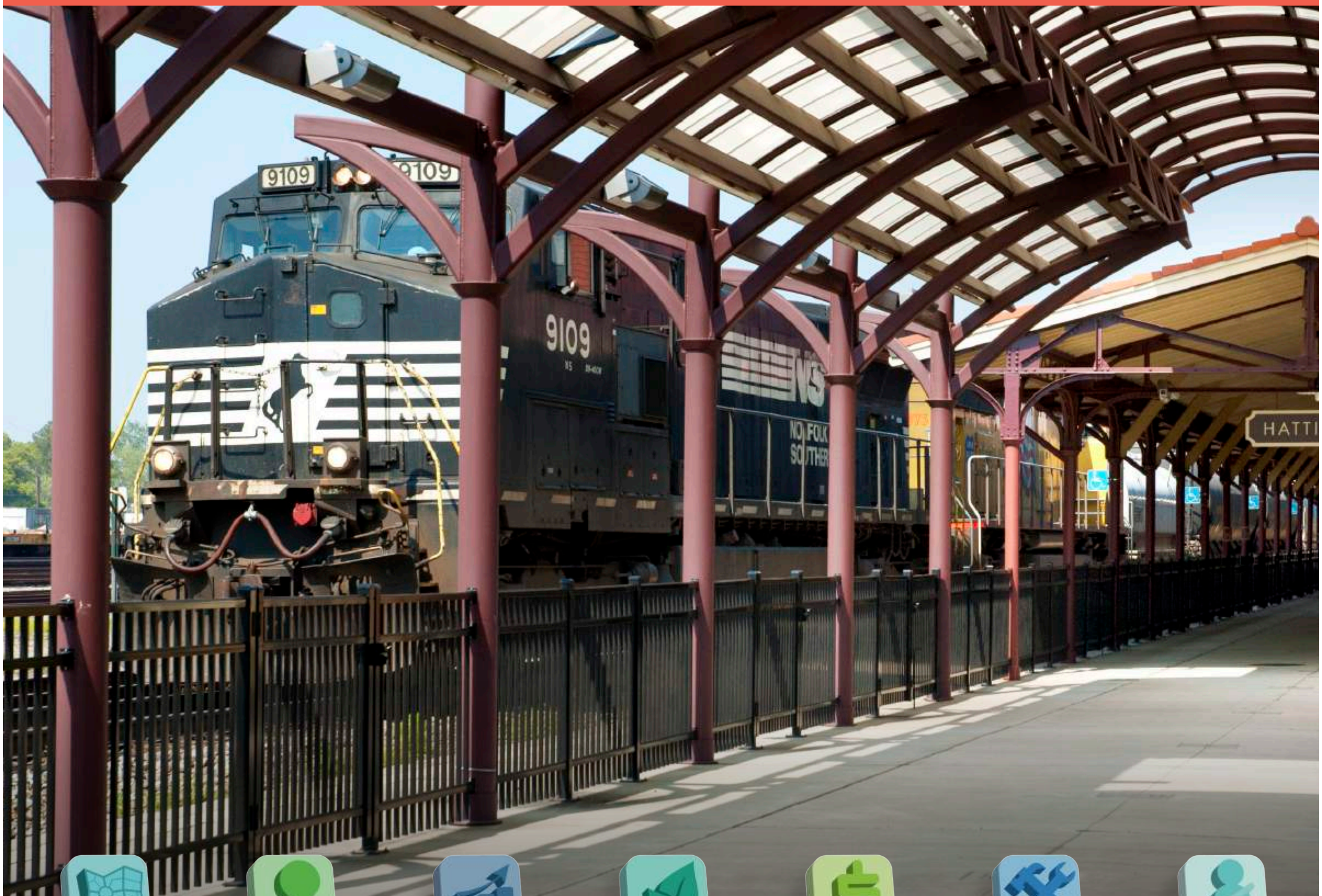

Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization

2040 Metropolitan Transportation Plan

December 2015

FINAL DRAFT

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1.0 Introduction

The 2040 Metropolitan Transportation Plan (MTP) is the long-range transportation plan for the Hattiesburg Metropolitan Planning Area (MPA), replacing the 2035 MTP. The 2040 MTP was developed concurrently with the 2040 Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN).

The 2040 MTP sets a regional vision and course of action for addressing the transportation needs of the Hattiesburg MPA over the next twenty-five years. Its recommendations are the result of public input, technical analysis, and close coordination between local municipalities and counties, public transportation providers, the Mississippi Department of Transportation (MDOT), and other members of the Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization (MPO).

The 2040 MTP utilizes a performance-based approach to metropolitan transportation planning that is described in detail in Chapter 2: Plan Development Process.

1.1 The Metropolitan Planning Organization (MPO)

Purpose and Primary Functions

An MPO is a federally-mandated transportation policy-making body made up of representatives from local government and transportation agencies who have authority and responsibility within the MPAs.

With the passage of the Federal-Aid Highway Act of 1962, Congress made metropolitan transportation planning a condition for receipt of federal funds for transportation projects in urban areas with a population of 50,000 or greater. That legislation, and subsequent legislation, has encouraged a continuing, cooperative, and comprehensive (3-C) transportation planning process between MPOs, states, and public transit providers in these urban areas.

According to the Federal Highway Administration (FHWA) report *The Transportation Planning Process: Key Issues*, there are six core functions of an MPO:

1. **Establish a setting for effective decision-making:** Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.
2. **Identify and evaluate transportation improvement options:** Develop transportation improvement options and use data and planning methods to evaluate whether those options support criteria and system performance targets. Planning studies and evaluations are included in the Unified Planning Work Program (UPWP)

4. **Prepare and maintain a Metropolitan Transportation Plan (MTP):** Develop and update a long-range transportation plan for the metropolitan area covering a planning horizon of at least 20 years. MPOs prepare MTPs using performance measures and targets.
5. **Develop a Transportation Improvement Program (TIP):** Develop a short-range, four-year program of priority transportation improvements drawn from the MTP. The MPO creates the TIP with spending, regulating, operating, management, and financial tools. The TIP represents immediate priority actions to achieve the area's goals and associated system performance targets.
6. **Identify performance measure targets and monitor whether implemented projects are achieving targets:** MPOs coordinate with state and public transportation operators to establish performance targets that address performance measures, as set forth in federal law, related to surface transportation and public transportation. A System Performance Report, that tracks progress in meeting performance targets, will be prepared when updating future plans.
7. **Involve the public:** Involve the general public and other affected constituencies related to the essential decision-making elements listed above.

Federal Designation

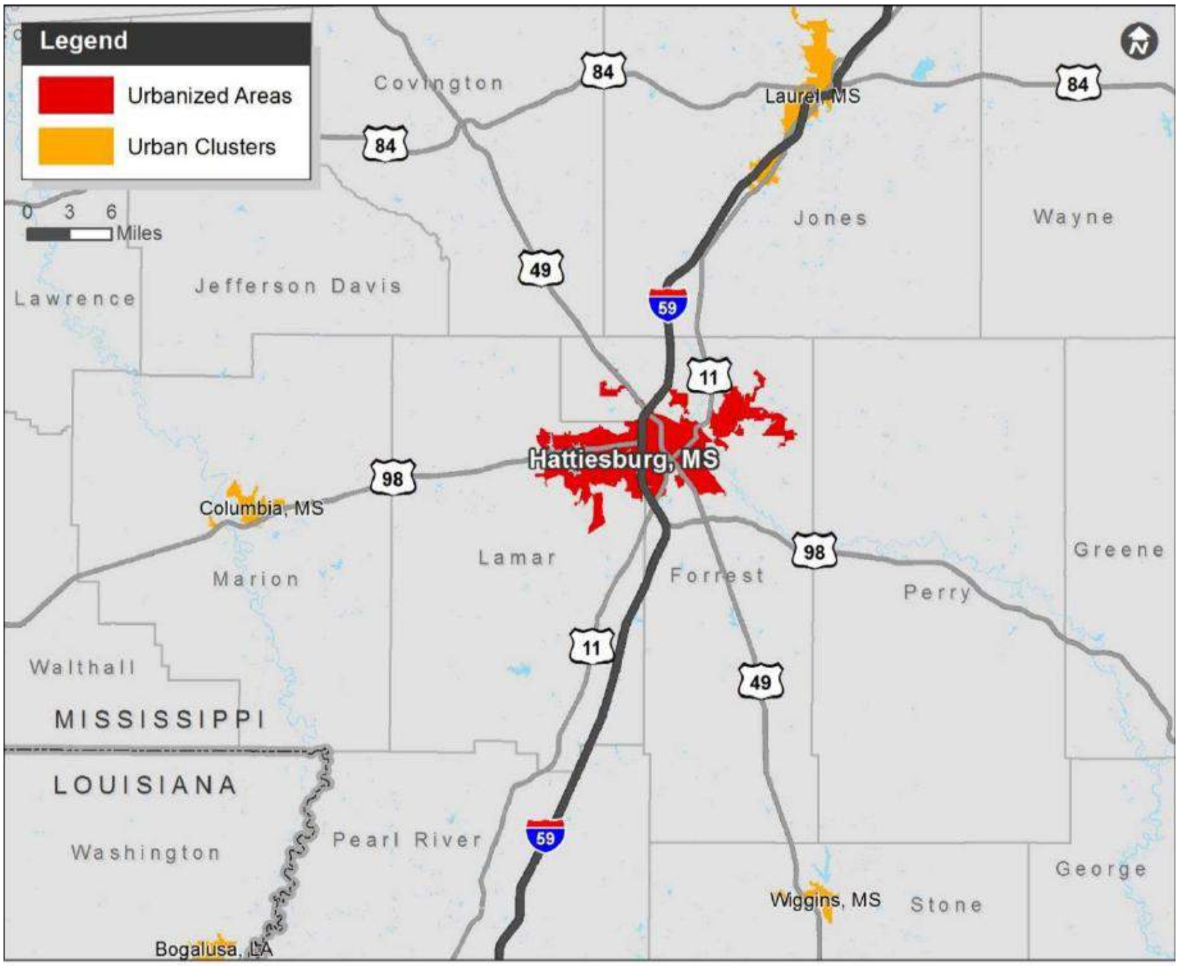
The Census Bureau defines urban areas after each decennial census, with all other areas being classified as rural. After identifying urban areas, the Census Bureau classifies all urban areas as either an urbanized area or an urban cluster. Urbanized areas must have at least 50,000 people, while urban clusters are all remaining urban areas or those with a population ranging from 2,500 to 49,999.

