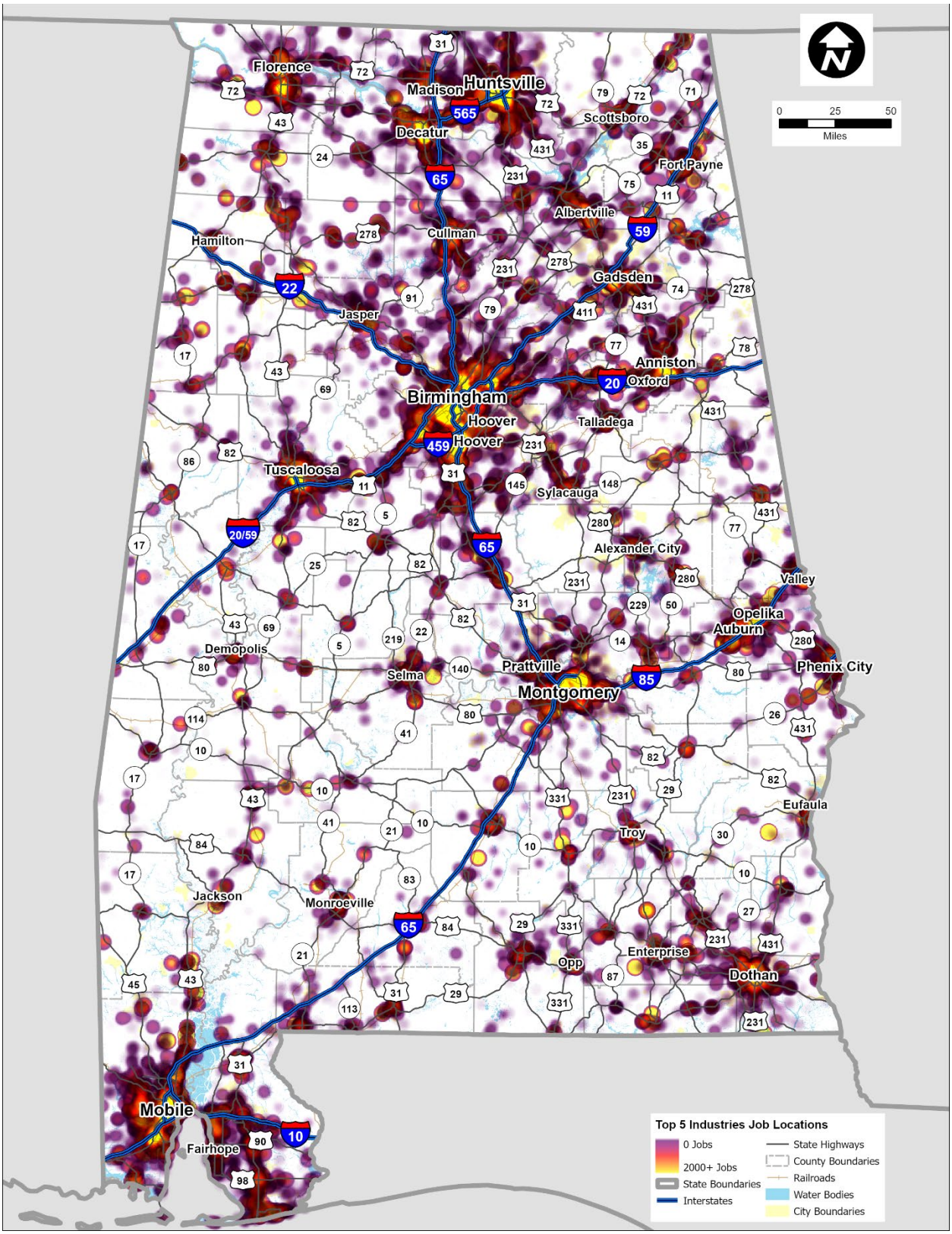

Figure 10. Top Freight-Reliant Jobs in Alabama

2.5 Impacts of E-Commerce

Increasingly, consumers are turning to e-commerce, or online shopping, for day-to-day needs. Rather than buying from brick-and-mortar stores, people are making purchases online and having goods delivered directly to their homes. Based on data from the US Census Bureau, over the past 20 years, e-commerce as a percentage of total retail sales has risen from 0.8% in the first quarter of 2000 to 14.8% in the third quarter of 2022, peaking at 16.4% in the second quarter of 2020, during the height of the COVID-19 pandemic.[36] This rising demand in e-commerce has resulted in a significant increase in freight traffic across all modes.

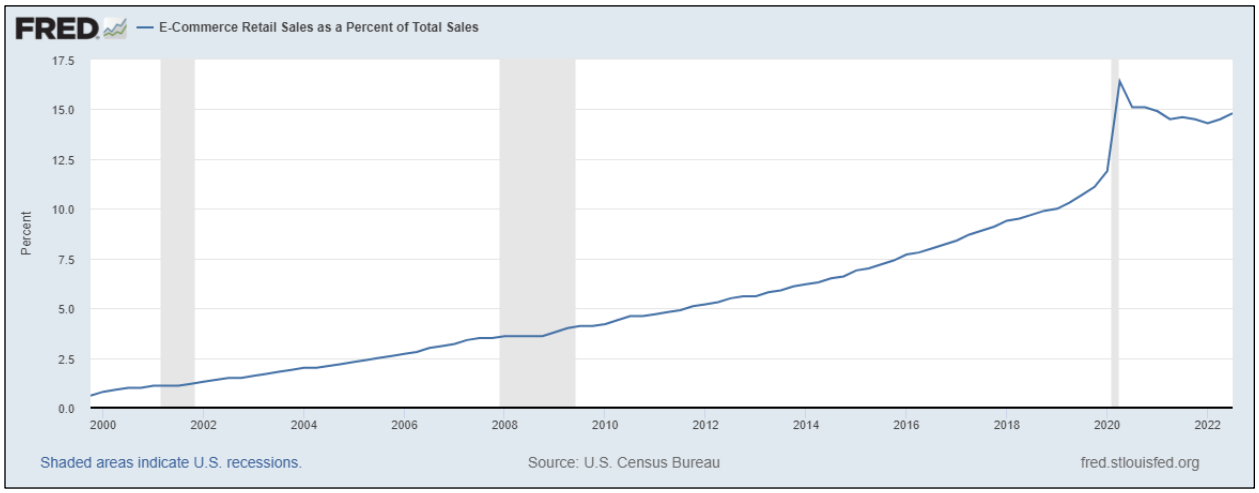

Figure 11. E-Commerce Retail Sales as a Percent of Total Sales

Supporting the movement of goods requires a complex web of distribution facilities: ocean ports and smaller inland ports; large intermodal rail facilities; expansive warehousing and distribution facilities, which are often located on the periphery of major metropolitan areas; and last-mile order fulfillment centers closer to the urban core of cities. Goods are transported between these facilities via ships, barges, trains, and trucks. In urban areas, the proliferation of last-mile facilities has also led to larger last-mile carrier workforces, expanded hours of operations, and the proliferation of more convenient, flexible, and diverse fleets of delivery vehicles including trucks, vans, personal automobiles, and bikes. Often the focus is on cost-effective solutions, improving reliability, and reducing waste. The growth in delivery vehicles sharing city streets with commuters and pedestrians has increased competition for curb space. Other trends are starting to shift even this newer model of e-commerce. Uber Eats, a transportation network company, recently announced that it would start delivering other goods and products, not just food. Other models of last-mile delivery are also evolving and changing the way goods are delivered. Examples include bicycle fleets, personal mobility devices, unmanned or robotic delivery vehicles.

The ongoing COVID-19 pandemic has had significant impacts on the supply chain and freight operations. Even as public health has improved, shortages in the supply chain, rising costs for transportation, staffing difficulties for warehouse workers and truck drivers, and other challenges continue to plague the freight industry. These challenges are often rooted in global issues that no

one government entity, agency, business, or freight operator has control over. While there is not a specific set of strategies that can mitigate these challenges, these trends underscore the need for ongoing coordination among operators of freight facilities and modes, municipal and regional agencies, and statewide entities, including ALDOT, to identify ways to continually improve freight operations within the State of Alabama.

2.6 Military Freight

Military Freight Network

Military installations such as military posts and bases contribute to freight flows as both freight generators and as last mile destinations. Freight to and from these installations utilize the same transportation networks as commercial goods movements. During peace time, these installations use the transportation network just as any other commercial enterprise would, shipping goods to and from the installations and facilitating access for the military personnel. During deployment, the effective mobilization of these military installations depends on the surface transportation network to move military equipment and personnel to where they are needed.

The FHWA established the Strategic Highway Network (STRAHNET) for the emergency mobilization and peacetime movement of commodities that support US military operations, including fuel, ammunition, repair parts, food, and other goods. The STRAHNET consists of both interstate and non-interstate highway routes on the NHS. When a state department of transportation invests the maintenance or improvement of a NHS route, this also supports the STRAHNET. Given the importance of military installations to the economy during both peacetime and mobilization, it is critical to maintain and improve these STRAHNET facilities. Figure 12 shows the STRAHNET in Alabama.[37]

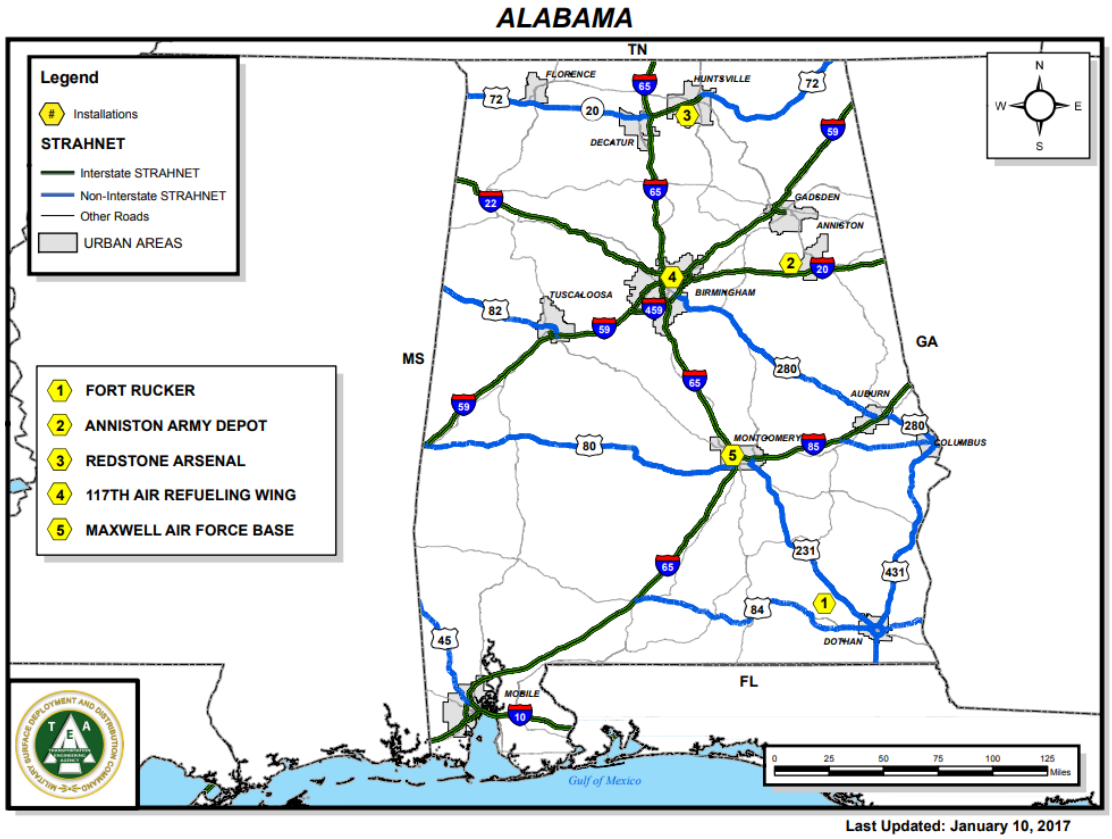

Figure 12. STRAHNET in Alabama

Similarly, the Federal Railroad Administration (FRA) has established the Strategic Rail Corridor Network (STRACNET) to designate portions of the railroad network that are critical to national defense. The STRACNET generally consists of rail lines that provide access to military installations and major intermodal facilities such as ports. There are two military facilities in Alabama, Redstone Arsenal and Anniston Army Depot Base, that are connected to the STRACNET. Figure 13 shows the STRACNET and defense connector lines in Alabama.[38]

In addition, the Maritime Administration (MARAD) maintains the Ready Reserve Force (RRF) as vessels that can support the rapid deployment of US military forces worldwide, including military equipment and personnel. These vessels are stored at "outports" through the nation.[39] While the Port of Mobile once served as an outport, currently, the closest outports to Alabama are Cape Kennedy and Cape Knox in New Orleans, Louisiana.[40] If the Port of Mobile were to be utilized for the RRF in the future, there would be a significant increase in freight operations in the region.

Military Facilities

Military facilities in Alabama are critical for defense operations. Redstone Arsenal in Madison, for example, operates the Redstone Test Center, which engages in extensive research and testing of aviation, missile, and sensor systems. The Anniston Army Depot Base produces hundreds of military vehicles each year. Military facilities in Alabama are both freight generators and

destinations, and also serve as homes and workplaces for thousands of military personnel and their families. These are shown in Figure 14.

Maxwell Gunter Air Force Base

Maxwell Air Force Base (AFB) is located near Montgomery, Alabama. The primary freight connectors for the air force base include I-65 and I-85, rail lines, and the Port of Montgomery on the Alabama River. Maxwell AFB is the headquarters of Air University, a major component of Air Education and Training Command and a prominent entity in educating branches of the military. The University is the largest facility on the site and occupied by approximately 4,000 military and civilian personnel. There are also over 12,500 active-duty, reserve, civilian, and contractor personnel that support the facility. Supplies such as ammunition, parts, aircraft, vehicles, food, and water are regularly transported to and from the base. The MH-139A Grey Wolf helicopter, which is housed at the facility, requires special equipment for transport to the base.

Fort Rucker Army Base

Fort Rucker Army Base is located near Dale, Alabama. The base is not located near an interstate highway; the primary freight connector is the US 84 corridor. Fort Rucker has a population of over 20,000 residents and over 4,600 military personnel. Supplies, such as ammunition, parts, aircraft, and vehicles, are regularly shipped to and from the base, along with food, water, medicines, and other basic needs to support personnel.

Redstone Arsenal

Redstone Arsenal is located between the cities of Madison and Huntsville in Alabama. The primary freight connectors include I-565, SR 72, and SR 231. The closest port is Port of Decatur, located on the Tennessee River. Redstone Arsenal is also located on the STRACNET, allowing for transport of commodities to and from the base by rail. There are between 36,000 and 40,000 government and contractor personnel stationed on the base each day, working at entities such as the Department of Defense, Department of Justice, and National Aeronautics and Space Administration (NASA). Redstone Arsenal is a pre-eminent site for the development and testing of missiles by the United States military. It is also a proposed site of the headquarters of the United States Space Command. Special vehicles and equipment are necessary for the safe passage of critical assets such as missiles, which are engineered and tested at the base. General supplies such as food, water, and other goods are also needed to support Redstone Arsenal's large staff.

Anniston Army Depot Base

Anniston Army Depot Base is located in Anniston, Alabama. The primary freight connectors are I-20 and US 78, which run south of the base, and US 431, which runs east of the base. The base is also located on the STRACNET, allowing for transport of commodities by rail. The Anniston Army Depot Base employs over 3,800 personnel and is responsible for over 25,000 jobs in the area. The base produces over 500 combat vehicles each year and regularly stores over 500,000 tons of a variety of commodities. It is also an important maintenance facility for land-based military vehicles,

requiring specialized vehicles and equipment that are regularly shipped into and out of the facility.

Aviation Training Center Coast Guard Base

The Aviation Training Center in Mobile, Alabama is the Coast Guard's aviation and capabilities development center. The primary freight connectors are US 98 to the north and I-65 to the east, as well as the nearby Port of Mobile. The base stores numerous helicopters that require special transport to and from the base, as well as food, water, and other general commodities.

Figure 13. STRACNET in Alabama

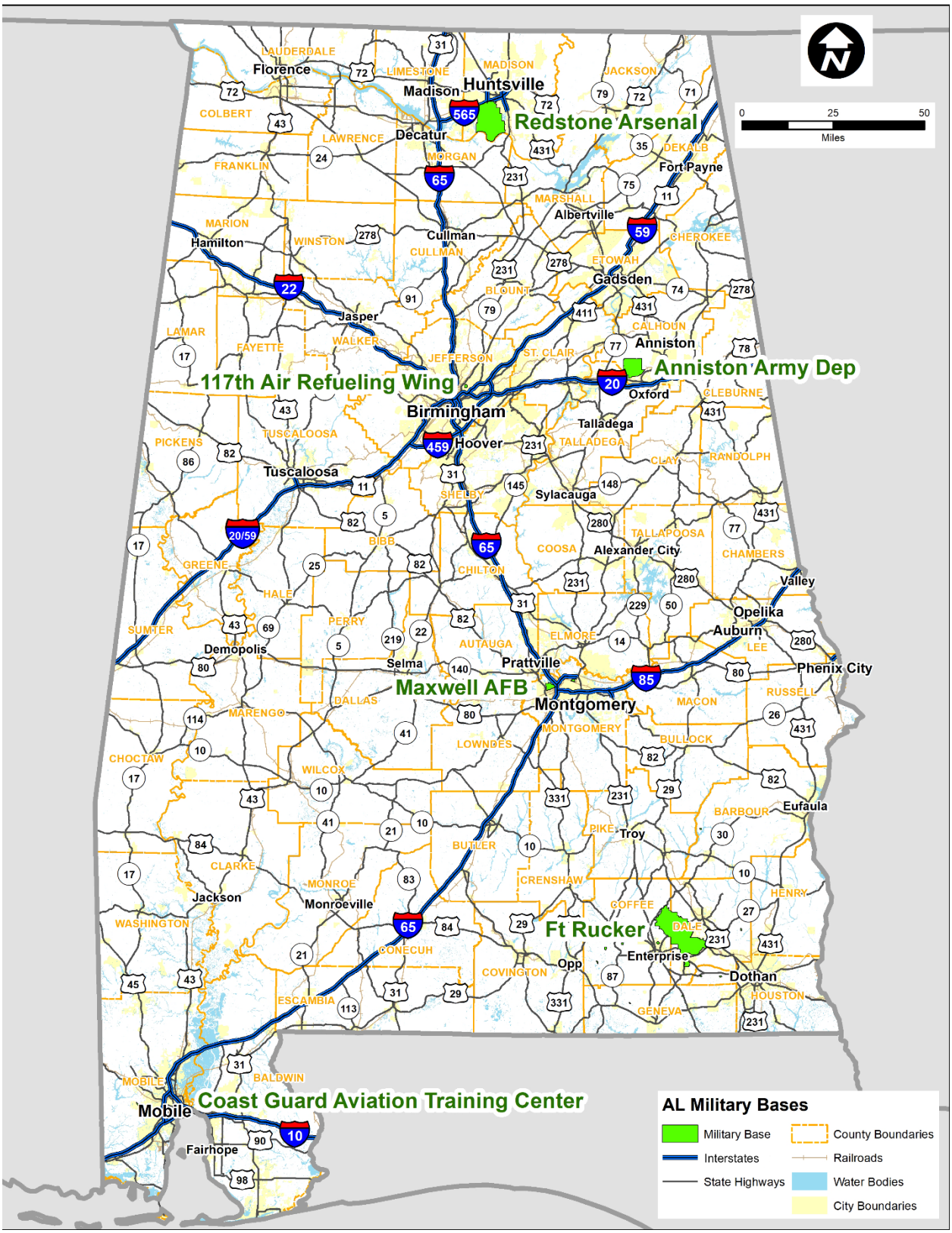

Figure 14. Military Facilities in Alabama

Chapter 3: National Freight Network Designations

There are several federally-designated freight networks within the US, including the following:

- National Highway Freight Network (NHFN)
- Primary Highway Freight System (PHFS)
- Non-PHFS Interstates
- Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs)
- Interim National Multimodal Freight Network (NMFN)
    - Other Non-Roadway

The interrelationship between these networks is shown in Figure 15. As the chart indicates, the Interim National Multimodal Freight Network (NMFN) is the overarching network that includes all federally- designated freight networks. More discussion on the Interim NMFN is provided in Section 3.5.

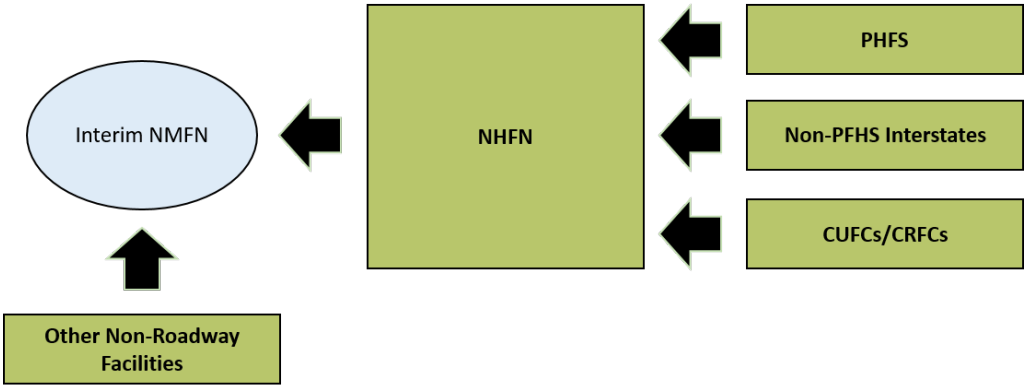

Figure 15. Framework of FHWA Freight Networks

3.1 National Highway Freight Network (NHFN)

The National Highway Freight Network (NHFN) was established by the Fixing America's Surface Transportation Act (FAST Act) and is being continued as part of the IIJA, which was signed into law in November 2021. The NHFN strategically directs Federal resources and policies toward improved highway system freight performance at the federal level.[41] The NHFN contains approximately 58,654 centerline miles of roadway across the United States. The portion of NFHN within Alabama comprises 1,042 miles, or 1.7 percent of the NHFN system.

Within Alabama, a key benefit of inclusion on the NHFN is the eligibility to utilize National Highway Freight Program (NHFP) funding for improvements along NHFN facilities. This eligibility is due to the fact that Alabama contains less than two percent of the national PHFS mileage; states over the two percent threshold must invest all NHFP funds on the PHFS. [42] More information on the NHFP is provided in Chapter 5. In accordance with the latest FHWA definitions, the NHFN is comprised of the following:[43]

- **Primary Highway Freight System (PHFS)** – A network of highways identified by FHWA (with input from the State DOT) as the most critical highway portions of the US freight transportation system, as determined by measurable and objective data.
- **Other Interstate Portions Not on the PHFS** – Consists of the remaining portions of US Interstate highways not included in the PHFS. These routes provide important continuity and access to freight transportation facilities.
- **Critical Rural Freight Corridors (CRFCs)** – Public roads not in an urbanized area which provide access and connection between the PHFS/Interstates and other important ports, public transportation facilities, or intermodal freight facilities. These are designated at the discretion of the State DOT based on FHWA criteria, as discussed in more detail in Section 3.3. Currently, no CRFCs have been designated within Alabama.
- **Critical Urban Freight Corridors (CUFCs)** – Public roads in urbanized areas which provide access and connection between the PHFS/Interstates and other ports, public transportation facilities, or intermodal transportation facilities. These are designated at the discretion of the State DOT in consultation with the MPOs, as discussed in more detail in Section 3.3. Currently, no CUFCs have been designated within Alabama.

Figure 16 shows the Alabama portion of the NHFN, and the total mileage by component in Alabama is identified in Table 7. There are approximately 935 miles of NHFN facilities in Alabama, with interstate facilities comprising approximately 97 percent (over 900 miles).[44] More detailed descriptions of the NHFN components in Alabama are provided in this chapter.

Table 7. NHFN Mileage in Alabama

NHFN Facility Types	Miles	Percentage
PHFS Interstates	784.12	83.9%
PHFS Intermodal Connectors	27.72	3.0%
Non-PHFS Interstates*	122.44	13.1%
Critical Rural Freight Corridors	0.0	0.0%
Critical Urban Freight Corridors	0.0	0.0%
TOTAL	**934.28**	**100.0%**

Source: FHWA

**Total does not include mileage from I-22*

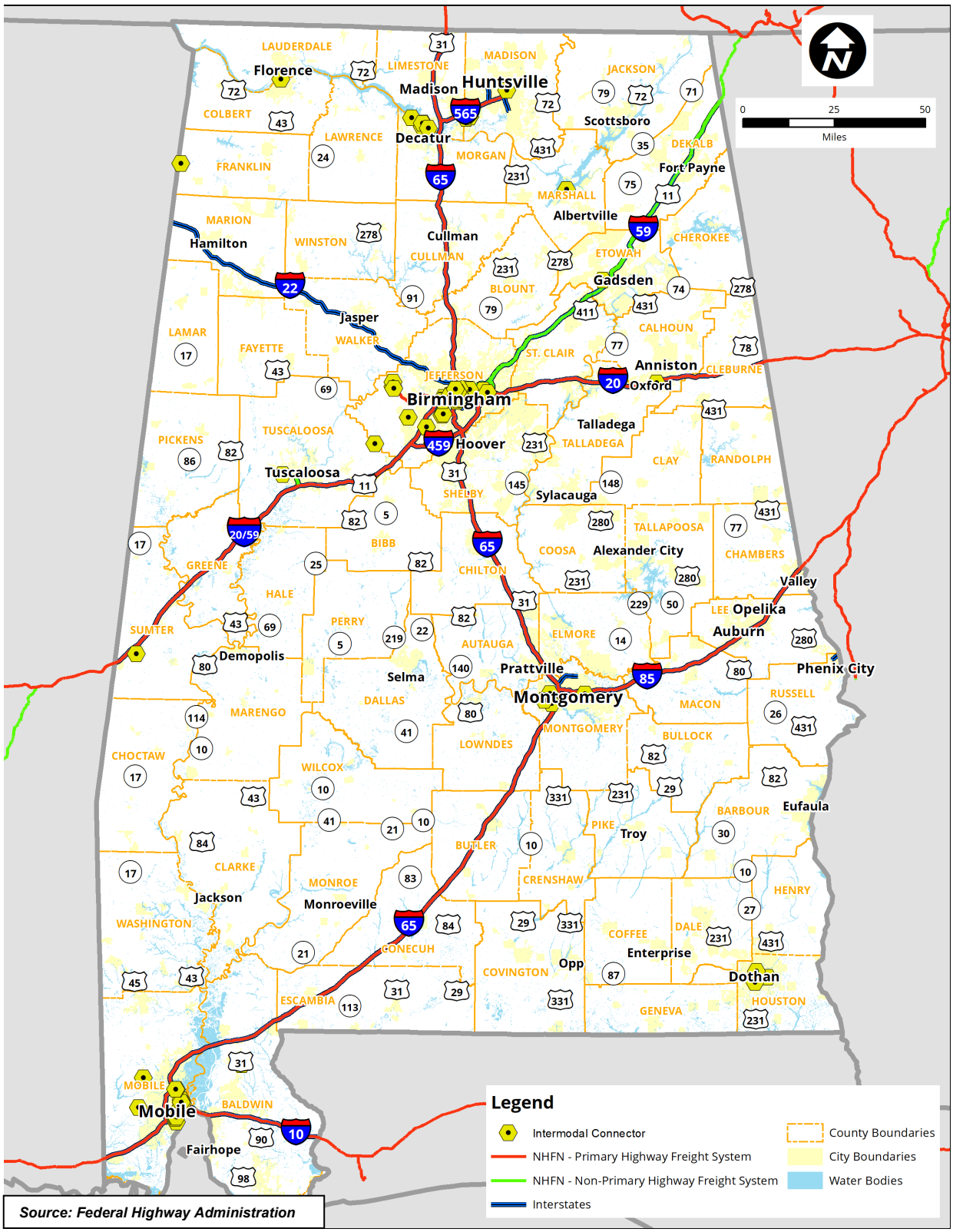

Figure 16. National Highway Freight Network in Alabama

3.2 Primary Highway Freight System (PHFS)

Within the NHFN, the primary highway freight system (PHFS) consists of those transportation facilities identified by FHWA as the most critical within the nation for transporting freight. The network consists of 41,518 centerline miles, including 37,436 centerline miles of Interstate routes as well as 4,082 centerline miles of non-Interstate routes and intermodal connectors.[45]

PHFS Interstates

There are approximately 784 miles of PHFS Interstates within Alabama, as identified in Table 8 and shown in Figure 16.[46] Interstate 65 accounts for almost half of the total PHFS mileage within the state; the highway extends for over 366 miles across the length of the state, from I-10 in the south to the Tennessee state line in the north. Interstate 20 accounts for about one-quarter of the total PHFS Interstate mileage, traveling east-west for 215 miles between Georgia and Mississippi in the central portion of the state. While I-22 is not currently displayed on the map of the PHFS (as shown in Figure 16), the FHWA maintains a route log and finder list that verifies that I-22 is included on the network.[47] ALDOT has conferred with FHWA to add I-22 as a PHFS route on FHWA's map in the near future.

Table 8. PHFS Interstates in Alabama

Route Number	Start Point	End Point	Length (Miles)
I-10	MS State Line	FL State Line	66.32
I-165	AL State Docks (AL 7P)	I-65	4.90
I-20	MS State Line	GA State Line	214.80
I-459	I-20/59	I-20	29.56
I-565	I-65	US 72	22.12
I-65	I-10	TN State Line	366.23
I-85	I-65	GA State Line	80.19
TOTAL			**784.12**

Source: National Highway Freight Network Map and Table for Alabama[46]

PHFS Intermodal Connectors

There are just over 29 miles of PHFS Intermodal Connectors in Alabama, as listed in Table 9. Mostly located in the Birmingham and Mobile metropolitan areas, they provide connectivity to major intermodal facilities such as the Alabama State Docks, Port Birmingham, and key railroad yards.

Table 9. PHFS Intermodal Connectors in Alabama

Facility ID	Facility Name	Connector Description	Length (Miles)
AL11P	Port Birmingham – North Terminal	AL 269 (Port to I-20)	17.46
AL12P	*Port Birmingham – Central Terminal*	*AL 269 (Port to I-20) – Mileage included as part of North Terminal (0.22 mi)*	
AL13P	*Port Birmingham – South Terminal*	*AL 269 (Port to I-20) - Mileage included with North Terminal Complex, 11P (0.11 mi)*	
AL14L	Colonial Pipeline	Facility to 28th St. to Balsam Ave to Nabors Rd to Ishkooda Rd to Spaulding-Ishkooda Rd to I-65	3.67
AL15R	Ernest Norris RR Yards	Entrance at Norfolk Southern Dr to Ruffner Rd to 16th St to US 78 to Kilgore Mem Dr to I-20	2.88
AL4R	Burlington Northern RR Dixie Hub Center	Finley Ave to I-65 and US 78 West	1.67
AL7P	Alabama State Docks (Freight Docks)	Beauregard St and The Robert Hope Bridge from the Facility to Water St and I-165	1.39
AL9R	Brookley Industrial Complex	Michigan Ave (Ave I to I-10)	0.65
TOTAL			**27.72**

Source: FHWA[48]

Non-PHFS Interstates

There are approximately 219 miles of Interstates within Alabama that are not included on the PHFS, as shown in Table 10. They include two mainline facilities (I-22[a] and I-59), as well as auxiliary Interstate facilities that form spurs and bypasses serving regional needs (I-359, I-459, and I-759). All Interstate facilities in Alabama are part of the NHFN and therefore have the same funding eligibility under the NHFP, regardless of their inclusion on the PHFS. As previously noted, this broader eligibility is due to the fact that Alabama contains less than 2 percent of the national PHFS mileage.[49]

Table 10. Non-PHFS Interstates in Alabama

Route Number	Start Point	End Point	Length (Miles)
I-22[a]	MS State Line	I-65	96.25
I-59	I-20	GA State Line	111.11
I-359	I-20	US 11	2.23
I-459	I-20	I-59	4.23
I-759	US 411	I-59	4.87
TOTAL			**218.69**

Source: FHWA[50]

3.3 Critical Rural and Urban Freight Corridors

In addition to the federally designated PHFS and Interstate networks, the FAST Act enables state DOTs, including ALDOT, to identify Critical Rural Freight Corridors (CRFCs) and Critical Urban Freight Corridors (CUFCs) that provide critical connectivity to the NHFN.

In establishing the CRFCs and CUFCs, FHWA imposed maximum mileage limitations on their designation in each State, and these were increased by the IIJA. These mileage limits are now as follows:

- CRFCs: 300 centerline miles or 20 percent of the PHFS mileage for CRFCs, whichever is greater. Within Alabama, ALDOT may designate a maximum of 162.61 centerline miles as CRFCs and a maximum of 81.30 centerline miles as CUFCs.
- CUFCs: 150 centerline miles or 10 percent of the PHFS mileage for CRFCs, whichever is greater. Within Alabama, ALDOT may designate a maximum of 162.61 centerline miles as CRFCs and a maximum of 81.30 centerline miles as CUFCs.

[a] I-22 will be added to the list of PHFS interstates in Alabama during an upcoming update. The mileage in this table has been derived from the FHWA Route Log.

Eligibility

A public roadway can be designated as a CRFC if it meets one or more of the following criteria:

- Is a rural principal arterial roadway with a maximum of 600 miles of highway, or 25 percent of the PHFS mileage in the state, whichever is greater.
- Provides access to energy exploration development, installation, or production areas.
- Connects the PHFS or the Interstate System to facilities that handle more than:
    - 50,000 20-foot equivalent units per year; or
    - 500,000 tons per year of bulk commodities.
- Provides access to a grain elevator, an agricultural facility, a mining facility, a forestry facility, or an intermodal facility.
- Provides for the modernization or rehabilitation of a lock and dam, if the project is functionally connected to the NHFN and likely to reduce on-road mobile source emissions.
- Falls along a marine highway corridor, connector, or crossing, if the project is functionally connected to the NHFN and likely to reduce on-road mobile source emissions.
- Connects to an international port of entry.
- Provides access to significant air, rail, water, or other freight facilities.
- Is vital to improving the efficient movement of freight of importance to the State economy.

A CUFC must be a public roadway that meets one or more of the following criteria:

- Connects an intermodal facility to the PHFS, the Interstate System, or an intermodal freight facility.
- Is located within a corridor of a route on the PHFS and provides an alternative highway option important to goods movement.
- Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land.
- Is important to the movement of freight within the region, as determined by the MPO or the State.

In addition, the State is required to consult with the MPOs in designating CUFCs. This is particularly important in the Birmingham area, as it is Alabama's only MPO with a population of more than 500,000 – it was 1.1 million as of the 2020 Decennial Census.[51]

Corridor Identification, Assessment, and Designation

At this time, ALDOT has decided not to designate any corridors as CRFCs or CUFCs due to the limited amount of NHFP funding available throughout the state. During future updates of the Statewide Freight Plan, ALDOT will coordinate and consult with the MPOs and other regional and local governments to identify potential corridors for CUFC and CRFC designation as appropriate. If

additional federal funding were to become available through the NHFP, additional projects for funding would be identified from the list of candidate corridors.

3.4 National Highway System (NHS) Intermodal Connectors

In addition to the PHFS intermodal connectors identified previously, FHWA also designates National Highway System (NHS) intermodal connectors. Although improvements along these facilities are not eligible for NHFP funding, overall goods movement will be positively impacted by improvements to these links. There are 35.1 miles of NHS intermodal connectors within Alabama:[52]

- Airport
    - Airport Highway from I-59/20 to the Birmingham International Airport
    - Wall-Triana Highway from I-565 to the Huntsville International Intermodal Facility
    - Airport Boulevard between I-65 and Mobile Regional Airport
- Port Terminal
    - Beauregard Street and the Robert Hope Bridge from I-165 and Water Street to the Alabama State Docks north of downtown Mobile
    - Glenn Hearn Boulevard from I-565 to the Huntsville International Airport Main Terminal
    - AL 269 from I-20 to Port Birmingham – North Terminal
- Truck/Pipeline Terminal
    - Spaulding-Ishkooda Road at I-65 to Ishkooda Road to Nabors Road to Balsam Avenue to 28th Street to the Colonial Pipeline Facility northwest of Birmingham
- Truck/Rail Facility
    - Michigan Avenue in Brookley from Avenue I to I-10 to connect to the Brookley Industrial Complex
    - Finley Avenue in Birmingham to connect from I-65 to the Burlington Northern RR Dixie Hub Center
    - From Kilgore Memorial Drive at I-20 to US 78 to 16th Street to Ruffner Road to connect I-20 to the Ernest Norris RR Yards east of Birmingham
- Intercity Bus Terminal
    - The following roadways connecting to the Birmingham Greyhound Terminal:
        - 19th Street to 8th Avenue North to 23rd Street to I-59/20
        - 18th Street to I-59/20 to I-65 South
        - I-65 to I-59/20 to 17th Street to 8th Avenue North to 19th Street
        - I-59/20 to 22nd Street to 8th Avenue North to 19th Street

3.5 Interim National Multimodal Freight Network (NMFN)

The FAST Act included a National Multimodal Freight Policy which included national goals to guide decision making and directed FHWA to develop a National Multimodal Freight Network (NMFN) that would consist of the NFHN and certain other non-roadway facilities.[53] These non-roadway facilities include:[54]

- Freight rail systems of Class I railroads
- US public ports that have total annual foreign and domestic trade of at least 2 million short tons
- US inland and Intracoastal waterways
- The Great Lakes, the St. Lawrence Seaway, and coastal and ocean domestic freight routes
- 50 US airports with the highest annual landed weight
- Other strategic freight assets, including strategic intermodal facilities and other freight rail lines

As a first step, FHWA has developed an Interim NMFN that meets the above criteria. The Interim NMFN (2017) in Alabama includes the following non-roadway facilities (and their lengths of NMFN miles):

- Port of Mobile
- Huntsville International Airport
- Approximately 2,460 miles of railways, including:
    - Norfolk Southern (1,443 miles)
    - CSX Transportation (886 miles)
    - Burlington Northern Santa Fe (130 miles)
    - Alabama and Gulf Coast Railway (less than one mile)
- The following waterways:
    - Alabama River (271 miles)
    - Tennessee River (200 miles)
    - Tombigbee Waterway (172 miles)
    - Black Warrior River (168 miles)
    - Chattahoochee River (134 miles)
    - Gulf of Mexico Intracoastal Waterway (52 miles)
    - Mobile River (45 miles)
    - Mulberry Fork River (43 miles)
    - Coosa River (37 miles)
    - Mobile Bay (29 miles)
    - Locust Fork River (19 miles)

FHWA has issued no specific guidance on the overall policy implications for facilities being part of the NMFN (such as additional funding or priorities) other than the increased funding eligibility related to the NHFN designation described previously.

ALDOT has requested that I-59 and I-22 be added to the NMFN. FHWA has indicated that these changes will be reflected during forthcoming updates to the NMFN maps and tables.

Chapter 4: Existing and Projected Commodity Flow

A basic definition for commodity flow is the movement of goods (commodities) from one place (the origin) to another (the destination). This is also the crux of freight mobility. Assessing commodity flow is a means of analyzing trends in goods movement over time. Chapter 4 provides an overview of existing and projected commodity flows throughout Alabama for the years 2022 and 2050. The types and amounts of commodities transported are presented by freight mode—truck, rail, waterway, air, and pipeline.

4.1 Methodology

Existing and projected commodity flows were developed through the statewide commodity flow assignment process, which relies on its primary data source, the Freight Analysis Framework Version 5.4 (FAF 5.4) produced by FHWA. FAF 5.4 contains freight movement data for the United States taken from the Commodity Flow Survey and additional economic and mode specific databases. FAF Zones are shown in Figure 17. The FAF network, in TransCAD software, and the assignment flow tables for the year 2022 were used. The assignment flow table includes daily truck trips on each FAF link by direction, as well as the total (of both directions). The Network and the table were joined by the Link ID, the joined data were exported as a shapefile, and a freight flow map was created.