MPOs have authority within an area referred to as the MPA. MPAs are established around urbanized areas with formalized agreements between the affected jurisdictions and the governor(s) of the affected state(s). Typically, the MPA includes the smoothed urban area and all areas expected to urbanize within the next 20 years. The MPA boundary may also be influenced by jurisdictional lines, physical features of the landscape, or major roadways.

After the 2010 Census, urban areas were redefined. The first step in identifying the extent of urban areas is to identify a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with any adjacent territory containing non-residential urban land uses. Then, additional densely settled areas are added to this core based on their proximity. Finally, to qualify as an urban area, the area identified by Census Bureau criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters.

Following the 2010 Census, the Census Bureau identified just over 450 urbanized areas in the United States. Figure 1.1 shows the location of urban clusters and urbanized areas near the Hattiesburg Urbanized Area.

Figure 1.1 Nearby Urban Areas



Disclaimer: This map is for planning purposes only.
Map Source: Neel-Schaffer, Inc.

Based on US 2010 Census data
Data Sources: Census Bureau

About the Hattiesburg-Petal-Forrest-Lamar MPO

The Hattiesburg-Petal-Forest-Lamar Metropolitan Planning Organization (HPFLMPO) was created after the 1980 Census, at which point the urban area centered around Hattiesburg exceeded 50,000 persons and was designated an urbanized area. The City of Hattiesburg serves as the Lead Planning Agency (LPA) for the MPO, with its Department of Urban Development fulfilling MPO staffing requirements.

Figure 1.2 shows the boundaries of the smoothed Hattiesburg urbanized area and the HPFLMPO's MPA. Again, the MPA encompasses the smoothed urban area and contiguous areas likely to become urbanized within the next 20 years.

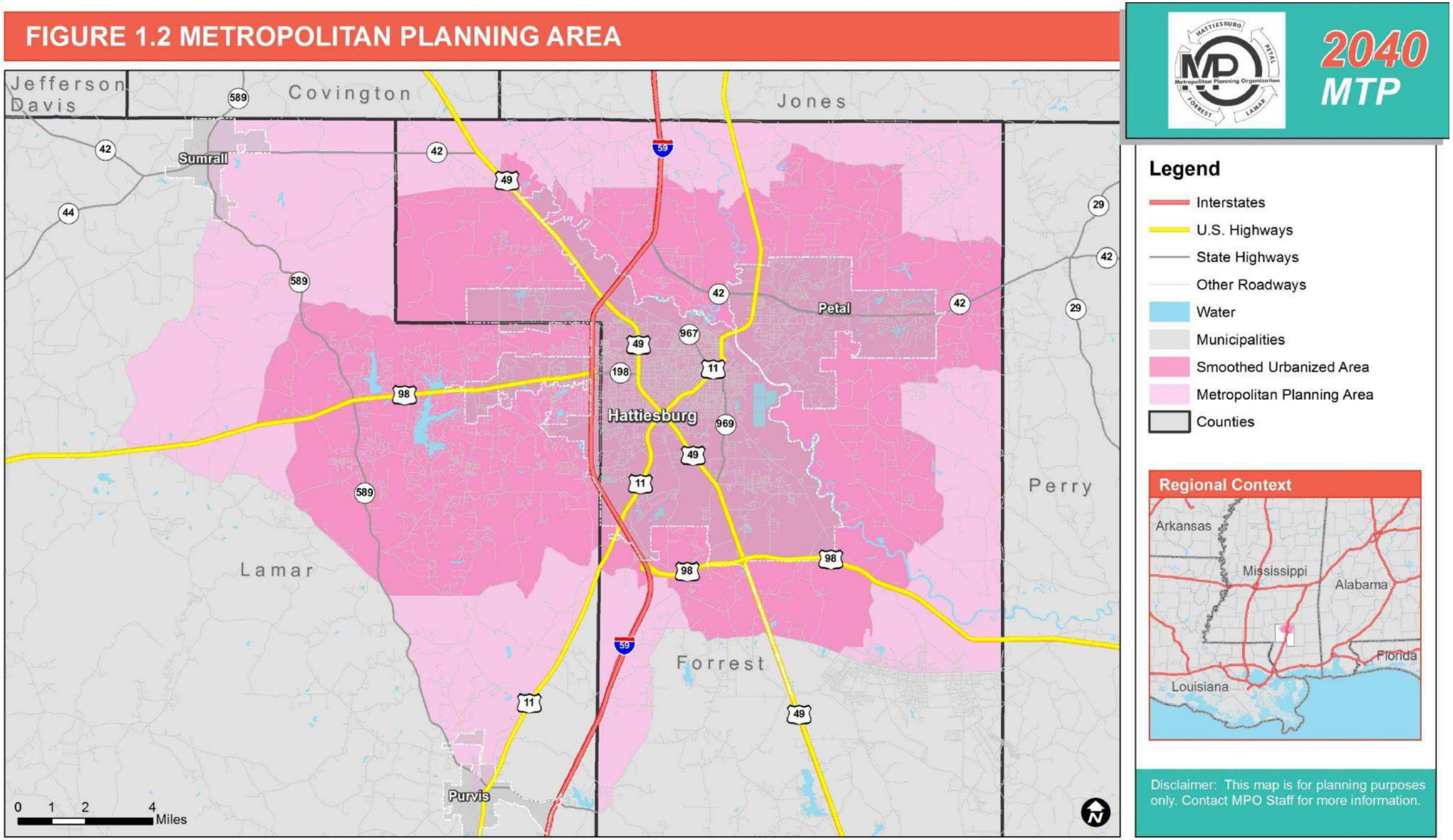
The Hattiesburg MPA includes the Hattiesburg urbanized area but does not include any other urban areas. The 2010 population for the Hattiesburg MPA is approximately 106,500. Most of the MPA population, approximately 97,500, is within the smoothed urbanized area.

All local governments within the smoothed urbanized area are members of the MPO and they are encouraged to actively participate in the metropolitan transportation planning process. These local governments include:

- City of Hattiesburg
- City of Petal
- Forrest County
- Lamar County

In addition to local governments, public transportation providers, the Mississippi Department of Transportation (MDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and other stakeholders participate in the MPO transportation planning process.

FIGURE 1.2 METROPOLITAN PLANNING AREA



Map Source: Neel-Schaffer, Inc.

Data Sources: Census Bureau; MPO Staff

Organizational Structure and Committees

Two committees shape the decision-making process of the MPO: the Policy Committee, which is the official decision-making body and the Technical Committee, which advises the Policy Committee on technical matters of projects, plans, and programs.

Policy Committee

The Policy Committee reviews all recommendations from the Technical Committee and makes final decisions regarding all documents and products produced by the MPO including, but not limited to the Unified Planning Work Program (UPWP,) Metropolitan Transportation Plan (MTP), Public Participation Plan (PPP), and Transportation Improvement Program (TIP).

Policy Committee membership is comprised of elected officials from municipalities and counties within the MPO, as well as state and federal agencies holding an interest in transportation planning. Members consist of the following:

- The Mayor of the City of Hattiesburg;
- The Mayor of the City of Petal;
- The Board President of Forrest County;
- The Board President of Lamar County;
- The Mississippi Department of Transportation;
- The Federal Highway Administration; and
- The Federal Transit Administration.

Technical Committee

The Technical Committee serves as an advisory committee that makes recommendations to the Policy Committee regarding all documents and products produced by the MPO including, but not limited to the UPWP, MTP, PPP, and TIP.

Committee membership is comprised of public works officials, engineers, planners and other representatives whose skills and training are more technical in nature. Members represent each of the county and municipal jurisdictions located in the MPO, state and federal transportation agencies, and other agencies involved in streets/highways, public transportation, bicycling/walking, aviation, and freight. Members consist of the following:

- City of Hattiesburg;
- City of Petal;
- Forrest County;
- Lamar County;
- The Mississippi Department of Transportation;
- The Federal Highway Administration;
- University of Southern Mississippi;
- Hattiesburg/Laurel Regional Airport;
- Southern Mississippi Planning and Development District;
- Hub City Transit;
- Illinois Central Railroad; and
- Norfolk Southern Corporation.

1.2 The Metropolitan Transportation Plan

Purpose and Authority of Plan

Since the 1962 Federal-Aid Highway Act, federal legislation has required metropolitan transportation plans for urban areas with a population of at least 50,000 as a condition of receipt of surface transportation funds. Today, metropolitan transportation plans are governed by Federal Law 23 U.S.C. §134 and regulations codified in 23 C.F.R. §450.

According to the FHWA's The Transportation Planning Process: Key Issues:

> "Metropolitan transportation planning is the process of examining travel and transportation issues and needs in metropolitan areas. It includes a demographic analysis of the community in question, as well as an examination of travel patterns and trends. The planning process includes an analysis of alternatives to meet projected future demands, and for providing a safe and efficient transportation system that meets mobility while not creating adverse impacts to the environment."

The primary purpose of metropolitan transportation planning, and MTPs by extension, is to ensure that transportation planning in urbanized areas is carried out through a continuing, cooperative, and comprehensive (3-C) planning process. This 3-C process ensures that transportation planning is based on the most current information, reflects regional needs and priorities that are consistent with those of the state, takes into account all modes of transportation, and is consistent with other planning efforts, such as land use and economic-development plans.