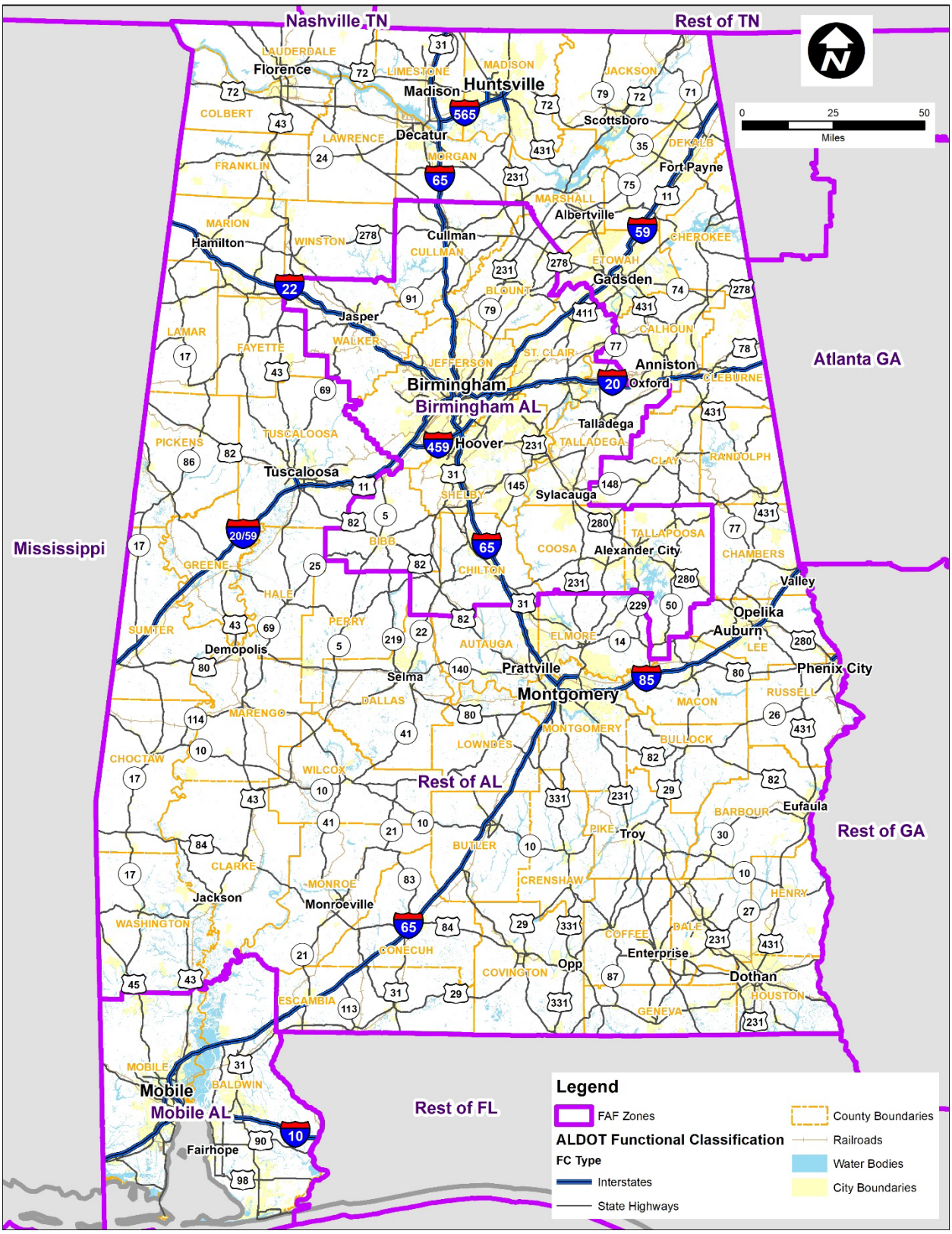

Figure 17. FHWA FAF Zones

The FAF flows were used to determine the top ten inbound and outbound commodities for Alabama. The flow data file includes several attributes, including FAF origin and destination, travel mode, commodity by SCTG code, commodity tonnage in (K-tons), and value in dollars. The flows have been categorized as follows: 1) Inbound (from non-Alabama zone to Alabama zone), 2) Outbound (from Alabama zone to non-Alabama zone), and 3) Internal (between the three Alabama zones).

There are two distinct limitations of the FAF 5.4 data. The first is that the FAF 5.4 database does not include local delivery trips, essentially trips designated as less than 50 miles. Therefore, the commodity flow assignment is for the longer trips expected in a statewide model, not for the trips inside urban areas that are the focus of regional (MPO) travel demand models. The second limitation is that the FAF 5.4 does not include empty trucks. Therefore, there is no direct methodology to include empty trips into the assignment without making assumptions. It is important to note that this commodity flow assignment is designed to examine the tons of product moving long distance across the state or nation. More detail on the commodity flow assignment methodology is provided in Appendix C of this report.

4.2 Top Commodities by Mode

A summary of the existing and projected top commodities by mode follows. It should be noted that the commodity flows represented are not mode-exclusive, meaning that many will transfer between different modes (e.g., truck-to-rail or truck-to-waterway) and, therefore, are likely double-counted in this material.

Table 11 presents a summary comparison of existing and projected commodity flows by mode based on the FAF 5.4 data, by volume of commodities (tonnage) as well as value. To clarify, the "multiple modes and mail" category represents commodities that move by more than one mode. Shipments reported as multiple modes can include anything from containerized cargo to coal moving from mine to railhead by truck and rail to harbor. The "mail" component recognizes that shippers who use parcel delivery services typically do not know what modes are involved after the shipment is picked up.

Table 11. Existing and Projected Modes for Commodity Flows (FAF 5.4)

Code	Mode	Mode Category
1	Truck	Truck
2	Rail	Rail
3	Water	Water
4	Air (includes truck-air)	Air
5	Multiple Modes and Mail	Other
6	Pipeline	Pipeline
7	Other and Unknown	Other
8	No Domestic Mode	Other

Several points of significance indicated by the data are that:

- Trucks have the highest volume of commodity flow by mode, given their ability to transport a wide range of commodities and service last mile needs. The truck is the mode most directly influenced by ALDOT and its management of operations and maintenance of the state roadway network. While ALDOT also influences the operations of other modes ,with last mile connectivity, the overall operations and maintenance for goods movement is the responsibility of other entities (i.e., railroad companies, airports, and Port of Mobile).
- Pipeline is the second most commonly used mode of transport, carrying approximately 32 percent of the state's freight (in kilotons).
- While the smallest portion of cargo flow with respect to tonnage is by air, commodities shipped via air cargo are more valuable than those shipped by any other mode.
- Alabama imports slightly more goods than the state exports, as shown by comparing the total kilotons for origins in Alabama (exports) to destinations in Alabama (imports).

Figure 18 and Figure 19 present a comparison of total volume and value of commodities, by mode, transported through Alabama in 2022 and as projected in 2050. The overall volume of commodities is projected to increase between 2022 and 2050, with a substantially higher volume of commodities anticipated to be transported via truck and rail, and a moderate increase projected in transport by rail, multiple modes and mail, and air. A moderate decrease is projected for transport by water. Likewise, the overall value of commodities is projected to increase between 2022 and 2050, with the greatest gains expected for transport via truck and pipeline.

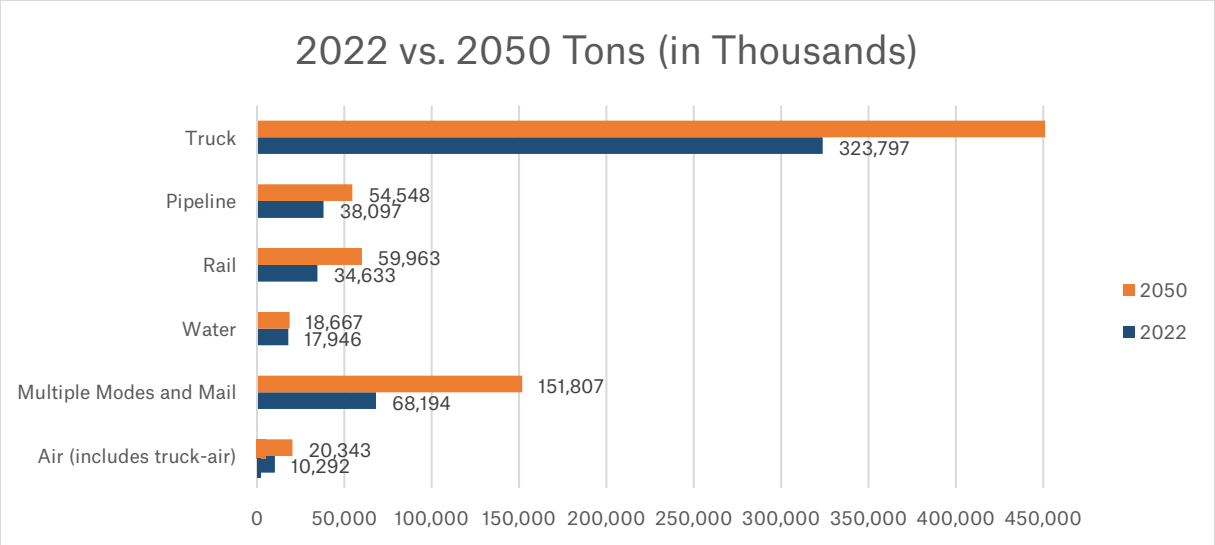

Figure 18. Commodities by Mode by Ton (2022 vs. 2050)

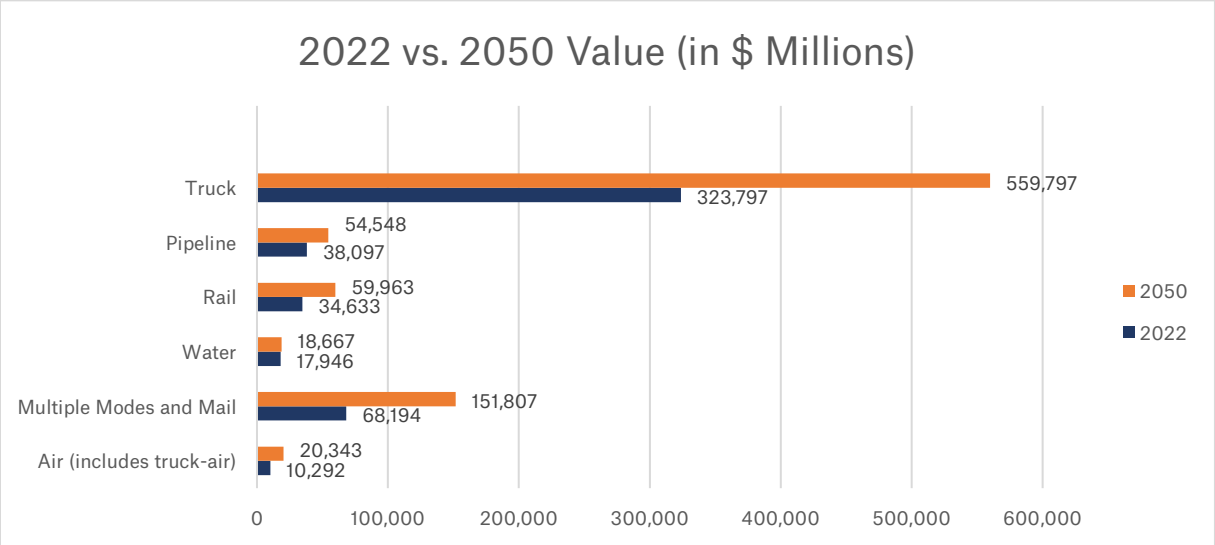

Figure 19. Commodities by Mode by Value (2022 vs. 2050)

The following sections summarize trends in inbound commodity flows, or the shipment of commodities that terminate in Alabama, and outbound commodity flows, or the shipment of commodities that originate in Alabama.

Commodity Flow by Truck

As shown earlier, the dominant mode for moving commodities is trucks. The largest inbound commodity by truck in 2022 is base metal in primary or semi-finished forms, with over 5 million tons. The second-largest volume of inbound commodity by truck is wood products, with just over 4 million tons. In 2050, it is projected that the greatest volume of inbound commodities by truck will be basic chemicals (8 million tons), wood products (7 million tons), plastics and rubbers (6.7 million tons), and animal feed, eggs, honey, and other products of animal origin (6.4 million tons).

The most valuable inbound commodity imported into Alabama in 2022 is motorized and other vehicles (including parts), at approximately $18 billion. Several commodities make up the second to fifth ranked most valuable commodities, including machinery, mixed freight, electronics and other equipment, and plastic and rubber, each valued at approximately $9 billion. In 2050, it is projected that the greatest value of inbound commodities by truck will remain motorized and other vehicles (including their parts), which will grow to approximately $30 billion, followed by plastics and rubbers ($21 billion), and electronic and other electrical equipment and components, and office equipment ($18 billion).

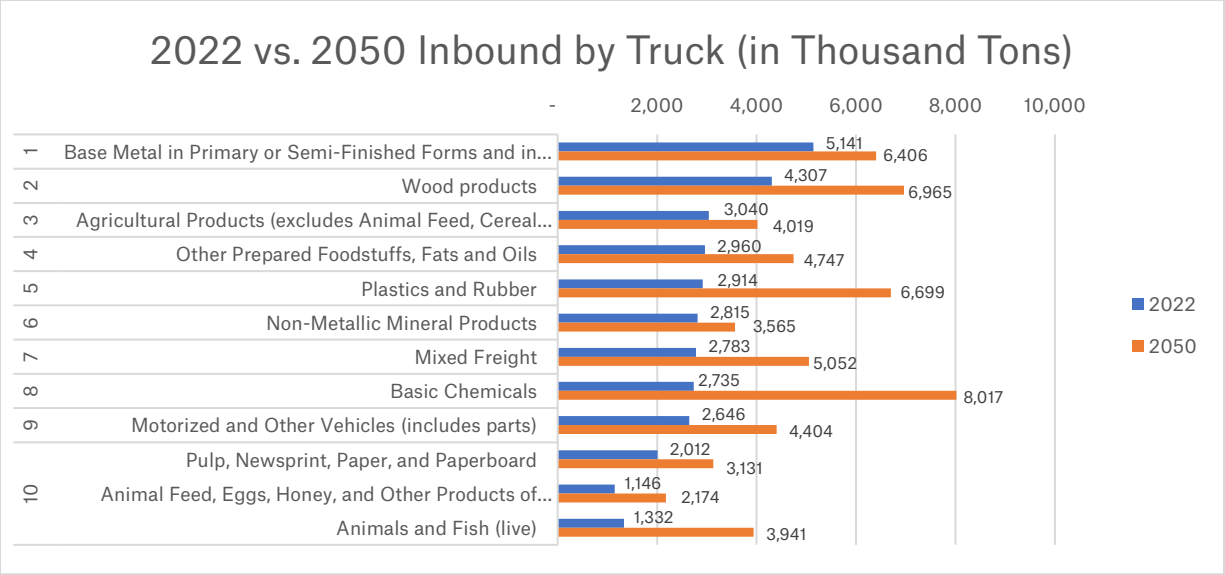

Figure 20. Top Inbound Commodities by Truck (in Tons) in 2022 vs. 2050

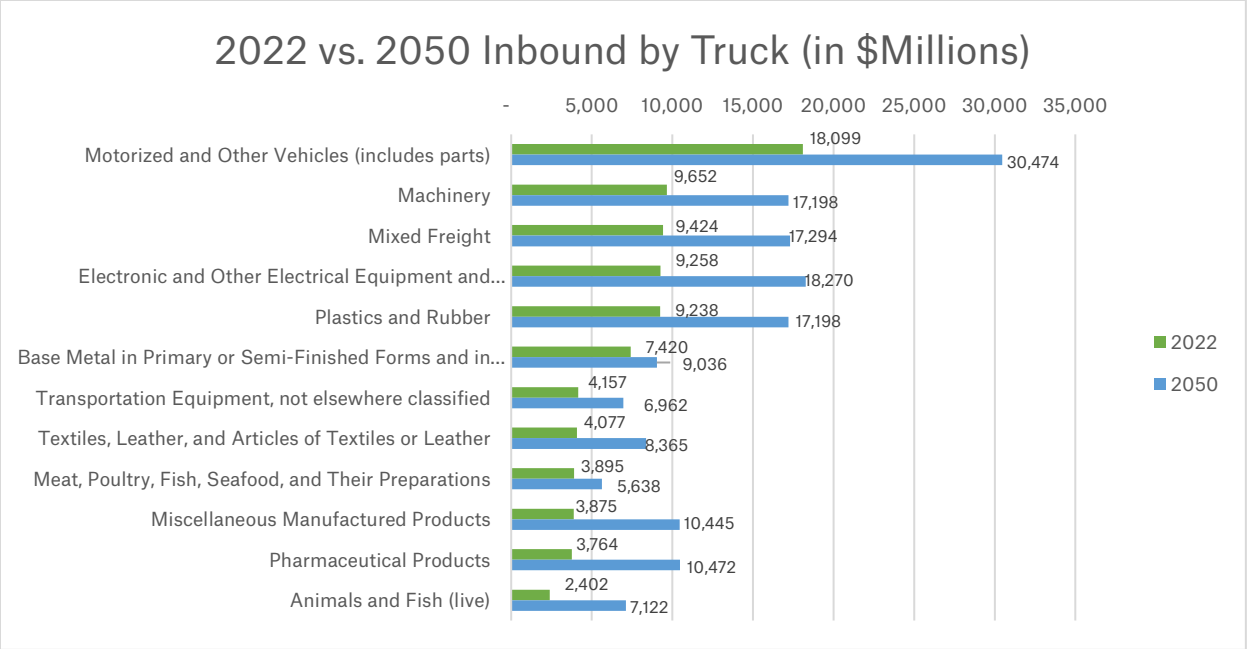

Figure 21. Top Inbound Commodities by Truck (in Value) in 2022 vs. 2050

In 2022, the top outbound commodities by truck by volume echo the top inbound commodities: base metal in primary or semi-finished form (8 million tons) and wood products (6 million tons). The top outbound 2050 commodity for trucks by volume is projected to remain as wood products, growing substantially to 10 million tons. Several other commodities, including non-metallic mineral products, gravel and crushed stone, mixed freight, and miscellaneous manufactured products, are projected to see substantial increases in volume by 2050.

The most valuable outbound commodity by truck in 2022 is motorized and other vehicles (including parts), representing over $20 billion in exports. The next highest valued outbound commodities are mixed freight and base metal in primary or semi-finished form, each at just over $10 billion in value. Motorized and other vehicles is projected to remain the top outbound commodity for trucks by value in the future, doubling from $20 billion in 2022 to $41 billion in 2050. Mixed freight is similarly projected to double in value, to $21 billion, and plastics and rubber is projected to move into the third-highest value commodity export at around $15 billion, up from $8 billion in 2022.

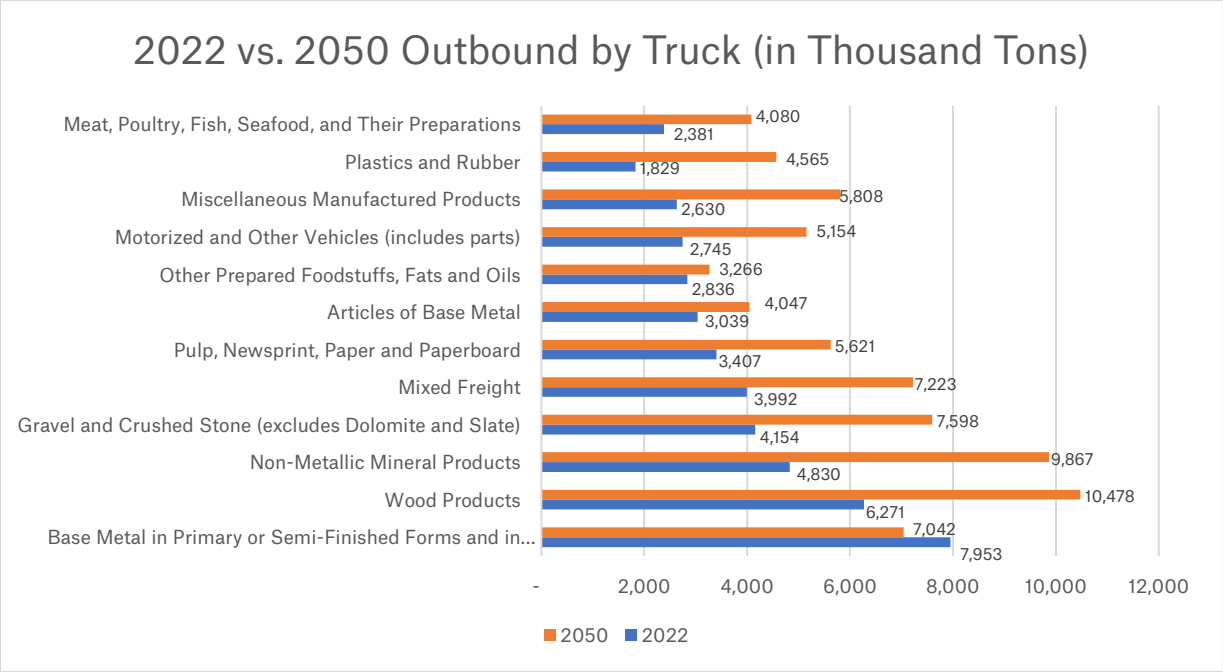

Figure 22. Top Outbound Commodities by Truck (in Tons) in 2022 vs. 2050

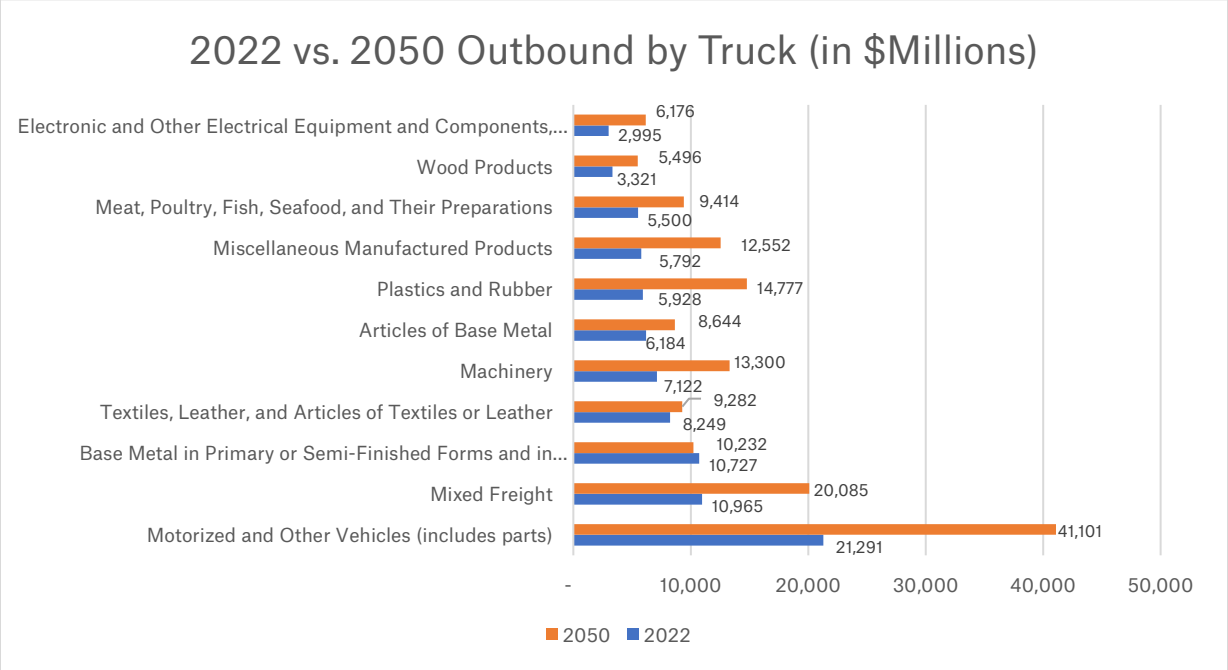

Figure 23. Top Outbound Commodities by Truck (in Value) in 2022 vs. 2050

Commodity Flow by Rail

By rail, the inbound commodity with the greatest volume is coal at just over 8 million tons. The next largest commodity imported by rail is base metal in primary or semi-finished forms, at 1.5 million tons. In 2050, coal imports by rail are projected to drop to 1 million tons, while base metal will grow to the top ranked inbound commodity by rail, at 1.6 million tons. By value, base metal rail in primary or semi-finished form is the greatest import in 2022, valued at $1.2 billion. It far exceeds the next highest value import, basic chemicals ($400 million). Base metal is projected to remain the highest value import by rail in 2050, and basic chemicals is projected to experience a significant rise in import value, at $9 billion. The third most valuable inbound commodity is projected to be motorized and other vehicles at $7 billion. Other commodities, including machinery, electronic and other electric equipment, and plastics and rubber, are projected for a substantial rise in import value by 2050.

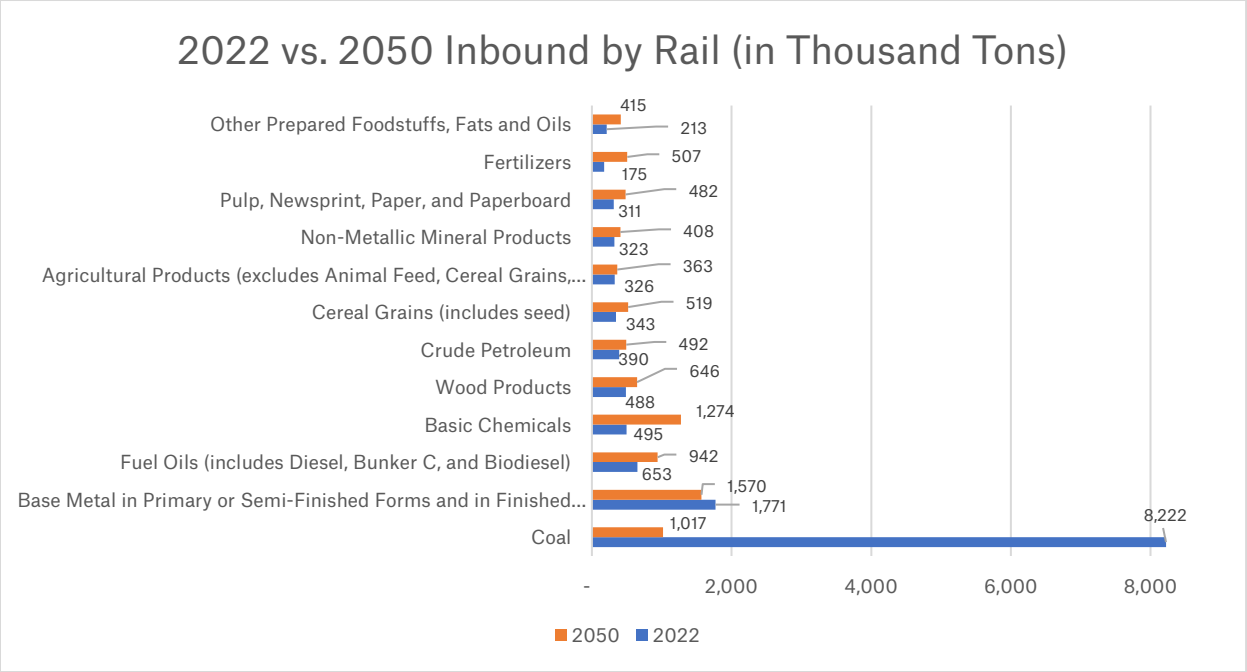

Figure 24. Top Inbound Commodities by Rail (in Tons) in 2022 vs. 2050

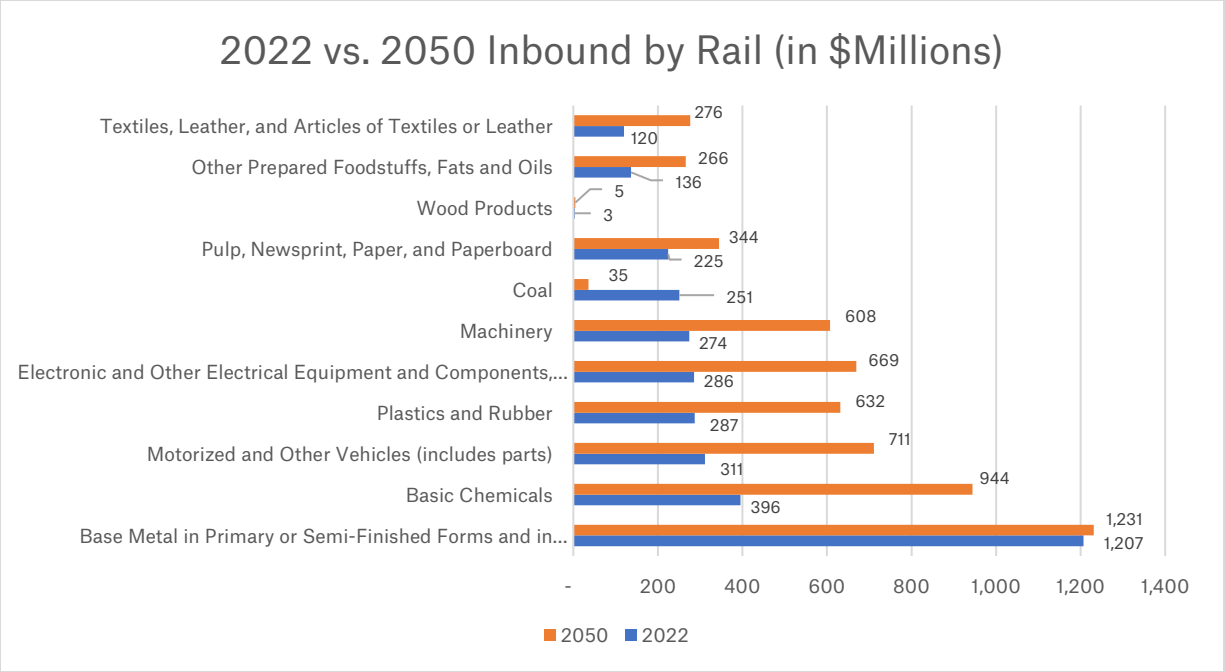

Figure 25. Top Inbound Commodities by Rail (in Value) in 2022 vs. 2050

The largest outbound commodity by rail in 2022 is natural sands at 5.5 million tons. It is nearly double the next greatest export, basic chemicals (2.6 million tons). Natural sands is projected to remain the largest export by rail in 2050, growing to 8 million tons. Outbound rail shipments of basic chemicals are projected to more than double by 2050 to 7.9 million tons. The highest value commodity being shipped out of Alabama in 2022 is motorized and other vehicles (including parts) at a value of $3.5 billion, followed by basic chemicals valued at $1.25 billion. In 2050, motorized and other vehicles is projected to remain the highest value export by rail, increasing substantially to a value of $9 billion.

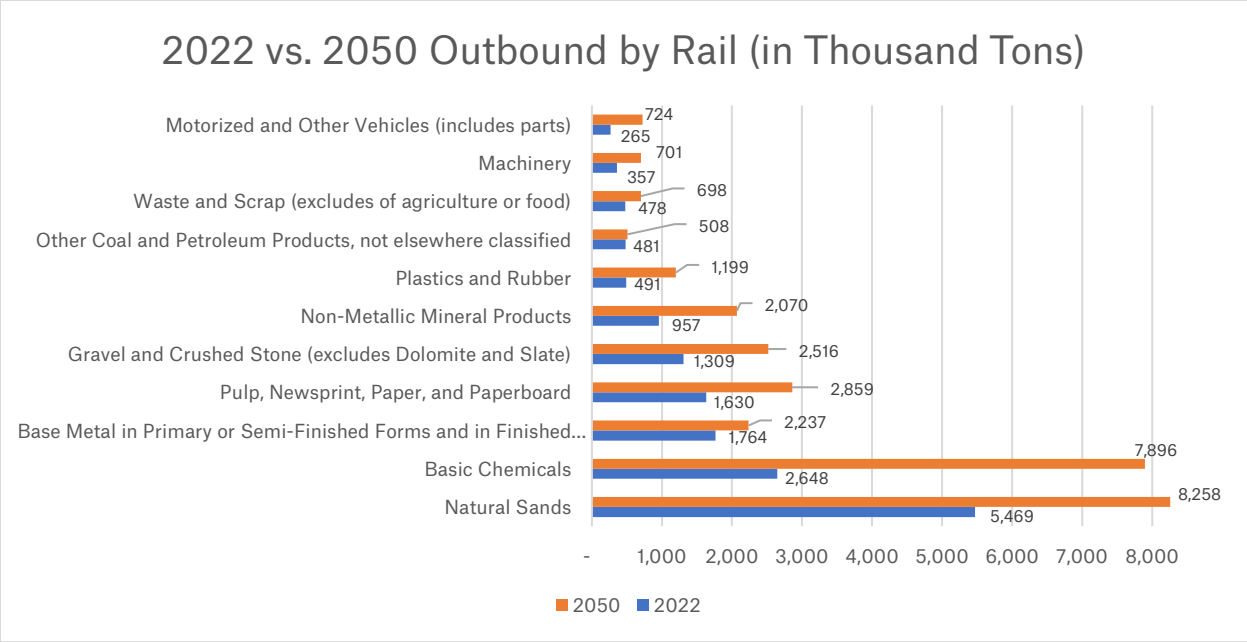

Figure 26. Top Outbound Commodities by Rail (in Tons) in 2022 vs. 2050

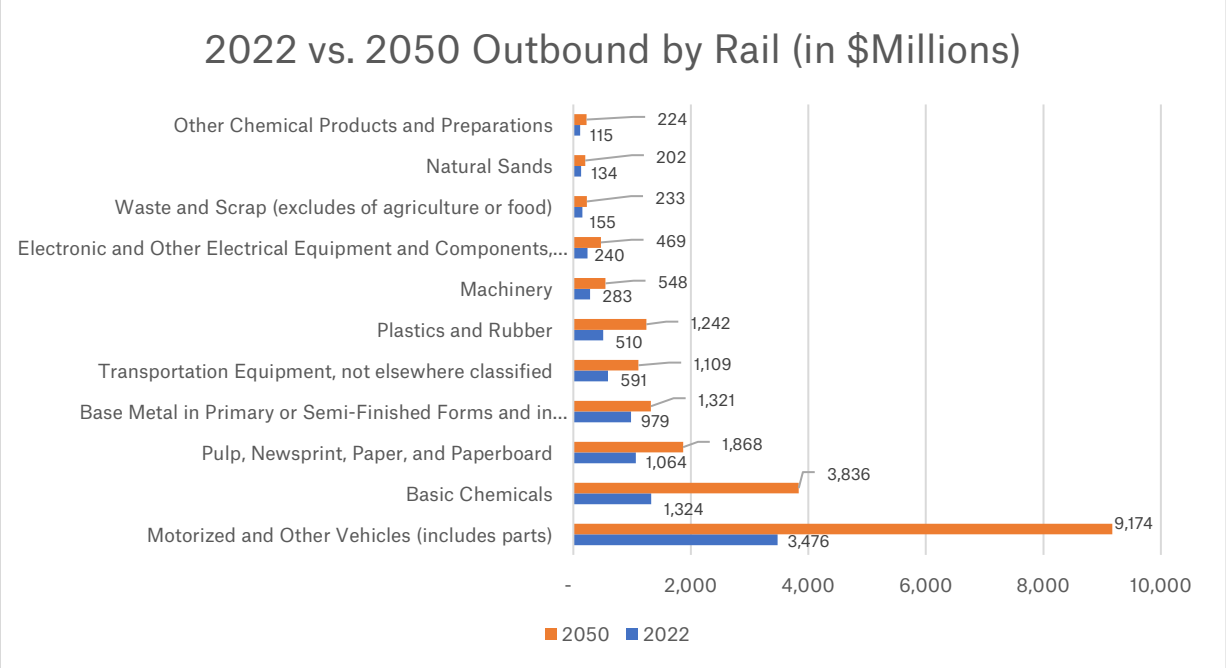

Figure 27. Top Outbound Commodities by Rail (in Value) in 2022 vs. 2050

Commodity Flow by Inland Waterway

For commodities being imported by water in 2022, basic chemicals is the highest ranked by both weight and value. About 1.4 million tons of basic chemicals at a value of $1 billion are imported into Alabama by water. The second highest import by tonnage is base metal in primary or semi-finished form at just over 750,000 tons. The second highest import by value is textiles, leather, and articles of textiles or leathers at nearly $400 million. In 2050, basic chemicals is projected to rise to 1.9 million tons, with base metal in the primary or semi-finished form growing to become the largest import by waterway at 4.2 million tons. Basic chemicals is projected to remain the most valuable inbound commodity, more than doubling to $2.75 billion in 2050. Similarly, textiles, leather, and articles of textiles or leather will remain a high value import, growing to over $600 million in value.

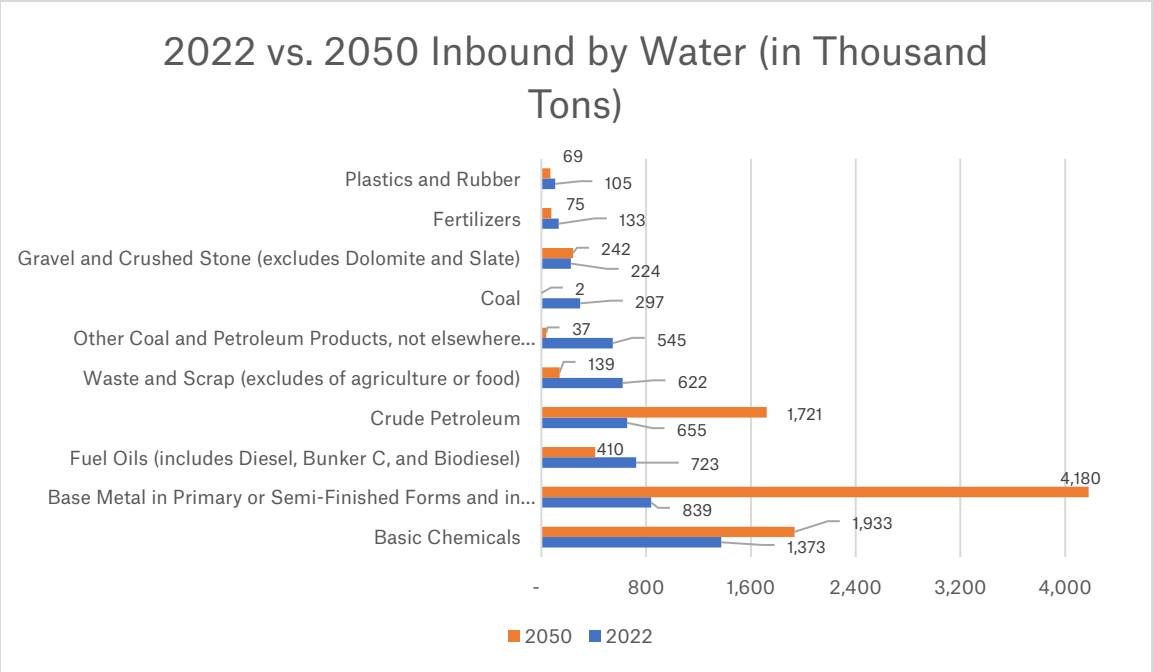

Figure 28. Top Inbound Commodities by Water (in Tons) in 2022 vs. 2050

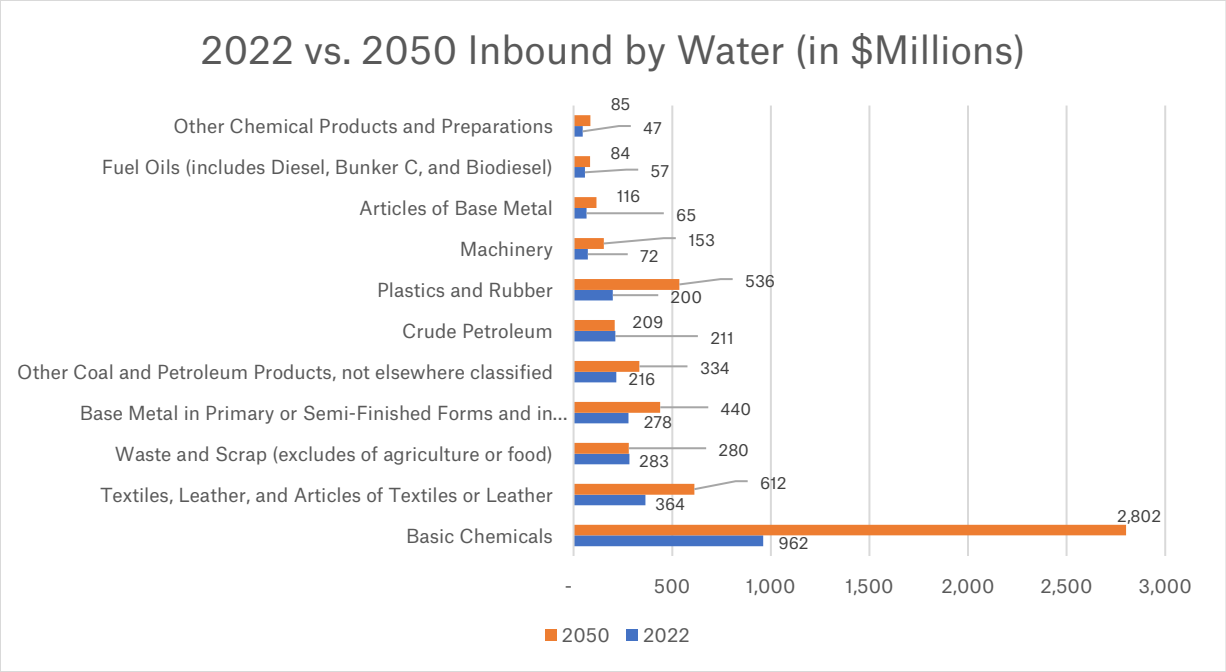

Figure 29. Top Inbound Commodities by Water (in Value) in 2022 vs. 2050

The largest outbound commodity by water is crude petroleum at 4.6 million tons, followed by base metal in primary or semi-finished forms at 2.5 million tons and machinery at 2.25 million tons. The same three commodities are also the highest in value. Crude petroleum exports by water is valued at $1.5 billion in value, base metal in primary or semi-finished form is valued at $1.25 billion, and machinery is valued at just under $1 billion. The largest outbound future commodities by water in 2050 are projected to remain as base metal in primary or semi-finished form (slightly decreasing to 4.2 million tons) and machinery (growing to 4.1 million tons). Basic chemicals are projected to be the most valuable outbound commodity in 2050, valued at $2.25 billion. The second most valuable future commodity is projected to be base metal in the primary or semi-finished form at $1.8 billion.

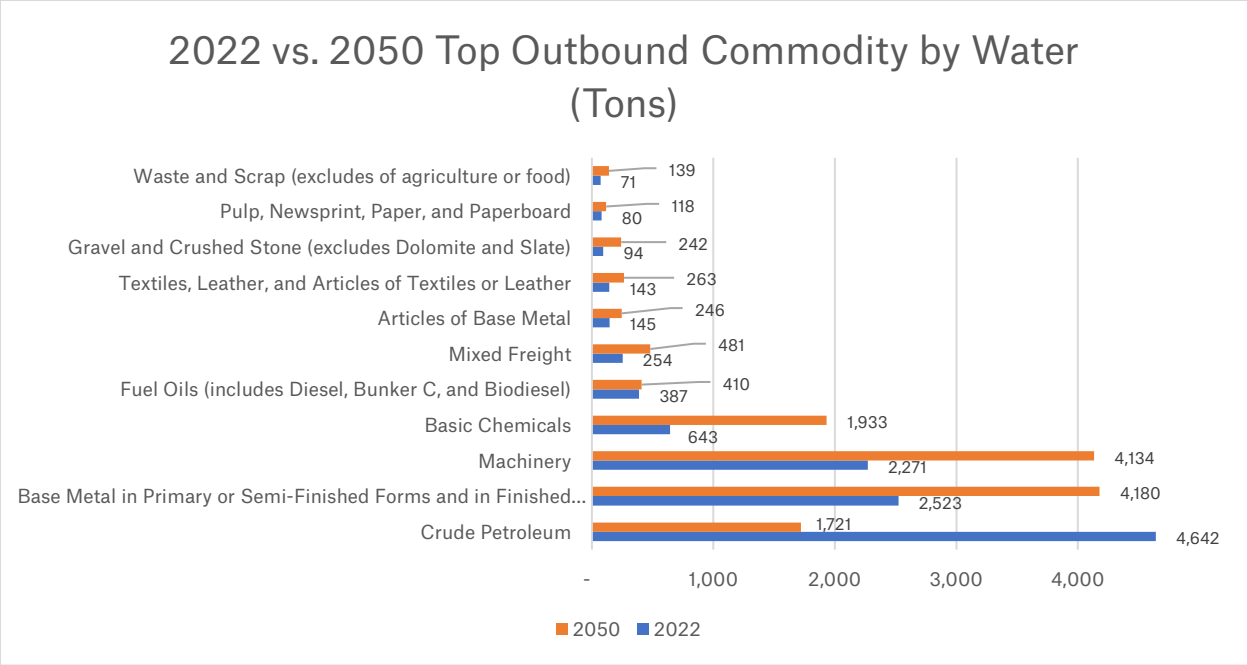

Figure 30. Top Outbound Commodities by Water (in Tons) in 2022 vs. 2050

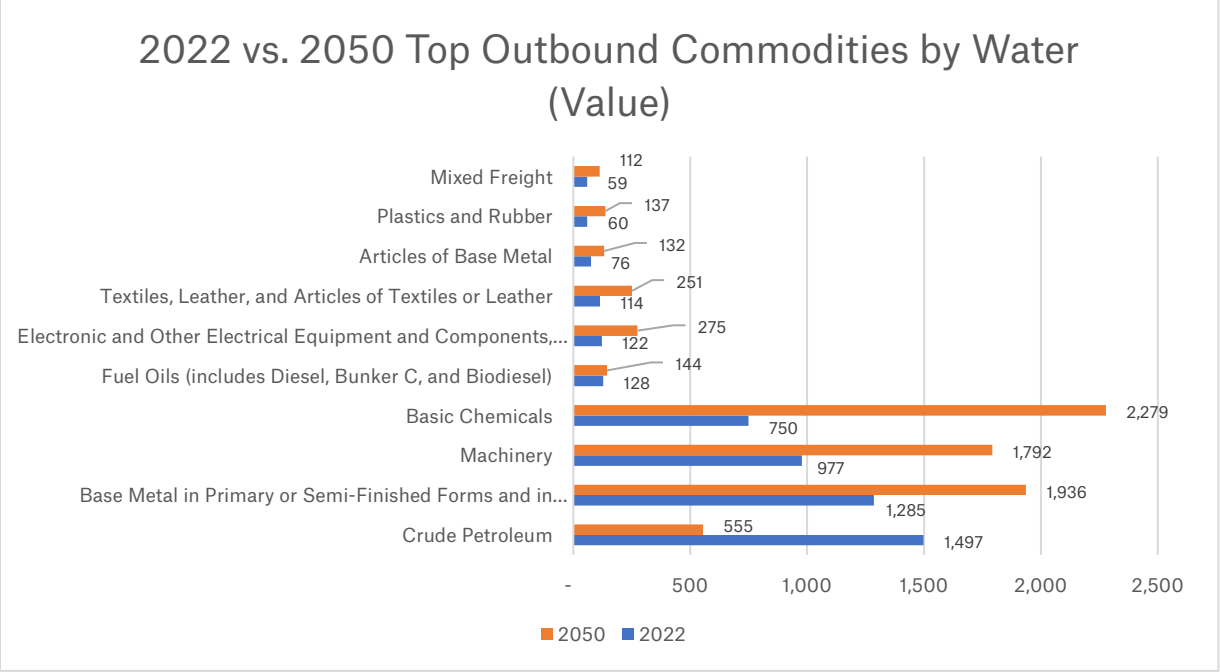

Figure 31. Top Outbound Commodities by Water (in Value) in 2022 vs. 2050

Commodity Flow by Air

Commodities by air represent the least tonnage by mode but have high monetary value. In 2022, the largest inbound commodity by air is electronic and other electrical equipment at 6,500 tons, followed by machinery at 4,600 tons. Electronic and other electrical equipment and components is projected to remain the top air import in 2050, growing to over 12,000 tons . Similarly, machinery is projected to grow to nearly 9,000 tons. In 2022, the highest value air import is pharmaceutical products ($650 million), followed closely by precision instruments and apparatus ($625 million). These are projected to remain the most valuable air imports in 2050, more than doubling to $1.35 billion and $1.3 billion, respectively.

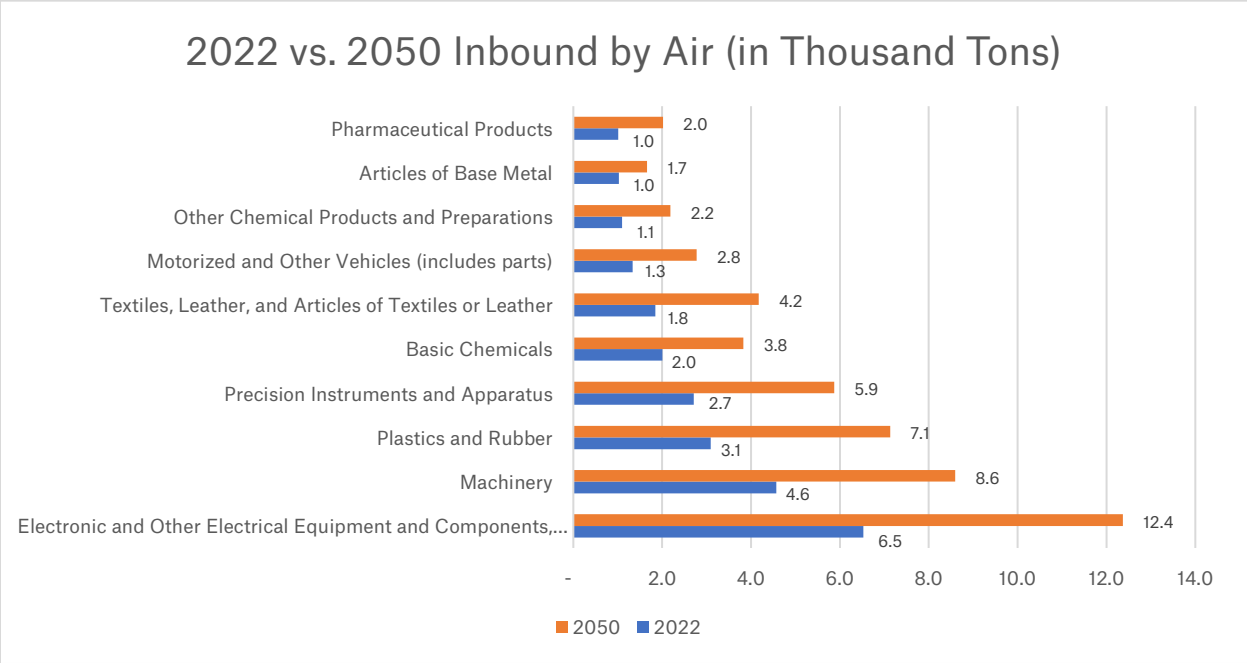

Figure 32. Top Inbound Commodities by Air (in Tons) in 2022 vs. 2050

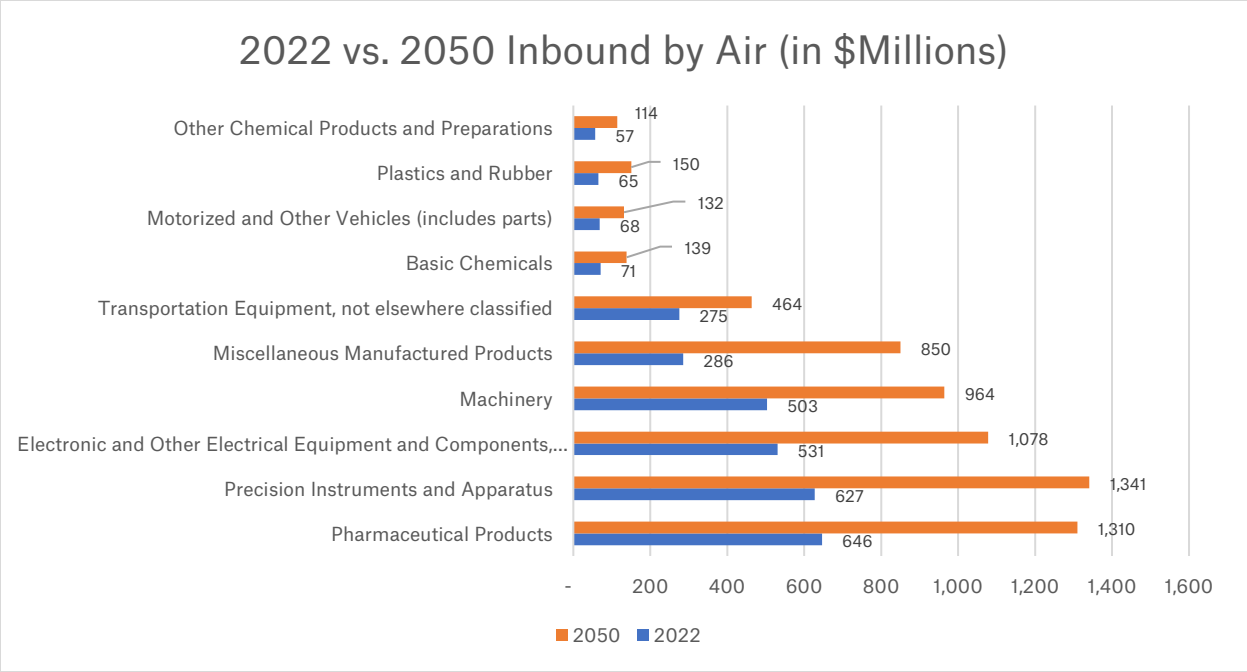

Figure 33. Top Inbound Commodities by Air (in Value) in 2022 vs. 2050

The largest commodity exported by air in tons is machinery at approximately 40,000 tons, followed by electronic and other electrical equipment at 30,000 tons. These are projected to grow 75,000 tons and 59,000 tons by 2050, respectively. Pharmaceutical products are the most valuable commodity exported from Alabama by air, valued at $2.5 billion, followed by machinery at just over $1.5 billion. By 2050, it projected that pharmaceutical products will remain the most valuable outbound commodity by air, growing to $4.25 billion. The second most valuable commodity in 2050 is projected to be machinery at $3.25 billion. It is projected that electronic and other electrical equipment and components will grow to $2.5 billion by 2050.

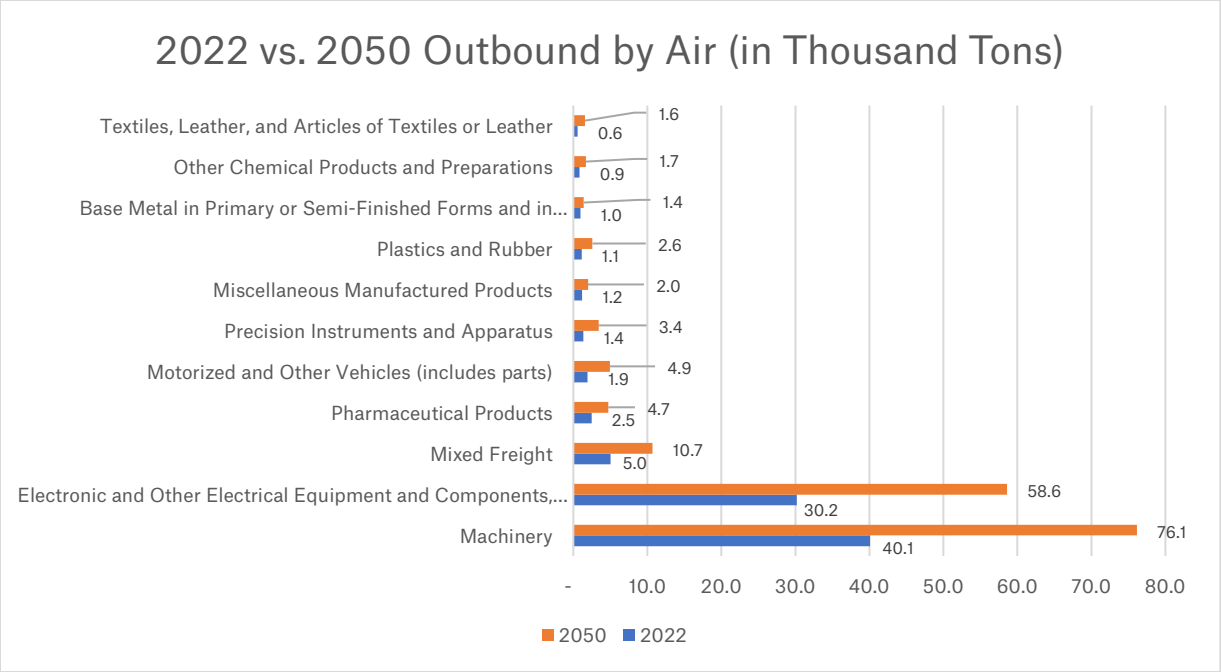

Figure 34. Top Outbound Commodities by Air (in Tons) in 2022 vs. 2050

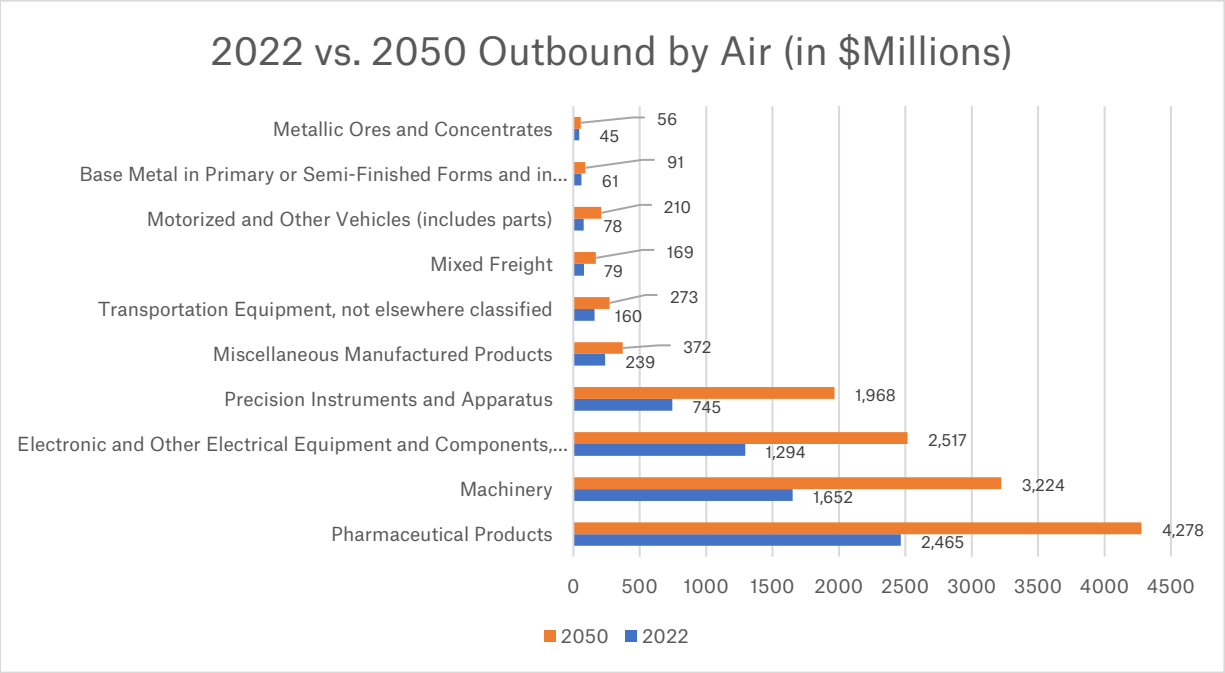

Figure 35. Top Outbound Commodities by Air (in Value) in 2022 vs. 2050

Commodity Flow by Pipeline

There are only three commodities ranked for the pipeline category. The largest commodity brought into Alabama by pipeline is other coal and petroleum products at nearly 100 million tons. The second largest is crude petroleum at approximately 4.75 million tons, followed by gasoline, aviation and turbine fuel, and ethanol at 346,000 tons. By 2050, it is projected that coal and petroleum products will remain the largest inbound commodity by pipeline, growing to over 150 million tons. Inbound crude petroleum is projected to experience a slight decrease to 4.74 million tons in 2050. Inbound gasoline, aviation and turbine fuel, and ethanol by pipeline is projected to decrease to 105,000 tons by 2050. Coal and petroleum products are the highest value inbound pipeline commodity at just over $19 billion, followed by crude petroleum at $1.5 million and gasoline, aviation and turbine fuel, and ethanol at $186,000. In 2050, it is projected that coal and petroleum products will grow to $28.8 billion, while crude petroleum will remain around $1.5 million and gasoline, aviation and turbine fuel, and ethanol will decrease to $57,000.

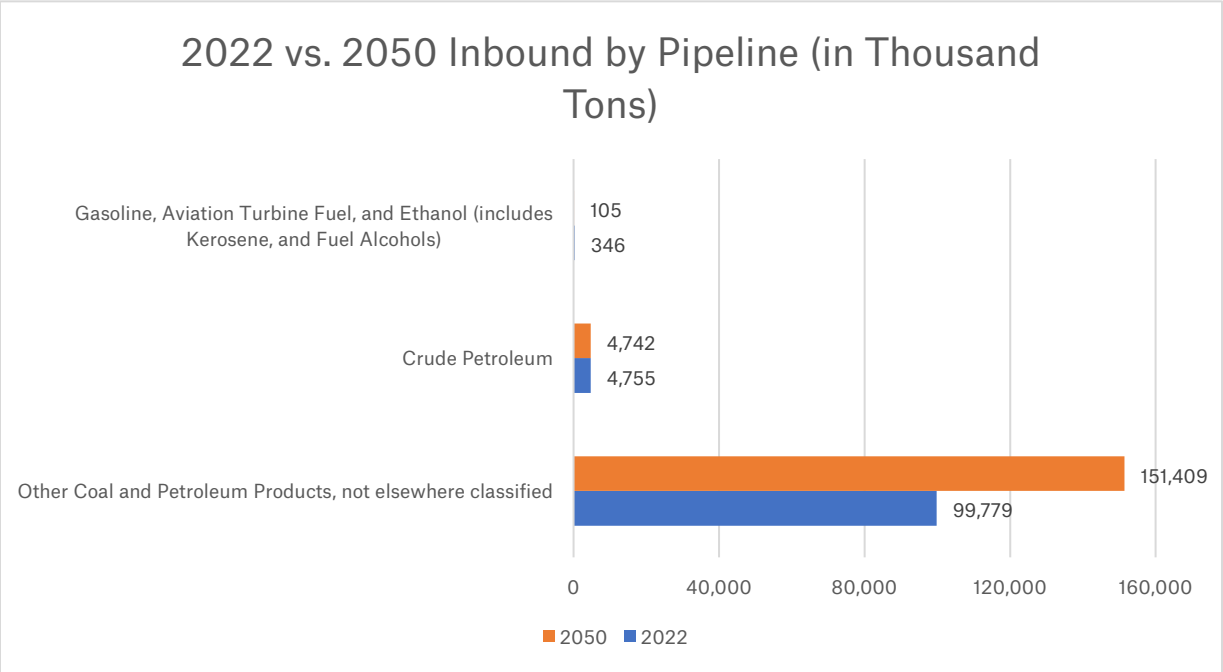

Figure 36. Top Inbound Commodities by Pipeline (in Tons) in 2022 vs. 2050

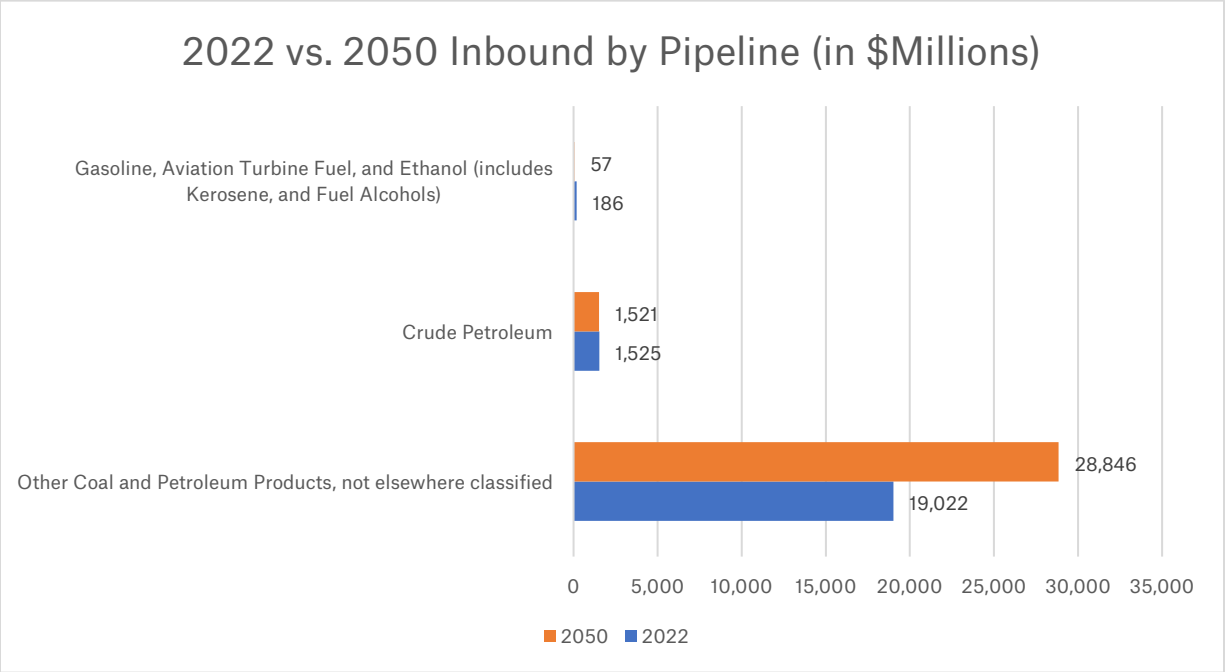

Figure 37. Top Inbound Commodities by Pipeline (in Value) in 2022 vs. 2050

There are two outbound commodities by pipeline, other coal and petroleum products (79 million tons) and crude petroleum (1.9 million tons). In 2050, these are projected to remain the primary commodities exported via pipeline, with other coal and petroleum products rising to a projected 113 million tons. The current value of the state's exports is $13.3 billion dollars for other coal and petroleum products and $628 million for crude petroleum. Exports for other coal and petroleum products are projected to rise in value to $19 billion in 2050, while the value for crude petroleum exports is projected to drop to $587 million.

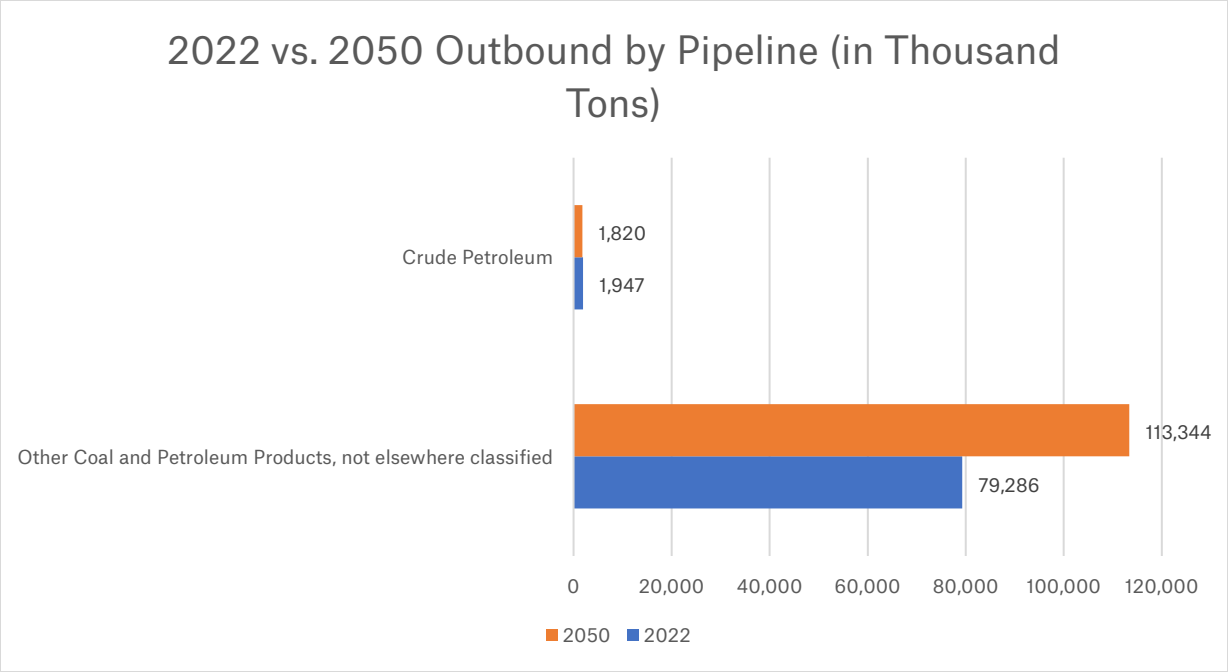

Figure 38. Top Outbound Commodities by Pipeline (in Tons) in 2022 vs. 2050

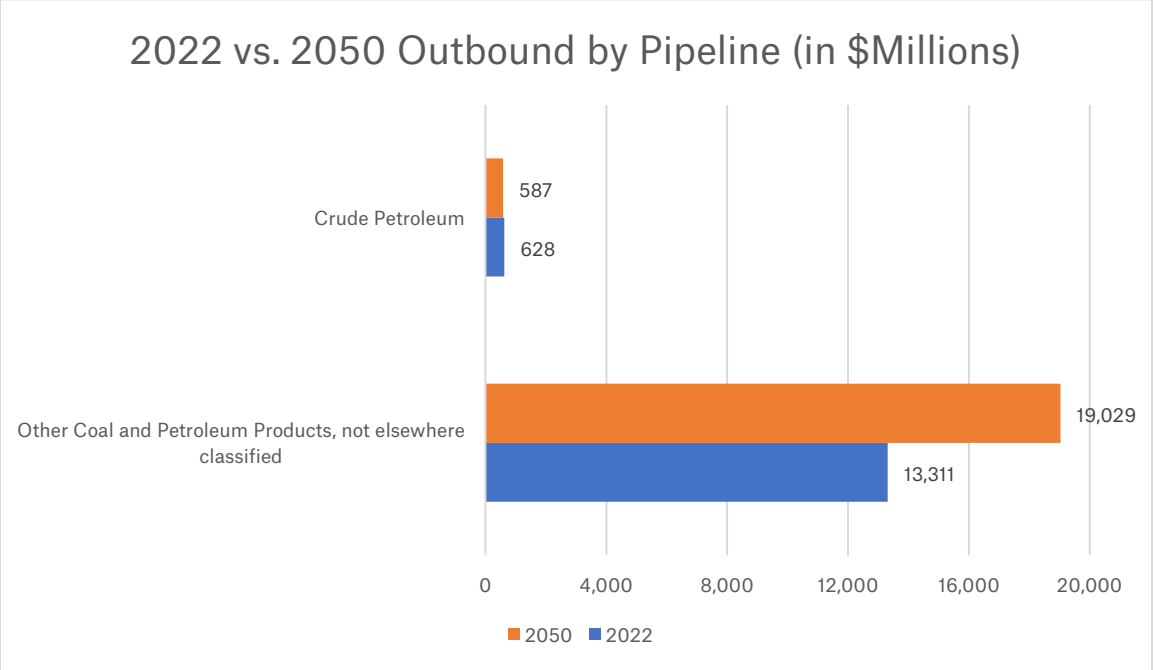

Figure 39. Top Outbound Commodities by Pipeline (in Value) in 2022 vs. 2050

The Uncertainty of Coal Demand

The Clean Power Plan, which was enacted under President Obama's administration, sought a 32% cut in the power sector's carbon emissions by 2030 compared with 2005 levels in an effort to reduce greenhouse gas emissions. Several states (including Alabama) and power companies challenged the EPA rule through litigation. In June 2019, President Trump's administration repealed the Clean Power Plan and replaced it with the Affordable Clean Energy Rule, negating the previous mandate for power sector emissions. In February 2021, the US EPA, under President Biden's administration, confirmed that the Clean Power Plan will not be reinstated, and that ongoing changes in electricity generation mean that the emission reduction goals called for in the Clean Power Plan have been achieved.[55] In April 2021, however, President Biden announced a new target for the US to achieve a 50-52% reduction from 2005 levels in economy-wide net greenhouse gas pollution by 2030.[56] New legislation in the future may mandate further cuts in electricity emissions nationwide.

FAF 5.4 data projects that will continue to be a major commodity shipped by rail and truck in Alabama in 2050. However, the flow of coal throughout the state is projected to drop from nearly 87,000 kilotons in 2022, to 16,371 kilotons in 2050, representing an 81% decrease the volume of coal that will move throughout the state. It should be noted that given the uncertainty of future coal demand, the projected 2050 freight flow of this commodity may be inaccurate (regardless of mode).

4.3 Maritime Cargo Trends and Best Practices

The Alabama maritime freight network provides a way to move heavy goods at an economical price both into and out of the state. It is an extremely important part of the state's economy and provides a way for manufacturers to reduce costs in shipping. Maritime connections to other modes provides additional support for the Alabama freight network to facilitate the movement of goods between freight generators and last-mile destinations.

Maritime Cargo Trends

Port of Mobile, Mobile River, and Mobile Bay

According to the USACE 5 Year Cargo report, the top domestic and foreign commodities in 2020 originating from and destined for the Port of Mobile include coal and lignite, crude petroleum, iron & steel primary forms and iron & steel plates and sheets, and pig iron. Total commodities imported and exported appear to have increased from 2016 to 2019, but decreased in 2020. The decrease is likely due to the onset of the COVID-19 pandemic in 2020.

As for individual commodities, coal and lignite is the largest commodity transported through the Port of Mobile. Two of the individual commodities did not follow the trend and did not decrease in 2020. Iron and steel plates increased by nearly 500,000 tons in 2020 and nearly 2 million tons throughout the five-year period. The other commodity that does not follow the trend is pig iron. It

continued to grow by approximately 400,000 tons in 2020. The growth of these commodities can likely be linked to the growth of the auto industry throughout the state over the five-year period.[57]

Table 12. Commodity Flow in the Mobile Region

	2020 tons	2019 tons	2018 tons	2017 tons	2016 tons
All Commodities	**53,206,561**	**56,893,814**	**58,635,622**	**58,157,248**	**58,024,317**
1100-- Coal & Lignite	16,402,405	18,011,813	18,722,537	15,107,865	14,311,164
2100-- Crude Petroleum	9,403,592	10,126,739	11,354,149	12,260,622	13,422,017
5320-- Iron & Steel Primary Forms	5,571,556	7,831,284	7,413,591	7,699,179	6,944,274
5330-- Iron & Steel Plates & Sheets	2,496,617	1,978,401	1,747,584	511,019	479,973
5312-- Pig Iron	1,953,678	1,855,694	1,727,694	1,536,079	1,523,757

Tennessee Tombigbee Waterway

According to the USACE 5 Year Cargo report, the top domestic and foreign commodities in 2020 along the Tennessee Tombigbee Waterway include wood chips, sand and gravel, other hydrocarbons, nitrogen functional compounds, and iron and steel scrap. Total commodities imported and exported range from 6.4 million tons in 2020 to 7.9 million tons in 2016. The decrease in 2020 is likely due to impacts from the COVID-19 pandemic. That said, it does appear that an overall decrease in traffic along the Tennessee Tombigbee Waterway over the past five years likely has contributed to this trend as well.

Regarding individual commodities, wood chips is the largest commodity transported along the Tennessee Tombigbee Waterway, ranging from 1.1 to 1.5 million tons over the five-year period. [58]

Table 13. Commodity Flow in the Tennessee Tombigbee Region

	2020 tons	2019 tons	2018 tons	2017 tons	2016 tons
All Commodities	**6,405,639**	**6,953,711**	**7,412,050**	**7,289,538**	**7,930,710**
4161-- Wood Chips	1,119,607	1,235,823	1,363,249	1,130,744	1,514,583
4331-- Sand & Gravel	848,051	729,167	632,859	299,267	545,193
3219-- Other Hydrocarbons	799,337	1,218,504	795,604	983,236	239,019
3240-- Nitrogen Functional Compounds	427,465	459,767	551,444	547,924	382,466
4420-- Iron & Steel Scrap	387,907	222,030	517,470	554,100	422,562

Black River and Tombigbee Rivers

According to the USACE 5 Year Cargo report, the top domestic and foreign commodities in 2020 along the Black Warrior and Tombigbee Rivers include coal & lignite, iron and steel primary forms, iron and steel plates & sheets, crude petroleum, and iron and scrap steel. Total commodities imported and exported range from 16.0 million tons in 2020 to 17.7 million in 2016. The decrease in 2020 is likely due to impacts from the COVID-19 pandemic. That said, it does appear an overall decrease in traffic along the Black Warrior and Tombigbee Rivers over the past five years likely has contributed to this trend as well.

Regarding individual commodities, coal & lignite is the largest commodity transported along the Black Warrior and Tombigbee River, ranging from 4.3 million tons in 2017 to 6.5 million tons in 2016. There was a significant increase in 2018 of the transport of iron steel plates and sheets. This is likely due to the growth of the automobile industry in Alabama over the past few years. [59]

Table 14. Commodity Flow in Black Warrior and Tombigbee Region

	2020 tons	2019 tons	2018 tons	2017 tons	2016 tons
All Commodities	**16,028,718**	**17,266,176**	**17,006,486**	**16,905,316**	**17,705,351**
1100-- Coal & Lignite	4,642,429	5,076,838	5,074,506	4,331,845	6,550,453
5320-- Iron & Steel Primary Forms	2,782,821	3,620,013	3,413,377	3,465,544	3,215,025
5330-- Iron & Steel Plates & Sheets	1,716,874	1,816,352	1,658,833	20,798	72,873
2100-- Crude Petroleum	1,035,109	871,495	916,234	854,987	777,685
4420-- Iron & Steel Scrap	831,329	687,114	893,613	1,156,480	900,591

Maritime Best Practices

The 2017-2021 Maritime Administration Strategic Plan presents strategic goals at the national level. This section addresses the implication of the Maritime Administration's strategic goals on Alabama's Maritime Freight Network.

The Strategic Plan presents six overarching goals for MARAD:

- Goal #1: Support US Maritime Capabilities, which includes maximum preference cargo for US Vessels, reducing US vessel operating costs, and training for maritime related jobs including crew and port workers.
- Goal #2: Maintain and Modernize the Maritime Workforce, which includes ensuring economic and national security requirements are met and promoting shipyard training and certification.

- Goal #3: Improve, Expand, and Protect Waterborne Transportation, which includes reducing port congestion, establishing marine highway services and corridors, enabling additional ports to accommodate container ships, and enabling additional ports to accommodate dry bulk and tanker vessels of 50 feet in draft.
- Goal #4: Minimize Environmental Impacts, which includes reducing pollution and congestion in other modes, reducing environmental footprints though technology and practice, utilizing clean energy sources, and disposing of government-owned ships in an environmentally responsible manner.
- Goal #5: Maritime Innovation, which includes leveraging ITS technology to benefit maritime and intermodal transportation, tracking cargo movements through ports and on connecting surfaces, innovative ships designs and business processes, and automation at shipyards and ports.
- Goal #6: Organizational Excellence, which includes diversity in workforce, efficient support, and execution of the strategic plan.

The following best practices and strategies should be considered to help the Alabama Maritime Freight Network align with MARAD's strategic goals:

- Identify and design programs and policies to train the Alabama workforce for maritime-related jobs, including ship crews and port workers, and assisting in earning of certifications.
- Identify congestion at ports and intermodal facilities in Alabama and develop transportation-related solutions to relieve congestion.
- Develop policies that address economic and security issues at ports in and along Alabama's maritime network.
- As future transportation-related facilities are constructed to support maritime activities, minimize impacts to existing environmental assets and encourage use of clean energy resources throughout the freight network.
- Leverage transportation technologies and designs, including cargo tracking technologies, to enhance the operations of Alabama's ports and waterways.
- Continue coordination with MARAD staff to align the goals of the Alabama maritime network with national goals.