Adoption of the MTP is the first step towards the implementation of any transportation project using federal funds or any regionally significant transportation project, regardless of funding source. Following formal adoption of the plan, a project can be programmed for design, right-of-way acquisition, or construction in the Transportation Improvement Program (TIP), which identifies funding sources, fiscal year(s) of implementation, and the estimated amount of funding to be used.

Federal Requirements

Every MPO must prepare and update a transportation plan for its MPA in accordance with the federal requirements set forth in federal law (23 U.S.C. §134) and codified in 23 C.F.R. §450. Aside from ensuring that the metropolitan transportation planning process is continuous, cooperative, and comprehensive, the MTP must provide for consideration and implementation of projects, strategies, and services that will address the following eight planning factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

MTP Development and Content

The MTP must utilize the most recently available, valid information and assumptions to provide long- and short-range strategies and actions for the MPA that preserve and enhance the multimodal transportation system and facilitate the safe and efficient movement of people and goods.

Federal regulations (23 C.F.R. §450) require the MTP to include:

- Projections of future demand of people and goods over the period of the plan (at least 20 years);
- Inventory of existing and proposed transportation facilities, with an emphasis on nationally and regionally significant facilities;
- Operational and management strategies that improve the efficiency and safety of the existing transportation system;
- Capital investment and other strategies to preserve the existing and future transportation system and improve multimodal capacity based on regional priorities and needs;
- Evaluation of environmental impacts and potential mitigation activities;
- Pedestrian and bicycle transportation facilities;
- Transportation and transit enhancement activities;

- A financial plan that demonstrates that the plan is fiscally constrained;
- Comparison of the transportation plan with state and local conservation plans and maps and natural and historic resource inventories, if available;
- A safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the MPA contained in the state's Strategic Highway Safety Plan;
- Reasonable opportunity for the public and all relevant parties to review the transportation plan and to provide comments; and
- Consideration of the results of a Transportation Management Area's Congestion Management Process.

Transportation Management Areas and the Congestion Management Process

Urbanized areas with populations exceeding 200,000 typically have more complex transportation systems and associated challenges than smaller regions. Accordingly, these large urbanized areas have additional planning responsibilities and are designated as Transportation Management Areas (TMAs).

The major MTP-related requirement for TMAs is the development of a Congestion Management Process (CMP). The CMP is intended to address congestion through a process that provides for effective transportation system management and operations, based on cooperatively developed travel demand reduction and operational management strategies. The CMP establishes a systematic method to identify and evaluate transportation improvement strategies, including operations and capital projects.

Projects and strategies from the CMP should be considered for inclusion in the MTP and subsequently, the TIP.

The Hattiesburg urbanized area does not exceed 200,000 in population nor is expected to increase by 2040.

Air Quality Attainment

Areas exceeding air quality standards for transportation-related pollutants are designated as either an air quality nonattainment area or maintenance area. If an MPO includes nonattainment or maintenance areas, it must ensure that it's MTP, TIP, and federally funded projects conform to the purpose of the state's air quality plan, known as the State Implementation Plan (SIP).

Areas designated as air quality nonattainment areas must also update their plans every four years as opposed to every five years.

The HPFLMPO is currently in attainment for air quality pollutant emissions. However, the U.S. Environmental Protection Agency (EPA) does periodically update air quality standards. In the future, the MPO could become a non-attainment area if standards become higher or pollution becomes worse in the region.

Consistency with Other Plans

A major federal requirement of the MTP is that it is consistent with other plans.

The metropolitan transportation planning process must be carried out in coordination with the statewide transportation planning process. The MTP should be consistent with state's Strategic Highway Safety Plan and any other safety and security plans. Both the Statewide Transportation Improvement Program (STIP) and TIP must be consistent with the MTP. Changes must be made to the MTP before changes can be made in the TIP or STIP.

The MTP should be developed to be consistent with the coordinated public transit human services transportation plan and any plans for regional Intelligent Transportation Systems (ITS) architecture.

The MTP should also be developed to be consistent with locally-adopted planning documents, such as land use plans and economic development plans.

Planning Horizon and Update Cycle

The MTP must have a planning horizon of at least 20 years from its effective date and be updated at least every four years in air quality nonattainment and maintenance areas, and at least every five years in attainment areas. This requirement ensures that transportation plans remain valid and consistent with current and forecasted transportation and land use conditions.

The 2040 MTP must be updated at least five years from its adoption date, since the MPA is not a designated nonattainment or maintenance area. In order to maintain a 20-year planning horizon, the 2040 MTP must be updated and adopted by the same adoption date in 2020.

In between the five-year update cycle, the MPO may make amendments and modifications to the MTP at any time without a requirement to extend the horizon year. However, these revisions must be approved by the MPO under the requirements set forth in the PPP and described later in this chapter.

Transportation Equity

According to the FHWA document The Transportation Planning Process Briefing Book:

> "Transportation Equity refers to the way in which the needs of all transportation system users, in particular the needs of those traditionally underserved by existing transportation systems, such as low-income and minority households, older adults, and individuals with disabilities, are reflected in the transportation planning and decision making process and its services and products. Transportation Equity means that transportation decisions deliver equitable benefits to a variety of users and that any associated burdens are avoided, minimized, or mitigated so as not to disproportionately impact disadvantaged populations."

Federal legislation and executive orders prohibit discrimination and/or exclusion from participation in any program or activity receiving federal financial assistance on the basis of race, color, national origin, disability, income, minority-status, or Limited-English Proficiency. The MPO's Public Participation Plan (PPP) specifies the manner in which the MPO prevents discrimination and accommodates these populations. The PPP is discussed further in Chapter 2: Plan Development Process.

Title VI of the Civil Rights Act of 1964 ensures that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, or national origin.

The Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990 encourages the participation of people with disabilities in the development of transportation and paratransit plans and services.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. There are three fundamental Environmental Justice (EJ) principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Executive Order 13166: Improving Access to Services for Persons with limited English Proficiency was signed by President Clinton in 2000. Along with Title VI of the Civil Rights Act of 1964, the federal government requires federal agencies to examine the services they provide, identify any need for service to those with limited English proficiency (LEP), and develop and implement a system to provide those services so LEP persons can having meaningful access to them. For recipients of federal financial assistance, such as MPOs, the federal government requires provision of meaningful access to their LEP applicants and beneficiaries.

Performance-Based Planning

According to the FHWA report Performance Based Planning and Programming Guidebook:

> "Performance-Based Planning and Programming (PBPP) refers to the application of performance management within the planning and programming processes of transportation agencies to achieve desired performance outcomes for the multimodal transportation system. PBPP attempts to ensure that transportation investment decisions are made - both in long-term planning and short-term programming of projects - based on their ability to meet established goals."

The most recent transportation legislation, the Moving Ahead for Progress in the 21st Century Act (MAP-21), was adopted in 2012. One of its most significant changes to the metropolitan transportation planning process is that it mandates performance-based planning for all MPOs. While the United States Department of Transportation (USDOT) is currently in the rulemaking stage of creating performance-based planning regulations, some information and guidance has already emerged.

In general, MTPs and TIPs will be required to be developed through a performance-driven, outcome-based approach that supports the national goals stated in MAP-21 and illustrated in Table 1.1.

Table 1.1 MAP-21 National Performance Goals

Goal Area	National Goal
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
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

Source: FHWA

MPOs will also be required to monitor national performance measures developed by USDOT and track these measures over time. Performance measures under development by USDOT reflect most of the national goals articulated in MAP-21. Though subject to further clarification, the performance measures currently proposed by USDOT include:

- The number of serious injuries and fatalities;
- Serious injuries and fatalities per 100 million vehicle miles traveled on public roads;
- The condition of pavements on the interstate system;
- The condition of pavements on the National Highway System (excluding the interstate);
- The condition of bridges on the National Highway System;
- The performance of the Interstate System;
- The performance of the National Highway System (excluding the Interstate System);
- Traffic congestion;

- Freight movement on the Interstate System;
- On-road mobile source emissions; and
- Public Transit state of Good Repair.

Once all of the national performance measures are adopted, states will work with their MPOs to set state targets. Then, each MPO will set its own targets for its respective MPA and will be required to monitor and evaluate these performance measures in a performance report every four to five years, in tandem with updating its MTP. The MPO may elect to track more performance measures than USDOT requires.

Amending and Modifying the MTP

Between five-year updates, the need may arise for revisions to the MTP which significantly alter the scope or budget of the MTP. Typically this situation arises when existing projects are modified or removed or new projects are added. Since federally funded projects included in the short-range TIP for the MPO area must be consistent with the fiscally constrained MTP, these revisions would require either a formal amendment or an administrative modification.

The HPFLMPO defines the exact situations when a formal amendment or administrative modification would be appropriate. This document is available from MPO staff. 23 C.F.R. §450.104 provide the following definitions:

> "Administrative modification means a minor revision to a long- range Statewide or metropolitan transportation plan, Transportation Improvement Program (TIP), or Statewide Transportation Improvement Program (STIP) that includes minor changes to project/project phase costs, minor changes to funding sources of previously- included projects, and minor changes to project/project phase initiation dates. An administrative modification is a revision that does not require public review and comment, re-demonstration of fiscal constraint, or a conformity determination (in non- attainment and maintenance areas)."

> "Amendment means a revision to a long-range statewide or metropolitan transportation plan, TIP, or STIP that involves a major change to a project included in a metropolitan transportation plan, TIP, or STIP, including the addition or deletion of a project or a major change in project cost, project/project phase initiation dates, or a major change in design concept or design scope (e.g., changing project termini or the number of through traffic lanes). Changes to projects that are included only for illustrative purposes do not require an amendment. An amendment is a revision that requires public review and comment, re-demonstration of fiscal constraint,

or a conformity determination (for metropolitan transportation plans and TIPs involving "non-exempt" projects in nonattainment and maintenance areas). In the context of a long-range statewide transportation plan, an amendment is a revision approved by the state in accordance with its public involvement process."

1.3 Current Trends Affecting Transportation Planning

Changing Socio-Demographics

There are many national social and demographic trends affecting travel demand and transportation in general. In summary, the U.S. is projected to grow more slowly, age more rapidly, become more ethnically diverse, and experience more growth in central urban areas and suburban areas.

The U.S. Census Bureau projects that the U.S. population will grow from 310 million in 2010 to 380 million by 2040. While substantial in absolute terms, the rate of growth during this period is slower than in recent decades. Most of this slowdown is attributed to lower fertility rates amongst U.S. women and lower rates of immigration. Despite lower rates of immigration, the majority of population growth over the next 25 years is anticipated to come from immigrants and their descendants.

At the same time, longer lifespans are creating a population that will continue to see its elderly population grow in both absolute and percentage terms. This will likely translate to less overall trips per capita, but especially to less automobile trips per capita.

The increase in ethnic diversity in the U.S. population will likely have a short-term effect that increases carpooling, transit ridership, walking, and biking, while decreasing Vehicle Miles Traveled (VMT) per capita. However, as immigrants adapt to American culture, they are anticipated to adopt travel patterns similar to native residents. This means a possible increase in VMT per capita for immigrants and their descendants in later decades.

The American workforce is also changing, largely mirroring demographic changes. As the population ages, the overall labor force participation rate will decrease as a lower proportion of the population will be in the prime working-age group. While some of this decrease in labor force participation may be made up by retiree-age workers seeking part-time employment, there is an anticipated drop in overall employment by 2050. Since commute trips are a major contributing factor to peak period congestion, structural workforce trends will have a major impact on transportation.

Though population and employment growth is anticipated to slow down, growth will likely continue to be uneven throughout the United States. The migration patterns from rural to urban and from Northeast and Midwest to the Southeast and Western part of the country are likely to continue. However, growth within metropolitan areas is expected to change slightly.

Suburban population and employment growth is anticipated to continue to outpace that of central urban areas, but growth in central urban areas is expected to occur at a faster rate than in recent decades. Both changes have the potential to decrease VMT per capita as urban residents are more likely to use transit, walk, or bike and suburban areas have the opportunity to develop more walkable and transit-oriented areas. However, there is also the potential for increases in VMT per capita, if destinations continue to scatter within metropolitan regions and transit does not effectively serve these areas and provide an attractive alternative to driving.

While some of the projected socio-demographic trends may have conflicting impacts on travel demand, there appears that total VMT will increase in growing areas, while VMT per capita will stagnate or decline and more trips will be made by public transit, walking, biking, carpooling, or other means.

Changing Technology

The actual impact of technological improvements on transportation is difficult to predict. However, there are many current technological trends that are influencing travel demand.

Telecommuting has been around for several decades now. While telecommuting increased at a rapid rate over the past couple of decades, it continues to represent a small percentage of the overall workforce. However, advancement in communications and incentives provided by local governments implementing Transportation Demand Management (TDM) programs may cause this workplace trend to continue to grow, thereby reducing the demand for peak period travel.

Technology is also improving operations of existing and new transportation infrastructure by allowing for improved ITS. According to the USDOT, ITS technologies "improve transportation safety and mobility, reduce environmental impacts, and enhance productivity through the integration of advanced communications-based information and electronic technologies into the transportation infrastructure and vehicles."

ITS technologies that are likely to have a major impact on future transportation include connected vehicles, automated vehicles, and live data collection and dissemination. These technologies will enable new ITS solutions and improve existing ones such as traffic signal coordination, reversible lane systems, traffic monitoring, demand-based roadway and parking pricing, and real-time travel information.

Bikesharing, carsharing, and ridesharing are all relatively new technologies that are impacting travel demand, especially in urban areas. These technologies are constantly improving with technological advances.

Bikesharing and carsharing are both essentially rental services whereby a person pays for temporary use of a vehicle (bike or automobile, respectively). There are many variations of each service, but the intent is to provide convenience when one does not have access to a private vehicle. In urban areas where many trips can be made by walking, biking, or public transit, bikesharing and carsharing are filling in the gaps for destinations not easily accessible by these modes. In this manner, these rental services are making car ownership less important for urban residents. If these services become more widespread, VMT per capita, and perhaps overall VMT would decline in many urban areas.

Ridesharing, according to the Victoria Transport Policy Institute, is "carpooling or vanpooling service in which the vehicle carries additional passengers when making a trip, with minimal additional mileage." It is offered by multiple providers, such as public transit agencies, private taxis, vanpools, and carpools. The continued growth of smartphones and advancement in GPS and mobile technology are constantly improving ridesharing services. As with bikesharing and carsharing, ridesharing offers an affordable alternative to vehicle ownership in walkable areas or to traditional taxis in all areas.

Declining Transportation Revenues

Gasoline taxes are the primary revenue source for both federal and state transportation funds. Despite the fact that transportation project construction costs have increased over the last twenty years, the last increase in the federal gasoline tax was in 1993, and the last increase in the Mississippi gasoline tax was in 1987. Furthermore, no significant new revenue streams have emerged to fill these funding gaps.

The Federal Highway Trust Fund, the primary source of funding for highway and transit projects, has been on the brink of insolvency many times in recent years. At the same time, MDOT has delayed projects because of a lack of state-matching funds.

USDOT, state DOTs, and local agencies have taken a variety of approaches to deal with declining and uncertain transportation revenue. For instance, In order to maximize its shrinking revenues, the FHWA encourages innovative financing strategies for transportation projects through its Innovative Program Delivery program.

At the local level, many local governments have begun to look at the Return on Investment (ROI) of their capital improvement projects, especially transportation projects. They have also raised new transportation revenue through temporary bonds, tax increases, special assessment districts, and other means.

At all levels, it is becoming increasingly important to prioritize transportation projects based on some measure of cost-effectiveness. It will also be necessary to seek innovative and alternative means of financing and funding transportation. There are many successful examples of local and state agencies utilizing public-private partnerships, privatization, Tax-Increment Financing (TIF), and other innovative financing structures to overcome funding shortfalls.

2.0 Plan Development Process

2.1 Performance-based Planning Approach

The 2040 MTP utilizes a performance-based planning approach that can be expanded in later updates as federal rule-making and guidance on national performance measure monitoring are established.

Performance based planning and programming (PBPP) is the application of performance management - a strategic approach to decision-making that is based on the development, application, and monitoring of performance data - to the long-range planning and programming process. PBPP uses data derived indicators about the current and desired transportation system to set strategic directions to analyze how funds are invested and programmed, and to evaluate program outcomes.

MAP-21 introduced requirements for performance-based planning in statewide and metropolitan planning. It requires USDOT to establish performance measures that will enable states and MPOs to track their performance in addressing the national goals set forth in MAP-21 described in Chapter 1: Introduction. Once these performance measures become effective, states and MPOs are required to adopt state and metropolitan targets, respectively, for each measure.

While federal guidance on MAP-21 performance measures and targets is still emerging, the general planning process below illustrates how the 2040 MTP incorporates an outcome-oriented, performance-based planning approach:

1. **Set Regional Vision** – A regional vision is developed based on previous plans and public input.
2. **Define Goals and Objectives** – Goals are developed that address desired outcomes consistent with the regional vision and national goals set forth in MAP-21. Then, objectives that are specific and measurable are established to support achievement of the stated goals.
3. **Establish System Performance Measures** – Performance measures to monitor are selected and are consistent with the MTP's stated goals and objectives, as well as with available guidance on federal performance measures. Monitoring these measures over time will allow the MPO to be responsive to unintended or unforeseen changes.
4. **Assess Baseline System Performance** – Existing conditions of the transportation system are assessed from an asset inventory, technical analysis, and input received from the public and stakeholders.

5. **Identify Desired System Performance** – Because performance targets are not yet set and some necessary data are not yet available, the 2040 MTP solely focuses on the preferred overall trend of performance measures (i.e., the direction of results).

6. **Forecast Future Conditions and Need** – Future growth in population and employment from 2013 to 2040 is forecasted. The impacts of the forecasted change in land use and demographic patterns were then modeled using the existing transportation network and committed projects. Future projects were then evaluated both individually and as part of larger packages of projects.

7. **Develop Implementation Strategy** – A prioritization methodology is developed to rank future transportation projects that are consistent with the stated goals and objectives as well as public and stakeholder input. The projects that most effectively balance future demand with these concerns are then included in the fiscally constrained project list, so long as there is no preliminary concern of significant environmental impact or disproportionately adverse effects to environmental justice populations.

2.2 Title VI in Development of the Metropolitan Transportation Plan

The HPFLMPO is committed to ensuring public participation in the development of all transportation plans and programs. It is the overall goal of the MPO that the transportation planning process is open, accessible, transparent, inclusive, and responsive. As a continuing effort by the MPO to provide public access and the means by which to engage in the planning process, the MTP development process is compliant with and follows all Title VI laws, processes, and programs, including the following:

- Civil Rights Act of 1964, 42 USC 2000d, et seq. prohibits exclusion from participation in any federal program on the basis of race, color, sex, or national origin.
- Rehabilitation Act of 1973, 29 USC 701 Section 504, prohibits discrimination on the basis of a disability, and in terms of access to the transportation planning process.
- Americans with Disabilities Act of 1990 prohibits discrimination based solely on disability. ADA encourages the participation of people with disabilities in the development of transportation and paratransit plans and services. In accordance with ADA guidelines, all MTP meetings take place in locations which are accessible by persons with mobility limitations or other impairments.
- Executive Order 12898 or referred to as Environmental Justice, requires that federal programs, policies and activities affecting human health or the environment will identify and avoid disproportionately high and adverse effects on minority or low income populations. The intent is to ensure that no racial, ethnic,

or socioeconomic group bears a disproportionate share of negative environmental consequences resulting from government programs and policies.

- Limited English Proficiency (LEP) Plan which is required by Title VI of the Civil Rights Act of 1964, Executive Order 13166, and FTA Circular C 4702.1B, October 2012.