Chapter 5: Freight Network Performance

5.1 Existing and Projected Commodity Flow by Truck

An assessment of existing and projected commodity flow along the roadways was undertaken to identify areas where future improvements could facilitate overall freight mobility. Figure 40 and Figure 41 display existing and projected truck volumes throughout the state, based on existing and future commodity flows developed through the FAF analysis. This is relayed as average annual daily truck traffic (AADTT).

In 2022, corridors with high levels of commodity flow by truck include:

- I-20 east of Birmingham
- I-85 from the Georgia state line towards Montgomery
- I-65 between Montgomery and Mobile
- I-20/I-59 south of Tuscaloosa

In 2050, truck traffic is projected to increase along these corridors, and along greater extents of interstates as well as US and state highways. Projected increases in truck traffic are seen in and around larger cities, including Montgomery, Huntsville, Mobile, Florence, and Decatur, and on major corridors connecting those cities.

It must be noted that the commodity flow assignment is based on national origin-destination tables. As such, discrepancies in flows along particular routes might occur because of distribution patterns and trucking company route policies that are not possible to account for in a flow assignment. Therefore, the commodity flow assignment should be used as one potential tool to support decisions, with knowledge of truck volumes being used at times to override the values presented in the output.

It is also worth noting that a substantial volume of the commodity flow to and from the Port of Mobile occurs by rail, which accounts for the Mobile area's comparatively lower volumes on the previous two figures. Impacts on the roadway network from truck movements associated with the Port of Mobile become mixed with local traffic in the areas adjacent to the port.

The methodology employed for the commodity flow assignment is presented in Appendix C.

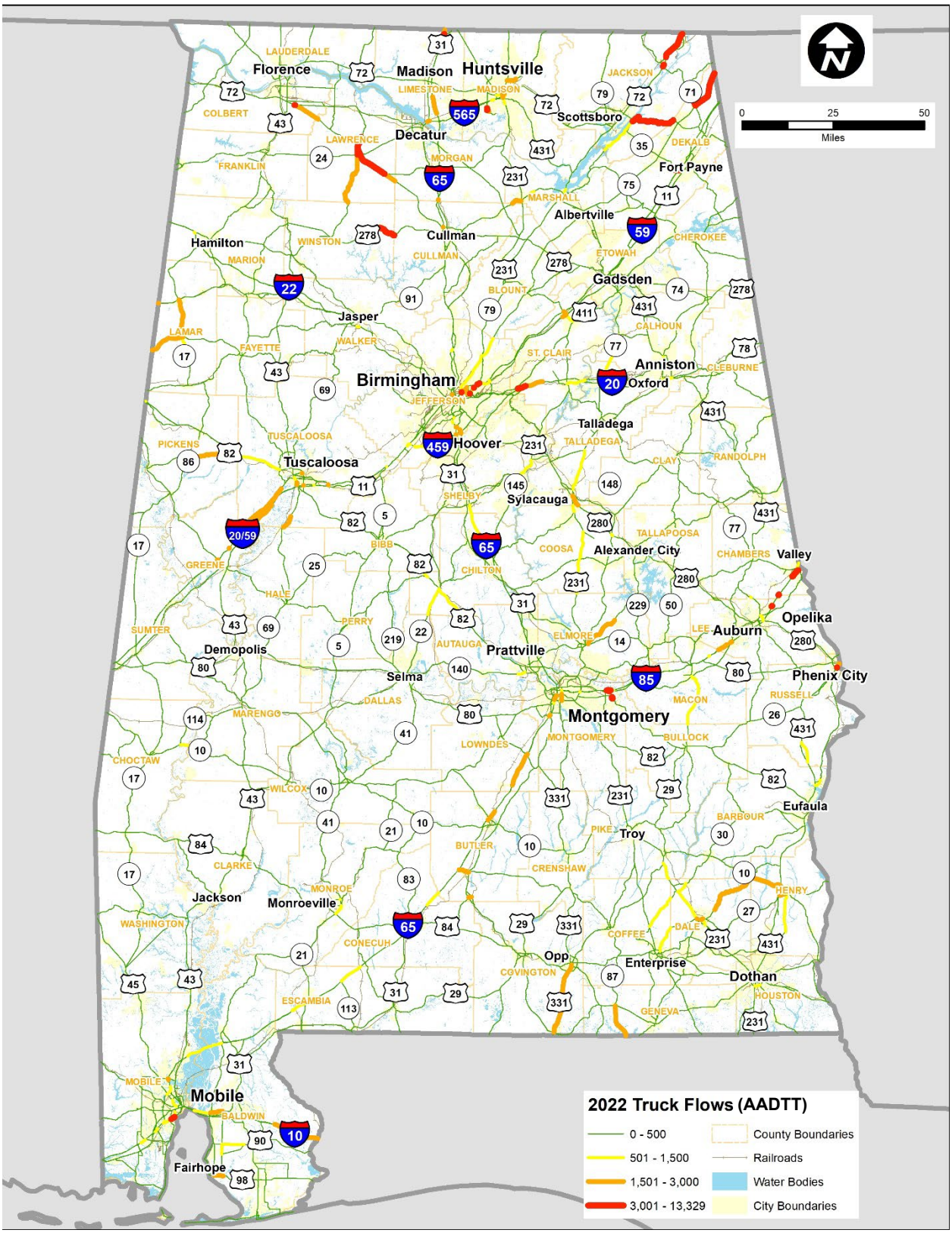

Figure 40. Existing Commodity Flows by Truck (AADTT) (2022)

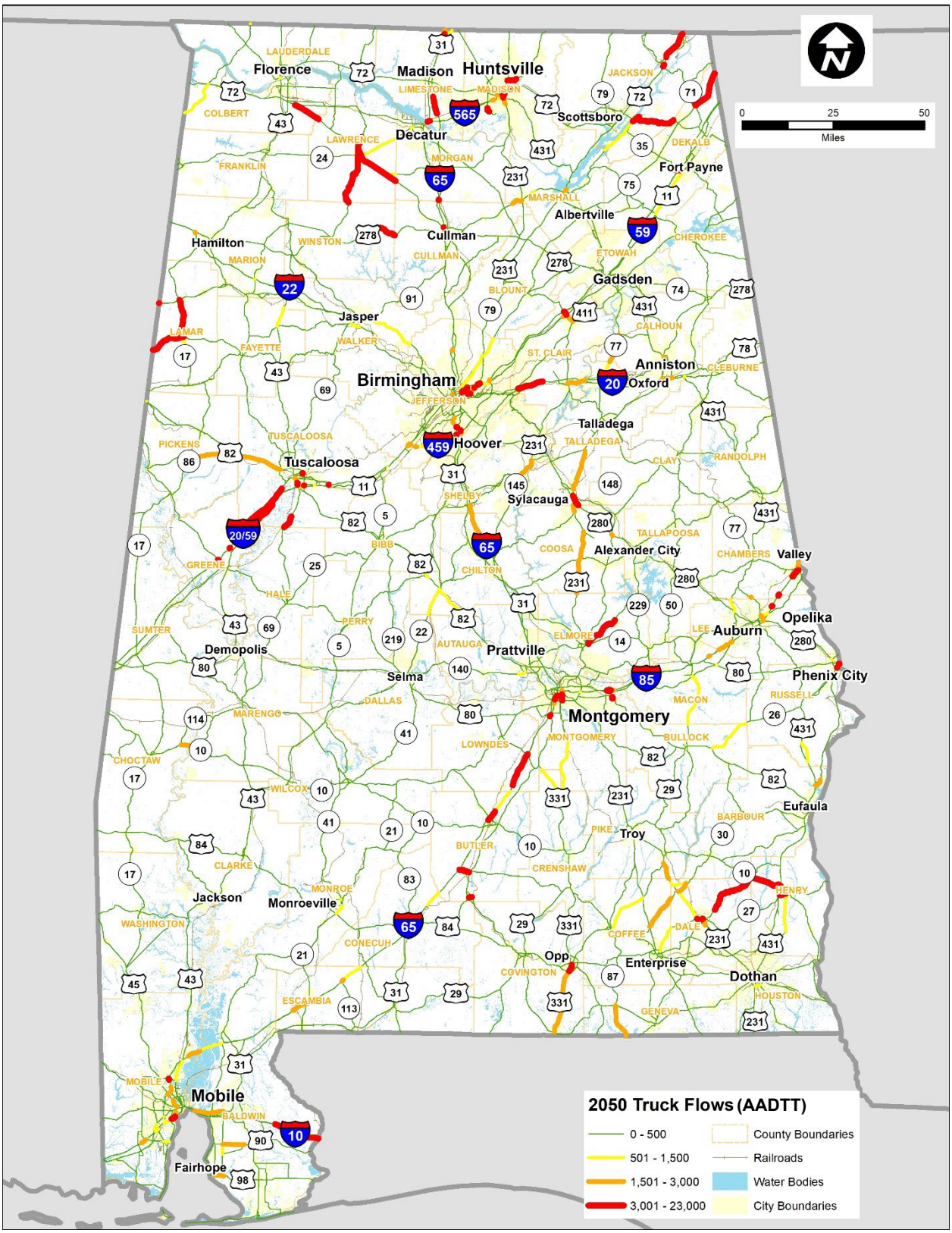

Figure 41. Projected Commodity Flows by Truck (AADTT) (2050)

5.2 Existing and Projected Bottlenecks

Existing and projected bottlenecks are another major consideration in the development of an overall freight investment plan. It is important to note that in many cases the bottlenecks result from general automobile traffic congestion rather than directly from freight traffic. Nevertheless, corridor congestion is a challenge to freight mobility regardless of the cause.

Existing bottlenecks have been identified through a review of the ALDOT Mid-Period Freight Bottleneck Report (2020); FHWA Freight Mobility Trend Tools and Database (2021); and the updated Statewide Travel Demand Model (2022).

ALDOT Mid-Period Freight Bottleneck Report (2020)

The ALDOT Mid-Period Freight Bottleneck Report (2020) identified numerous bottlenecks as of 2018. These are shown in Figure 42.

The report identifies bottlenecks based on a combination of the volume to capacity ratio and the percentage of truck traffic compared to regular traffic. It is not explicitly stated that both conditions must be met for a stretch of road to qualify as a bottleneck, but it is implied.

Table 15. Bottleneck Criteria from ALDOT Mid-Period Bottleneck Report (2020)

Volume to Capacity (V/C) Ratio	Percent Trucks
V/C > 1.00	5%
V/C > 0.85	10%
V/C > 0.70	15%

Several of the bottlenecks are concentrated along Interstates 65, 59, 20, and 85, and Alabama Route 38.

It is worth noting that the Mid-Period Freight Bottleneck Report also identified bottleneck locations that had near-term improvements scheduled as of 2020. There is an opportunity to check on the status of the improvements and note any contributions toward reducing the bottleneck severity. These bottlenecks adjacent to near-term improvements as of 2018 are shown in Table 16.

Table 16. 2018 Bottleneck Locations with Scheduled Near-Term Improvements (ALDOT Mid-Period Freight Bottleneck Report)

Route	County	Project Type
Alabama Route 3	Shelby	Capacity
Alabama Route 4	Calhoun	Capacity
Alabama Route 6	Montgomery	Bridge
Alabama Route 7	Tuscaloosa	Bridge
Alabama Route 16	Mobile/Baldwin	Bridge
Alabama Route 69	Tuscaloosa	Capacity
Alabama Route 150	Jefferson	Bridge and Capacity
Alabama Route 157	Cullman	Pavement
Alabama Route 210	Houston	Capacity
Alabama Route 271	Montgomery	Capacity
Interstate 20	St. Clair/Talladega	Bridge
Interstate 59	Tuscaloosa	Pavement
Interstate 59	Jefferson	Pavement
Interstate 565	Limestone	Pavement

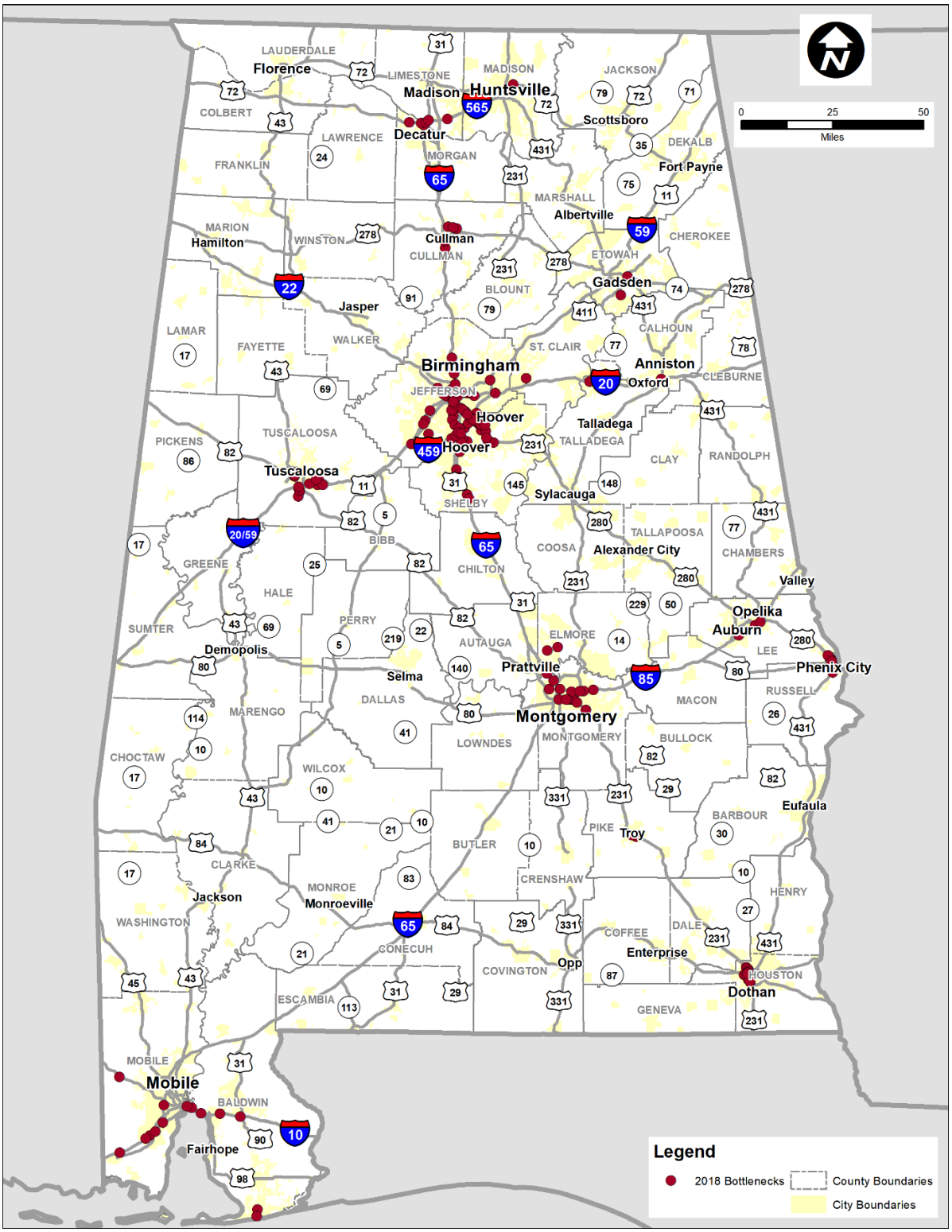

Figure 42. 2018 Bottlenecks from ALDOT Mid-Period Bottleneck Report

FHWA Freight Mobility Trends Tool and Database

The FHWA Freight Mobility Trends Tool and Database allows for the ranking of freight bottlenecks by several mobility indicators. [60] These indicators help to identify where mobility issues are occurring in Alabama and identify areas that may need to be addressed or prioritized over others.

As shown in Figure 43, one of the indicators included in the FHWA Freight Mobility Trends Tool is truck volumes. The truck volumes show the highest number of trucks along the I-20 corridor east of Birmingham. The second highest volume corridor is I-65 primarily north of Huntsville, but also in the Montgomery metropolitan area. In addition, a large amount of truck volume can be seen on I-10 through Mobile. Other high-volume roadways throughout the state include I-59 northeast of Huntsville, I-20/I-59 southwest of Huntsville through Tuscaloosa, I-85 east of Montgomery, and I-65 south of Montgomery. Moderate volumes of 1,000 to 2,500 trucks per day can be found at other locations throughout the state.

Figure 44 presents the Travel Time Index (TTI) as found in the Freight Mobility Trends Tool. Travel Time Index is an indicator that compares the peak period mean travel time to the free flow travel time. This indicates the additional time required to make a trip along a roadway segment. The locations with the highest TTI generally experience slower speeds, reflecting travel time delay. Most of the segments with the highest TTI are in the major metropolitan areas such as Huntsville, Birmingham, Montgomery, and Mobile. There is also significant congestion in and around several other locations such as Auburn, Dothan, Tuscaloosa, Monroeville, Gadsden, and Anniston. Also of note are moderate TTI along additional corridors outside the major metropolitan areas, including US 43, US 278, US 231, US 431, US 72, US 80, US 31, and US 84.

Figure 45 presents the Truck Delay per Mile found in the Freight Mobility Trends Tool. This indicator identifies the truck hours of delay per mile and captures the degree of congestion weighted by the magnitude of truck volume. It is calculated as the extra travel time over normal conditions multiplied by the number of people experiencing the delay, divided by the roadway segment length. This enables a normalized comparison between different roadway segments. This indicator is the primary attribute used to identify roadways with mobility issues (bottlenecks) by the Freight Mobility Trends Tool. The results of this analysis validate the TTI findings shown in Figure 44. As expected, the Truck Delay/Mile is greatest in major metropolitan areas in the state. The largest concentration of bottlenecks can be seen in Birmingham and Huntsville, with Montgomery and Mobile following closely behind. There are also several bottlenecks identified in Tuscaloosa and Dothan. Other areas where less severe bottlenecks include Gadsden, Florence, Decatur, Anniston, and Auburn. The top 25 freight bottlenecks enumerated by truck delay per mile are shown in Figure 46 and Table 17. As shown, most of the top 25 bottlenecks are primarily in and around the Birmingham metropolitan area, however, the number one bottleneck identified is in Mobile along I-10. Several other communities also have bottlenecks identified in the top 25, such as Montgomery, Dothan, Jasper, Gadsden, Tuscaloosa, and Cullman.

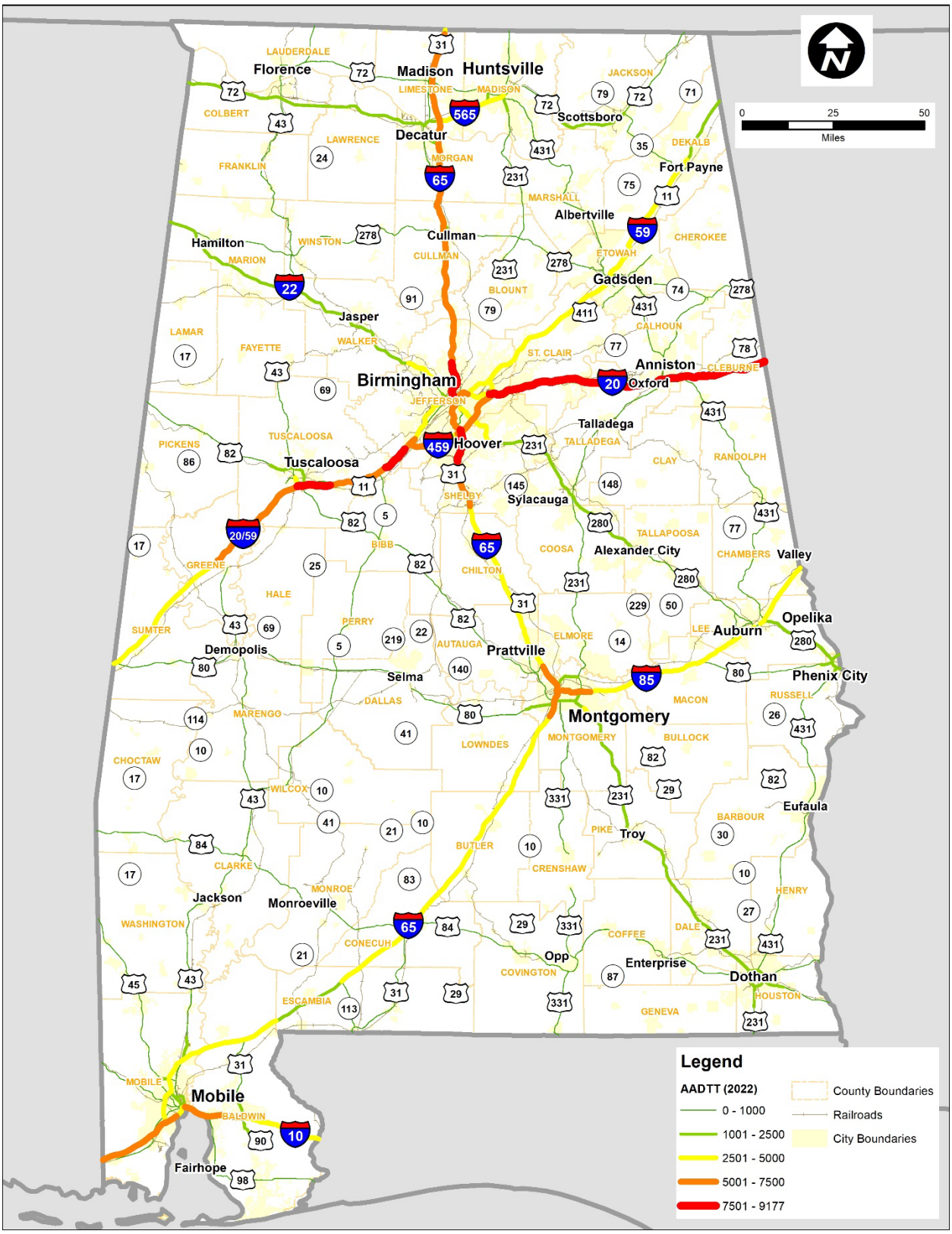

Figure 43. FHWA Truck Volumes (2022)

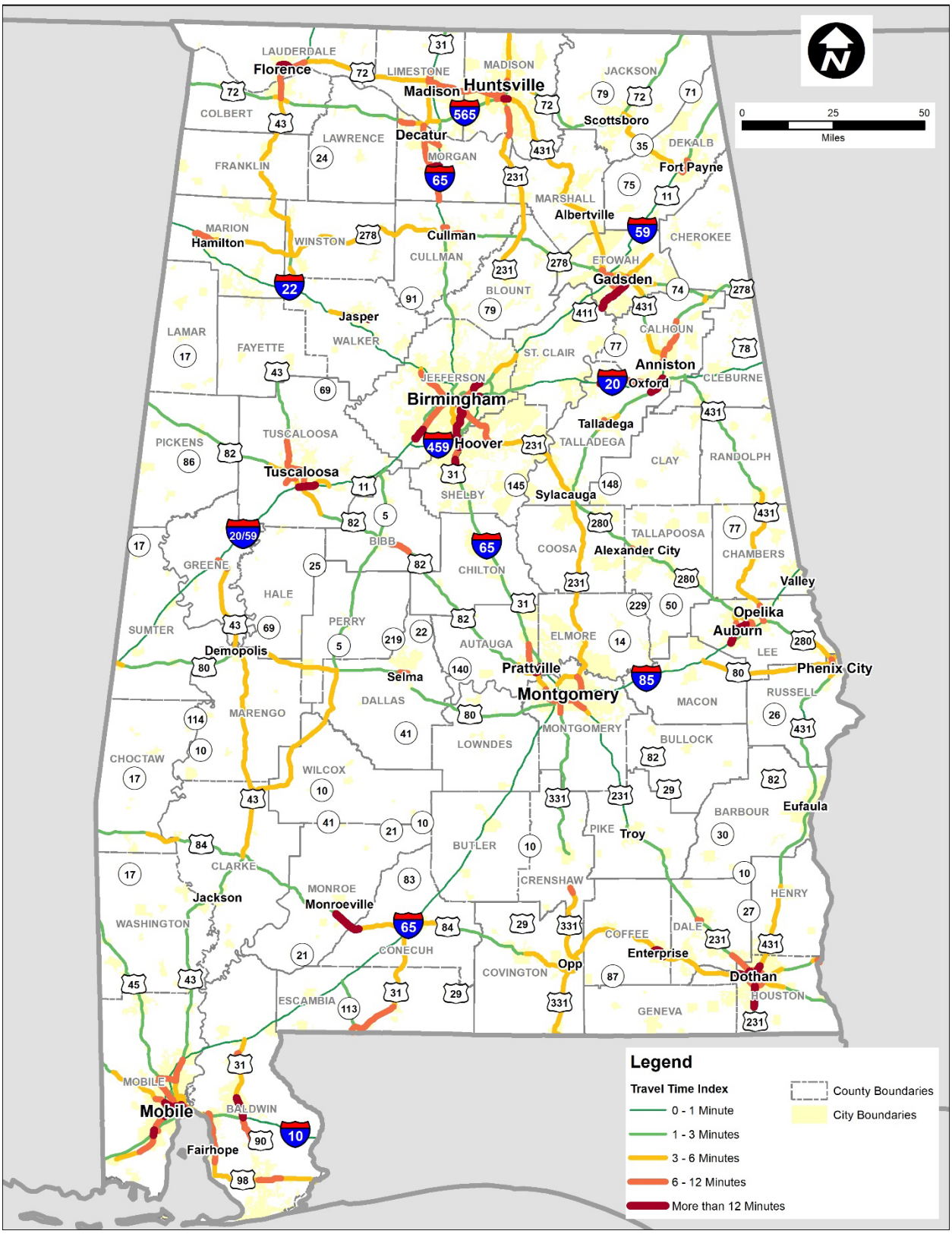

Figure 44. FHWA Travel Time Index (2022)

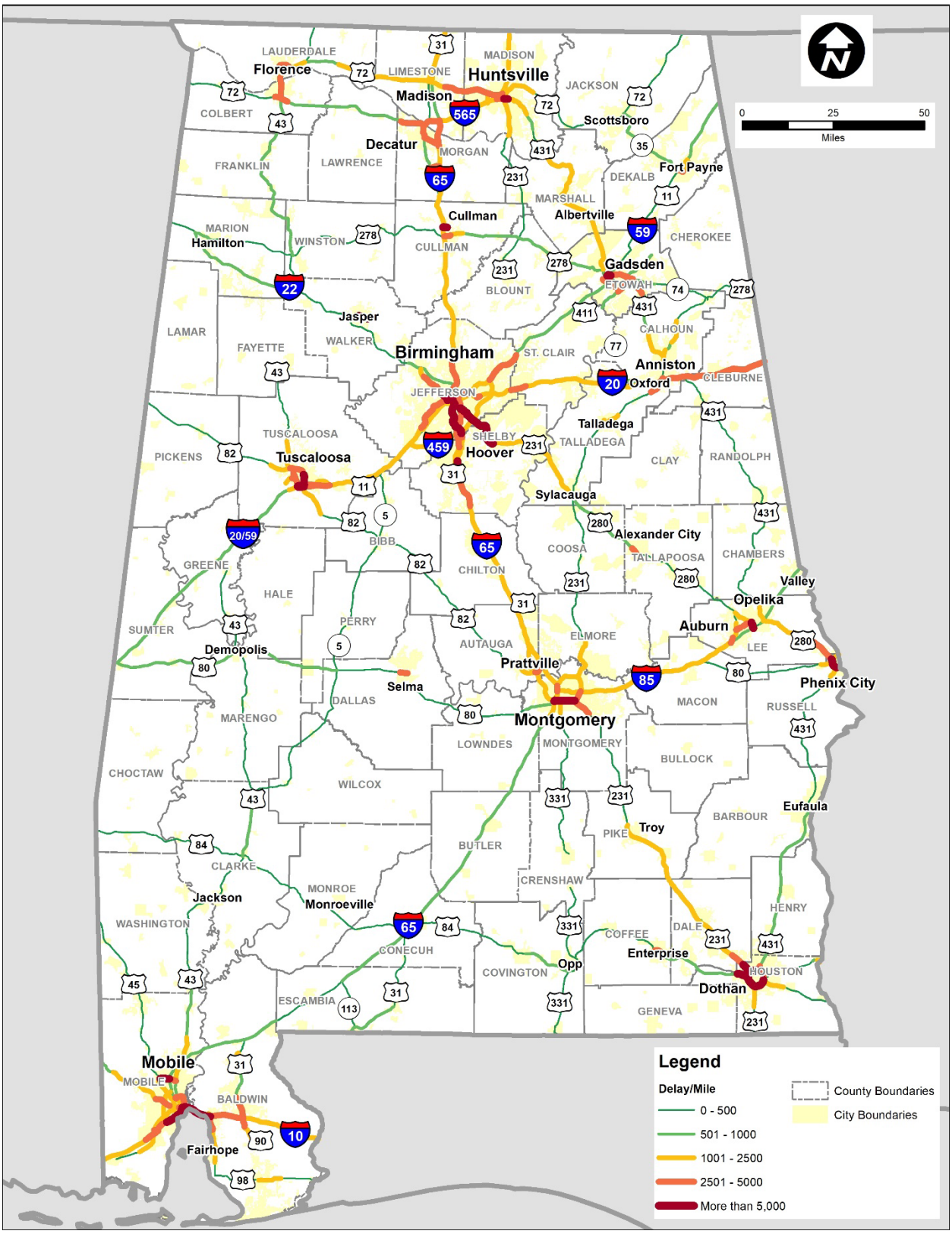

Figure 45. FHWA Truck Delay per Mile (2022)

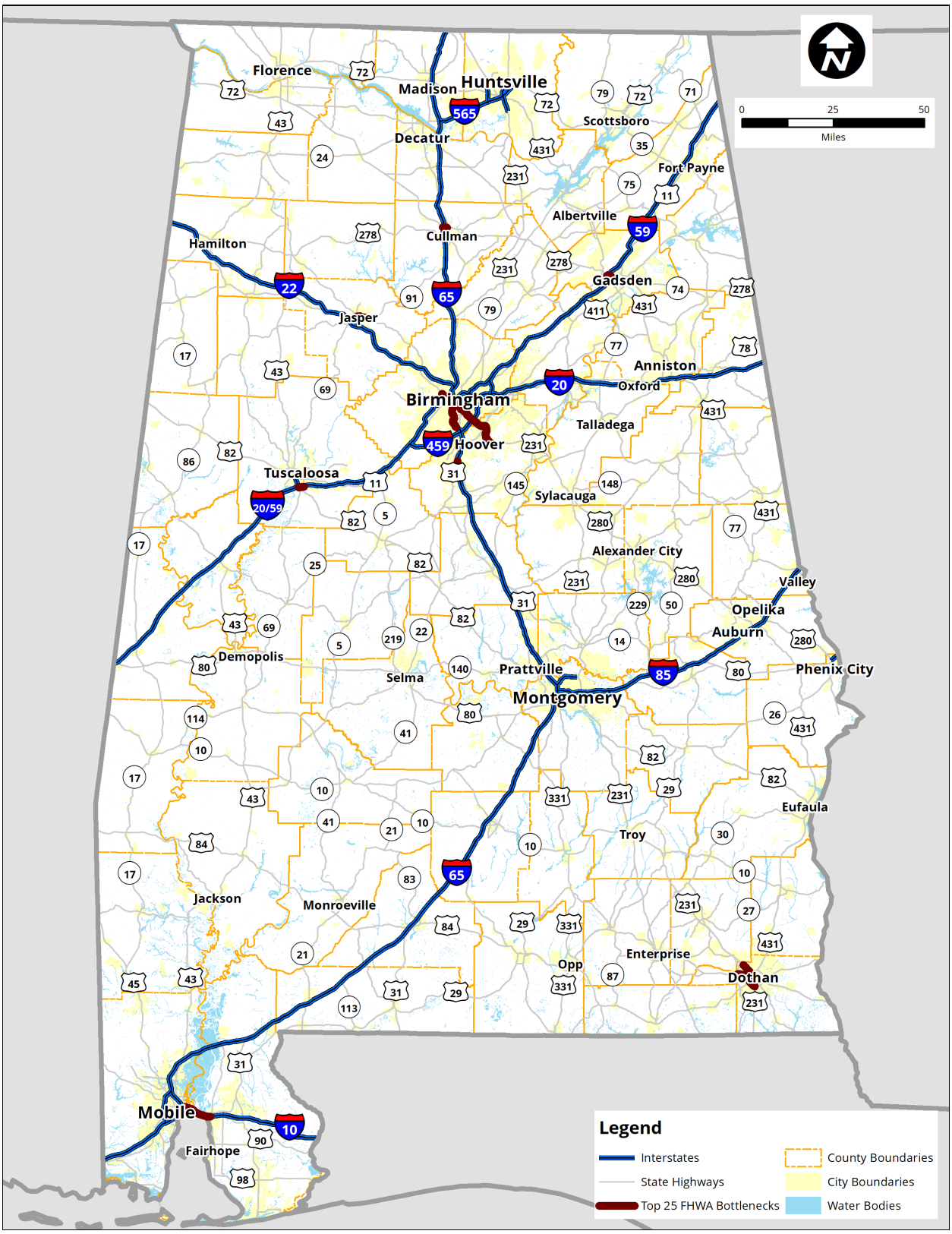

Figure 46. FHWA Top 25 Bottlenecks Based on Delay/Mile (2022)

Table 17. Top 25 Freight Bottlenecks based on Truck Delay/Mile in Alabama (FHWA)

Rank	Urban Area	Road	Beginning Intersection	Ending Intersection	Delay/Mile
1	N/A	I-10	US-98	Old Spanish Trail	8,743
2	Birmingham	I-65	1st Ave North	US-31	7,909
3	Birmingham	I-65	12th CT N	1st Ave N	7,494
4	Birmingham	I-65	Oxmoor Road	Lakeshore Pky	7,241
5	Birmingham	I-65	Lakeshore Pky	Montgomery Hwy	6,137
6	Birmingham	I-65	County Rd 52	1 St S	6,076
7	Mobile	I-10	Old Spanish Trail	I-65	5,603
8	Birmingham	I-65	Montgomery Hwy	John M Harbert III Fwy	5,564
9	Tuscaloosa	I-20/I-59	I-359	McFarland Blvd E	5,154
10	N/A	I-10	US-98	Old Spanish Trail	4,843
11	Birmingham	I-20/I-59	I-20/I-59 Interchange	US-31	4,813
12	Birmingham	I-59	Liles Ln	Chalkville Rd	4,511
13	Birmingham	I-65	I-459/I-65 Interchange		4,436
14	Tuscaloosa	I-20/I-59	Skyland Blvd E	McFarland Blvd E	4,250
15	Birmingham	I-65	Decatur Hwy	Oxmor Road	3,905
16	Gadsden	AL-77	3rd St W/I-11	Steele Station Rd	3,893
17	Tuscaloosa	AL-13	Fosters Ferry Road	University Blvd	3,871
18	Tuscaloosa	I-20/I-59	McFarland Blvd	Skyland Blvd	3,575
19	Birmingham	I-65	1 St S	16th Ave	3,517
20	Birmingham	I-65	16th Ave	1 St S	3,501
21	Birmingham	I-20	Dawson Street	Kelley Creek Rd	3,491
22	Tuscaloosa	I-359	15th Street	Skyland Blvd	3,328
23	Mobile	US-98	I-65	Shelton Beach Rd	3,208
24	Mobile	I-10	Theodore Dawes Rd	Government Blvd	3,182
25	Gadsden	AL-77	Steele Station Rd	3rd St SW	3,096

* Truck hours of delay per mile captures the degree of congestion weighted by the magnitude of truck volume. It is calculated as the extra travel time over normal conditions multiplied by the number of travelers, then divided by the roadway segment length. This enables a fair comparison between different roadway segments.

Alabama Statewide Travel Demand Model

Freight bottlenecks have also been derived based on the updated Alabama Statewide Travel Demand Model. For this analysis, a freight bottleneck is defined based on the roadway's volume to capacity (V/C) ratio and the percentage of trucks (or heavy vehicles) that attempt to utilize the roadway. Including both factors ensures the two most prevalent causes of freight bottlenecks are captured. One situation occurs when the large number of passenger cars slows roadway operating speeds, thereby causing freight to be likewise slowed simply by being present in the traffic stream. The other situation directly relates to the large number of trucks on the roadway. This plan defines freight bottlenecks as locations that meet both the V/C ratio and percent trucks criteria at the threshold values identified in Table 18.

Table 18. Freight Bottleneck Criteria Thresholds

Volume-to-Capacity Ratio	Percent Trucks
V/C > 1.00	5%
V/C > 0.85	10%
V/C > 0.70	15%

The roadway system used included all roadways within Alabama with a functional classification between 1 and 6, inclusively. Functional classifications are designated as follows: 1 for interstates, 2 for principal arterials (other freeways and expressways), 3 for principal arterials (other), 4 for minor arterials, 5 for major collectors, and 6 for minor collectors.

For 2022, there are a total of 192.4 miles of freight bottlenecks, including 116.4 miles on the Interstate system and 76 miles on the highway system. Most of the bottlenecks are concentrated in the Birmingham area, along major interstates such as I-65, I-59, I-20, and I-459, and major highways such as US 78 and US 280. There are also some bottlenecks on interstates and highways between Prattville and Montgomery; in and around Mobile, Tuscaloosa, and Huntsville; and in smaller cities such as Phenix City, Dothan, Anniston, Gadsden, and Decatur. These are displayed in Table 19 and Figure 47.

For 2050, the freight bottlenecks were determined by applying a growth factor to the passenger cars from the 2022 traffic counts and using the trucks from the disaggregation of the FAF5 database for 2050. The growth factor is 1 percent for all roadways. The bottleneck locations are shown in the following table and map. In 2050, there is a projected total of 724.8 miles of freight bottlenecks, including 391.7 miles on the interstate system and 333.1 miles on the highway system. This represents a nearly three-fold increase in freight bottleneck mileage between 2022 and 2050. The freight bottlenecks are generally concentrated in the same areas as in 2022, but are more

widespread, extending further along interstates and highways outside of cities. This is particularly the case around Birmingham, Montgomery, and Mobile. There are also several bottlenecks along interstates in less urbanized parts of Alabama, including I-65 between Decatur and Birmingham, I-20 east of Birmingham, and on I-85 east of Montgomery and in the Auburn/Opelika area. Freight bottlenecks have also emerged and expanded in more rural parts of Alabama, including Dothan, Phenix City, Troy, Florence, Albertville, and Scottsville. These are shown in Table 20 and Figure 48.

For the purposes of the Statewide Freight Plan Update, the bottlenecks as identified from the Statewide Travel Demand Model will be considered the “official” bottlenecks for this planning effort, including subsequent analyses.