The MPO's Public Participation Plan (PPP) supports Title VI compliance by enabling and encouraging all members of the public to actively participate in the development of the MTP. Details on the public involvement process for the MTP are discussed in the next section.

2.3 Public Involvement Process

Public involvement is the cornerstone of metropolitan transportation planning. Successfully engaging the public throughout the planning process provides decision-makers with the information necessary to ensure that public concerns and needs are being addressed adequately.

Federal Requirements

Federal regulation (23 CFR 450.316) requires that each MPO develop and use a documented participation plan that defines a process for providing citizens with reasonable opportunities to be involved in the metropolitan transportation planning process. This PPP is required to address the following:

- Adequate public notice of activities and time for public review and comment.
- Timely notice and access to information.
- Employment of visualization techniques to describe plans and programs.
- Make information available electronically and on the internet.
- Hold meetings at convenient times and easily accessible venues.
- Consider and respond to public input in a timely fashion.
- Seek out and consider the needs of the traditionally underserved in the community, such as low-income and minority populations.
- Provide additional opportunity for public comment on all plans, and changes to plans, following initial agency and public reviews during development, especially the MTP and TIP.
- Coordination with statewide public involvement and consultation processes.
- Periodically review procedures and effectiveness of plan strategies.

- Provide a summary of public comments on the draft for the MTP and TIP and include those in the final documents.
- Provide a minimum of a 45 day public comment period before finalization of a PPP Plan or an update of an existing PPP Plan.

Federal legislation and executive orders also prohibit discrimination and/or exclusion from participation in any program or activity receiving federal financial assistance on the basis of race, color, national origin, disability. Special accommodations must also be made for minority, low-income, and limited English proficiency (LEP) populations.

Public Participation Plan Requirements

The MPO's PPP addresses all the federal requirements and was adopted in 2013. The 2040 MTP public involvement process follows the procedures outlined in the PPP and reproduced below:

- There shall be two public meetings for the MTP prior to TPC approval.
- Provide reasonable public access to technical and policy information used in the development of the MTP and conduct open public meetings where matters related to transportation programs are being considered. Give adequate public notice of public participation activities and allow time for public review and comment at key decision points.
- Seek out and consider the needs of those traditionally under-served by existing transportation systems, including but not limited to the transportation disadvantaged, minorities, elderly, persons with disabilities, and low-income households who may face challenges accessing employment and other services.
- Provide timely information about transportation issues and processes to citizens, affected public agencies, representatives of transportation agencies, private providers of transportation, other interested parties and segments of the community affected by transportation plans, programs and projects (including but not limited to local jurisdiction concerns).
- Provide a public comment period of not less than 30 calendar days prior to adoption of the MTP, or any formal amendments or update to the MTP. Notice of the comment period will be advertised in a newspaper of general circulation and various other publications prior to the commencement of the 30-day comment period. Notice will also be mailed to the entire HPFLMPO mailing list prior to the start of the 30-day comment period.
- A summary of all oral and written comments for the MTP will be provided to the TPC and available for public review and placed in MPO minutes. When significant

written and oral comments are received on the draft MTP, a summary, analysis, and report on the disposition of comments shall be made part of the final MTP.

- If the final draft of any transportation plan differs significantly from the one available for public comment by the MPO and raises new material issues, which interested parties could not reasonably have foreseen, an additional opportunity for public comment on the revised plan shall be made available.

Beyond requirements for the MTP, all MPO activities must accommodate persons with disabilities and LEP persons. All MPO meetings are required to take place in locations which are accessible by persons with mobility limitations or other impairments. The MPO also provides notice of the availability of language assistance to LEP persons.

Public Involvement Activities

To develop a MTP that effectively meets the needs of the public and is consistent with local values, extensive public involvement activities were conducted. Members of the general public participated by:

- clarifying a regional vision by expressing their satisfaction with current transportation system conditions;
- identifying future transportation projects to be evaluated in the MTP;
- communicating their ideal transportation investment strategies; and
- providing feedback on draft versions of the MTP.

Various outreach methods were used to inform the public about the update process and the public involvement activities. Beyond providing public notice in local print media, outreach methods included the following:

- engaging transportation partners and stakeholders, such as state and federal government agencies;
- reaching out to all agencies, businesses, associations and others on the MPO's contact list database;
- using social media (Facebook/Twitter/MindMixer/websites);
- issuing a press release to media representatives;
- reaching out to special-needs groups such as Living Independently for Everyone (LIFE);
- placing phone calls and sending emails to known Environmental Justice groups and minority community leaders; and

- posting fliers in shopping and community centers as well as in churches and private venues.

A schedule of the primary public involvement activities is summarized in Table 2.1. Documentation of the public participation process is located in the Appendix.

Table 2.1 Public Participation Outreach Schedule

Activity	Purpose	Date, Time, and Location
Public Meeting Open House and Workshop	Kickoff Event and Public Visioning (Lamar County).	Wednesday, February 18, 2015 4:00 – 6:00 PM Breland Community Center 79 Jackson Road, Hattiesburg, MS
Public Meeting Open House and Workshop	Kickoff Event and Public Visioning (Forrest County).	Thursday, February 19, 2015 4:00 – 6:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Draft MTP released	Draft made available for public comment.	Friday, October 30, 2015 made available online and at MPO office
Public Meeting Open House	Presentation of Draft MTP to public (Forrest)	Thursday, November 5, 2015 4:00 – 6:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Public Meeting Open House	Presentation of Draft MTP to public (Lamar)	Tuesday, November 10, 2015 4:00 – 6:00 PM Oloh Community Center 45 Oloh Road, Sumrall, MS
Joint Technical Committee and Policy Committee Meeting and Public Hearing	Presentation of Draft MTP and summary of comments received. Committee considers adoption of MTP if no significant changes needed.	Wednesday December 16, 2015 TBD Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS

2.4 Stakeholder Consultation and Coordination

To develop a truly effective transportation plan that addresses the needs of all system users, it is necessary to obtain input from all stakeholders. For this reason, the consultation and coordination process is an important component of plan development. The consultation process is designed to make an additional effort to gather input from key stakeholder constituencies that may not be adequately represented in the public participation process described above.

Federal Requirements

As with public involvement for citizens, Federal regulations (23 CFR 450.316) require MPOs to develop and use a documented participation plan that defines a process for providing transportation-related stakeholders with reasonable opportunities to be involved in the metropolitan transportation planning process. These stakeholders include: affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties.

Federal regulations also encourage MPOs to consult with agencies and officials responsible for other planning activities within the MPA that are affected by transportation or to coordinate its planning process, to the maximum extent practicable, with such planning activities. Beyond this, MTPs are required to give due consideration of other related planning activities within the MPA and to include transportation services and projects within the MPA that are provided by other agencies that receive federal funding, such as public transit systems or national parks.

The metropolitan planning process requires that where a metropolitan planning area includes federal public lands and/or Indian Tribal lands, the affected federal agencies and Indian Tribal governments shall be involved appropriately in the development of transportation plans and programs.

Consultation Activities

Beyond the opportunities provided to the general public described previously, the MPO's PPP provides a list of agencies for consultation. This list includes:

- Elected Officials
- Local Government Staff
- Transportation Agencies (Airports, Transit, Freight Services, etc.)
- Local Media (TV, Radio, Print, etc.)
- Homeowners Associations
- Civic Groups
- Special Interested Groups
- Libraries (For Public Display)
- Consultation with federal, state and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation, and other environmental issues.

- Consultation with parties that would have an interest in the planning and development of the transportation network including affected public agencies in the metropolitan planning area.
- Private Freight Shippers
- Representatives of Public Transportation Employees
- Providers of Freight Transportation Services
- Private Providers of Transportation
- Representatives of Users of Public Transportation
- Representatives of Users of Pedestrian Walkways
- Representatives of Users of Bicycle Transportation Facilities
- Representatives of the Disabled
- Indian Tribal Governments

Coordination Activities

In addition to consulting stakeholders throughout the development of the MTP, the MPO and the consultant team (Neel-Schaffer) coordinated with stakeholder groups to obtain relevant data (e.g., inventories of natural, historic, and community resources) and to review existing plans, maps, and other information for consistency with the MTP.

2.5 Visioning Activities and Results

To gather public input for the development of the MTP, the MPO held two open-house style public meeting at the beginning of the plan update process. These meetings were intended to gain insight into the public's desired future of transportation in the Hattiesburg MPA. At these meetings, stakeholders and members of the general public shared their concerns, ideas, values, and visions regarding the state of both the current transportation system and future transportation needs for the region.

The following sections describe the visioning activities and its outcomes. Overall, the results of these activities mirror national trends. In particular, the results suggest three major themes:

- increased emphasis on system maintenance and preservation;
- increased emphasis on projects and programs improving conditions for pedestrians, bicyclists, and transit riders; and

- increased emphasis on streetscape improvements, which improve community aesthetics and create safer, more attractive environments for pedestrians, bicyclists, and transit riders.

Comments received outside of these activities can be found in the Appendix.

Visioning Meeting Format and Activities

The February 18th and 19th meetings served as a kickoff for both the MTP and the Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). The format of the meeting was a combination of an open-house and workshop-style meeting. For the first part of the meeting, participants were provided information on the planning process and the current state of transportation in the MPA and the state as a whole. In the second part of the meeting, participants were guided through three activities designed to solicit input on local priorities. Throughout the meeting MPO staff, MDOT staff, and the consultant team were available to explain the activities and provide any necessary assistance.

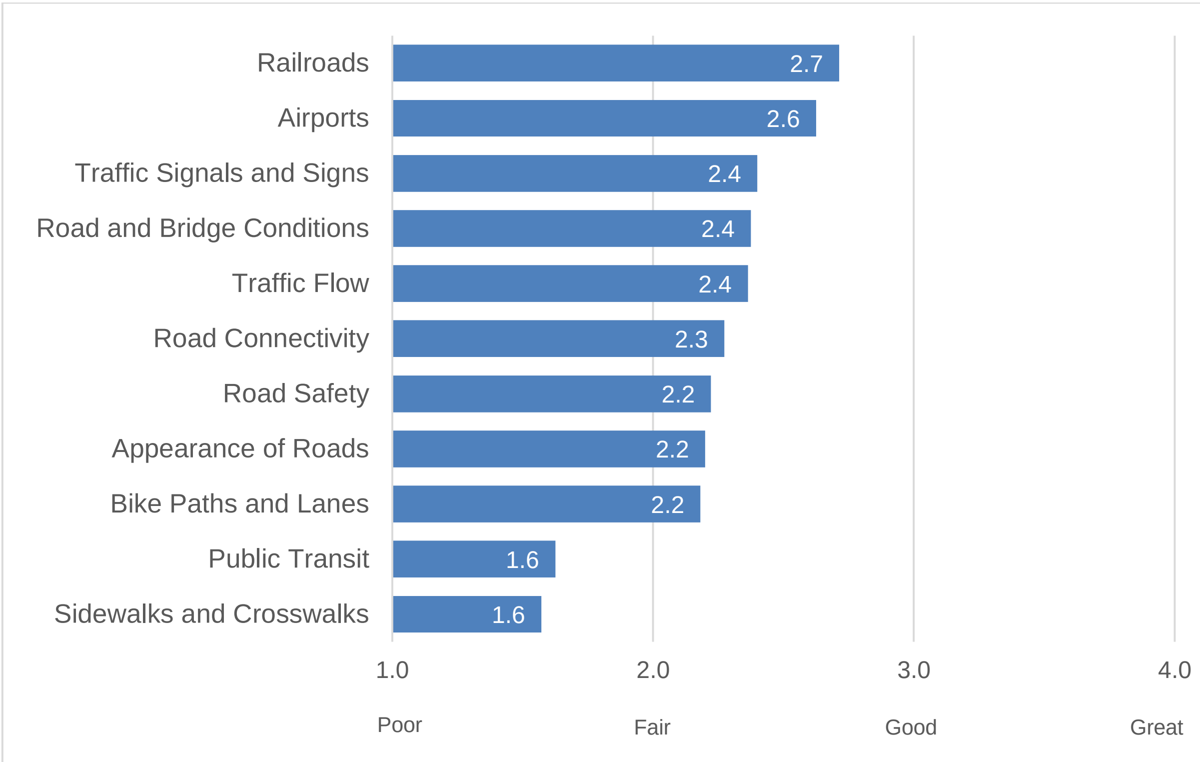
Workshop Activity I - Current State of the Transportation System

Activity I asked participants to rate the current performance of different aspects of the transportation system. Participants indicated performance as poor, fair, good, or great. If participants weren't sure or unfamiliar with a particular aspect of the transportation system, they did not respond. Figure 2.1 displays the results of this activity.

For most aspects of the transportation system, the overall rating ranged from fair to good. Only public transit and sidewalks and crosswalks were rated as poor, on average.

There are no water ports in the MPA and no participants provided a response for this aspect of the transportation system, so this information was not included.

Figure 2.1 Rating of Transportation Conditions Activity I Results



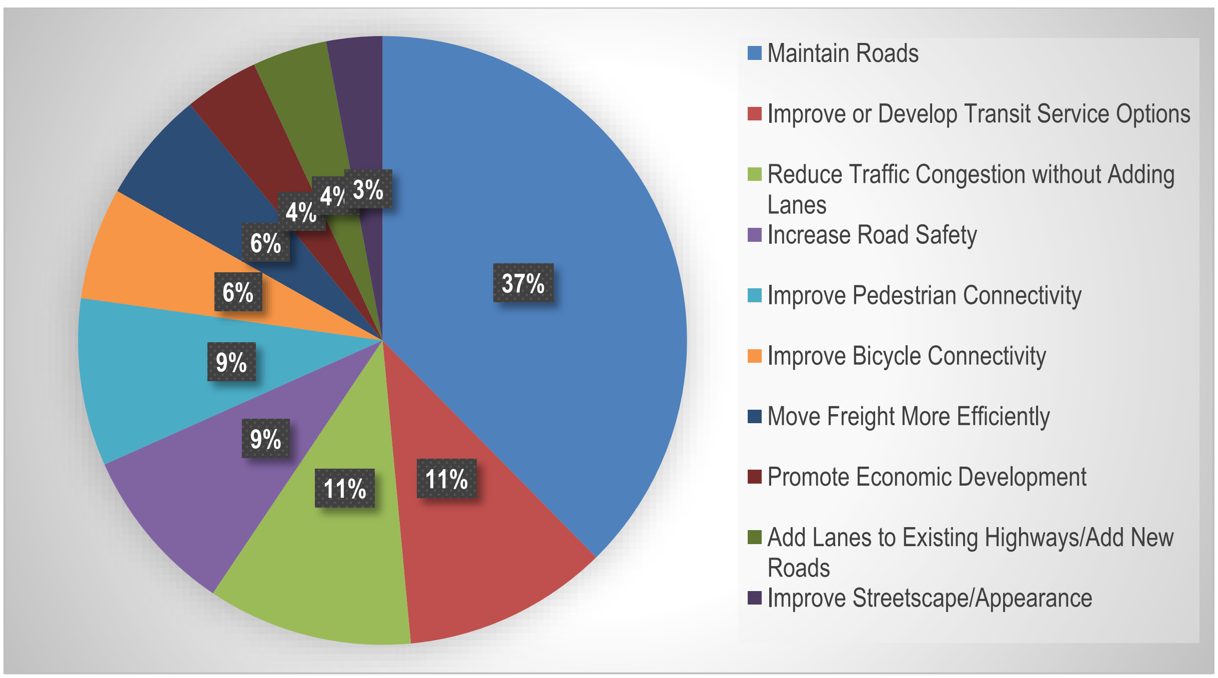
Source: Visioning Activities

Workshop Activity II – Transportation Spending

For Activity II, the moderator provided each participant with a sheet of paper that listed various types of transportation improvements and brief descriptions of each. The participants were each given 100 dollars to allocate to the various types of improvements. Participants were required to use all of their allocated transportation dollars and were allowed to put as much or as little as they wished into each item. Figure 2.2 displays the average desired distribution of funding by the participants.

Overall, participants allocated about one-third of all transportation funding to maintaining roads. Conversely, participants only allocated 4 percent of all transportation funding to add lanes to existing highways/add new roads. Alternatives to roadway capacity projects received the majority of the remaining funding.

Figure 2.2 Transportation Spending Activity II Results



Source: Visioning Activities

Workshop Activity III – The Transportation System in 2040

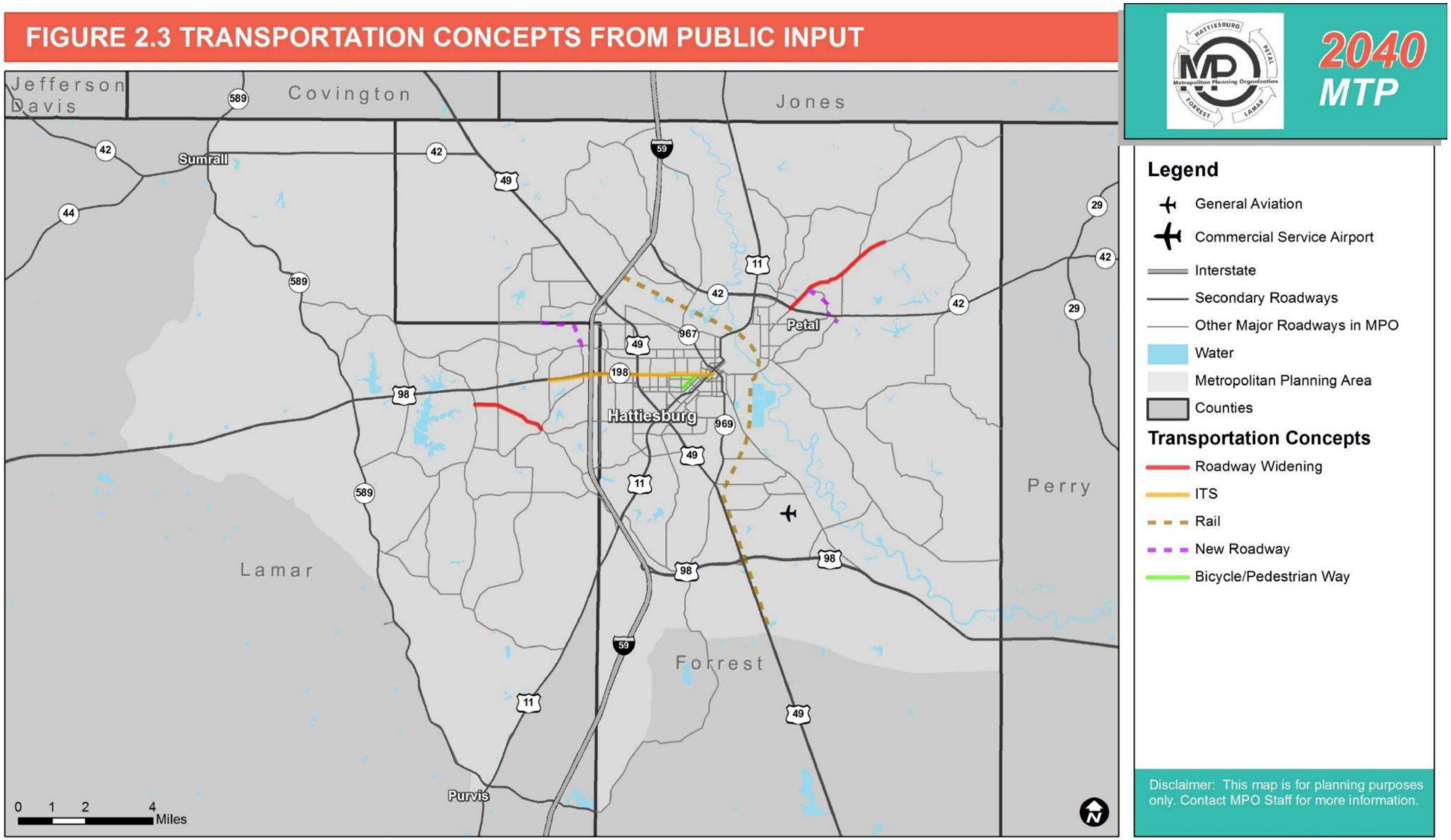
For Activity III, participants were seated at a table with a large-scale blank map of the MPA that included the roadway network, water bodies, and landmarks. The moderator asked participants to consider future transportation needs over the next 25 years and mark needed improvements on the map.