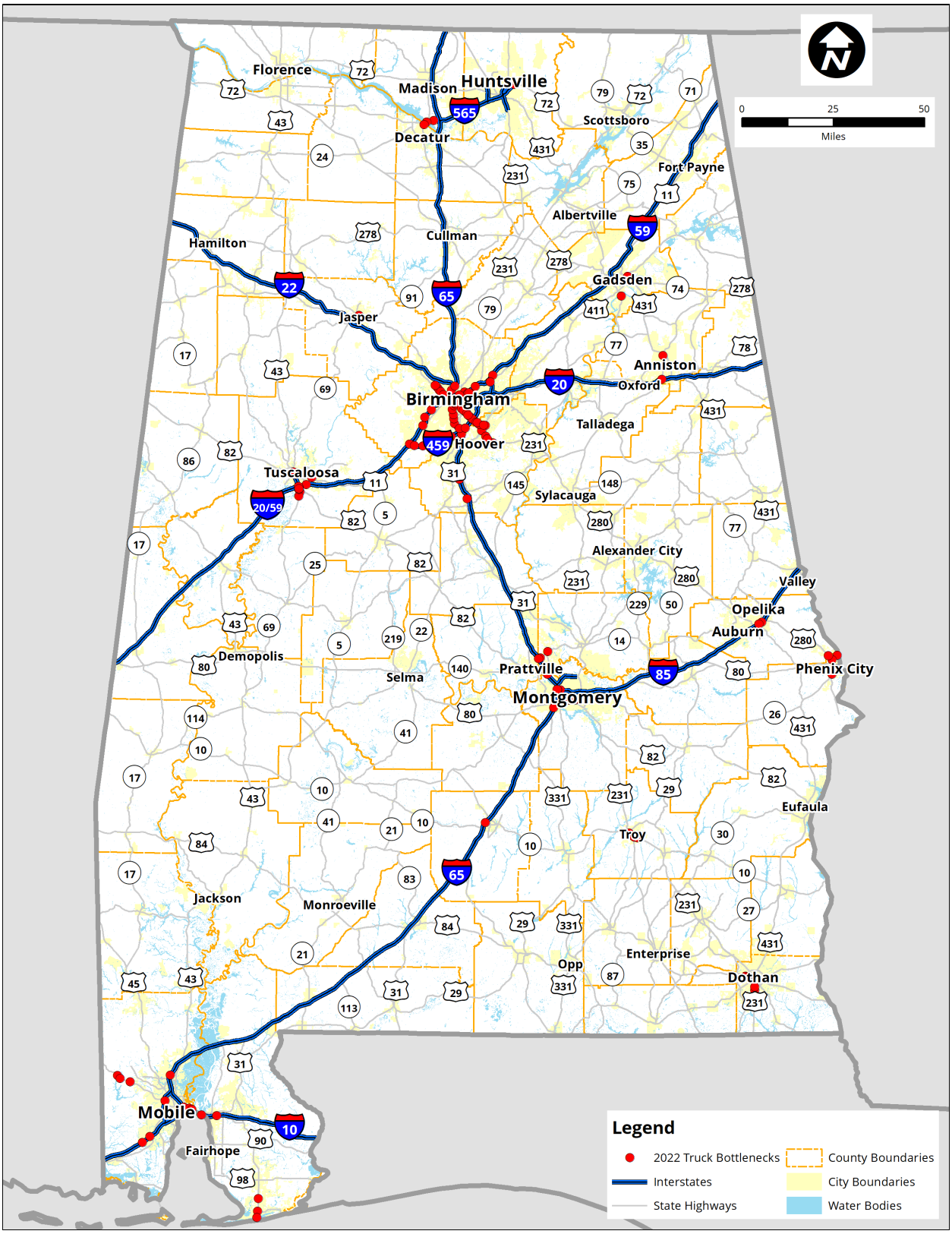

Figure 47. 2022 Freight Bottlenecks

Table 19. 2022 Freight Bottleneck Locations

Route	County	Urban Area	Begin Milepost	End Milepost
AL 1	Houston	Dothan	11.9	13.3
AL 1	Russell	Phenix City	109.2	116.7
AL 1	Calhoun	Anniston	234.2	235.1
AL 1	Etowah	Gadsden	260.3	260.6
AL 2	Madison	Huntsville	101.4	102.5
AL 3	Shelby	Birmingham	242.3	244.6
AL 3	Morgan/Limestone	Decatur	357.2	359.2
AL 5	Jefferson	Birmingham	134.4	140.1
AL 5	Walker		170.9	172.0
AL 6	Montgomery	Montgomery	157.9	161.8
AL 8	Montgomery	Montgomery	136.7	137.1
AL 8	Russell	Phenix City	215.6	216.8
AL 10	Pike		168.1	172.3
AL 12	Houston	Dothan	207.7	208.9
AL 13	Tuscaloosa	Tuscaloosa	195.2	196.2
AL 14	Elmore	Montgomery	159.4	163.1
AL 20	Limestone		71.2	74.1
AL 21	Calhoun	Anniston	250.8	250.9
AL 38	Jefferson	Birmingham	0	15.2
AL 42	Mobile	Mobile	4.7	10.6
AL 59	Baldwin		0	5.9
AL 69	Tuscaloosa	Tuscaloosa	138.8	142.9
AL 77	Etowah	Gadsden	100.4	101.8
AL 119	Shelby	Birmingham	25.6	27.9
AL 215	Tuscaloosa	Tuscaloosa	9.8	10.1
IN 10	Mobile	Mobile	10.6	15.7
IN 10	Baldwin/Mobile	Eastern Shore/Mobile	26.5	38.8
IN 20	Jefferson	Birmingham	129.8	131.9
IN 59	Tuscaloosa	Tuscaloosa	72.9	75.9
IN 59	Jefferson	Birmingham	111.8	140.6
IN 65	Mobile	Mobile	5.8	8.4
IN 65	Mobile	Mobile	13.0	15.1
IN 65	Butler		127.8	130.2
IN 65	Montgomery	Montgomery	163.8	167.1
IN 65	Montgomery	Montgomery	175.5	178.6
IN 65	Autauga	Montgomery	181.3	181.7
IN 65	Jefferson	Birmingham	233.9	265.5
IN 85	Montgomery	Montgomery	0	1.6

Route	County	Urban Area	Begin Milepost	End Milepost
IN 85	Lee	Auburn	58.9	62.4
IN 359	Tuscaloosa	Tuscaloosa	0	0.4
IN 459	Jefferson	Birmingham	0	6.8
IN 459	Jefferson	Birmingham	11.1	17.7
IN 459	Jefferson	Birmingham	32.7	33.4

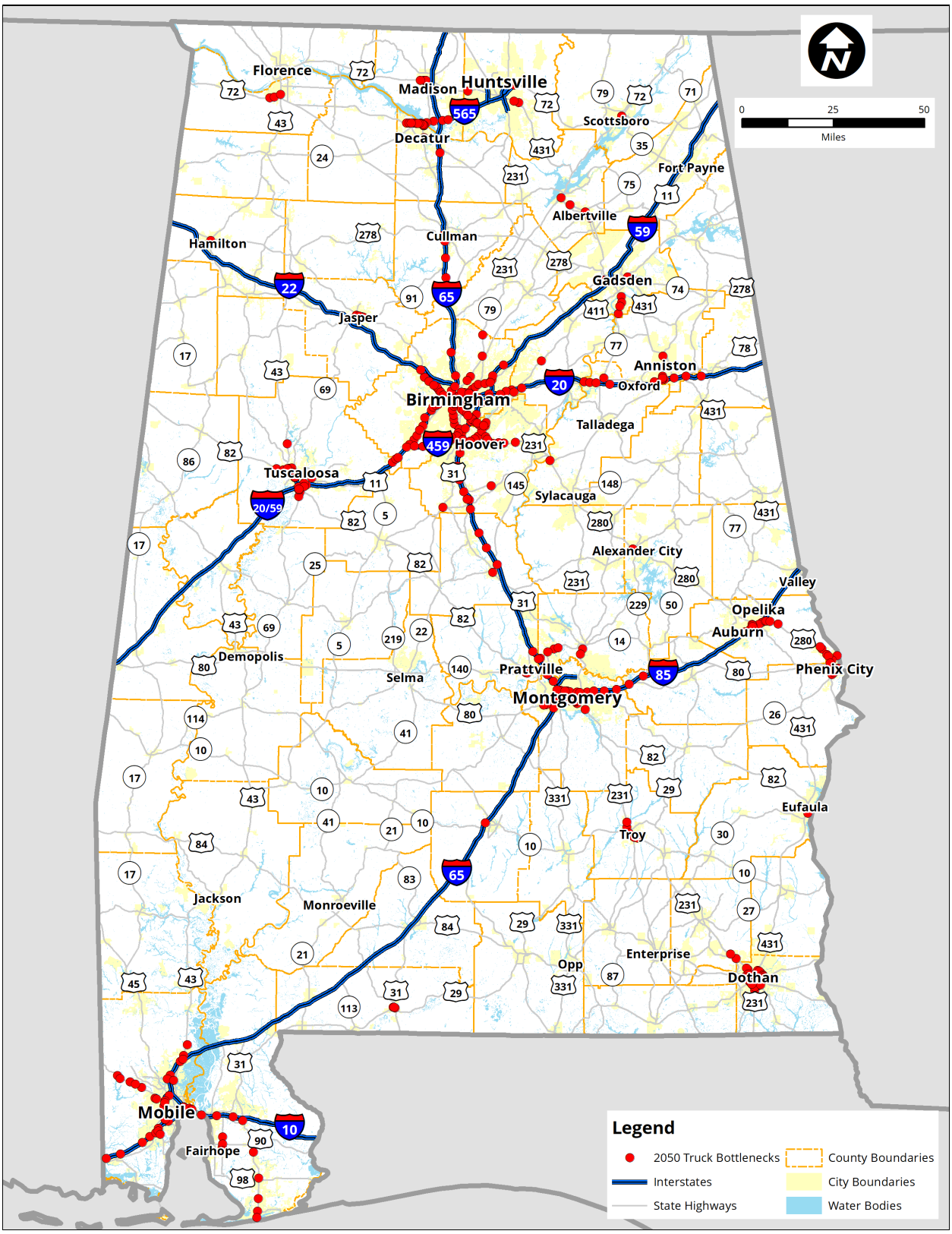

Figure 48. 2050 Freight Bottlenecks

Table 20. 2050 Freight Bottleneck Locations

Route	County	Urban Area	Begin Milepost	End Milepost
AL 1	Houston	Dothan	11.8	13.3
AL 1	Barbour	-	65.0	66.1
AL 1	Russell/Lee	Phenix City/Opelika	109.2	137.3
AL 1	Calhoun	Anniston	228.0	235.1
AL 1	Etowah/Marshall	Gadsden	258.5	295.2
AL 1	Madison	Huntsville	328.6	330.9
AL 2	Colbert	Muscle Shoals	22.8	27.4
AL 2	Limestone	-	73.0	75.2
AL 2	Madison	Huntsville	87.0	88.1
AL 2	Madison	Huntsville	101.3	102.6
AL 2	Jackson	-	136.6	138.2
AL 3	Escambia	-	68.9	69.4
AL 3	Chilton	-	219.8	220.3
AL 3	Shelby	Birmingham	242.2	244.6
AL 3	Morgan	Decatur	357.1	359.2
AL 4	Calhoun	Anniston	162.3	162.7
AL 5	Walker	-	134.3	146.5
AL 5	Jefferson	Birmingham	168.8	172.4
AL 6	Tuscaloosa	Tuscaloosa	41.3	52.9
AL 6	Autauga	Montgomery	139.7	141.0
AL 6	Montgomery	Montgomery	156.9	167.3
AL 7	Tuscaloosa	Tuscaloosa	80.0	82.2
AL 7	Jefferson	Birmingham	147.6	148.6
AL 8	Montgomery	Montgomery	126.9	139.8
AL 8	Russell	Phenix City	212.8	216.8
AL 9	Elmore	Montgomery	119.4	123.5
AL 10	Pike	-	168.0	172.3
AL 12	Houston	Dothan	207.6	208.9
AL 13	Mobile	Mobile	10.5	15.8
AL 13	Tuscaloosa	Tuscaloosa	194.5	205.9
AL 14	Elmore	Montgomery	159.4	166.3
AL 15	Escambia	-	0	0.8
AL 17	Mobile	Mobile	3.8	4.4
AL 17	Marion	--	277.3	277.7
AL 20	Morgan	Decatur	62.4	74.1
AL 21	Calhoun	Anniston	250.7	251.3
AL 22	Tallapoosa	-	112.8	114.2
AL 25	Shelby	Birmingham	111.4	111.8

Route	County	Urban Area	Begin Milepost	End Milepost
AL 25	Jefferson	Birmingham	170.1	170.4
AL 25	St. Clair	Birmingham	181.9	183.0
AL 38	Jefferson/Shelby	Birmingham	0	18.9
AL38	Shelby	Birmingham	20.2	24.1
AL 38	Talladega	-	32.1	32.8
AL 38	Lee	Auburn	106.8	108.4
AL 38	Russell	Phenix City	137.0	137.5
AL42	Mobile	Mobile	4.6	19.8
AL 42	Mobile	Mobile	27.3	28.0
AL53	Houston	Dothan	24.4	29.9
AL 53	Dale	-	30.5	32.2
AL 53	Pike	-	77.0	80.6
AL 59	Baldwin	-	0	5.9
AL 59	Baldwin	-	10.9	12.0
AL 59	Baldwin	-	15.8	21.0
AL 59	Baldwin	-	27.8	29.4
AL 67	Morgan	Decatur	38.9	39.7
AL 69	Tuscaloosa	Tuscaloosa	138.7	142.9
AL 70	Shelby	Birmingham	6.5	7.1
AL 77	Talladega	-	77.0	79.0
AL 77	Etowah	Gadsden	95.1	108.9
AL 79	Jefferson	Birmingham	0	5.9
AL 79	Jefferson	Birmingham	17.4	18.7
AL 119	Shelby	Birmingham	18.3	29.2
AL 149	Jefferson	Birmingham	7.5	8.1
AL 150	Jefferson	Birmingham	8.5	11.8
AL 151	Jefferson	Birmingham	0	0.4
AL 158	Mobile	Mobile	6.0	9.3
AL 181	Baldwin	-	7.1	11.9
AL 193	Mobile	Mobile	24.2	25.8
AL 210	Houston	Dothan	0	13.8
AL 215	Tuscaloosa	Tuscaloosa	9.8	10.1
IN 10	Mobile/Baldwin	Mobile/Eastern Shore	0	44.3
IN 20	Jefferson	Birmingham	129.8	147.2
IN 20	St. Clair/Calhoun	Anniston	162.8	199.2
IN 59	Tuscaloosa	Tuscaloosa	72.9	75.9
IN 59	Tuscaloosa/ Jefferson	Tuscaloosa/ Birmingham	97.0	143.6
IN 65	Mobile	Mobile	0.5	19.4
IN 65	Butler	-	127.8	130.2

Route	County	Urban Area	Begin Milepost	End Milepost
IN 65	Montgomery	Montgomery	163.8	185.8
IN 65	Shelby/Jefferson/ Blount/Cullman/ Morgan	Birmingham	208.3	333.2
IN 85	Montgomery	Montgomery	0	26.2
IN 85	Lee	Auburn	55.0	62.4
IN 359	Tuscaloosa	Tuscaloosa	0	0.4
IN 459	Jefferson	Birmingham	0	33.4
IN 565	Limestone/Madison	Huntsville	0.8	9.7

5.3 Commercial Vehicle Parking Assessment

Commercial vehicle parking and its availability is essential to the safety and operations of Alabama's freight transportation system. FHWA's emphasis on providing safe truck parking dates back to 2012 with the passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21), which included Jason's Law, requiring a nationwide survey of truck parking facilities supported by state DOTs.[61] The IIJA reiterates this requirement with the inclusion of regulations on statewide freight plans – among which is a stipulation that state DOTs must conduct a commercial vehicle parking assessment as part of statewide freight plan updates.[62] This includes the following text from the IIJA (49 USC 70202):

As part of the development or updating, as applicable, of a State freight plan under this section, each State that receives funding under section 167 of title 23, in consultation with relevant State motor carrier safety personnel, shall conduct an assessment of-

> *(1) the capability of the State, together with the private sector in the State, to provide adequate parking facilities and rest facilities for commercial motor vehicles engaged in interstate transportation;*
>
> *(2) the volume of commercial motor vehicle traffic in the State; and*
>
> *(3) whether there exist any areas within the State with a shortage of adequate commercial motor vehicle parking facilities, including an analysis (economic or otherwise, as the State determines to be appropriate) of the underlying causes of such a shortage.*

This section of the Statewide Freight Plan includes a summary of key findings for both the existing year (2022) and future year (2032) analysis.

Commercial vehicle parking is in demand throughout Alabama. Commercial vehicle drivers must adhere to federal regulations regarding when they can and cannot drive. During a consecutive fourteen-hour period, eleven hours may consist of driving. Within those eleven hours, if an operator has been driving for eight consecutive hours, they must take a half-hour break before finishing the

remainder of the shift. Following each fourteen-hour shift, a driver is mandated to wait ten hours until they can begin a new shift. Due to these time limits, once a driver has reached the maximum amount of driving allowed, they must find a spot to park. Because there are limited commercial parking spaces in many areas, some rest areas and truck stops are reaching capacity by early evening. Consequently, an increasing number of drivers are parking in areas and spots that are unsafe, lacking in security, and, at many times, are illegal. Conversely, they may drive past their legal limits, potentially in a tired state, creating greater risk to themselves and other people on the roadway.

The State of Alabama, much like other states in the southeastern United States, has limited truck parking. To combat the lack of parking and staging locations where shortages exist, truck drivers are often found parking along highway and ramp shoulders, close to residential areas, along roadways where unallocated pavement exists, and in abandoned or underutilized properties.

This challenge is particularly more pronounced in larger metropolitan areas and near major freight terminals and facilities. These truck parking shortages sometimes lead to illegal parking and staging that put both drivers and other roadway users at risk.

Methodology

An assessment was conducted to understand supply and demand patterns of truck parking throughout the state and to identify needed investment in existing and planned public rest areas and welcome centers. This assessment also explores potential partnerships with private organizations and truck stop operators to make truck parking more readily available along the NHS as well as near freight generators and intermodal facilities. Truck parking and staging availability also ensures driver compliance with hours of service (HOS) regulations and prevents unsafe or unauthorized parking practices, such as parking along roadway or ramp shoulders.

The methodology utilized is based on guidance from the FHWA[63] as well as two case studies from peer state DOTs: the Kentucky Transportation Cabinet (KYTC)[64] and Oregon Department of Transportation (ODOT)[65] , which conducted statewide truck parking assessments in the past three years.

Truck Parking Facilities and Spaces

In order to identify truck parking supply, public rest area and welcome center facilities operated by ALDOT were considered, along with private truck parking facilities (such as truck stops and travel centers with truck parking) and highway amenities with available truck parking. Several resources were consulted, including the National Truck Stop Directory (2021)[66], Truck Stops and Services[67], and private company websites for chains such as Love's[68], TravelCenters of America[69], and Pilot/Flying J[70], among others. This information was further substantiated through an aerial survey to validate the data.

Figure 49 shows public rest areas and welcome centers by the number of truck parking spaces and Figure 50 shows the location of private truck parking facilities by the number of truck parking spaces.

Public rest stops and welcome centers are predominantly located along Alabama's Interstate facilities near state boundaries; however, there are a few locations along US highways or state routes such as along US 231 south of Dothan, US 331 south of Opp, and US 231 between Troy and Dothan. The rest area and welcome center with the highest number of truck parking spaces is located along I-10 eastbound near the Mississippi State line in Grand Bay. I-22 between the Mississippi state line and I-65 north of Birmingham has no public rest facilities nor public truck parking spaces.

Private truck parking spaces are located throughout the state both along and adjacent to Interstate and US highways and state routes. Clusters of private truck parking spaces are located to the west of Birmingham near the Port of Birmingham northwest of the I-20/59 and I-459 interchange as well as west of Mobile along I-10, east of Tuscaloosa along I-20/59, south of Cullman along I-65, and between Pell City and Lincoln along I-20. Areas where truck parking is minimal where freight facilities are present include, but are not limited to, Alexander City, Auburn/Opelika, Greenville, Guntersville, Huntsville, Madison Prattville, Phenix City, Sylacauga, and Troy.

Truck Parking Demand

The quantitative supply and demand analysis which follows shows where there is an existing or forecasted shortage and surplus of truck parking spaces throughout Alabama. This analysis is based upon the FHWA Truck Parking Methodology, which outlines a modeling framework to project truck parking demand based on truck volumes, length of the roadway segment being analyzed, and the posted speed limit of the roadway, as well as peak parking factors for long-haul and short-haul truck trips.

The truck parking demand model indicates that in 2022, most segments of the interstate have enough truck parking space to meet current demand. There are several segments, however, where truck parking demand is not being met. These are shown in Figure 51 and include:

- I-20 Eastbound between I-65 to US 98/Old Spanish Trail
- I-10 Westbound between US 98/Old Spanish Trail and I-65
- I-20/I-59 Eastbound/Northbound between US 43 (Eutaw) and I-359 (Tuscaloosa)
- I-20/I-59 Westbound/Southbound between SR 13 (Eldridge) and Industrial Pkwy (Jasper)
- I-22 Eastbound between Industrial Parkway (Jasper) and I-65
- I-22 Westbound between I-65 and Industrial Parkway (Jasper)
- I-459 Northbound between I-20/59 (Bessemer) and I-59 (Trussville)
- I-459 Southbound between I-59 (Trussville) and I-20/59 (Bessemer)

- I-59 Northbound between I-20 (Birmingham) and US 231 (Ashville), and SR 68 (Collinsville) and GA State Line
- I-59 Southbound between GA State Line and SR 68 (Collinsville), and US 231 (Ashville) and I-20 (Birmingham)
- I-65 Northbound between US 84 (Evergreen) and SR 10 (Greenville), US 82 (Prattville) and US 31 (Clanton), US 31 (Calera) and I-459 (Hoover), I-22 (Birmingham) and US 31 (Smoke Rise), and I-565 (Decatur) and TN State Line
- I-65 Southbound between US 31 (Smoke Rise) and I-22 (Birmingham), I-459 (Hoover) and US 31 (Calera), US 31 (Clanton) and US 82 (Prattville), and SR 10 (Greenville) and US 84 (Evergreen)
- I-85 Northbound between I-65 and SR 108 (Montgomery)
- I-85 Southbound between SR 108 (Montgomery) and I-65

The truck parking demand model indicates that in 2050, assuming no new truck parking spaces are built, truck parking will continue to be constrained along the segments identified for 2022. Truck parking demand along these segments will be higher due to anticipated increases in truck traffic by 2050. There is a minimum projected increase in truck parking demand of 55%, with some segments such as I-65 Northbound from US 43 (Creola) to US 84 (Evergreen) anticipating a doubling in truck parking demand. In addition to the aforementioned segments where truck parking demand is not being met in 2022, demand will not be met on the following additional segments in 2050 (shown in Figure 52):

- I-20 Eastbound between US 431 (Oxford) and GA State Line
- I-565 Northbound and Southbound between I-65 and US 72 (Huntsville)

The anticipated increase in truck traffic in the future underscores the need for greater access to truck parking to help facilitate the efficient movement of freight on the state's highways.

The ALDOT work program includes three projects that may help to expand truck parking in the state. These projects within state-owned facilities are located in areas or adjacent to areas identified as having truck parking needs.

- Rest areas on northbound and southbound I-65 near Greenville (project number 100075182)
- Welcome center rehabilitation along I-59 near Georgia state line (project number 100047076)
- Northbound and southbound rest area renovations along I-59 at Eutaw (project number 100049320)
- Northbound and southbound rest area renovations along I-59 at Brookwood (project number 100049318)

The state may also consider employing the following strategies to address truck parking needs:

- **Coordinate with ALDOT Region Offices and MPOs to pinpoint truck parking needs along specific corridors.** The Region Offices and MPOs have firsthand knowledge of truck parking needs in the state and can help to verify the corridors and more specific areas that have the greatest need for truck parking.
- **Coordinate with the Alabama Trucking Association to identify areas of the state that are in the greatest need of additional truck parking.** The Alabama Trucking Association has direct and regular communication with truck operators throughout the state and can help ALDOT identify corridors with the greatest parking needs from the private sector perspective.
- **Conduct a more detailed truck parking study utilizing truck driver surveys and GPS data.** This would provide more detailed origin and destination data for trucks to serve as inputs to the calculation of truck parking demand.
- **Install improved signage for truck parking.** ALDOT may consider installing new or enhanced signage in advance of private or public truck parking facilities. This low-cost solution can help to better disseminate information about truck parking facilities for drivers who are seeking spaces to park in order to meet hours of service requirements.
- **Work with ports and terminals to help identify temporary or permanent truck staging areas.** Trucks that are destined for intermodal facilities often have to wait for space to become available to unload goods or pick up freight. Truck staging areas provide spaces for trucks to wait , avoiding the need for trucks to park on highway ramps, parking lots, or other unauthorized locations.
- **Explore the use of Truck Parking Information Management Systems (TPIMS).** TPIMS utilize sensors at truck parking sites that convey real-time information to truck drivers about available parking, helping to optimize utilization of truck parking capacity. Several states have implemented or are exploring use of TPIMS.
- **Explore the use of public-private partnerships to expand truck parking facilities.** Some states have utilized state-owned property or constructed new truck parking adjacent to truck stops, allowing drivers to take advantage of the truck stop services and avoiding the needs to provide these amenities. There are also opportunities for the state to own the truck parking facility but contract with private companies for operation and maintenance of the facilities.
- **Identify new capital projects for truck parking or expand truck parking at rest areas, weigh stations & welcome centers.** As previously mentioned, ALDOT already has programmed projects to construct, rehabilitate, and renovate rest areas and welcome centers. As funding becomes available, ALDOT can look for opportunities to program additional projects to expand truck parking.

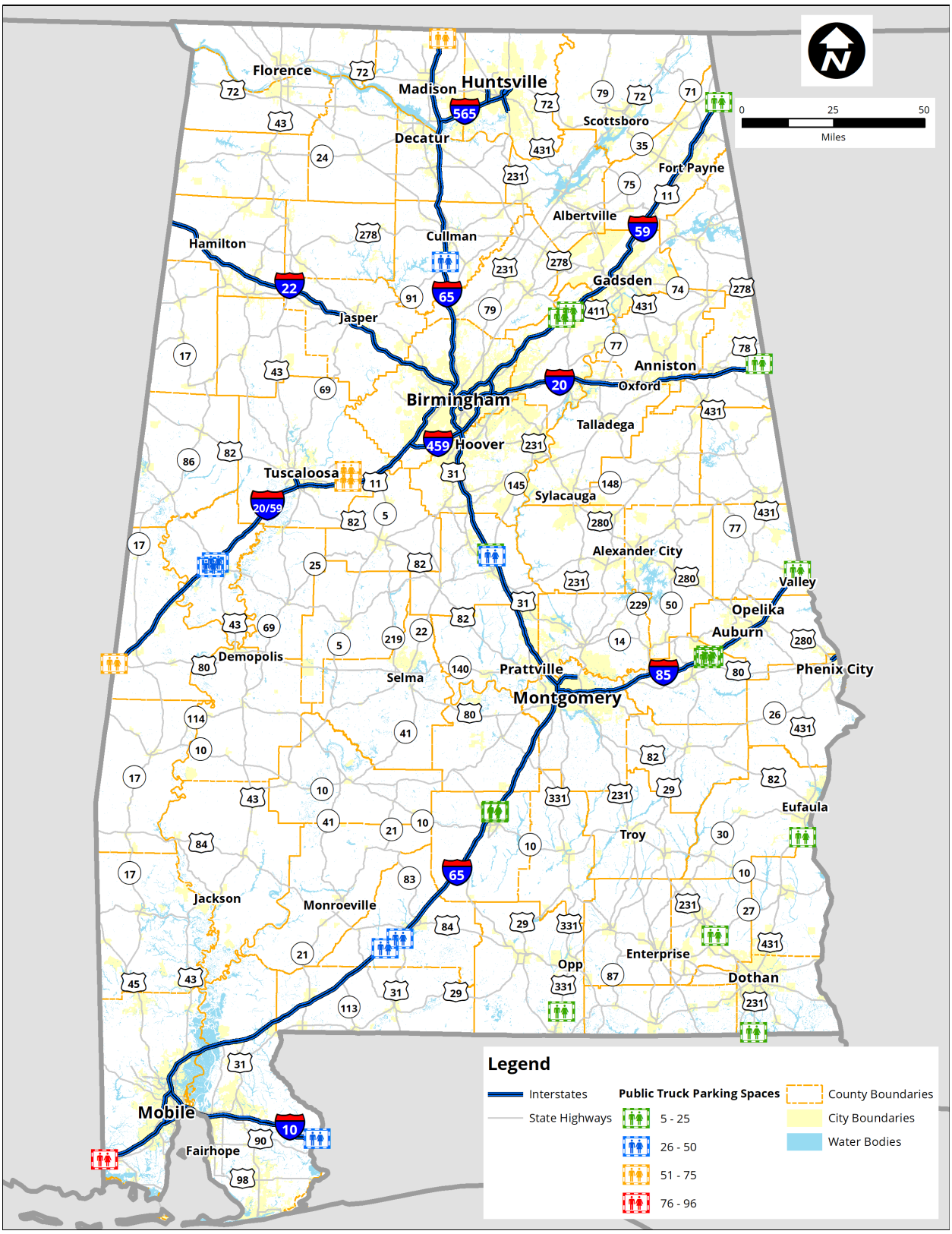

Figure 49. Public Truck Parking Facilities in Alabama

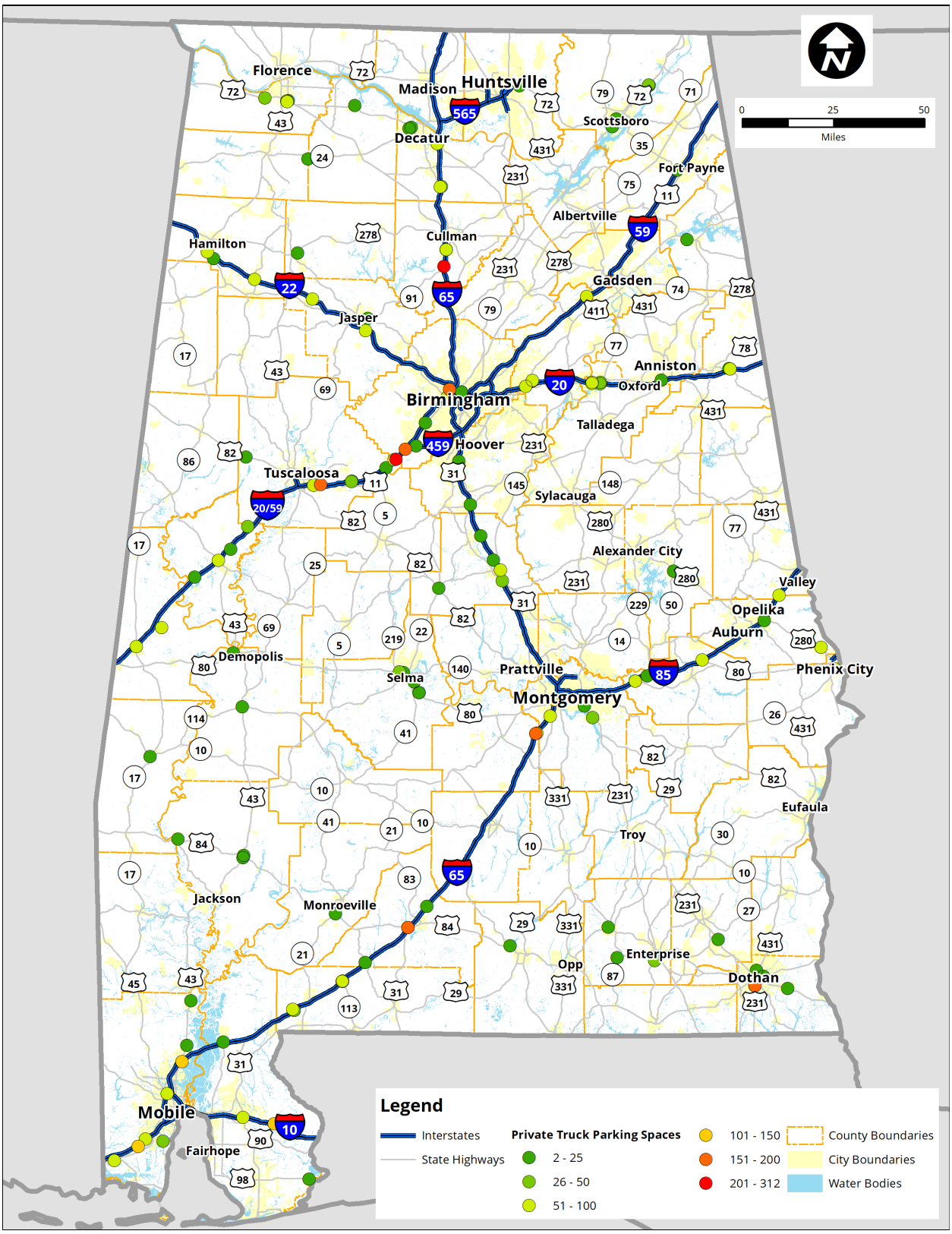

Figure 50. Private Truck Parking Facilities in Alabama

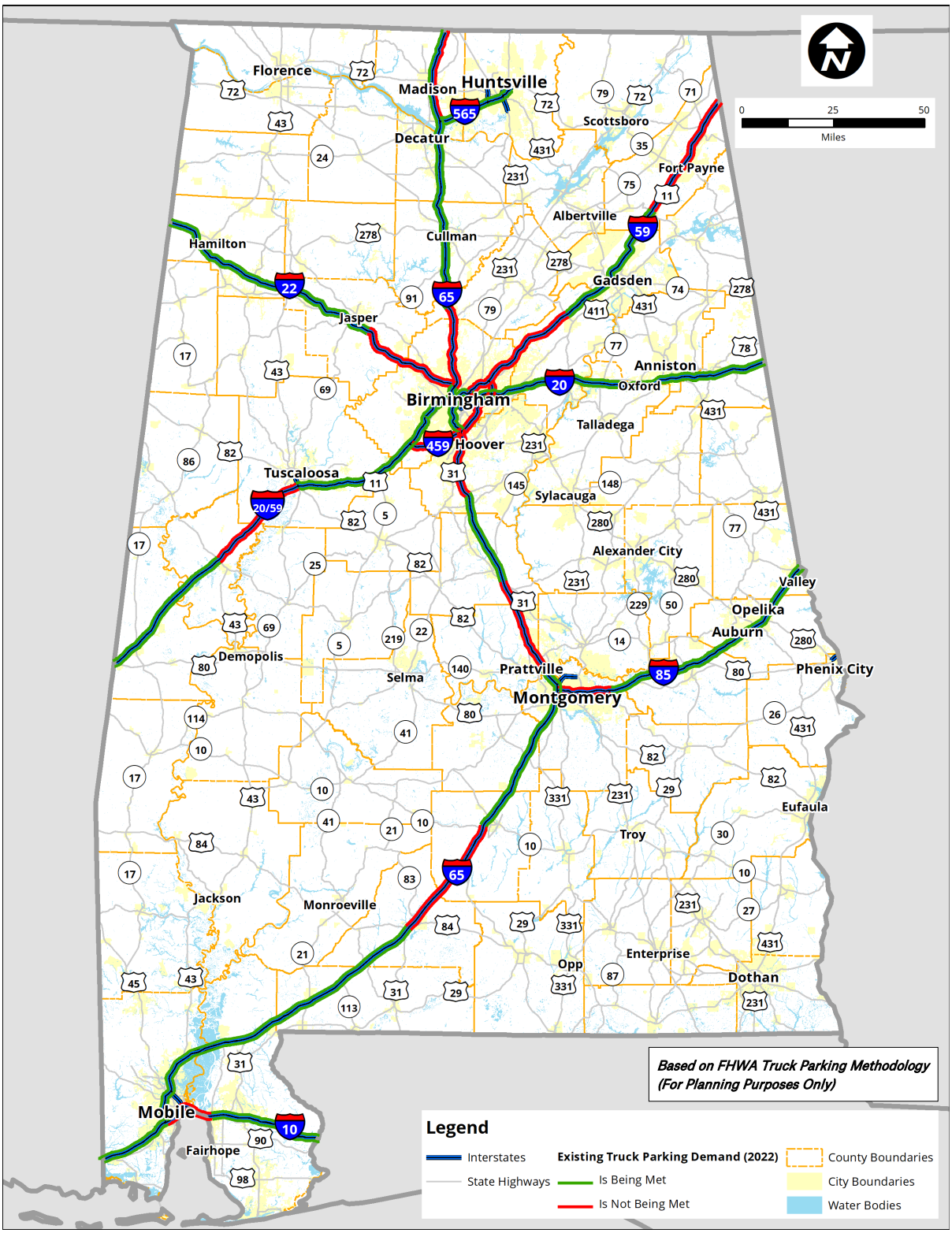

Figure 51. Existing Truck Parking Demand (2022)

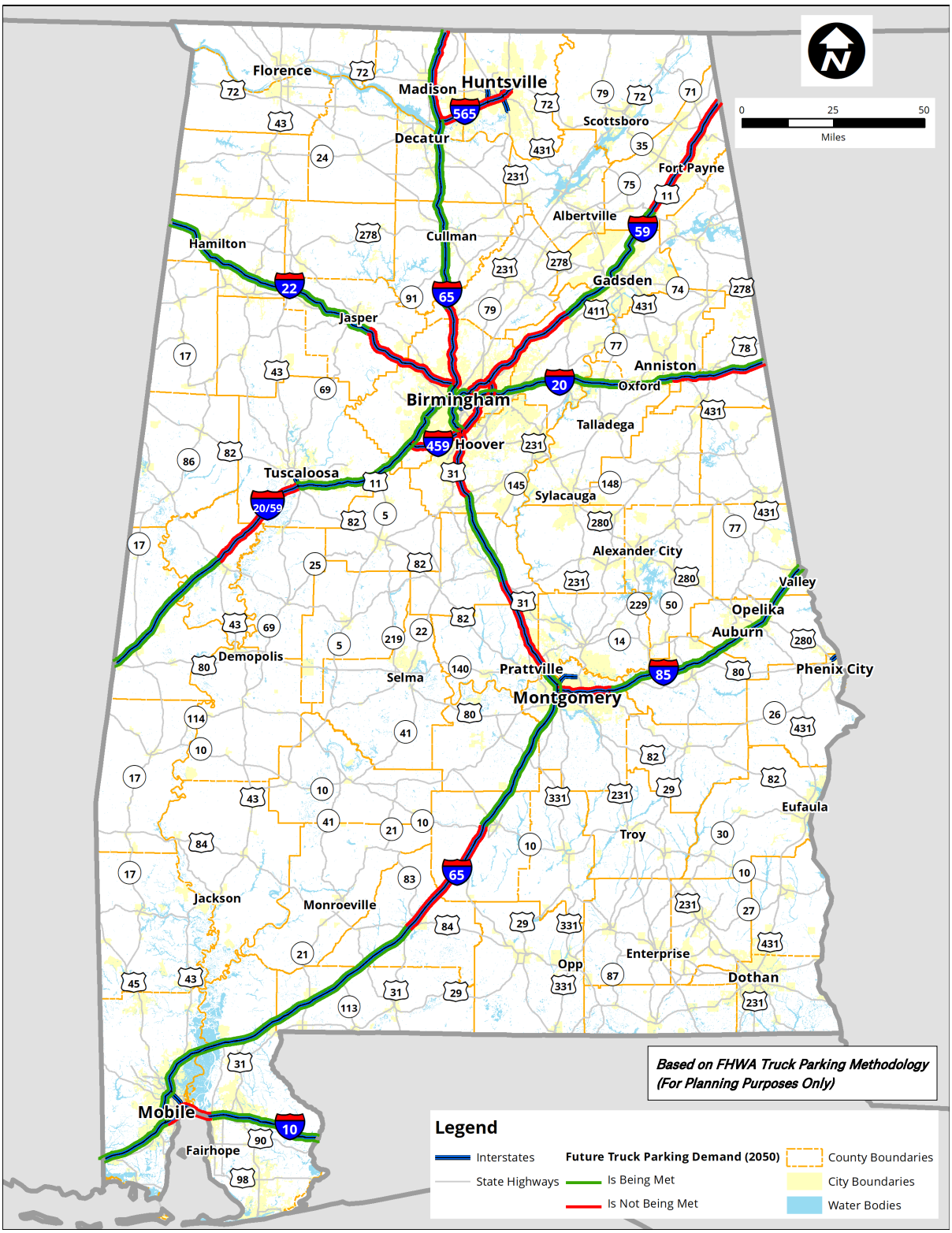

Figure 52. Future Truck Parking Demand (2050)

5.4 Transportation Resilience

Resilience strategies provide a network to support both public agencies and freight operators during disruptions in freight travel due to the unpredictability of nature (such as severe weather events, or the COVID-19 pandemic) and human-induced incidents. Traffic congestion, road or bridge failure, and natural disasters are examples of scenarios which underscore the need for resilience strategies to mitigate against complicated cascading effects. Freight routes can be particularly susceptible to such disruptions, creating detrimental impacts not only on the movement of goods but also the local and state economy. While many disruptions are difficult to predict or plan ahead for, it is crucial to plan for the inevitable to minimize disruption to the freight network and the movement of goods and services that Alabama relies on. This section summarizes resilience corridors and routes, potential system stressors, borrow pit sites, previous incidents, and potential corridors that may be significant to the freight network. It also provides a high-level overview of potential resilience strategies and tools for future resilience planning.

Primary Highways and Resilience Corridors

Alabama's roadway network has over 100,000 miles of roadways, including 10,940 miles of roadways managed by the state. The key interstates in Alabama are I-65, I-20, I-59, I-565, I-459, I-85, and I-10. These interstates serve as the primary roadways to move goods by truck into, out of, and around Alabama. A long-standing disruption on the interstate system would likely have a significant impact on the movement of goods in Alabama. Identifying parallel corridors for resilience purposes is the first step in planning for the unexpected. The ability to reroute traffic to these parallel corridors creates redundancy during disruptions and thus makes the network more resilient.

I-65/US 31 Resilience Corridor

I-65, which runs north to south from the Alabama/Tennessee border to Mobile in south Alabama, generally runs parallel to US 31. US 31 begins at the Alabama/Tennessee border and terminates in Mobile. Were a disruption to occur along I-65, it would be reasonable in most cases to reroute traffic to US 31 to avoid the disruption without too much loss of time and provide a redundant north-south route. In addition to US 31, US 43, US 231, and US 431 generally run north-south and could serve as alternate routes, though these trips would likely result in significantly greater travel time.

I-565/US 72 Resilience Corridor

I-565, which runs east to west from I-65 to Huntsville, is paralleled by US 72 to the north. In addition, US 72 is paralleled to the west of I-65 by ALT US 72. These roadways provide a good east-to-west redundancy for the northern portion of Alabama. The primary challenge with this resilience corridor is the Tennessee River. The river runs parallel to the US 72 and ALT US 72 corridors, restricting the number of locations at which trucks can cross the river.

I-59/US 11 Resilience Corridor

I-59, which runs southwest to northeast from the Alabama/Mississippi state line to the Alabama/Tennessee state line, is paralleled by US 11. US 11 runs in close proximity to I-59 for most of the length of the interstate throughout Alabama, creating good redundancy should an incident disrupt travel along I-59.

I-85/US 29/US 80/US 31 Resilience Corridor

I-85, which runs west to east from Montgomery to the Alabama/Georgia state line, has some parallel corridors but these routes do not directly follow the interstate. US 80 parallels I-85 from just east of Montgomery to Tuskegee, at which point it becomes US 29. US 29 then continues east through Auburn to the state line. While this provides some resilience east of Montgomery, there is no immediately adjacent connection east to west around Montgomery. The closest roadway that does parallel I-85 is SR 14, but this highway runs several miles north of I-85 and would likely add significant travel time to a trip.

I-10/US 90 Resilience Corridor

I-10 runs east to west through Mobile to the Alabama/Mississippi state line. On the west end, US 90 closely parallels I-10. In Mobile, US 98 is the only parallel route to I-10. The Mobile Bay limits opportunities for parallel routes, allowing for limited redundant routes. On the east end of I-10, US 90 once again generally parallels I-10 but gets increasingly further from I-10 near the Alabama/Florida state line.

Hurricane Re-Entry and Debris Removal

This section summarizes state-designated hurricane evacuation routes and the location of existing debris removal sites, or borrow pits, along Alabama's highway network.

As a state that is adjacent to the Gulf of Mexico, Alabama is frequently impacted by hurricanes and tropical storms. The most significant storm events in recent years include Tropical Storm Alberto (2018), Tropical Storm Lee (2011), Tropical Storm Fay (2008), Hurricane Katrina (2005), and Hurricane Ivan (2004).

Tropical Storm Alberto-- Tropical Storm Alberto caused extensive flooding in coastal Alabama, and high winds felled numerous trees, destroying structures and impeding roadway access. The storm resulted in $125 million in damage at the Gulf Coast.

Tropical Storm Lee-- Tropical Storm Lee caused heavy rainfall in Alabama with up to 13 inches of rain in some locations. Over 200,000 residents lost power during the storm, and extreme wind caused damage to the numerous electricity poles, power lines, and other structures within Alabama. Many trees were also downed because of high wind speeds during the storm event. The storm resulted in approximately $2.8 billion in damage to the Gulf Coast.

Tropical Storm Fay-- Tropical Storm Fay caused significant damage to many regions in Alabama through severe thunderstorms, rainfall, and flooding. In Midway, Alabama, high-speed winds

exacerbated the pre-existing problems with the city's water tower. Even as the storm weakened as it moved inland, numerous tornadoes caused extensive damage.

Hurricane Katrina-- Hurricane Katrina affected a significant portion of the Gulf Coast, including Alabama, Louisiana, and Florida. In Mobile Bay, storm surge reached 16 feet in height. Winds over 60 miles per hour were recorded in Mobile, and there was serious flooding at the coast and inland. The storm resulted in approximately $125 billion in damage in the US.

Hurricane Ivan-- Hurricane Ivan impacted coastal Alabama, primarily the Gulf Shores area. Evacuations were in effect in the City of Mobile and Baldwin County as winds reaching over 120 miles per hour devasted the area. Storm surges reached as high as 14 feet near Orange Beach. During the hurricane, almost half a million residents lost power. There was an estimated $18 billion dollars in damage to Alabama.

While this list is far from comprehensive, these incidents illustrate how hurricanes and tropical storms can have a significant impact on the state. Beyond the immediate coastal impacts from these major storms, hurricanes and tropical storms cause inland flooding and tornadoes, disrupting the movement of goods. In the event of a major storm affecting Alabama, ALDOT has state-designated hurricane evacuation routes, shown in Figure 53. These are comprised of interstates and US and state routes extending northward from coastal Alabama. From Mobile, evacuation routes include I-65, US 43, I-10, US 46, US 31, and US 90. There are also several routes that lead northward from the Florida panhandle into Alabama, including US 231, US 331, US 431, SR 87, and US 29. During a mass evacuation, redundant routes are needed to ensure a safe and efficient evacuation from the coast. This would primarily include evacuation for citizens, but trucks would utilize these routes as well. In addition, there would be buses transporting evacuees that lack their own transportation, and special buses for nursing home evacuations. After a storm event, once tropical storm force winds have subsided, Alabama EMA coordinates re-entry procedures per the Alabama Emergency Operations Plan.[71] More important than the flow of goods, initially, is having redundant routes for resources needed to restore power and other critical services at the coast, including gasoline tankers and tow trucks, so that conditions can be made safe for people to return.

The state also has designated borrow pit sites. When activated, these sites serve as designated locations where debris from natural disasters is taken for further processing. These sites are significant, as they serve as a staging area during recovery operations. When active, the borrow pits attract high volumes of truck traffic; thus, it is critical to maintain access to facilitate recovery operations at the coast. There are heavier concentrations of borrow pits in the southern half of the state, particularly near Mobile, Montgomery, Dothan, and Monroeville. The borrow pits are well served by interstate, US, and state roadways.

In addition to the roadway network, it is important to consider the impacts of natural disasters and other disruptions to the other modes of freight transportation. For example, ports in the state of Alabama would be severely affected by flooding, storm surges, and other weather events, thus

disrupting the movement of goods through the navigable waterways and loading and unloading freight goods and services at the ports. The railroads could also be affected, should damage or blockage occur to a critical rail line or railyard. Damage could affect the loading and unloading of trains to/from trucks and thus impact delivery times of goods and services. Airports that provide air cargo services could be shut down for many hours due to high winds and heavy rain, causing delays in air-to-truck transfers. While the roadways are by far the largest component of the freight network, it is important to consider these modes also provide valuable goods and services both into and out of Alabama.

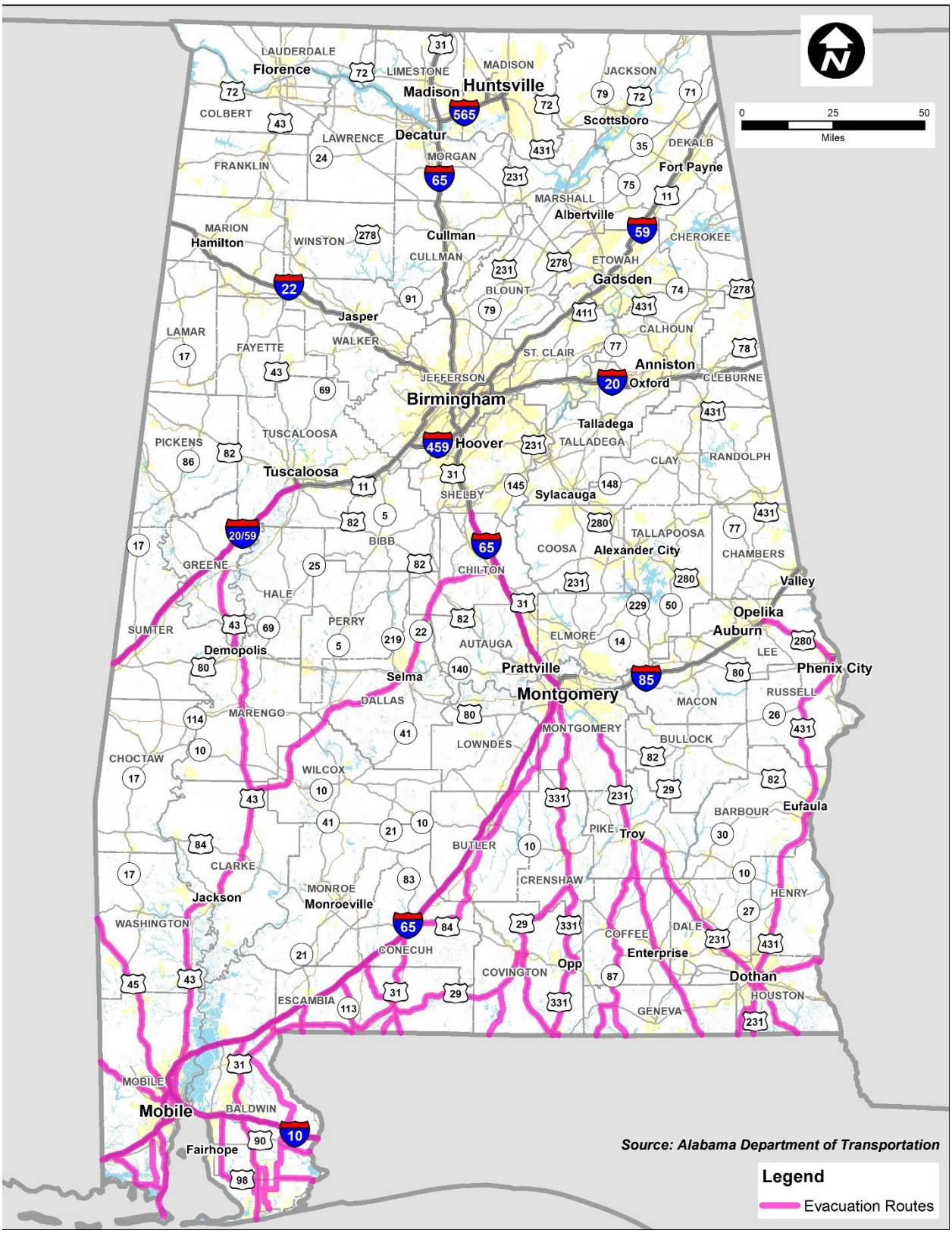

Figure 53. Hurricane Evacuation Routes in Alabama

Chapter 6: Freight Investment Plan

The Statewide Freight Plan is required to include a fiscally constrained work program for using National Highway Freight Program (NHFP) funding. In addition, this chapter documents how the ALDOT work program addresses current needs on the NHFN.

This section documents:

- NHFP funding eligibility
- Fiscally constrained Freight Investment Plan for NHFP funds
- Other projects along the NHFN in the ALDOT work program
    - Capacity
    - Bridge
    - Safety
    - Operations
- Rail Crossing Improvements
- Truck Parking Needs
- Freight Related ITS
- Other Funding Sources

6.1 NHFP Funding Eligibility

An approved State Freight Plan is necessary for a state to obligate National Highway Freight Program (NHFP) funds after December 4, 2017. A compliant State Freight Plan must also include a Freight Investment Plan. Only projects on the NHFN, as described in Chapter 3, are eligible for NHFP funds. NHFP funds may be obligated for one or more of the following:

- Development phase activities including planning, feasibility analysis, revenue forecasting, environmental review, preliminary engineering and design work, and other preconstruction activities
- Construction, reconstruction, rehabilitation, acquisition of real property (including land relating to the project and improvements to land), construction contingencies, acquisition of equipment, and operational improvements directly relating to improving system performance
- Intelligent transportation systems (ITS) and other technology to improve the flow of freight, including Intelligent Freight Transportation Systems (IFTS)
- Efforts to reduce the environmental impacts of freight movement
- Environmental and community mitigation for freight movement
- Railway-highway grade separation
- Geometric improvements to interchanges and ramps

- Truck-only lanes
- Climbing and runaway truck lanes
- Adding or widening of shoulders
- Truck parking facilities eligible for funding under the Highway Safety section of MAP-21
- Real-time traffic, truck parking, roadway condition, and multimodal transportation information systems
- Electronic screening and credentialing systems for vehicles, including weigh-in-motion truck inspection technologies
- Traffic signal optimization, including synchronized and adaptive signals
- Work zone management and information systems
- Highway ramp metering
- Electronic cargo and border security technologies that improve truck freight movement
- Intelligent transportation systems that would increase truck freight efficiencies inside the boundaries of intermodal facilities
- Additional road capacity to address highway freight bottlenecks
- Physical separation of passenger vehicles from commercial motor freight
- Enhancement of the resiliency of critical highway infrastructure, including highway infrastructure that supports national energy security, to improve the flow of freight
- Highway or bridge projects to improve the flow of freight on the NHFN
- Modernization or rehabilitation of a lock or dam, if the project is functionally connected to the NHFN and likely to reduce mobile source emissions
- Marine highway corridor, connector, or crossing (including an inland waterway corridor, connector, or crossing) , if the project is functionally connected to the NHFN and likely to reduce mobile source emissions[72]

Generally, the federal share for NHFP funding is 90 percent for projects on the Interstate system and 80 percent for non-Interstate projects.

6.2 Fiscally Constrained NHFP Freight Investment Plan

Alabama's Freight Investment Plan was prepared in accordance with the FAST Act definition and requirements of the FAST Act and IIJA, as contained in 49 U.S.C. 7020l), which requires that a Freight Investment Plan must:

- Address the State's freight planning activities and investments (both immediate and long-range).
- Be aligned with the Statewide Transportation Improvement Program (STIP).
- Be fiscally constrained.
- Contain a list of priority projects.

- Describe how the State will invest and match its NHFP funds.
- Be updated at least every four years concurrent with Freight Plan updates, but can be updated more frequently than the overall Freight Plan.

Alabama's Freight Investment Plan outlines ALDOT's planned expenditures of NHFP funding on freight projects. The projects funded through the NHFP program and in the Freight Investment Plan were identified through input from ALDOT staff based on high priority needs for freight mobility and economic development.

There is one project within the fiscally constrained NHFP Freight Investment Plan: debt service related to Birmingham's Central Business District (CBD) project. This is an Interstate Interchange project at I-59/I-20 consisting of segmental bridge replacements in the downtown area. The project was constructed in approximately four phases. During 2018 to 2019, the project was in Phase 2 - 3 when detours caused major travel delay. Temporary detours were in place for westbound and eastbound traffic on I-459, including interstate ramps and state routes. There were also temporary closures of local streets (both partial and full closures) and traffic slowed due to the presence of work zones. The downtown bridges were replaced and reopened in early 2020. Between fiscal years 2022 and 2025, over $100 million will be expended towards debt service for this project.

There are three additional projects that were included in the last NHFP Freight Investment Plan. These projects are not yet complete, but are now utilizing funds from other federal and state sources, rather than the NHFP:

- Resurface I-65 from US 278 (MP 307.5) to near Hurricane Creek (MP 315.5)
- Widen I-10 from east of Bayway Bridge to 0.5 miles east of SR 181
- I-85 Bridge Widenings – Bridges BIN 008593 over Choctafaula Creek

Table 21 shows the annual programmed expenditure of funds that will go towards debt service for these projects, rounded to the nearest dollar. The full Freight Investment Plan is presented in Appendix D.

Table 21. Freight Investment Plan Expenditures by Year

Fiscal Year	NHFP Funds	State Funds	Other Federal Funds (NH)	State Funds (NH)	Total Expenditure
FY 2021	$31,845,601	$25,785,127	--	--	$57,630,728
FY 2022	$28,213,009	$3,134,779	--	--	$31,347,788
FY 2023	$25,785,127	$2,865,014	$31,845,601	$25,785,127	$86,280,869
FY 2024	$25,785,127	$2,865,014	--	--	$28,650,141
FY 2025	$25,785,127	$2,865,014	--	--	$28,650,141
FY 2026	$25,785,127	$2,865,014	--	--	$28,650,141
FY 2027	$25,785,127	$2,865,014	--	--	$28,650,141

6.3 Other Funding Sources

Signed into law on November 15, 2021, the Infrastructure Investment and Jobs Act (IIJA) is the largest transportation infrastructure investment in the nation's history, with $1.2 trillion allotted for the country's transportation, broadband, and energy infrastructure. Of this total, $567 billion is designated for discretionary and formula programs within the US Department of Transportation from fiscal year 2022, to fiscal year 2026. Included within IIJA funding are existing programs that have been reauthorized, as well as new programs focusing on climate, sustainability, equity, and freight at both regional and community levels. These programs are not exclusively used for freight improvements; improvements to the freight network, including highways, bridges, at-grade crossing improvements, and truck parking facilities, are eligible for many of the funding programs, including for both improved and new facilities. For the latest information on these programs, please refer to endnotes 73 through 95.

- National Highway Performance Program (NHPP)[73]
- Surface Transportation Block Grant (STBG) Program[74]
- Highway Safety Improvement Program (HSIP)[75]
- Railway-Highway Grade Crossings Program (RHCP)[76]
- Congestion, Mitigation & Air Quality (CMAQ) Improvement Program[77]
- Motor Carrier Safety Assistance Program (MCSAP)[78]
- Advanced Transportation Technologies and Innovative Mobility Deployment Program (ATTIMD)[79]
- Consolidated Rail Infrastructure and Safety Improvement (CRISI)[80]
- High Priority Innovative Technology Deployment Grants (HP-ITD)[81]
- Infrastructure for Rebuilding America (INFRA)[82]
- Rebuilding American Infrastructure with Sustainability and Equity (RAISE)[83]

- Bridge Formula Program[84]
- Carbon Reduction Program[85]
- National Electric Vehicle Infrastructure Formula Program[86]
- Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program[87]
- Bridge Investment Program[88]
- Local and Regional Project Assistance Program[89]
- Charging and Fueling Infrastructure[90]
- National Electric Vehicle Discretionary Grant Program[91]
- National Infrastructure Project Assistance Program[92]
- Railroad Crossing Elimination Program[93]
- Reduction of Truck Emissions at Port Facilities Grants[94]
- Rural Surface Transportation Grant Program[95]

6.4 Other Work Program Projects along the NHFN

In addition to Freight Investment Plan projects, there are several projects benefitting freight mobility and located along the NHFN throughout the state, funded by other sources. This section summarizes programmed improvements along the NHFN in ALDOT's work program[b] that fall within one mile of the 2050 bottlenecks as identified from the statewide travel demand model. These projects will directly address projected bottlenecks on the NHFN.

There are a variety of project types represented, including bridge replacements, capacity, interchanges, intelligent transportation systems (ITS), maintenance, rail safety, and road safety. These include nearly three dozen projects to widen roadways as well as a new location roadway, the Birmingham Beltline; numerous resurfacing and pavement rehabilitation projects; bridge replacements; and ITS projects, including corridor management and traffic signal upgrades. Table 22 through Table 26 present these projects by ALDOT Region, specifying the scope of work, or stage of the project. The scopes of work include preliminary engineering (PE), right-of-way acquisition (RW), utilities (UT), special (SP), force maintenance (FM), and construction (CM). The projects are also depicted by ALDOT Region in Figure 54 through Figure 58.

[b] The programmed improvements in ALDOT's work program are derived from the Comprehensive Project Management System (CPMS), as of September 21, 2022.

Table 22. ALDOT Projects in North Region within One Mile of 2050 Bottlenecks

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Capacity	Cullman	I-65	PE	-
Capacity	Limestone	US 72/SR 2	UT	-
Capacity	Limestone	I-65	CN	-
Capacity	Madison	US 72/SR 2	CN	-
Capacity	Madison	US 72/SR 2	RW	-
Maintenance	Cullman	I-65	CN	-
Maintenance	Etowah	US 431/SR 1	FM	-
Maintenance	Limestone	I-565	CN	-
Bridge	Etowah	SR 77	CN	-
ITS	Limestone	I-65	CN	-
ITS	Marshall	US 431/SR 1	SP	-

Table 23. ALDOT Projects in West Central Region within One Mile of 2050 Bottlenecks

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Capacity	Tuscaloosa	US 82/SR 6	RW	-
Capacity	Tuscaloosa	SR 216	RW	-
Maintenance	Tuscaloosa	SR 215	FM	-
Maintenance	Tuscaloosa	US 11/SR 7	FM	-
Maintenance	Walker	SR 69	FM	-

Table 24. ALDOT Projects in East Central Region within One Mile of 2050 Bottlenecks

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Capacity	Jefferson	New Roadway (Birmingham Northern Beltline)	RW, SP, UT, PE, CN	-
Capacity	Jefferson	I-59	RW	-
Capacity	Jefferson	I-59	CN	-
Capacity	Jefferson	I-59	UT	-
Capacity	Jefferson	US 280/SR 38	CN	-

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Capacity	Jefferson	US 78/SR 5	RW	-
Capacity	Shelby	SR 261	UT	-
Capacity	Shelby	I-65	PE	X
Capacity	Shelby	I-65	CN	-
Capacity	Shelby	I-65	PE	X
Maintenance	Calhoun	I-459	PE	-
Maintenance	Jefferson	I-59	RW	-
Maintenance	Jefferson	I-65	CN	X
Maintenance	Jefferson	I-59	CN	X
Maintenance	Jefferson	I-59	CN	X
Maintenance	Jefferson	I-65	CN	X
Maintenance	Jefferson	US 31/SR 3	FM	-
Maintenance	Jefferson	I-459	CN	X
Maintenance	Jefferson	I-59	CN	X
Maintenance	Jefferson	I-459	CN	X
Maintenance	Jefferson	I-65	PE, CN	-
Maintenance	Jefferson	I-65	CN	X
Maintenance	Jefferson	US 280/SR 38	FM	-
Maintenance	Jefferson	US 11/SR 7	FM	-
Maintenance	Jefferson	SR 79	FM	-
Maintenance	Jefferson	US 11/SR 7	FM	-
Maintenance	Jefferson	I-59	PE	-
Maintenance	Shelby	US 280/SR 38	FM	-
Maintenance	Shelby	I-65	PE	X
Maintenance	Shelby	I-65	CN	-
Maintenance	Shelby	I-65	PE	X
Maintenance	St. Clair	SR 174	FM	-
Maintenance	Talladega	US 280/SR 38	FM	-
Bridge	Jefferson	US 78/SR 4	RW	-
Bridge	Jefferson	I-59	CN	-
Bridge	St. Clair	I-20	PE	-
Bridge	Tallapoosa	SR 63	UT	-
ITS	Jefferson	I-20 & US 280/SR 38	SP	-
ITS	Shelby	I-65	SP	-

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Rail Safety	Jefferson	Multiple railroad crossings	CN	-
Safety	Calhoun	SR 21	FM	-
Safety	Jefferson	US 31/SR 3	FM	-

Table 25. ALDOT Projects in Southwest Region within One Mile of 2050 Bottlenecks

Project Type	County	Route	Scope of Work (Stage)	Separate Project Along Same Route
Capacity	Baldwin	SR 59	CN	-
Capacity	Baldwin	I-10	UT	-
Capacity	Baldwin	SR 180	UT	-
Capacity	Baldwin	SR 181	UT	-
Capacity	Baldwin	I-10	CN	-
Capacity	Mobile	I-65	CN	-
Capacity	Mobile	SR 158	UT	-
Capacity	Mobile	I-10	PE	-
Capacity	Mobile	I-10	CN	-
Capacity	Mobile	US 98/SR 42	CN	-
Maintenance	Baldwin	US 90/SR 16	FM	-
Maintenance	Baldwin	SR 59	FM	-
Maintenance	Mobile	US 43/SR 13	FM	-
Maintenance	Mobile	US 90/SR 16	FM	-
Maintenance	Mobile	US 98/SR 42	FM	-
Bridge	Mobile	US 90/SR 16	UT	-
ITS	Baldwin, Mobile	I-10	PE	-
Safety	Mobile	US 45/SR 17/SR 57	CN	-

Table 26. ALDOT Projects in Southeast Region within One Mile of 2050 Bottlenecks

Project Type	County	Route	Scope of Work (Stage)
Capacity	Elmore	SR 14	CN
Capacity	Houston	SR 210	RW
Capacity	Montgomery	I-85	CN
Capacity	Montgomery	I-85	CN
Capacity	Montgomery	I-65	PE
Maintenance	Autauga	I-65	PE
Maintenance	Autauga	SR 6	FM
Maintenance	Elmore	I-65	CN
Maintenance	Houston	SR 53	FM
Maintenance	Houston	US 84/SR 12	FM
Maintenance	Macon	US 80/SR 8	FM
Maintenance	Montgomery	I-85	PE
Maintenance	Pike	US 29/SR 15	FM
Maintenance	Pike	US 231/SR 53	FM
Maintenance	Pike	US 231/SR 53	FM
Bridge	Montgomery	SR 6	RW
Safety	Elmore	US 231/SR 9	PE
Safety	Elmore	US 231/SR 9	PE
Safety	Lee	SR 51	RW
Safety	Macon	US 80/SR 8	FM
Safety	Montgomery	SR 126	UT
Safety	Pike	US 231/SR 10	CN

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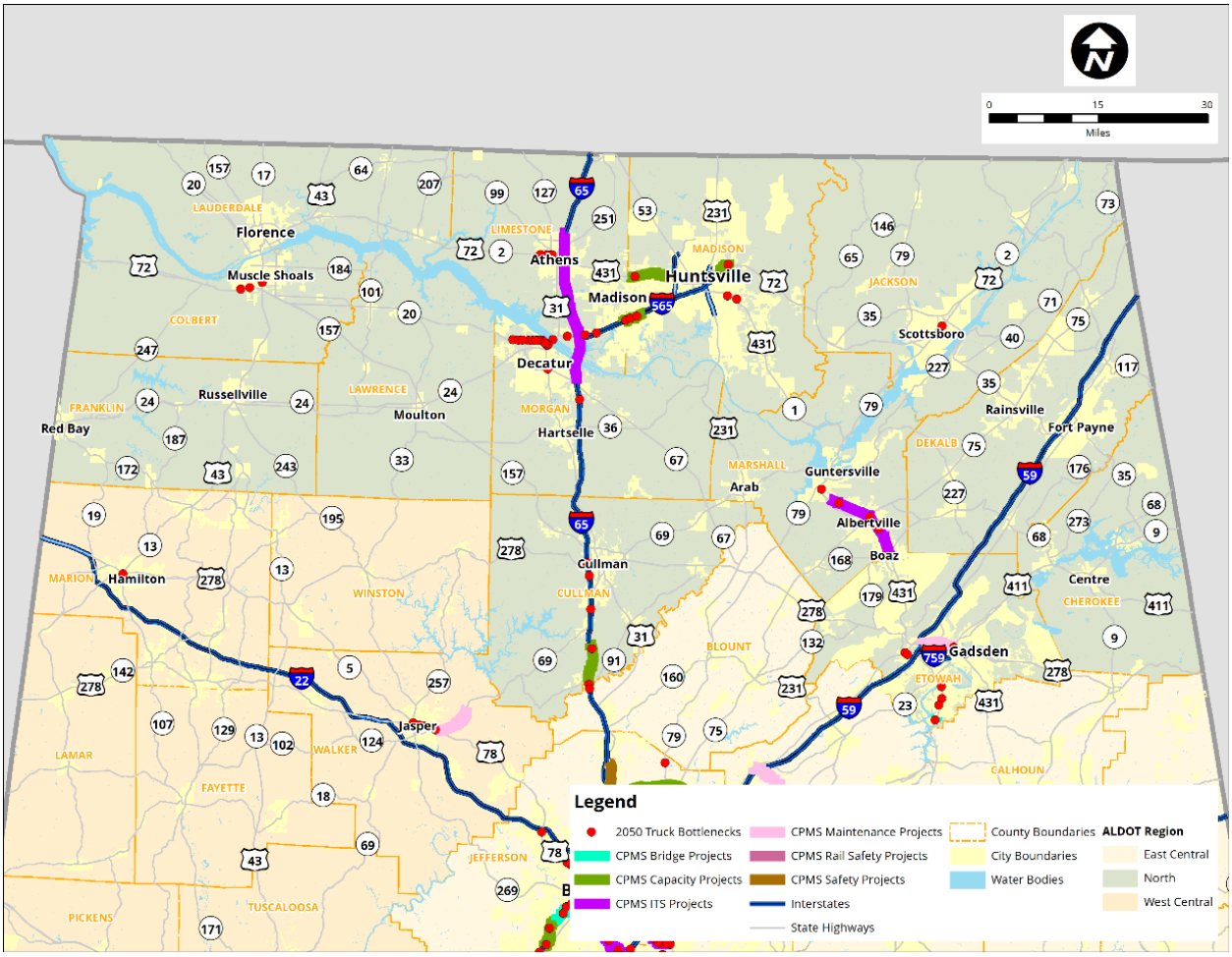


Figure 54. ALDOT Projects and 2050 Bottlenecks in North Region

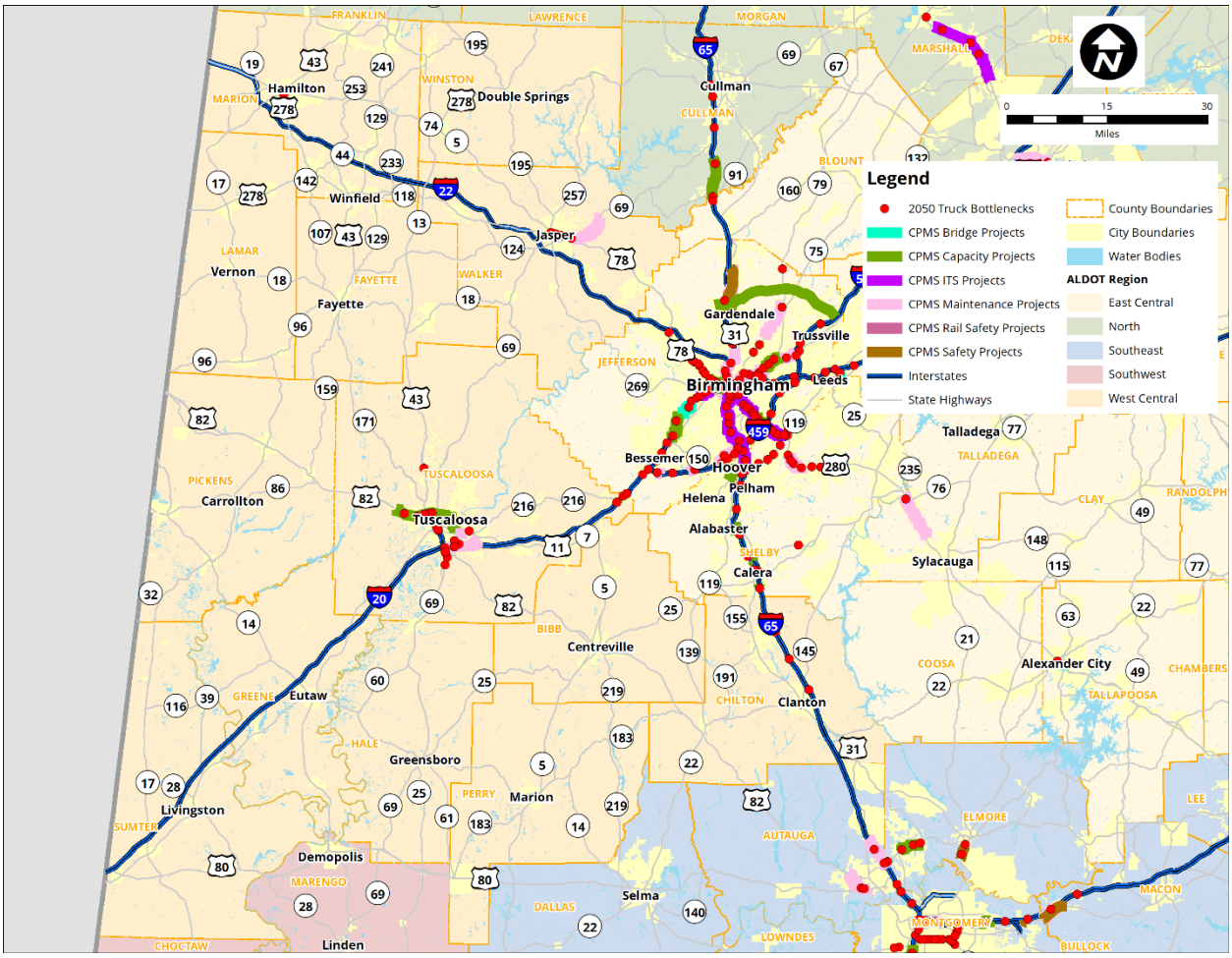


Figure 55. ALDOT Projects and 2050 Bottlenecks in West Central Region

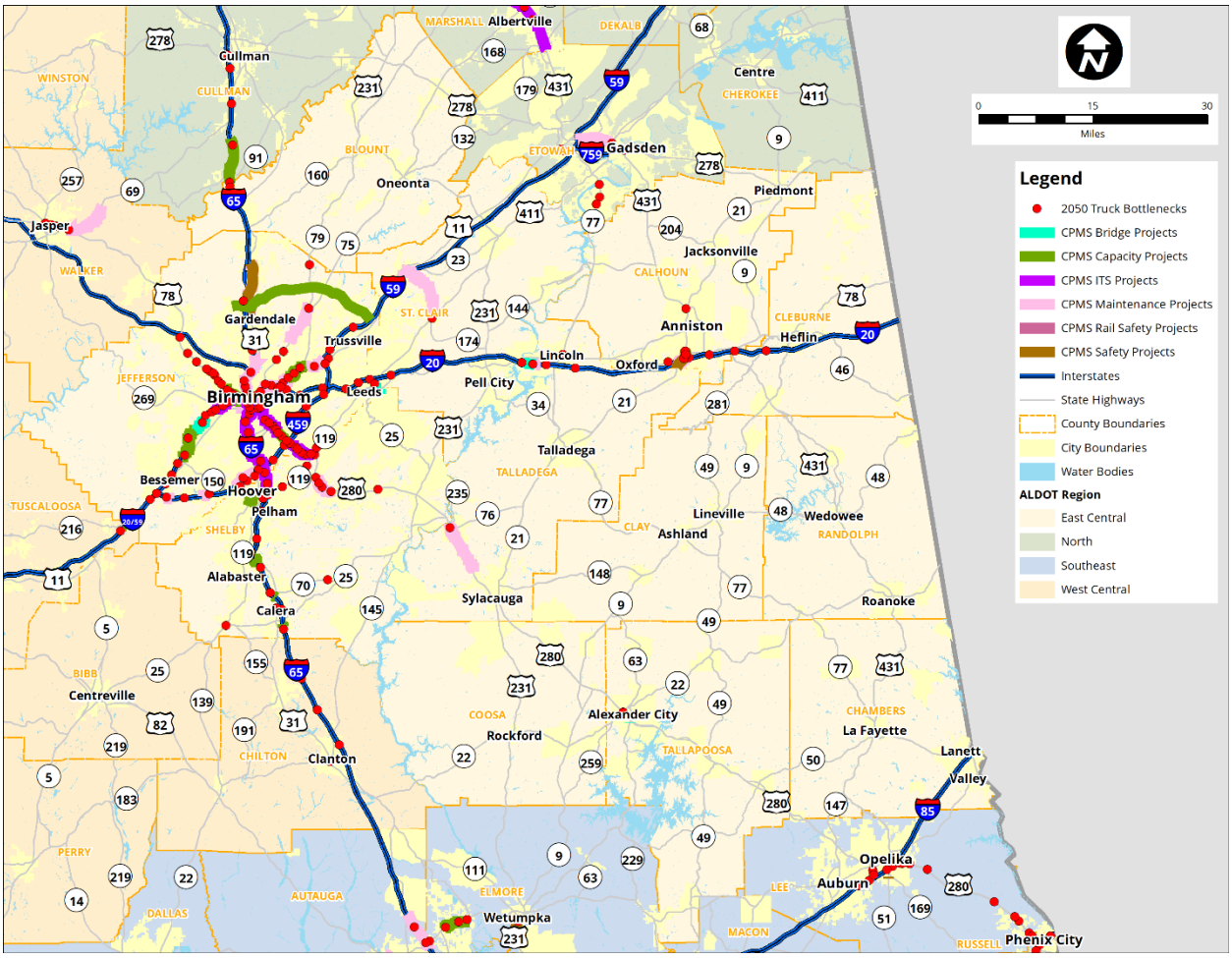


Figure 56. ALDOT Projects and 2050 Bottlenecks in East Central Region

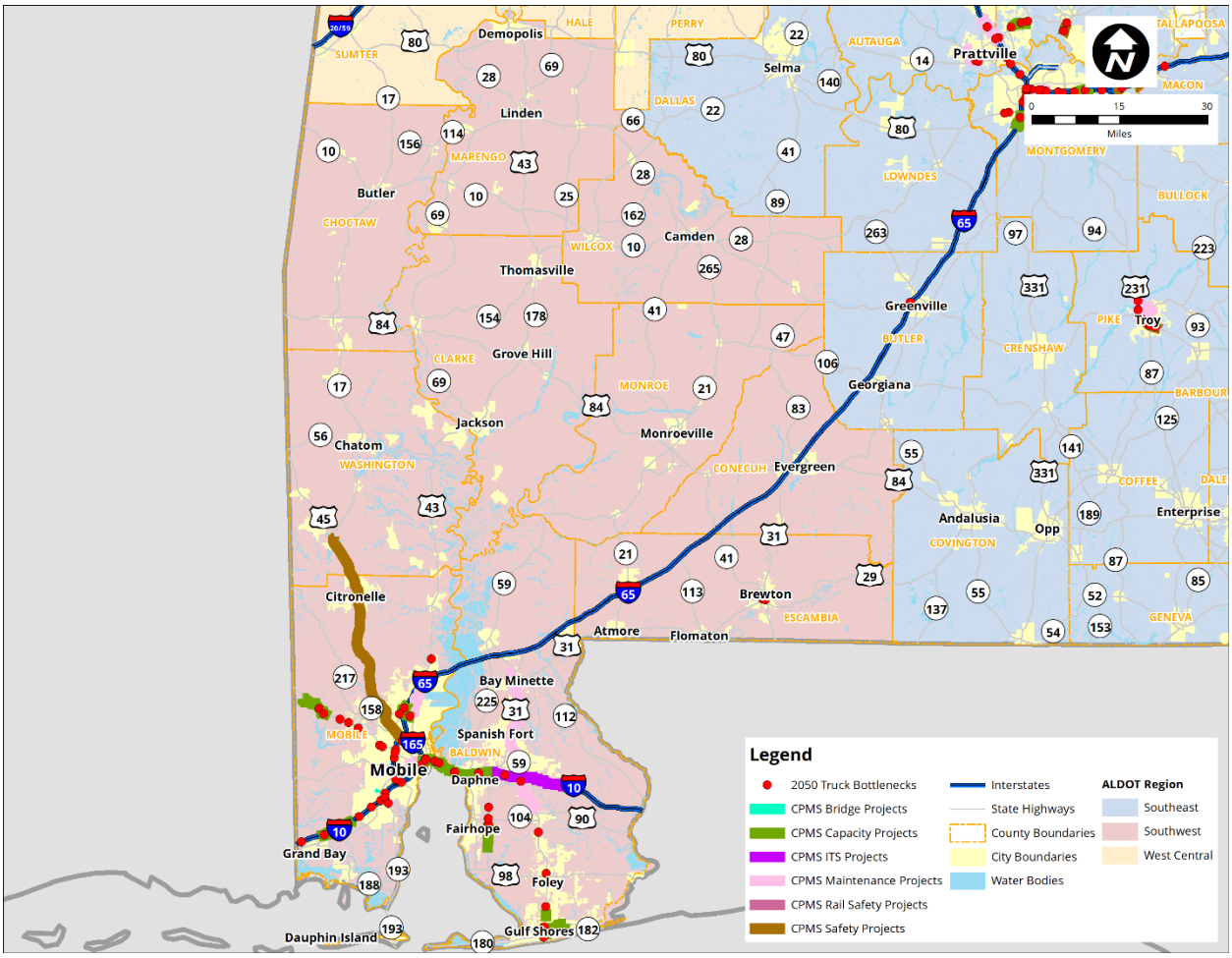


Figure 57. ALDOT Projects and 2050 Bottlenecks in Southwest Region

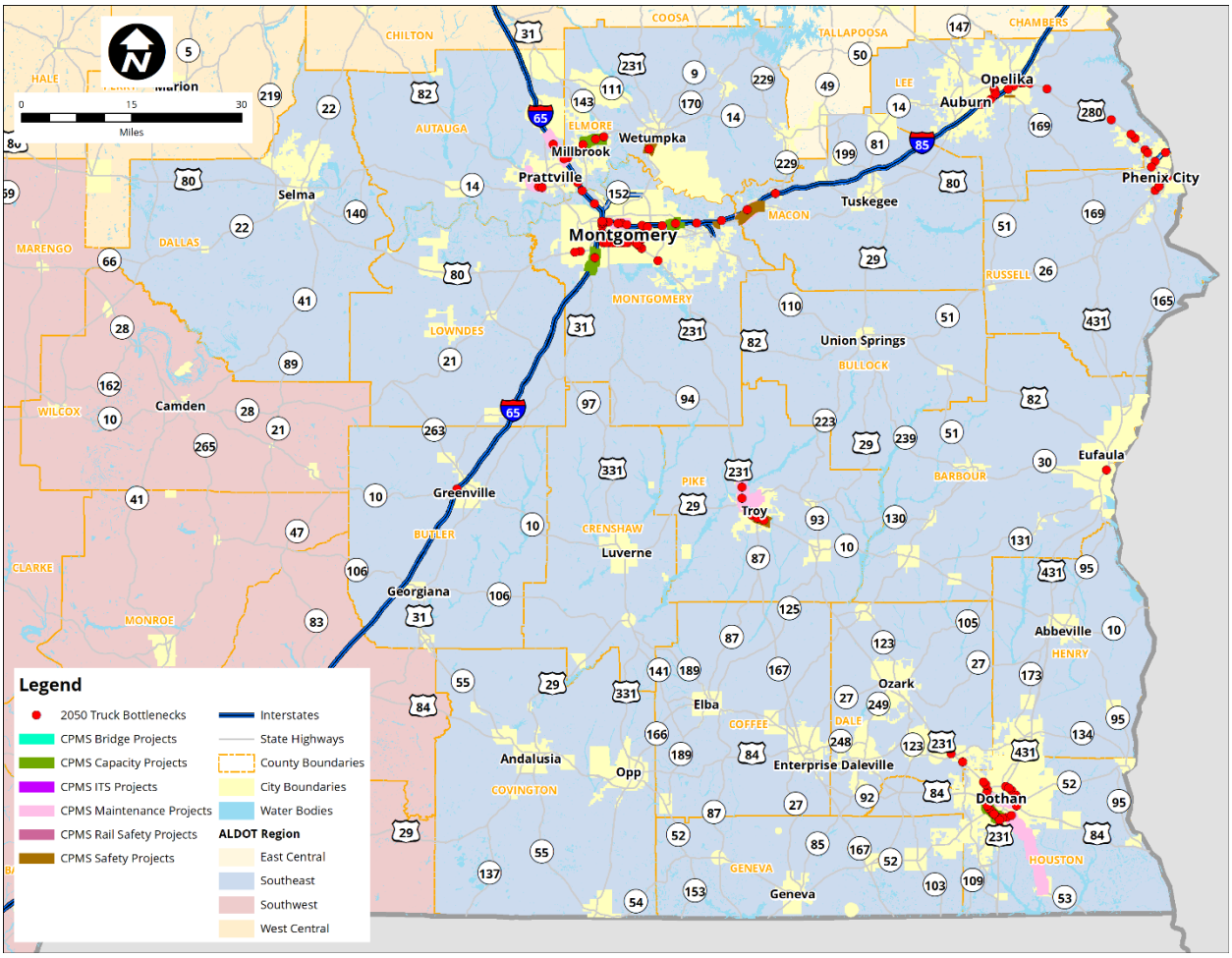


Figure 58. ALDOT Projects in 2050 Bottlenecks in Southeast Region

6.5 Freight-Related Intelligent Transportation Systems (ITS)

One of the objectives of the IIJA is to promote innovative solutions and the implementation of intelligent transportation systems (ITS) to facilitate freight mobility. Importantly, ITS applications that serve general mobility along the network also benefit freight mobility. An examination of existing ITS technologies indicates that those available on Alabama's highways that best serve freight mobility are:

- ALGO web site
- Regional Transportation Management Centers (RTMCs)
- Adaptive signals
- Alabama Service and Assistance Patrol (ASAP)
- Advanced Traffic Management System (ATMS) warning systems
- Construction zone notification
- Dynamic message signs
- Regional Traffic Operations Program (RTOP)
- Signalized intersection railroad devices
- Smart work zones
- Traffic controllers and cabinets
- Tunnel control center
- Vehicle detection systems
- Weigh-in-motion equipment
- Weather information systems and services

The core of ITS architecture is the Regional Transportation Management Center (RTMC). ALDOT has five RTMCs – in Birmingham, Mobile, Montgomery, Tuscaloosa and Huntsville. RTMC has local control of that region's field devices and is responsible for daily freeway and major arterial operations. The coverage of each RTMC is outlined below:

- Birmingham RTMC – Freeway and incident management for the ALDOT East Central Region, which includes Blount, Calhoun, Chambers, Clay, Cleburne, Coosa, Jefferson, Randolph, Shelby, St. Clair, Talladega, and Tallapoosa counties. The primary routes managed are I-20, I-20/59, I-22, I-59, I-65, I-459, US-31, and US-280. It operates 24 hours a day, 7 days a week.
- Mobile RTMC – Freeway and incident management for the ALDOT Southwest Region, which includes Baldwin, Conecuh, Escambia, Mobile, Clarke, Choctaw, Marengo, Monroe, Washington, and Wilcox counties. The primary routes managed are I-10, I-65, I-165, US-90, and US-98. It operates 24 hours a day, 7 days a week.

- Montgomery RTMC – Freeway and incident management for the ALDOT Southeast Region, which includes the counties of Autauga, Barbour, Bullock, Butler, Coffee, Covington, Crenshaw, Dale, Dallas, Elmore, Geneva, Henry, Houston, Lee, Lowndes, Macon, Montgomery, Pike, and Russell counties. The primary routes managed are I-65, I-85, US-80, US-82, US-31, US-231, and US-331. It operates 24 hours a day, 7 days a week.
- Tuscaloosa RTMC – Freeway and incident management for the ALDOT West Central Region, which includes Bibb, Chilton, Fayette, Greene, Hale, Lamar, Marion, Perry, Pickens, Sumter, Tuscaloosa, Walker, and Winston counties. The primary routes managed are I-20/59, I-22, I-65, I-359, US-11, US-31, US-43, US-82, SR-69, and SR-215. It operates 24 hours a day, 7 days a week.
- Huntsville RTMC – Freeway and incident management for the ALDOT North Region, which includes Cherokee, Colbert, Cullman, Dekalb, Etowah, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, Marshall, and Morgan counties. The primary routes managed are I-59, I-65, I-565, I-759, US-11, US-31, US-72, US-72 Alternate, US-231, and US-431. The facility operates weekdays from 6 AM to 10 PM and weekends from 7 AM to 7 PM. Operations are turned over to the Birmingham RTMC to manage events when the Huntsville RTMC is not operational.

Other ITS infrastructure includes:

- Field Devices – Including Advanced Traffic Management Systems (ATMS) hardware such as closed- circuit televisions (CCTV), dynamic message signs (DMS) and traffic signals among others, these devices collect live traffic conditions and relay information to motorists.
- Software – Supporting TMC operations with data collected from field devices, computer applications coordinate traffic signals, collect and archive incident management information, and manage work orders to repair ITS and traffic signal infrastructure.
- Incident Management and Traveler Information Systems – Used by motorists and first responders alike, these applications relay current traffic conditions through streaming video, active dynamic message signs, incident information, and road closures.
- Regional Traffic Operations Program – This program is being implemented in all regions along routes of significance. It includes upgrades to traffic signals and communications. Timing plans are being updated and created across the state. Additionally, with the implementation of a central management software, this will allow for remote connection to traffic signals, to monitor and implement changes in real time in response to planned and unplanned events.
- ALDOT's ITS Strategic Business Plan was completed in 2015. Serving as the five-year plan for necessary actions and priorities to appropriately guide the ITS program, key plan elements include:
    - Vision, goals and objectives for ITS deployment
    - Program needs and prioritized ITS improvements

- Financial plan that highlights expenditures over the next five years
- Prioritized deployment strategies, which fall into three primary categories:
- Interstate system improvements
- Urban area improvements
- General/statewide improvements

Interstate system projects include wireless and/or fiber optic communications, vehicle detection, surveillance cameras, and traveler information dissemination devices (ITS components or capability required for the reporting of real-time traffic and travel information). Projects also include necessary ATMS hardware, software and/or equipment upgrades at associated TMCs. Interstates scheduled for these improvements include all segments of I-65, I-20, I-59, I-10 and I-85.

Specific urban area ITS projects include:

- Installation of projects in the Birmingham region to provide real-time information on high priority/ heavily congested metropolitan corridors required for compliance with CFR 511, and State-designated routes of significance. It is recommended corridors include only State and US routes.
- Emergency management focused projects along parallel routes identified as detours and emergency alternate routes to assist emergency responders to avoid congestion. Projects may include enhancements to existing traffic signals (upgraded equipment, emergency traffic signal timing plans, and adaptive traffic signal timing), transit vehicle priority and emergency vehicle pre- emption enhancements as appropriate. This is planned in the Huntsville, Mobile, Tuscaloosa and Montgomery metropolitan areas.

Statewide projects that are not associated with a specific area or interstate facility are also included. These projects consist of various types of improvements, including parallel route emergency management strategies, planning activities, and installation of equipment (DMS, CCTV, etc.) throughout the state.

While the improvements in the ITS Strategic Plan are not specific to freight, the installation of ITS along the state's Interstates and in urban areas such as Birmingham and Mobile that accommodate significant amounts of commodity flow will generally benefit freight mobility. The use of these technologies enables ALDOT and its stakeholders to better manage the transportation network, thus improving the overall safety, mobility, and commerce in the state.

ALDOT's Statewide TSMO Master Plan was completed in 2019. The plan establishes strategies and programmatic fundamentals to further develop and provide direction for the Statewide TSMO Program. While TSMO strategies can address all modes of transportation, this plan focuses primarily on vehicular and freight movements.

TSMO strategies leverage enhanced organization techniques and performance measurement to promote program accountability throughout the transportation network. Examples of TSMO strategies used to improve safety, reduce congestion, and increase reliability include:

- Intelligent Transportation Systems (ITS) and Communications
- Advanced Traffic Signal Systems
- Traffic Management Centers (TMC)
- Real-time Traveler Information
- Traffic Incident Management (TIM)
- Emergency Transportation Operations
- Work Zone Management (WZM)
- Asset Management
- Road Weather Management
- Management and Operations Software Systems, including Decision Support Systems
- Performance Measures
- Special Event Management
- Emergency Management
- Connected/Automated Vehicles (CAV)
- Collaborative Business Practices
- Smart Cities

Goals and objectives related to freight are included in the Statewide TSMO Master Plan. These include:

- Increase safety of freight corridors
- Enhance freight route mobility
- Improve travel time reliability
- Reduce congestion and bottlenecks

According to the Statewide TSMO Master Plan, commercial vehicle information systems have a benefit that outweighs the cost. In states and other areas where this has been deployed, the benefit-to-cost ratio ranges between 3:1 and 5:1, indicating that these investments provide substantial benefit.

6.6 Freight-Related Safety Strategies

As mentioned in Section 6.3, there are numerous projects in ALDOT's work program that directly address safety needs. These include the following:

- Improvements to on- and off-ramps on interstates
- Shoulder widening on highways
- Access management improvements on major corridors
- Intersection improvements, including addition of turn lanes, re-alignments, and the installation of roundabouts

ALDOT administers the Section 130 program, which is intended to eliminate hazards at rail crossings. There are over 2,700 at-grade railroad crossings in the state that ALDOT monitors and programs improvements towards. There are numerous projects in ALDOT's current work program related to improve rail safety at crossings, including the installation of signals, gates, pavement markings, raised medians with delineators, and warning signage.

The expansion of truck parking facilities as included in ALDOT's work programs, as well as the strategies that ALDOT may consider to mitigate truck parking shortages, will also help to improve safety by reducing unauthorized truck parking that puts both drivers and other motorists at risk.

In addition, there are ITS solutions that ALDOT currently employs help to improve safety for freight operators and other motorists. These include TMCs and the information received from field devices and cameras, which allow ALDOT staff to monitor traffic conditions in real-time and quickly deploy emergency responses for incidents that arise. ITS and TSMO projects in ALDOT's work program, such as connected cameras, traffic signals, and other advanced corridor management systems, will help to make traffic conditions safer and more efficient.

The Federal Motor Carrier Safety Administration (FMCSA) has a wealth of resources to educate truck drivers, motorists, and pedestrians and cyclists about safety around commercial vehicles. The "Our Roads, Our Safety" national safety campaign encourage all users to share the road safely.[96] ALDOT may consider coordination among its Drive Safe Alabama program, industry groups such as the Alabama Trucking Association, and FMCSA to share safety messages on dynamic message signs, the ALDOT website, or other media platforms, in an effort to improve safety on the freight network.

6.7 Strategies to Mitigate Environmental Considerations

As part of the IIJA, FHWA is requiring statewide freight plans to include strategies to help mitigate the impact of freight traffic on the natural environment. Specifically, this section highlights strategies that can help to address the severity of impacts from extreme weather and natural disasters; local air pollution; flooding and stormwater runoff; wildlife habitat loss; and disproportionate adverse impacts to environmental justice communities.

Severity of Impacts from Extreme Weather and Natural Disasters

Section 5.4 highlights the impacts that extreme weather and natural disasters have had on Alabama's freight network, including hurricanes and tropical storms, and associated hazards such

as storm surge, high winds, inland flooding, and tornadoes. There are several resilience tools and strategies currently being utilized in the transportation planning community that could be utilized to help mitigate the impacts from these events.

Vulnerability Assessments

The FHWA has several resources to help local agencies conduct vulnerability assessments, which help to pinpoint specific hazards, the areas that are most susceptible to hazards, and related infrastructure that is most vulnerable to damage or disruption. FHWA has outlined the following overarching approach to conducting a vulnerability assessment:

- Define the scope and program goals that are sensitive to climate change and potential disruptions.
- Identify extreme weather trends that could impact the scope and program goals.
- Assess vulnerability through documentation, staff interviews, existing practices, historic trends, and qualitative and quantitative analysis.
- Integrate decision-making through performance measures and targets, and potential adaptation strategies.
- Apply policy, operational and maintenance, emergency management, and adaptive management strategies.
- Monitor progress through establishing a plan for monitoring progress, engaging stakeholders, monitoring trends, and revisiting programs frequently.

These strategies are also essential to the movement of goods through the transportation network, as they promote efficient traffic flow and preventative plans in the case of inevitable disruptions to the state freight network.

There are tools that have been developed to help local agencies in their resilience planning efforts. This section presents an overview of these tools and some contextual information on the types of data needed and outcomes that can help assess vulnerabilities to the transportation network.

Vulnerability Assessment Scoring Tool (VAST)

Developed by the USDOT, this tool is designed to help state departments of transportation, MPOs, and other organizations assess the vulnerability of their transportation assets in relation to climate stressors such as extreme heat, flooding, seas level rise, storm surge, and wind. It evaluates the characteristics of the transportation assets and identifies their exposure, sensitivity, and adaptive capacity. The VAST Tool is a Microsoft Excel-based tool that helps with better prioritization and adaptation measures of our transportation network and is effective in all regions of the US.[97]

Cascading Effects Model Toolkit

This toolkit utilizes existing data from regions' travel demand models and demonstrates how to scan a transportation network for sensitive links likely to have cascading effects on a wider

economic activity region. It develops a sensitivity profile based on types of employment activity that are most likely to be affected by disruptions. The results of this model identify critical links and rank them based on importance. The benefits of this methodology include highlighting sensitive regions, providing information for local planners, and identifying critical areas for further resilience planning.

Colorado DOT & FHWA Criticality Methodology

This methodology was initially developed to support investment decisions along Colorado's I-70 corridor. The methodology calculates criticality for different roadways by using an evenly weighted combination score based on six categories. Those categories include average annual daily traffic, roadway classification, freight value per ton, social vulnerability, system redundancy, and tourism dollars generated. The scores are then categorized - the lowest 50% of scores are considered "Low Criticality", the next 25% are "Moderate Criticality", and the highest 25% are considered "High Criticality." This methodology can be used to examine mitigation options and provide a simplified cost-benefit analysis, further providing additional information for future planning.[98]

Mitigation at Port Facilities

The Alabama State Port Authority has contingency plans to mitigate the impact of severe weather on port operations. During a heavy rain event, the Port Authority adheres to the US Coast Guard Sector Mobile Severe Weather Port Contingency Plan. This contingency plan provides guidance to port facilities and vessels in advance of a severe weather event, noting specific actions that should be undertaken during the prior days and hours. In anticipation of a severe weather event, the Port Authority or Coast Guard Sector Mobile has the authority to instruct ocean-bound vessels to depart the port prior to the event. If a vessel is not able to depart, then that vessel must have specific approval to remain in port, unless they are incapable of returning to the sea.[99] The Port Authority undertakes several additional actions to help ensure the safety of its staff and ship crews, and secure the port facilities against damage that may ensue from either a direct impact by the storm event, or from cargo or other materials that may damage infrastructure at the port facility.

Local Air Pollution

The Congestion Mitigation and Air Quality Improvement (CMAQ) program supports surface transportation improvements that provide congestion relief and thereby improve air quality. Administered by FHWA, the CMAQ program has been reauthorized under the IIJA. States receive CMAQ funds for areas in nonattainment or maintenance for ozone, carbon monoxide, and/or particulate matter as designated by the US Environmental Protection Agency (USEPA). In Alabama, because the state does not currently have any maintenance or non-attainment areas, a minimum apportionment of CMAQ funding is available for air quality projects or other elements of flexible federal aid highway spending.[100]

The IIJA has expanded the types of projects that are eligible for CMAQ funding. Several of these are relevant to freight operations, including purchase of diesel replacement for vehicles, purchase of medium/heavy-duty zero emission vehicles and related charging equipment, and modernization or rehabilitation of a lock and dam or a marine highway corridor, connector, or crossing, if certain criteria are met (≤10% of apportioned CMAQ funds).[101]

Several of the projects in ALDOT's work program will help to improve mobility, thereby reducing traffic congestion and traffic idling. These include intersection improvements as well as ITS and TSMO projects and corridor improvements. By increasing access to more truck parking, as noted in Section 6.5, there will also be fewer truck miles-traveled and less idling during staging, reducing overall emissions from heavy vehicles.

At the local level, counties and cities may enact anti-idling laws designed to reduce the impacts of emissions on surrounding communities. This may be done by the provision of a more efficient roadway network around distribution centers and other freight generating facilities, or by land use and zoning regulations that help facilitate more efficient last-mile connections between the highway network and freight facilities, and separate idling vehicles from residential uses.

Flooding and Stormwater Runoff

When there is rainfall over highways and other impervious surfaces, the ensuing stormwater runoff may carry pollutants, including chemicals, debris, and sediments, into nearby streams, ponds, and other water sources, diminishing water quality. ALDOT has an MS4 Stormwater Management Program that details stormwater management activities as well as intended goals and timeframes. During FY 2021, ALDOT continued a review of its major outfalls, or points where runoff is discharged to water bodies. ALDOT also initiated discussions with The Ray, a Georgia-based nonprofit that promotes and supports roadside green infrastructure and other sustainability measures. ALDOT plans to continue these discussions and potentially implement innovative post-construction stormwater management and vegetation management practices.[102]

Green infrastructure presents a tremendous opportunity to help reduce the impacts of flooding and stormwater runoff resulting from freight activities. As new intermodal terminals and warehousing/distribution facilities are constructed, the local governments may offer incentives to incorporate green infrastructure such as pervious pavements and rain gardens to help filtrate stormwater and reduce the impact of pollutants. For major new facilities where the Alabama Department of Community and Economic Affairs is involved, the agency may also encourage the use of green infrastructure or provide tax incentives to developers to incorporate these features. ALDOT may also consider incorporating green infrastructure for highway projects as they enter the design phase. Enhancements such as landscaped medians or permeable pavers generally add minimal cost to an overall project but can have a significant impact on reducing the negative impacts of flooding and stormwater runoff.

Wildlife Habitat Loss

As a largely rural state, Alabama has extensive natural areas that serve as critical habitats for a variety of wildlife. As freight traffic activity increases across the state, there is increased risk of interaction between wildlife and freight traffic, including animals that are hit by trucks, loss of habitat and habitat fragmentation from construction of new roads and freight-generating facilities, loss of natural habitat crossings for animals, noise and light pollution, and loss of vegetation from mowing or clear-cutting that occurs for new transportation infrastructure or freight-generating facilities.

Alabama's Wildlife Action Plan notes that the construction of large industrial developments tend to consume expansive areas of wildlife habitat. The plan also cites threats from long and narrow transportation corridors that increase wildlife mortality and fragment natural habitats. In economically distressed areas of the state, initiatives to construct new roadways to enhance job access and economic development often have unintended impacts, as these are often the same areas that have the most intact forest lands. The plan notes that major projects such as the West Alabama Corridor for Feasibility and Alignment Studies (between Mobile and Florence) and the Northern Beltway bypass around Birmingham have threatened forested areas. For each major project such as these, ALDOT prepares an Environmental Impact Statement (EIS) to document the need for the project, evaluate alternatives, assess impacts on the natural environment, and propose mitigation activities. On the local level, MPOs, counties and cities may consider targeting new warehousing and distribution facilities as infill development, utilizing vacant or underutilized properties in already-developed areas. This would help to minimize the impact on wildlife habits and provide new jobs in urban centers, which is particularly beneficial for areas that may be economically distressed.

As ALDOT develops its work program, the agency may also consider feasible alternatives to constructing new roadways in undeveloped areas. This may include expanding existing roadways or employing ITS, TSMO, or access management practices to optimize operations on existing corridors. ALDOT and local public works agencies may also work with local community development and economic development offices to encourage new warehousing/distribution facilities to be sited in a manner that enhances access to existing roadways and minimizes the construction of new, lengthy transportation corridors.

Disproportionate and Adverse Impacts to Environmental Justice Communities

Historically within the US, environmental justice communities, including minorities and low-income populations, have been disproportionately impacted by air pollution, proximity to hazardous waste, and similar public health hazards associated with freight-generating development. The US EPA's EJSCREEN tool is a mapping and screening tool that allows users to assess the proximity of environmental justice communities to a variety of indices related to public health impacts. Figure 59, for example, demonstrates how Black populations living below poverty level in the Birmingham area often reside in areas with high levels of diesel particulate matter, which may be emitted from trucks, trains, ships, or similar equipment. The highest levels of diesel

particulate matter (80th to 100th percentile) closely coincide with the greatest concentrations of these disadvantaged communities.

The aforementioned strategies to mitigate the impacts of local air pollution would apply to environmental justice communities as well. In addition, local governments and MPOs can enact local policies to minimize the disproportionate impacts of emissions and other negative externalities associated with industrial development. For example, anti-idling ordinances can help to limit emissions from heavy trucks. Industrial developments can also be required to install landscaping or noise walls to minimize auditory impacts on surrounding communities. Local governments can also strategically consider land use and zoning policies to ensure that new industrial developments are not sited near predominately low-income or minority communities.

The IIJA has includes several programs, as discussed in Section 6.3, that incentivize the use of electric trucks at major facilities. These include the Carbon Reduction Program, National Electric Vehicle Infrastructure Formula Program, Charging and Fueling Infrastructure, and Reduction of Truck Emissions at Port Facilities Grants. In addition, the CMAQ program now requires, to the maximum extent practicable, that disadvantaged communities and low-income populations be prioritized when obligating funds to reduce emissions.

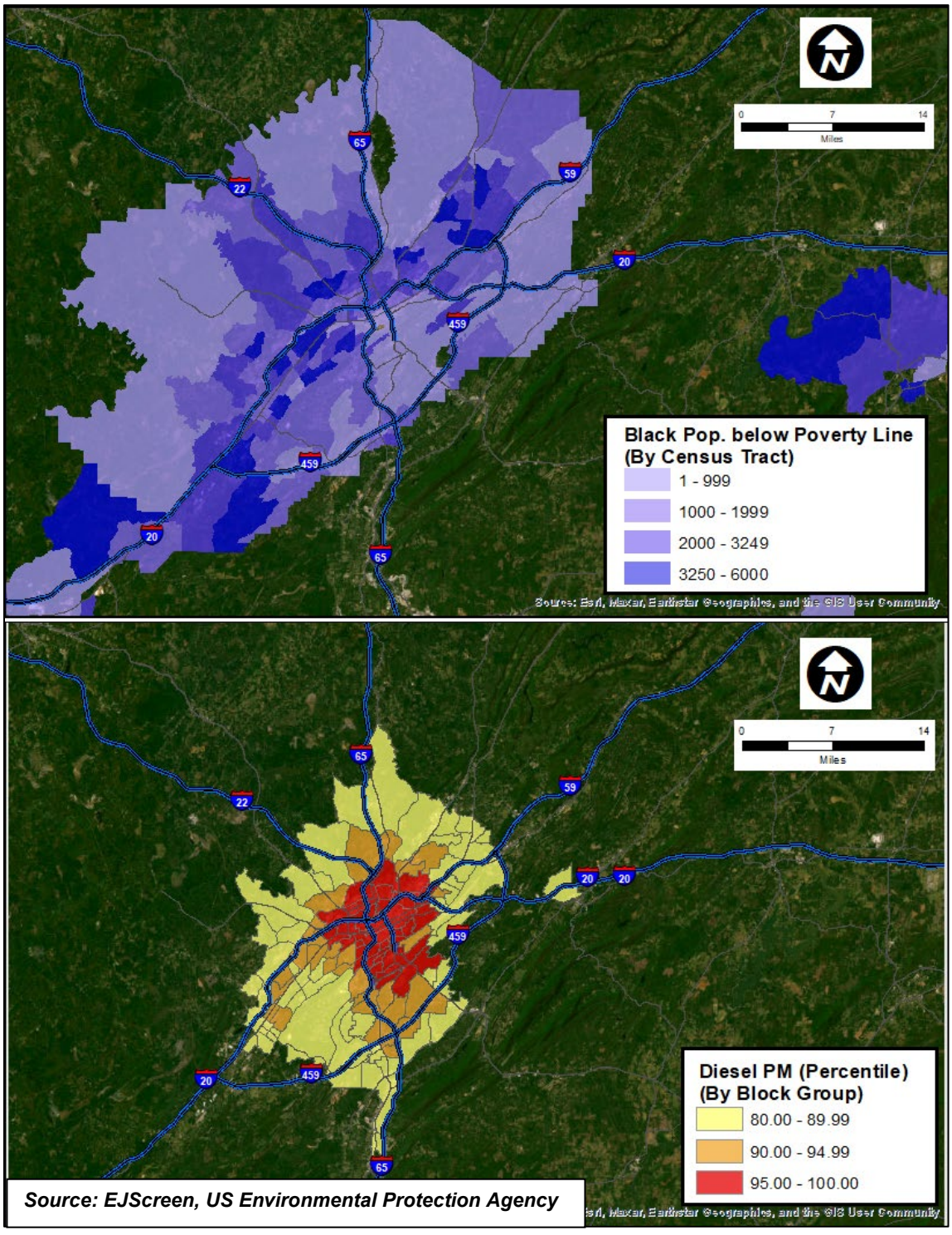


Figure 59. Diesel Particulate Matter and Black Population Below Poverty Level in Birmingham Area

Chapter 7: Freight Goals and Performance Monitoring

ALDOT has developed performance measures consistent with FHWA national performance goals. Those goals include:

- Safety – To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- Infrastructure Condition – To maintain the highway infrastructure asset system in a state of good repair.
- Congestion Reduction – To achieve a significant reduction in congestion on the National Highway System (NHS).
- System Reliability – To improve the efficiency of the surface transportation system.
- Freight Movement and Economic Vitality – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- Environmental Sustainability – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- Reduced Project Delivery Delays – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies" work practices.

While only one of these goals is specific to freight, promoting all of the goals will influence freight mobility directly or indirectly.

FHWA dictates the Truck Travel Time Reliability (TTTR) Index be utilized to assess freight movement. Highlights of this metric include:

- Reporting is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.).
- The TTTR ratio will be generated by dividing th^{e} 95th percentile time by the normal time (50th percentile) for each segment. Then, each segment's largest ratio of the five periods will be multiplied by its length, and the sum of all length-weighted segments divided by the total length of Interstate to arrive at the TTTR ratio.

ALDOT has developed the following performance measures and targets for the statewide highway network, shown in Table 27. ALDOT set the established targets PM2 and PM3 for the 1st reporting period for FY 2018 -2021. During the Mid Performance Period in 2020, an adjustment was made to the original two (2)-year targets because significant progress was not made for Interstate Reliability and Freight Reliability. Additional reporting requirements were submitted during the Mid Performance Period (2020). ALDOT utilizes Consultant Services to assist in setting and monitoring targets.

ALDOT and Consultant services completed an analysis of Truck Freight Bottlenecks. The basis of the analysis was the previous Alabama Freight Plan (2017). The analysis includes a description of methodology, list of previous truck freight bottleneck locations, related projects, and current truck bottleneck locations. Previous stakeholders' input was also solicited for this analysis. The progress made toward addressing congestion at truck bottlenecks includes projects related to the enhancement of the Interstate System. Chapter 5 provides details.

In 2022, ALDOT set the established targets for PM2 and PM3 for the 2nd performance period for FY 2022- 2025. Targets were set through a cooperative effort with the Metropolitan Planning Organizations (MPOs.) The 2022 Truck Bottleneck Locations was also submitted in federal reporting as a part of the establishing the Freight Reliability targets.

For details on Alabama's transportation performance targets, see:

https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Alabama

Table 27. Summary of ALDOT Performance Measures for 2022-2025 (Baseline, Two-Year Target, Four-Year Target)

Performance Measure	Baseline	Two-Year Target	Four-Year Target
Percentage of Pavements of the Interstate System in Good Condition	71.8%	50.0%	50.0%
Percentage of Pavements of the Interstate System in Poor Condition	1.2%	5.0%	5.0%
Percentage of Pavements of the Non-Interstate NHS in Good Condition	36.9%	25.0%	25.0%
Percentage of Pavements of the Non-Interstate NHS in Poor Condition	2.6%	5.0%	5.0%
Percentage of NHS Bridges Classified as in Good Condition	27.3%	25.0%	25.0%
Percentage of NHS Bridges Classified as in Poor Condition	0.5%	3.0%	3.0%
Percent of the Person-Miles Traveled on the Interstate that are Reliable	98.7%	92.0%	92.0%
Percent of the Person-Miles Traveled on the Non-Interstate NHS that are Reliable	95.5%	90.0%	90.0%
Truck Travel Time Reliability (TTR) Index	1.21	1.30	1.30
Annual Hours of Peak Hour Excessive Delay per Capita: Birmingham, AL	8.9	9.3	9.3

Performance Measure	Baseline	Two-Year Target	Four-Year Target
Percent of Non-Single Occupancy Vehicle (Non-SOV) Travel: Birmingham, AL	18.1%	16.5%	16.5%
Total Emissions Reductions (kg/day): PM 2.5	16.042	10.000	10.000
Total Emissions Reductions (kg/day): NOx	145.066	140.000	140.000
Total Emissions Reductions (kg/day): VOC	--	--	--
Total Emissions Reductions(kg/day): PM10	--	--	--
Total Emissions Reductions(kg/day): CO	--	--	--

APPENDIX A - Freight Advisory Committee (FAC) Roster (Invited)

Organization	Name	Title
ALDOT		
Office Engineer Bureau	Michael Hora	Deputy State Office Engineer
Office Engineer Bureau	Joe Lister	Bureau Chief, State Office Engineer
Office Engineer Bureau	Sonya Baker	Asst. Bureau Chief, Planning Studies
Office Engineer Bureau	Toni M. Arrington	Transportation Planner Senior
Local Transportation Bureau	Bryan Fair	Assistant Planning Engineer
Local Transportation Bureau	Robert B. Dees	State Local Transportation Asst. Design Engineer
Design Bureau	Oretta D Barrett	Safety Planning Administrator
Design Bureau	John M. Walker	Traffic and Safety Operations Engineer
Maintenance Bureau	Brett Sellers	Asst. State Maintenance Engineer, TSM&O
Maintenance Bureau	Asa Kirkus	Asst. State Maintenance Engineer, Management & Training
Administrative Bureau	Clay McBrien	Asst. Chief Engineer, Policy & Planning
North Region	Rodney Ellis	Pre-Construction Engineer
East Central Region	Steve Haynes	Asst. Region Engineer, Pre-Construction
East Central Region	Gary Smith	Region Pre-Construction Engineer
West Central Region	David Kemp	Region Pre-Construction Engineer
West Central Region	Brad Darden	Pre-Construction Engineer
Southeastern Region	Kris Kiefer	Region TSMO Engineer
Southwest Region	Edwin Perry	Pre-Construction Engineer
Southwest Region	Vincent Beebe	Asst. Region Pre-Construction Engineer
Airport		
Birmingham Airport Authority	Ronald F. Mathieu, C.M.	President/CEO
Birmingham Airport Authority	Jim Payne, C.M., A.C.E.	Chief Operating Officer
Mobile Airport Authority	Chris Curry, C. M.	President
Mobile Airport Authority	Ismael "Izzy" Bonilla	VP, of Operations
Montgomery Regional Airport	Wade Davis	Executive Director
Huntsville-Madison County Airport Authority	Richard Tucker	CEO
Huntsville-Madison County Airport Authority	Luther H. Roberts, Jr. AAE, CMA	Chief Operating Officer
Ports		
Alabama State Port Authority	Patrick Seals	Chief Info Officer
Alabama State Port Authority	Bill Inge	VP, of General Cargo & Central Services
Alabama State Port Authority	John C. Driscoll	Director / CEO
Alabama State Port Authority	Judith Adams	VP, of Internal/External Affairs
Port of Florence	Hal Greer	Director

Organization	Name	Title
Maritime Administration	Bruce Lambert	Gateway Director, Central Gulf and Southern Rivers
Alabama State Port Authority	Catherine Reaves	VP, of Policy & State Affairs
Port of Huntsville	Kevin Vandeburg, A.A.E.	Chief Operating Officer
Rail		
Alabama Railway Association	Maeci Walker	Executive Director
Burlington Northern Santa Fe Railway (BSNF)	Michael Garriga	Executive Director, State Government Affairs
Coosa-Alabama River Improvement Association	Blake Hardwich	Executive Director
CSX Transportation, Inc.	Jane Covington	Resident Vice President
Genesee & Wyoming Inc.	Bill Jasper	Senior VP, Southern Region
Genesee & Wyoming Inc.	Joe Arbona	Asst VP, Government Affairs
Norfolk Southern Railway Company	Elizabeth Lawlor	Resident VP, Government Relations
The Huntsville & Madison County Railroad Authority (HMCR)	John Peek	General Manager
Terminal Railway Alabama State Docks (TASD)	Mike Russell	General Manager
OnTrackNorthAmerica	Michael Sussman	President/CEO
Shippers & Carriers		
Southeast Association of Rail Shippers	Bob Gerard	Business Director
Federal Motor Carrier Safety Administration	Clinton Seymour	Division Administrator
Trucking		
Alabama Trucking Association	Tim Frazier	Director of Safety and Member Services
MPOs		
Montgomery MPO	Robert Smith	Director Of Planning
Montgomery MPO	Casey Lewis	Transportation Planner
South AL Regional Planning Commission (SARPC)	Rickey Rhodes	Exec. Director
South AL Regional Planning Commission (SARPC)	Tom Piper	Director Of Planning
City of Huntsville	Dennis Madsen	Coordinator
City of Huntsville	James Vandiver	Transportation Planner
City of Huntsville	Ken Newberry	Planner III
Regional Planning Commission of Greater Birmingham	Scott Tiillman	Director of Planning and Operations
Regional Planning Commission of Greater Birmingham	Michael "Kaz" Kaczorowski	Principal Planner
Economic Development & State Agencies		
Alabama Department of Commerce (Made In Alabama)	Greg Canfield	Secretary of Commerce

Organization	Name	Title
Alabama Department of Commerce (Made In Alabama)	Angela Till	Deputy Secretary, Business Development Div.
Alabama Law Enforcement Agency	Jeremy Baker	Traffic Homicide Coordinator
Alabama Law Enforcement Agency	Hal Taylor	Secretary of Law Enforcement
Alabama League of Municipalities	Greg Cochran	Executive Director
Alabama League of Municipalities	Baker Allen	Director Of Policy and Research
Other		
Federal Highway Administration (FHWA)	Aaron Dawson	Transportation Specialist
Federal Highway Administration (FHWA)	Vontra Giles	Community Planner
Poarch Band of Creek Indians	Stephanie Bryan	Tribal Chair
Poarch Band of Creek Indians	Casey Walker	Facilities Div. Executive Assistant

APPENDIX B - Freight-Reliant Businesses

The data presented in this appendix was derived from the Longitudinal Employer-Household Data (LEHD) and illustrates the density of freight-reliant activities within the state of Alabama. The LEHD is a US Census Bureau product that characterizes workforce dynamics and delineates employment data into specific categories from the Residence Area Characteristics (RAC) File Structure. To better understand potential last-mile destinations for freight activity, the following categories were identified as categories that rely heavily on freight activity.

- Agriculture
- Utilities
- Construction
- Manufacturing
- Wholesale Trade
- Retail Trade
- Administrative and Waste Management Services

This appendix presents a series of maps illustrating the density of jobs for individual freight-reliant business categories across the state of Alabama, as well as a brief narrative analyzing the category.

Regarding the symbology displayed on the maps for this analysis, points are aggregated into patches based on the number of points within an area. This point density reflects the concentration of freight-reliant jobs within each category. The concentrations range from “sparse” to “dense.” Areas with fewer points are more purple in color, while areas with more points will be more yellow in color. A reddish color indicates a moderate number of points. The underlying map highlights the location of the freight-reliant businesses relative to interstate highways and expressways, US and State highways, railroads, and navigable waterways.

Agriculture Jobs

Most of the agricultural activity within Alabama is distributed fairly evenly throughout the state. Primary locations of activity are generally situated outside of major metropolitan areas.

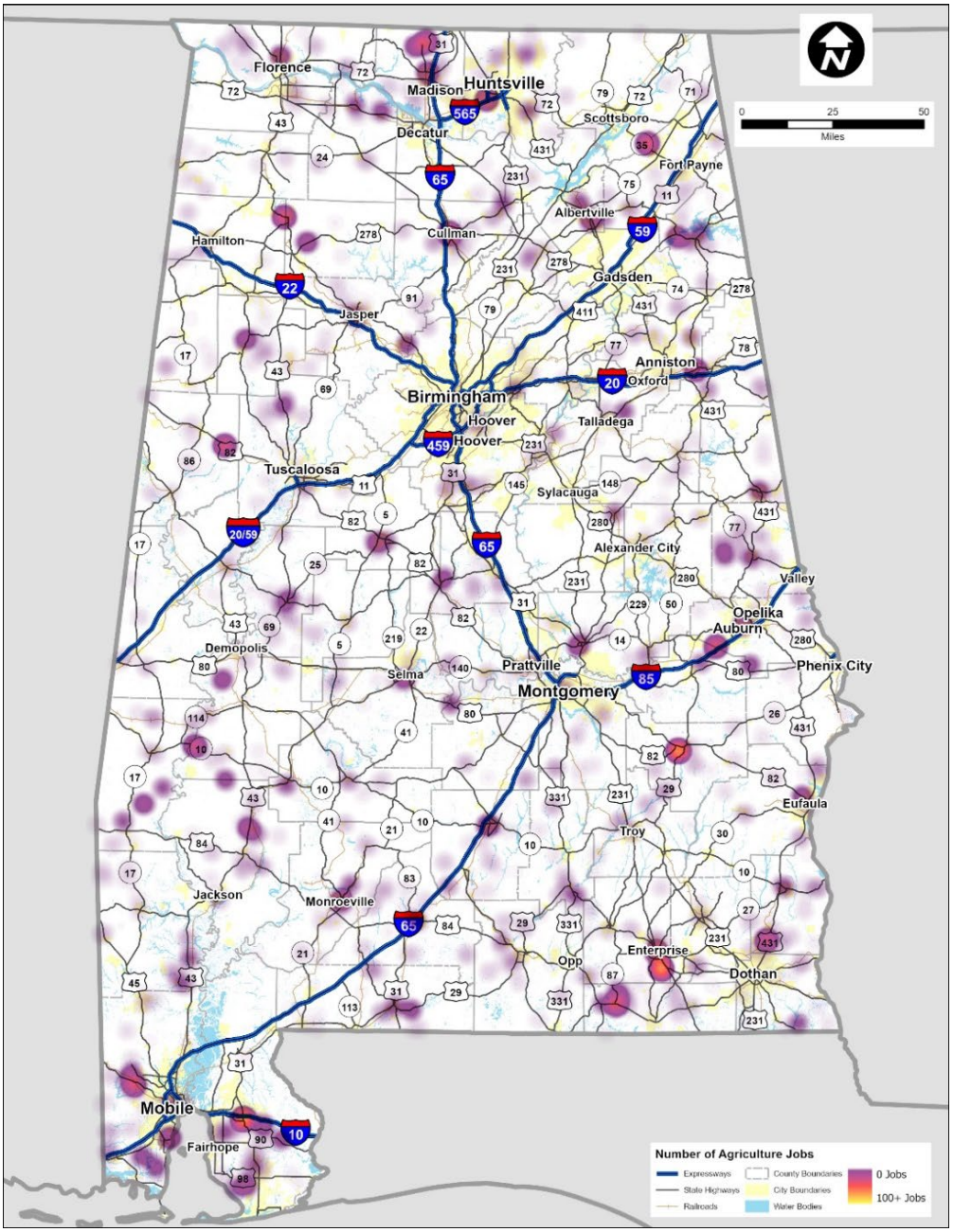


Figure 60. Agriculture Jobs in Alabama

Utilities Jobs

Most utility-related employment is located within and around the cities of Birmingham, Huntsville, Montgomery, Mobile, Florence, and Decatur.

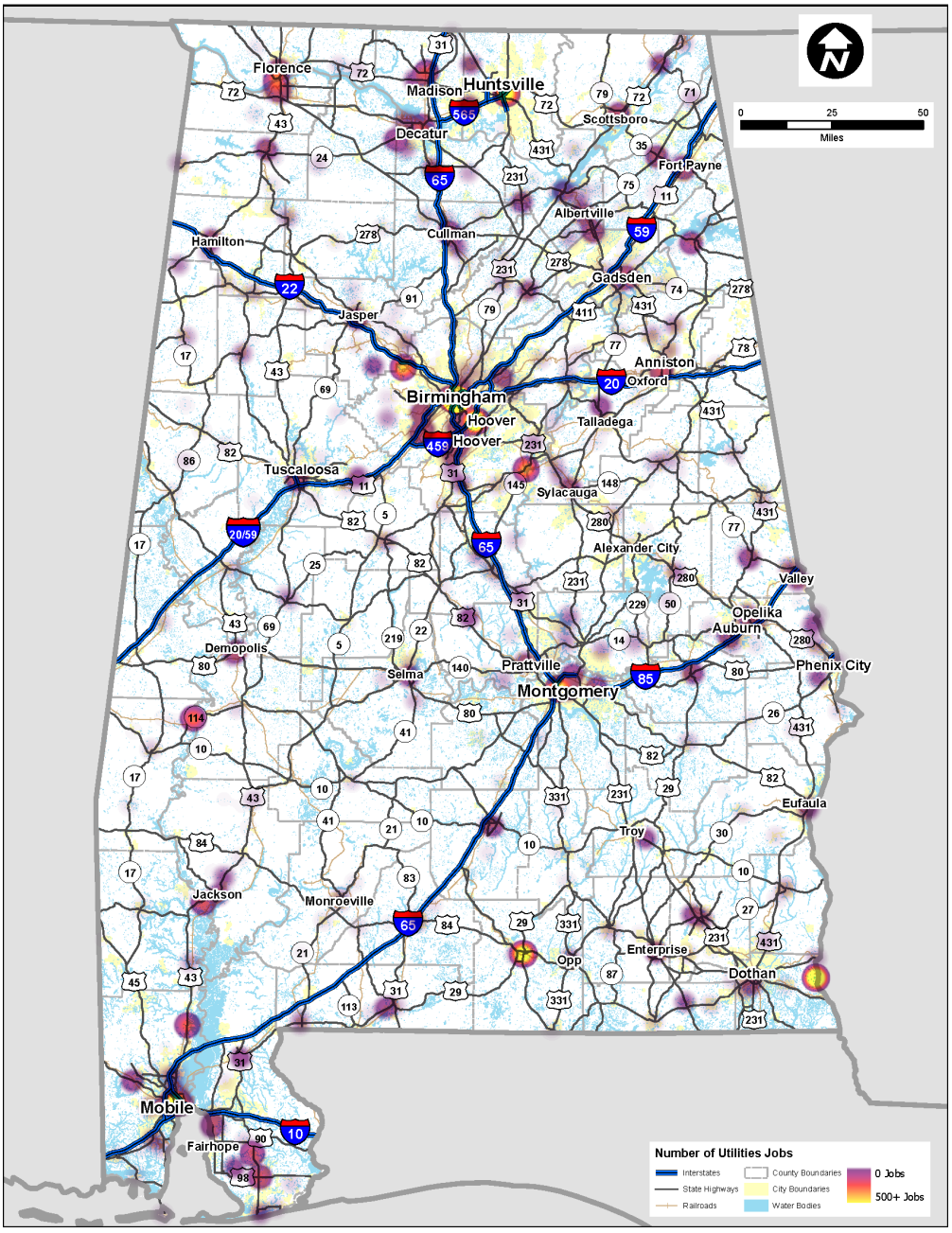


Figure 61. Utilities Jobs in Alabama

Construction Jobs

Construction is a vital industry for the state, particularly in faster-growing urbanized areas such as Birmingham, Huntsville, and Mobile.

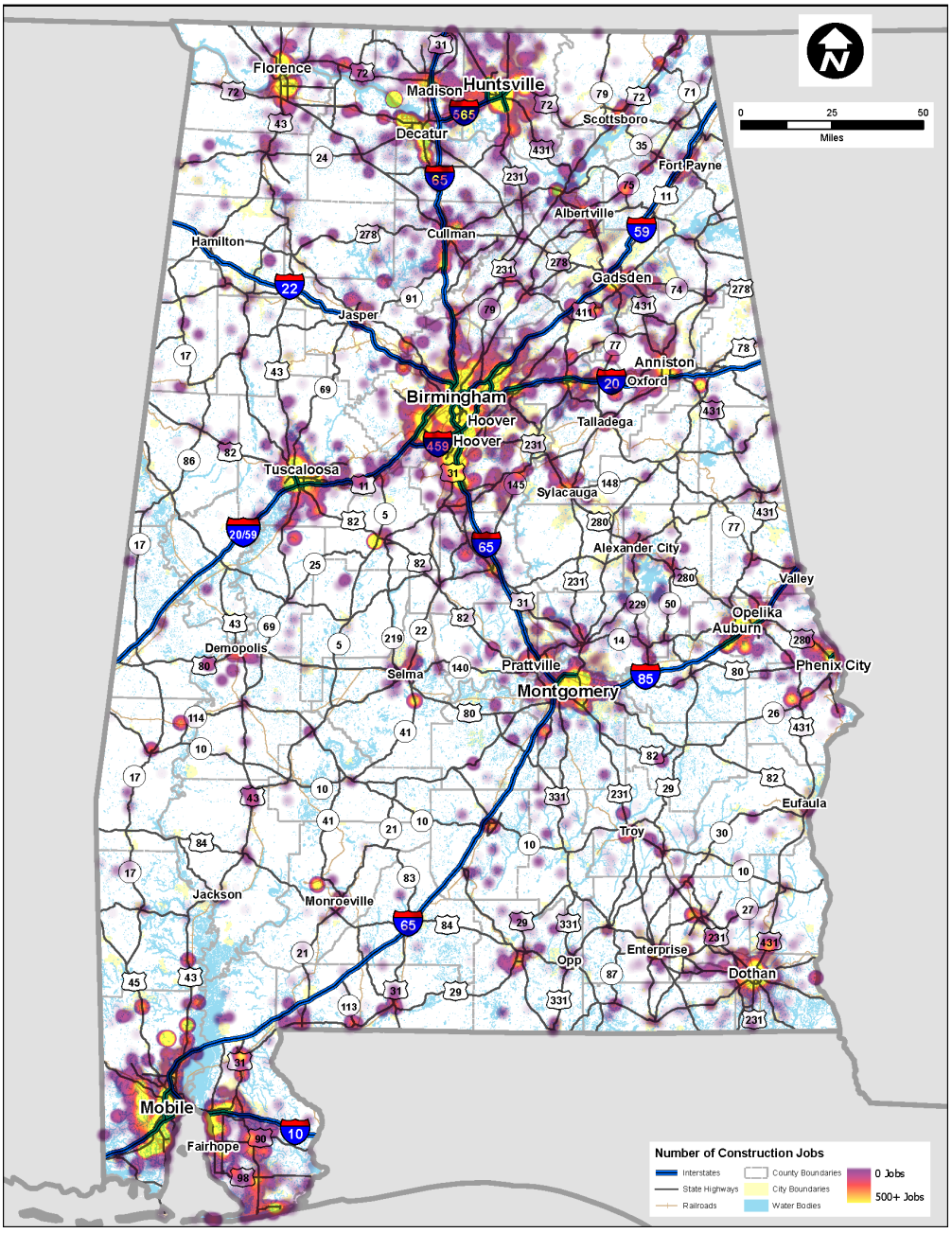


Figure 62. Construction Jobs in Alabama

Manufacturing Jobs

There are many clusters of manufacturing activity across the state. Notable areas with a very high concentration of manufacturing jobs (greater than 2,000) include Birmingham, Montgomery, Mobile, and Huntsville. Cities such as Tuscaloosa, Dothan, Auburn, Anniston, Oxford, Scottsboro, Albertville, Florence, and Gadsden also have significant manufacturing activity.

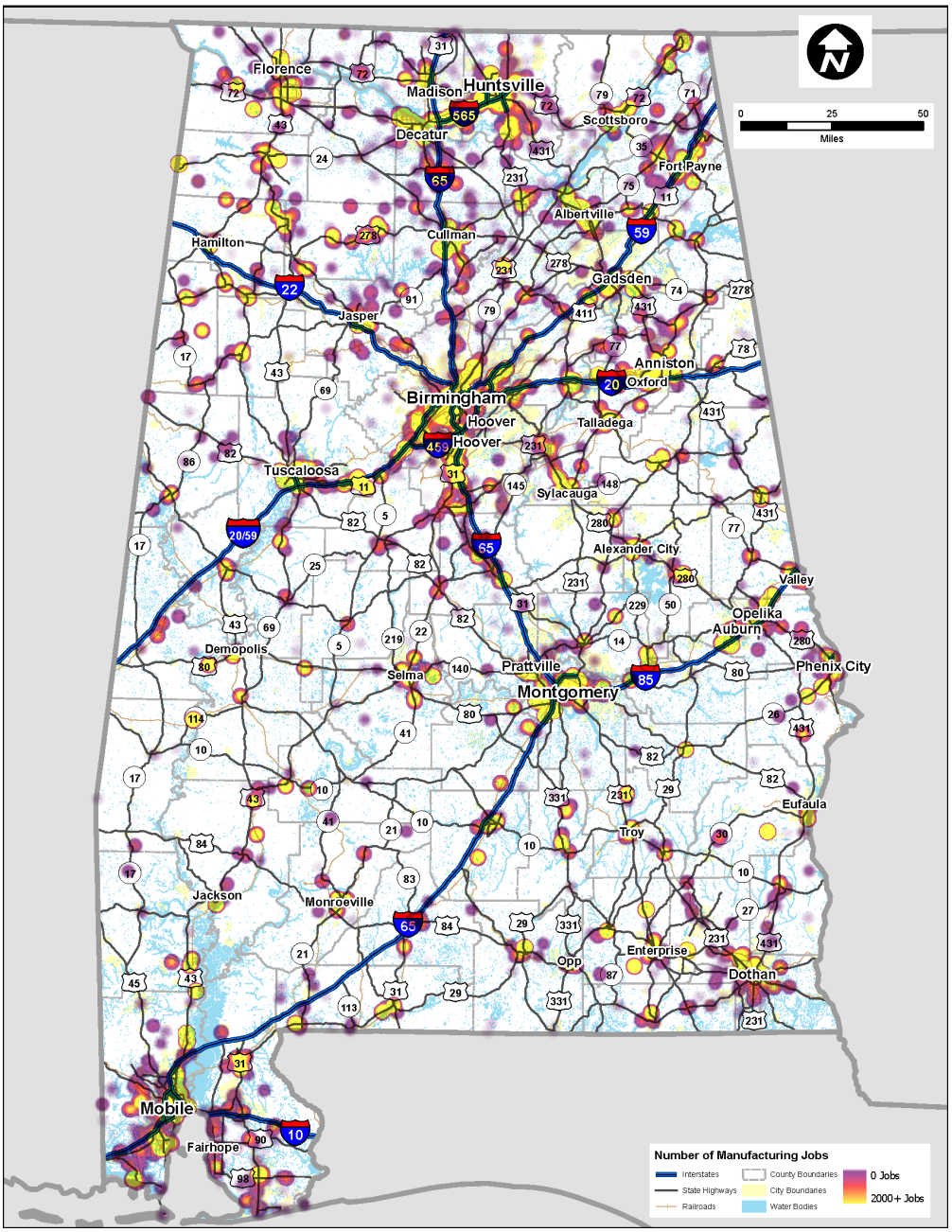


Figure 63. Manufacturing Jobs in Alabama

Wholesale Trade Jobs

Wholesale trade jobs are located mainly in urban areas throughout the state. The greatest concentration of jobs is in the Birmingham region. Other areas with significant wholesale trade activity (500+ jobs) include Mobile, Montgomery, Huntsville, Tuscaloosa, Decatur, Anniston, and Dothan.

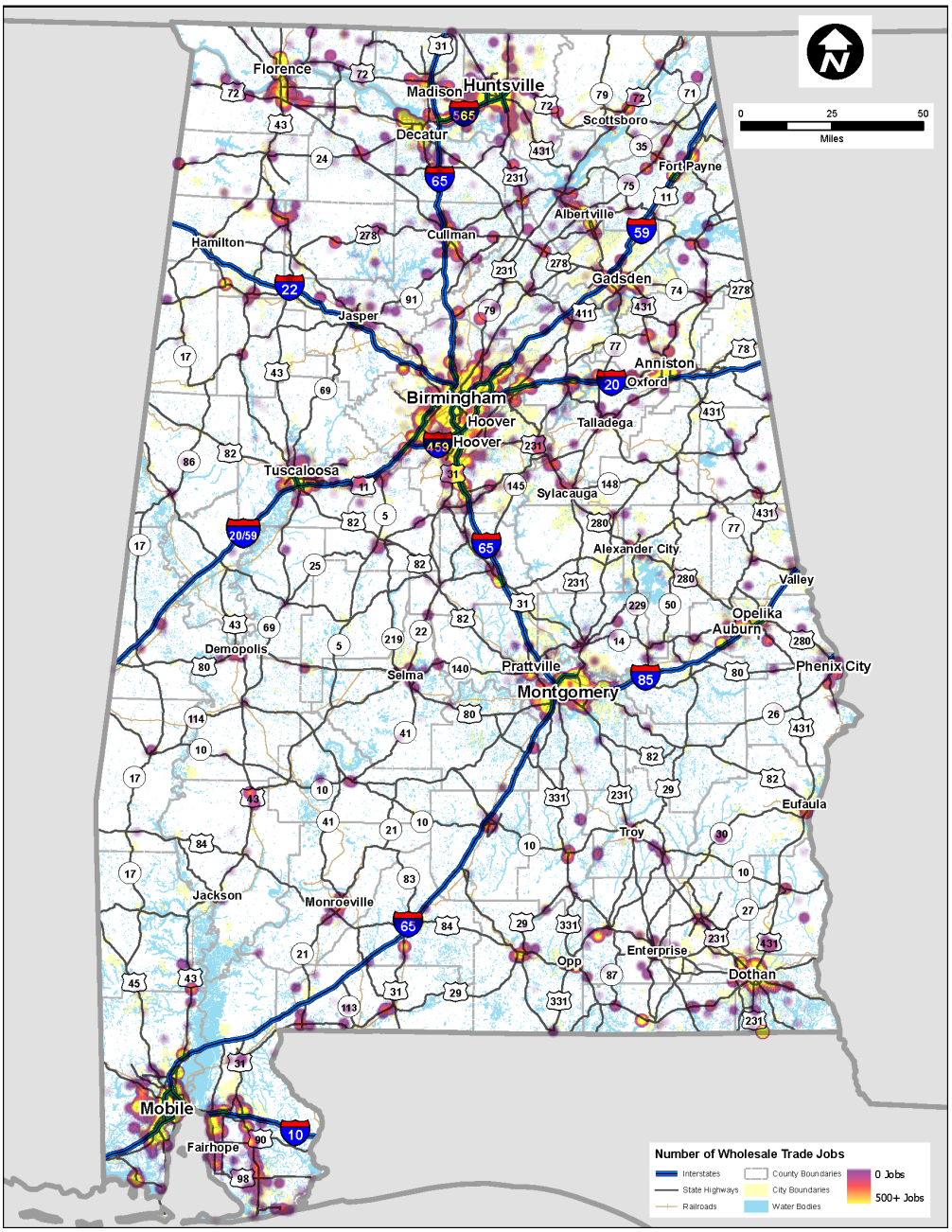


Figure 64. Wholesale Trade Jobs in Alabama

Retail Trade Jobs

The greatest concentration of retail trade jobs corresponds to larger urbanized areas such as Birmingham, Huntsville, Montgomery, and Mobile. Retail trade activity is also located between metropolitan areas and in smaller cities such as Florence, Dothan, Auburn, Tuscaloosa, Gadsden, Albertville, Cullman, Scottsboro, and Fort Payne.

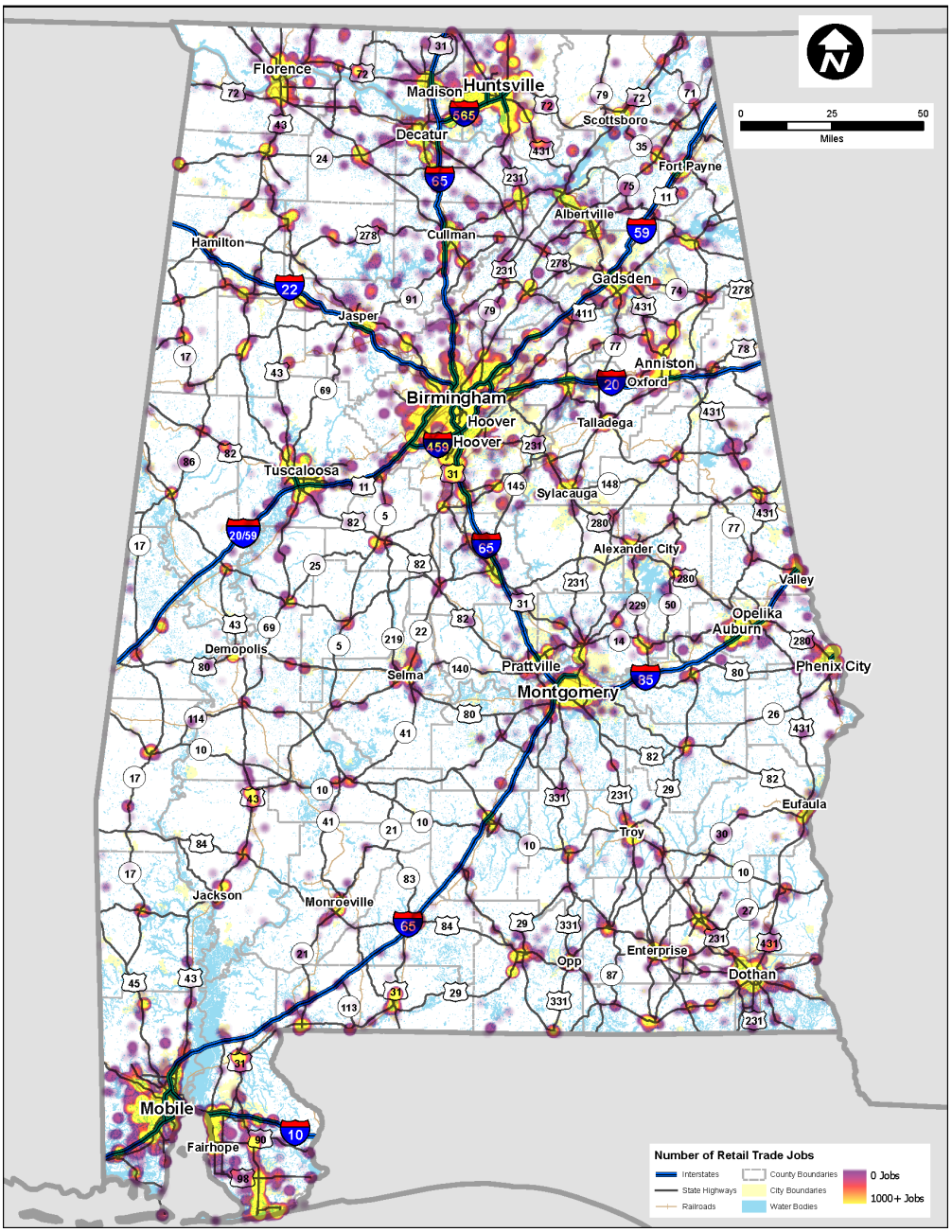


Figure 65. Retail Trade Jobs in Alabama

Administrative & Waste Management Services Jobs

Administrative and Waste Management Services related jobs are mainly located in larger urban areas within Alabama. Mobile, Montgomery, Birmingham, Huntsville, Tuscaloosa, Auburn, Dothan, Florence, Decatur, and Gadsden are cities within Alabama that have over 2,000 jobs related to this freight-reliant industry.

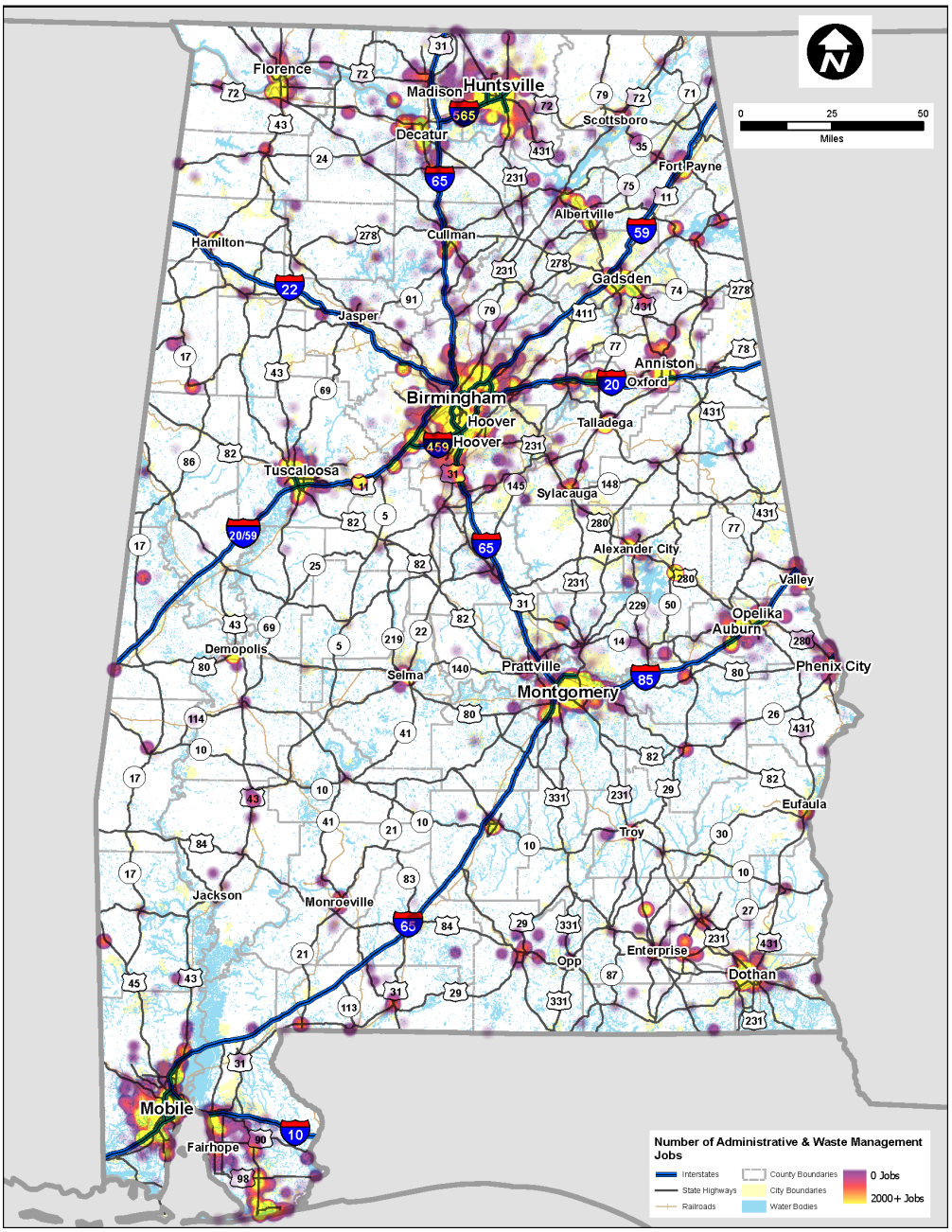


Figure 66. Administrative & Waste Management Services Jobs in Alabama

APPENDIX C - Commodity Flow Assignment

This appendix discusses the methodology to develop the truck trip tables for Alabama Statewide Travel Demand Model using the Freight Analysis Framework (FAF) data set from FHWA. The origin-destination truck trip tables and the commodity flows were developed for each FAF commodity.

Data Sources

The modeling region is the State of Alabama. The block groups were used as internal TAZs. Alabama has 3925 block groups, and there were 185 external stations identified by ALDOT, making 3,925 internal TAZs and 185 external TAZs.

Longitudinal Employer-Household Dynamics (LEHD) data was used to allocate commodities and trips from counties to TAZ.

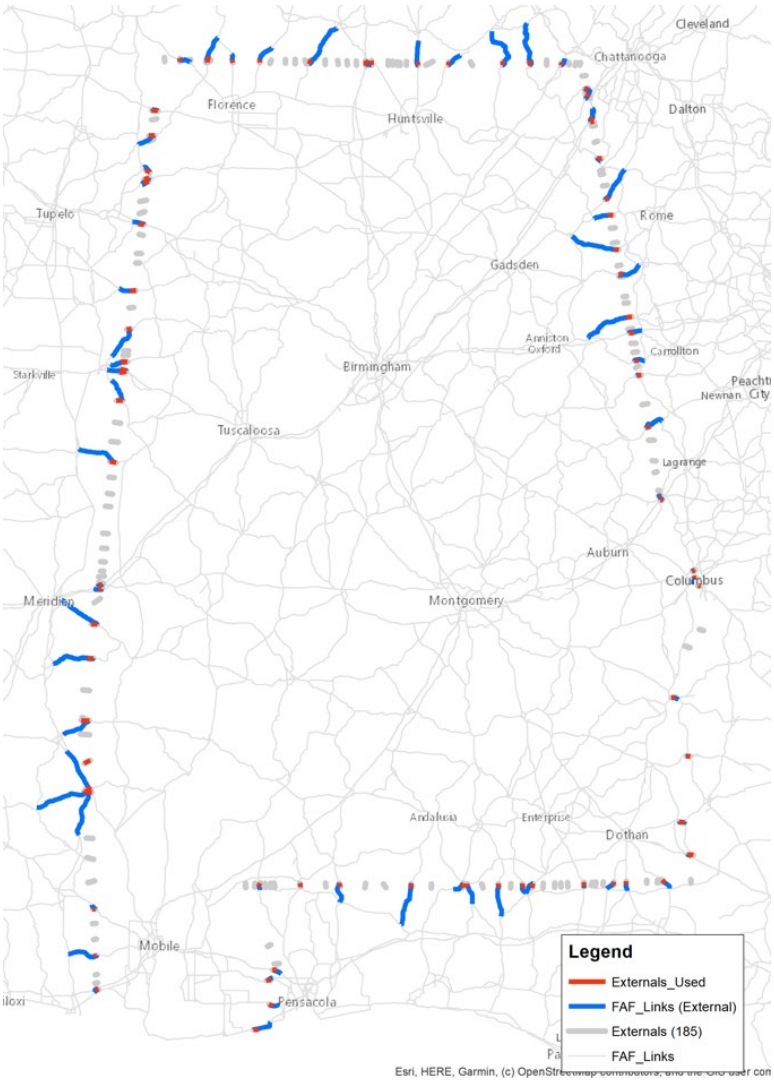
FHWA provided the 2022 FAF data that includes county-to-county tonnage and truck trips by each of the 42 FAF commodities.

Methodology

The process to convert the county-to-county flows (for tonnages and trips both) is described in the following steps.

Step 1: Select the externals to be used from the total of 185 identified

There are a total of 185 external nodes identified by ALDOT. However, the FAF used in the analysis is less dense and does not cover all the 185 links. The following figure shows the 185 externals stations (in thick gray), and those used (in red) depending on if they were on the FAF link.



Step 2: Identify the externals associated with the Internal-External (IE/EI) and External-External (EE) flows

The origin-destination (OD) flows from FAF are available from all counties to all counties within the United States. The flows from/to external counties (counties outside Alabama) need to be represented by appropriate external stations. For the IE/EI flows, there will be one external station representing the external county. For EE flows that pass-through Alabama, there will be two external stations, each representing one external county. The selection of the external station(s) in either case (IE/EI or EE) will depend on both, the origin and destination county pairs.

A process was developed to identify the most appropriate external(s) for every OD pair. The process uses the path skimming algorithm that is common in travel demand models. All links within the Alabama state were flagged as "1" and the external station links were flagged with their ID numbers, in new variables in the link layer. Using the FAF network and the county-to-county

trip tables, the skimming process is run based on the free-flow travel time. The results of the skimming process generate matrices of the variables that the user is interested in. Using the variable matrix of the Alabama link flag, it was determined whether the flow between two counties passes through Alabama or not. The OD pairs for which the flows do not occur through Alabama were discarded. For the flows that pass-through Alabama, the matrices of station ID variables were used to determine which external station (for IE/EI) or stations (for EE) were used. It should be noted that the skimming process was also tested on the shortest distance. But that provided a few cases where low functional classification routes were selected over the high functional classification routes, not representing the best truck routes. The shortest time skimming provided higher speed and more intuitive truck routes. Additional cleanups were also performed to take care of any unexpected results from the above process like getting more than one external station for an IE flow, or more than two externals for EE flows.

Two equivalencies were developed with this process - 1) An IE equivalency with the associated external to the external county, and 2) an EE equivalency with one external associated with each external county. The tables only provide a sample and a complete equivalency file can be provided upon request.

IE Equivalency sample

O County	D County	External
1001	2282	49
1001	2290	49
1001	4001	24
1001	4003	24

EE Equivalency sample

O County	D County	O External	D External
2016	12009	49	137
2016	12011	49	137
2016	12013	49	149
2016	12015	49	143

Step 3: Develop a relationship between commodity and employment to disaggregate the county values to TAZ

The distribution of tons or trips from county to TAZ requires developing the share of each TAZ within a county. The LEHD employment data by NAICS category was used for this purpose. Each commodity was associated with the NAICS categories and by the direction of flow (inbound or outbound). A regression process was developed to determine this relationship and is explained below.

The data used in this process were LEHD employment data from Alabama, Arkansas, Louisiana, Mississippi, Tennessee, Florida, South Carolina, and North Carolina, as well as that for FAF5.3 commodity movement. The process was designed to develop a relationship between inbound and outbound flows related to LEHD employment categories.

These datasets were joined such that each observation in the primed data set was a FAF zone, with attributes of employment numbers in each LEHD category as well as inbound and outbound tonnages associated with each FAF commodity. Out of the 20 NAICS employment categories, 8 were considered relevant predictors of tonnage. These were employment figures in Agriculture, Forestry, Fishing and Hunting (NAICS 11); Mining, Quarrying, and Oil and Gas Extraction (NAICS 21); Utilities (NAICS 22); Construction (NAICS 23); Manufacturing (NAICS 31-33); Wholesale Trade (NAICS 42); and Retail Trade (NAICS 44-45). The response variables (inbound and outbound tonnage of each commodity) and the predictors were transformed via log(x+1) for cleaner modeling. In total, 84 different regression models were run (42 commodities, inbound, and outbound).

For each model, the relevant predictors were found by isolating those with positive beta coefficients, and from that subset, selecting the top 3 predictors by greatest significance level. Then the beta coefficients of the 3 predictors for each model were converted into the percentage of the sum of the 3 beta coefficients, i.e.:

$$\frac{\beta_1}{\beta_1+\beta_2+\beta_3}$$

The results are a table of inbound and outbound commodities and the relationship percentages with each employment category.

For each block group, and for each commodity, the employment by NAICS category in each block group was multiplied by the percentage of the respective employment category from the table mentioned above, and total inbound and total outbound employment were calculated. The total employment (inbound or outbound) was aggregated to counties and the share of each TAZ was calculated. The origin shares came from outbound employment, and destination shares came from inbound employment. The files for all commodities were combined into a single field that includes the TAZ share of the county for each commodity.

Step 4: County to TAZ disaggregation process

Once the external counties were associated with one of the 185 externals, the disaggregation to TAZ was performed. The origin and destination flows were allocated to one of the three categories:

- “II” for Internal – Internal trips
- “EE” for External-to-External trips that pass-through Alabama

- "IE" or "EI" for trips that either start in Alabama and end out of state or vice-versa.

The datasets used were:

- The 2022 FAF flows of tonnage and trips
- II and IE/EI equivalencies
- County to TAZ origin and destination shares tables

To proportionally disaggregate the flows (tonnage and trips), each TAZ (block group) and the 185 external zones were assigned origin and destination share coefficients (developed based on the movement and employment characteristics of the zones). For II flow, both origin and destination TAZ shares were used to disaggregate the county values (tons or trips) to TAZ values. For IE flows, the external county value was allocated to the appropriate external from the equivalency file, and the internal county value was disaggregated using the TAZ shares. For EE trips, the values of both counties were assigned to the appropriate corresponding externals. Finally, the values were aggregated to obtain unique flows between every TAZ OD pair, for each commodity.

As there were 185 externals and 3,925 block groups in Alabama, the output produced was a 4,110 by 4,110 matrix of tonnage and trips for each commodity. The unit for truck trips is "Daily trips." The unit for tonnage is "Annual K-Tons."

APPENDIX D - Freight Investment Plan

#	#	CPMS ID	PROJECT DESCRIPTION	LENGTH (MI)	FREIGHT NETWORK DESIGNATION	PROGRAMMED FUNDING (BASED ON AUTHORIZATION YEAR)								
						STIP FY 2020-2023					STIP FY 2024-2027			
						2019	2020	2021	2022	2023	2024	2025	2026	2027
1	YES	100066223	RESURFACE I-65 FROM US-278 (MP 307.500) TO NEAR HURRICANE CREEK (MP 315)	8.0	PHFS									
	No Freight Funds		NATIONAL HIGHWAY FREIGHT PROGRAM			$ -								
			OTHER FEDERAL FUNDS			$ 20,941,382.66								
			STATE FUNDS			$ 2,326,820.29								
			TOTAL			$ 23,268,202.95								
2	YES	100055816	WIDEN I-10 FROM EAST OF BAYWAY BRIDGE TO 0.5 MILES, EAST OF SR-181	4.07	PHFS									
	No Freight Funds		NATIONAL HIGHWAY FREIGHT PROGRAM							$ -				
			OTHER FEDERAL FUNDS							$ 26,025,070.02				
			STATE FUNDS							$ 6,506,267.51				
			TOTAL											
3	YES	100051084	I-85 BRIDGE WIDENINGS- BRIDGES BBIN 008593 AND BIN 008593 OVER CHOCTAFAULA CREEK	0	PHFS									
	No Freight Funds		NATIONAL HIGHWAY FREIGHT PROGRAM							$ -				
			OTHER FEDERAL FUNDS							$ 5,820,530.67				
			STATE FUNDS							$ 646,725.63				
			TOTAL											
4	YES	100066878	PROJECT TO RECORD AND BILL CBD DEBT SERVICE INTERST COST FOR ISSUE (2017-2021)											
			NATIONAL HIGHWAY FREIGHT PROGRAM			$ 26,047,198.00	$ 28,941,332.00	$ 19,319,907.10						
			STATE MATCH			$ 6,511,799.50	$ 7,235,333.00	$ 4,829,976.78						
			TOTAL											
CBD DEBT REPAYMENT														
6		100074426	PROJECT TO RECORD AND BILL CBD DEBT SERVICE INTERST COST FOR ISSUE (2021-A)											
		100074428	PROJECT TO RECORD AND BILL CBD DEBT SERVICE INTERST COST FOR ISSUE (2021-B)											
			NATIONAL HIGHWAY FREIGHT PROGRAM					$ 12,515,558.90						
			STATE FUNDS					$ 1,490,609.64						
7		100064438	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2022											
			NATIONAL HIGHWAY FREIGHT PROGRAM						$ 28,213,009.00					
			STATE FUNDS						$ 3,134,778.78					
8		100064436	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2023											
			NATIONAL HIGHWAY FREIGHT PROGRAM							$ 25,785,127.00				
			STATE FUNDS							$ 2,865,014.11				
9		100075873	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2024											
			NATIONAL HIGHWAY FREIGHT PROGRAM								$ 25,785,127.00			
			STATE FUNDS								$ 2,865,014.11			
10		100075874	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2025											
			NATIONAL HIGHWAY FREIGHT PROGRAM									$ 25,785,127.00		
			STATE FUNDS									$ 2,865,014.11		
11		100075875	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2026										$ 25,785,127.00	
			NATIONAL HIGHWAY FREIGHT PROGRAM										$ 2,865,014.11	
			STATE FUNDS											
12		100075876	ATRIP AND CBD DEBT SERVICE PAYMENT FY 2027											$ 25,785,127.00
			NATIONAL HIGHWAY FREIGHT PROGRAM											$ 2,865,014.11
			STATE FUNDS											
			TOTAL NHFN			**$ 26,047,198.00**	**$ 28,941,332.00**	**$ 31,835,466.00**	**$ 28,213,009.00**	**$ 25,785,127.00**	**$ 25,785,127.00**	**$ 25,785,127.00**	**$ 25,785,127.00**	**$ 25,785,127.00**

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