The results from this activity are illustrated in Figure 2.3 and were used to identify future transportation projects to test for inclusion in the fiscally constrained MTP.

In addition to these transportation projects, participants also noted projects of perceived statewide significance on the statewide maps. While not included in the 2040 MTP, these projects include:

- a regional loop around Hattiesburg with connections near Prentiss, Columbia, Wiggins, New Augusta, and Laurel;
- connector roads from Highway 98 West to I-59 and from I-59 to Highway 49; and
- better access management along Highway 49 to improve safety.

FIGURE 2.3 TRANSPORTATION CONCEPTS FROM PUBLIC INPUT



Map Source: Neel-Schaffer, Inc.

Data Sources: Public Meeting Visioning Exercise

2.6 MTP Subcommittee

A subcommittee of the Technical Committee was formed to guide the development of the 2040 MTP. MPO Staff were also a part of this subcommittee. The subcommittee met several times throughout the plan development process to discuss various aspects of the MTP.

The MTP subcommittee activities are shown in Table 2.2. The input from this subcommittee will be discussed in later sections as it relates to the forecasting of future population and employment patterns (Chapter 7) and identification of potential transportation projects to be evaluated (Chapter 10).

Table 2.2 MTP Subcommittee Schedule of Activities

Activity	Purpose	Date, Time, and Location
Meeting #1	Discuss Goals and Objectives, MTP Process, test projects, and forecasting future growth areas.	Wednesday, November 19, 2014 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Meeting #2	Discuss test projects results.	Wednesday, August 19, 2015 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS
Meeting #3	Present and Discuss Draft MTP projects.	Tuesday, September 29, 2015 2:00 PM Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg, MS

3.0 Visioning and Performance Measures

3.1 Public Vision

Results from the public visioning exercises and stakeholder consultation, included in Chapter 2, indicate a need for a more balanced transportation system that provides viable alternatives to driving alone or carpooling. This need is reflected in the Vision Statement below, which guided the development of goals, objectives, and performance measures.

Vision Statement

A seamlessly-integrated, multimodal transportation system that connects people of all backgrounds and abilities to their desired destinations in a safe, convenient, and efficient manner. A transportation system that promotes a sustainable region with a high quality of life.

3.2 Goals and Objectives

The development of goals and objectives are often discussed simultaneously in transportation planning. However, it is important to make a critical distinction between goals and objectives, especially as they relate to performance-based metropolitan transportation planning, as required by MAP-21.

A goal is a broad statement that describes a desired end state. Goals should be consistent with the stated Vision and form the basis for selecting investments and activities that will effectively bring about that Vision.

An objective is a specific, measurable statement that supports achievement of a goal. A good objective should include or lead to the development of a performance measure. Objectives can be broken down into outcome, output, and activity-based objectives, as explained in Table 3.1. Outcome-based objectives are preferred for long-range planning because they allow the most effective communication with the public. Output and activity-based objectives should support the outcome-based objectives..

The 2040 MTP goals and objectives provided in this chapter are consistent with public/stakeholder input, and national transportation goals and planning factors specified in MAP-21.

Table 3.1 Outcome, Output, and Activity-based Objectives

Type	Description	Example
Outcome	Reflect concerns of the public, customers, or stakeholders; these objectives are often the most meaningful to the public and relate most directly to system goals; however, they may be influenced by a range of factors beyond the control of transportation agencies.	Reduce hours of incident-based delay experienced by travelers
Output	Reflect quantity of activities that affect outcomes, and may be more directly influenced by a transportation agency (although they also may not be entirely in the control of the agency).	Reduce the clearance time for traffic incidents (For incident clearance the transportation agency would need to work with law enforcement, etc.)
Activity	Reflect actions that are taken by transportation agencies. These are less directly tied to the outcome, and often directly relate to a strategy being implemented.	Increase the number of cameras tracking system conditions

Source: FHWA and FTA, "Advancing Metropolitan Planning for Operations: The Building Blocks of a Model Transportation Plan Incorporating Operations - A Desk Reference," April 2010.

Goal 1: Affordable, Convenient, and Reliable Access to Destinations by Multiple Modes of Transportation

Objectives:

- *Increase the percentage of trips made by bicycling, walking, and public transit.*
- *Reduce the percentage of households that spend more than 45% of their income on housing and transportation.*
- *Increase the percentage of the population with an average in-vehicle travel time of 20 minutes or less for all trips during peak hours.*
- *Increase the percentage of the population and employment within a half mile of a transit route (fixed or semi-fixed) with a frequency of one hour or less during peak hours.*
- *Increase the percentage of the population and employment within a half mile of marked bicycle facilities.*
- *Increase the percentage of collector and arterial roadway centerline miles in urban areas with sidewalk on both sides.*
- *Expand fixed-route and paratransit/demand response transit service to the weekend and into the late evening on weekdays.*
- *Reduce the annual hours of delay from recurring and non-recurring congestion experienced by motorists and transit riders.*

- *Improve on-time performance of fixed-route transit service.*
- *Increase the percentage of para-transit/demand-response trips that pick up passengers within two hours of request.*

Goal 2: A Connected Regional Economy Accessible to National and Global Markets

Objectives:

- *Increase the percentage of land in the smoothed urban area that is within one mile of an arterial roadway, excluding preservation areas such as national parks. What about rural areas?*
- *Minimize delay on principal arterials connecting rural and urban areas.*
- *Increase scheduled public transit connections between communities within the Metropolitan Planning Area.*
- *Designate and construct a network of regional multi-use paths and on-street bicycle facilities that connect activity centers throughout the Metropolitan Planning Area.*
- *Minimize railroad freight delay by improving operations and infrastructure and reducing railroad/roadway and land use conflicts*
- *Improve operations at intermodal freight and passenger facilities such as transload facilities, airports, and multimodal transit centers by ensuring sufficient storage capacity for all vehicles and cargo.*
- *Minimize delay on MDOT-designated Strategic Corridors and the USDOT-designated national freight network.*
- *Maintain a minimum average speed of 55 mph on Interstate facilities for efficient freight travel.*
- *Increase inter-city transit service to other Urbanized Areas in the Southeast by adding new destinations and increasing the frequency of existing service.*
- *Improve the average speed of existing passenger rail service between New Orleans, Louisiana and Charlotte, North Carolina as an extension of the Southeast High Speed Rail Corridor and maintain a local station.*
- *Provide daily commercial flights between the Hattiesburg-Laurel Regional Airport and a major international airport hub.*

Goal 3: A Well-Maintained and Efficient Transportation System

Objectives:

- *Reduce the percentage of roadway miles classified as Interstates, Arterials, and Collectors with a Pavement Condition Rating (PCR) of 72 or lower, indicating a need for resurfacing or reconstruction.*
- *Decrease the number of bridges on public roads that are classified as Structurally Deficient or Functionally Obsolete.*
- *Ensure that all transit facilities and vehicles are in a State of Good Repair, as required by the Federal Transit Administration.*
- *Reduce the length of sidewalk and crosswalk infrastructure along arterials and collectors that requires repair or maintenance.*
- *Reduce the length of bicycle facility and multi-use path infrastructure that requires repair or maintenance.*
- *Ensure that airport equipment, facilities, and pavement on runways, taxiways, and aprons are in good condition.*
- *Ensure that active railroad infrastructure is in good condition, especially tracks, vehicles, bridges, and roadway crossings.*
- *Reduce annual Vehicle Miles Traveled per capita and Vehicle Hours Traveled per capita through Transportation Demand Management strategies.*
- *Increase the number of congested intersections and corridors managed by Intelligent Transportation Systems.*
- *Reduce the number of underutilized roadway corridors in urban areas with projected 2040 Volume to Capacity ratios below 0.75 by reallocating roadway space to other modes and purposes where such reallocation is deemed appropriate.*
- *Increase fixed route and paratransit/demand response transit passenger trips while reducing the operating cost per passenger trip for both.*

Goal 4: A Safe, Secure, and Resilient Transportation System

Objectives:

- *Reduce the number of automobile crashes on public roads resulting in fatalities or serious injuries and the respective rates per 100 million Vehicle Miles Traveled.*
- *Reduce the number of bicycle and pedestrian crashes resulting in fatalities or serious injuries and the respective rates per capita.*

- *Reduce the number of safety and security incidents, injuries, and fatalities for all transit systems and the respective rates per 100,000 Vehicle Miles.*
- *Reduce the number of highway-rail crossing accidents, injuries, and fatalities for freight and passenger rail.*
- *Ensure that no aviation-related incidents or accidents are attributed to local airport operations or facilities.*
- *Increase the redundancy and diversity of the transportation network by increasing the number of emergency evacuation alternatives for multiple modes of transportation, with special consideration for the carless population.*
- *Improve the flexibility of the transportation network by increasing the number of intersections and corridors managed by Intelligent Transportation Systems.*

Goal 5: A Transportation System That Creates a Sense of Place and Improves Public Health

Objectives:

- *Increase the amount of public art installations and street furniture designed by local artists along transportation right of ways and on transportation facility properties.*
- *Increase the tree canopy and vegetated space along transportation right of ways.*
- *Increase the number of events projects where roadways are temporarily transformed for community events or tactical urbanism projects such as festivals and Better Block campaigns.*
- *Increase new residential and commercial development and reinvestment adjacent to transportation improvements in historic districts and areas with a high density of housing built at least 50 years ago.*
- *Increase the number of TAZs with a balanced Jobs to Housing ratio.*
- *Increase the population residing in urban TAZs where the combined length of sidewalk along collectors and arterials is at least 1.5 times greater than the length of those roadways.*
- *Increase the percentage of urban TAZs within 1 mile of a multiuse path.*
- *Increase the percentage of K-8 students that walk or bike to school.*
- *Reduce the number of urban food deserts with no fixed-route transit service.*
- *Reduce the number of days with poor air quality.*

Goal 6: A Transportation System That Distributes Benefits and Burdens in an Equitable Manner

Objectives:

- *Minimize the disparity between the percentage of Environmental Justice/Low Mobility (EJ/LM) area households that spend 45% of their income on housing and transportation versus all other areas.*
- *Minimize the disparity in the average travel time to work between EJ/LM areas and all other tracts.*
- *Minimize disparity between travel time by driving and by riding transit to primary employment centers and major medical and educational destinations in EJ/LM areas*
- *Increase the ratio of sidewalk and multi-use path length to roadway length in EJ/LM areas and areas within a half mile of fixed-route transit service.*
- *Minimize the disparity in exposure to arterial traffic (VMT) and associated greater air and noise pollution for EJ groups.*
- *Minimize the disparity between bicycle and pedestrian crashes in EJ/LM areas and other areas.*

Goal 7: A Transportation System That Minimizes Detrimental Impacts to the Natural and Historic Environment and Practices Environmental Stewardship

Objectives:

- *Reduce transportation-related greenhouse gas emissions per capita.*
- *Increase the number of transit and other fleet vehicles fueled by alternative and hybrid fuels that reduce fossil-fuel dependency.*
- *Reduce the number of days with poor air quality.*
- *Develop more residential units and commercial developments in infill locations than in greenfield locations.*
- *Reduce collisions between automobiles and trains and animals in high collision areas by introducing design countermeasures.*
- *Ensure that no programmed transportation project has a significantly adverse impact to historic sites or park and recreation areas where a feasible and prudent alternative exists.*

Goal 8: A Meaningful Public Involvement Process That Influences Transportation Decision-Making

Objectives:

- *Local residents, businesses, and other stakeholders are educated on the transportation planning process and local transportation issues and they provide an increased level of meaningful input that is incorporated into the decision-making process.*
- *The socioeconomic composition of public participants resembles that of the Metropolitan Planning Area as a whole and includes representation from a variety of urban, suburban, and rural communities.*
- *Projects prioritized for funding have support from the community as a whole as well as the majority of residents and businesses directly impacted.*

Goal 9: A Fiscally-Constrained 25-year Metropolitan Transportation Plan That Addresses Existing and Future Needs While Maximizing Projected Revenues.

Objectives:

- *Projected revenues through 2040 are greater than or equal to the projected cost of all programmed projects and maintenance.*
- *The overwhelming majority of programmed projects demonstrate a high benefit-cost ratio, regardless of mode.*

  Increase the number of projects completed before the anticipated Stage Year and below the projected cost.

3.3 System Performance Measures

Once the USDOT finalizes the national performance measures required by MAP-21 and the state DOTs have set state targets for these measures, MPOs will be required to set their own regional targets and evaluate their performance in the MTP.

At the time of development of the 2040 MTP, the USDOT was still in the rulemaking process for the national performance measures required by MAP-21 and some of the data required to track performance were not available. Therefore, the 2040 MTP simply states the national performance measures, which the MPO will be required to monitor in the future.

The national performance measures to monitor in the future are:

- **Pavement condition on the Interstate System and remainder of National Highway System (NHS)**
    - Percentage of Interstate pavements in Good condition
    - Percentage of Interstate pavements in Poor condition
    - Percentage of Non-Interstate NHS pavements in Good condition
    - Percentage of Non-Interstate NHS pavements in Poor condition
- **Performance of the Interstate System and the remainder of the NHS**
    - Measures forthcoming
- **Bridge condition on the NHS**
    - Percentage of bridges in Good condition
    - Percentage of bridges in Poor condition
- **Fatalities and serious injuries**
    - Number of fatalities (5-year rolling average)
    - Number of injuries (5-year rolling average)
    - Fatalities per 100 million Vehicle Miles Travelled (VMT) (5-year rolling average)
    - Injuries per 100 million VMT (5-year rolling average)
- **Traffic congestion**
    - Measures forthcoming
- **On-road mobile source emissions.**
    - Measures forthcoming
- **Freight movement on the Interstate System**
    - Measures forthcoming
- **State of Good Repair (SGR) for public transit**
    - Measures forthcoming

Future versions of the MTP will summarize current performance in regard to these measures and state the MPO's performance targets for each measure. The MPO may also add additional performance measures in the future, if so desired.

4.0 The Environment

4.1 The Environment and the MTP

Transportation planning must take into account the impacts of transportation on both the natural and human environment. By providing appropriate consideration of environmental impacts early in the planning process, the MTP increases opportunities for inter-agency coordination, enables expedited project delivery, and promotes outcomes that are more environmentally sustainable.

Federal Requirements

Federal regulations (23 C.F.R. §450) require the MTP to address environmental concerns by doing the following:

1. The development of the MTP must involve consultation with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation. This should include a comparison of the MTP with state conservation plans or maps and inventories of natural or historic resources, if this information is available.
2. The MTP must discuss types of potential environmental mitigation activities relating to the implementation of the MTP, including potential areas for these activities to occur and activities which may have the greatest potential to mitigate the effects of the MTP projects and strategies. Mitigation activities do not have to be project-specific and can instead focus on broader policies, programs, and strategies. The discussion must involve consultation with federal, state, and tribal land management, wildlife, and regulatory agencies.

The National Environmental Policy Act (NEPA) (1970) established the basic framework for integrating environmental considerations into federal decision-making. Federal regulations relating to NEPA (40 C.F.R. 1508) define mitigation as:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Section 4(f) of the U.S. Department of Transportation Act of 1966 provides additional environmental protection for property in publicly owned parks, recreational areas, wildlife and waterfowl refuges, and historic sites by preventing these properties from being used for transportation purposes unless there is no feasible and prudent alternative, the action includes all possible planning to minimize harm to the property, or a *de minimis* impact determination is made.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. It seeks to reaffirm the intent of Title VI of the Civil Rights Act of 1964, NEPA, and other federal laws, regulations and policies by establishing the following Environmental Justice (EJ) principles for all federal agencies and agencies receiving federal funds, such as MPOs:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

MTP Project Environmental Screening

Detailed, project-specific environmental impact evaluations are beyond the scope of an MTP. However, the 2040 MTP uses an environmental screening process to evaluate the relative likelihood of significant environmental impacts for all considered transportation projects. This process utilizes available inventories of all relevant natural and cultural resources and socioeconomic and demographic data from the U.S. Census Bureau.

Table 4.1 shows resources and issues typically considered in environmental impact evaluations. The environmental screening process utilized by the 2040 MTP will be described in detail later.

Table 4.1 Typical Environmental Resources and Issues Evaluated

Resource	Importance	Relevant Regulations
HAZMAT Sites	Health hazards, costs, delays, liability for both State & federal projects on either existing or acquired right-of-way	Various federal regulations
Air Quality	Public health, welfare, productivity, and the environment are degraded by air pollution	Clean Air Act of 1970; 40 CFR Parts 51 & 93; State Implementation Plan
Noise	Noise can irritate, interrupt, and disrupt, as well as generally diminish the quality of life	Noise Control Act of 1972
Wetlands	Flood control, wildlife habitat, water purification; applies to both State and federally funded projects	Clean Water Act of 1977; Executive Order 11990; 23 CFR 777
Threatened and Endangered Species	Loss of species can damage or destroy ecosystems, to include the human food chain	Endangered Species Act of 1973; 7 CFR 355
Floodplains	Encroaching on or changing the natural floodplain of a water course can result in catastrophic flooding of developed areas	Executive Order 11988; 23 CFR 650; 23 CFR 771
Farmlands	Insure conversion compatibility with State and local farmland programs and policies	Farmland Protection Policy Act of 1981; 7 CFR 658
Recreation Areas	Quality of life; neighborhood cohesion	Section 6(f) of the Land and Water Conservation Fund Act; Section 4(f) of the DOT Act of 1966 (when applicable); 23 CFR 771
Historic Structures	Quality of life; preservation of the national heritage	National Historic Preservation Act of 1966 (Section 106); the DOT Act of 1966 [Section 4(f)]; 23 CFR 771; 36 CFR 800
Archaeological Sites	Quality of life; preservation of national and Native American heritage	National Historic Preservation Act of 1966 (Section 106); the DOT Act of 1966 [Section 4(f)]; 23 CFR 771; Executive Order 13175
Environmental Justice	To avoid, minimize, or mitigate disproportionately high impacts on minorities and low-income populations; basic American fairness	Title VI, Civil Rights Act of 1964; Executive Order 12898

4.2 Regional Context

Climate Topography, Soils, and Vegetation

Climate, topography, soils, and vegetation are all factors that must be considered during project and program design. While these characteristics vary within any area, areas with similar characteristics are grouped into ecoregions. In this manner, understanding the characteristics of the region's ecoregions provide insights into potential environmental issues to consider when developing transportation projects or programs.

The climate in the MPA is classified as Humid, Subtropical (Cfa) according to the Koppen climate classification system. According to the National Weather Service station at Hattiesburg Chain Municipal Airport, from 1981 to 2010, the average July high temperature was approximately 92 degrees Fahrenheit, while the average January low temperature was approximately 37 degrees Fahrenheit. Average annual rainfall was approximately 59 inches.

The MPA is mostly in the Southern Pine Plains and Hills ecoregion. The only area not in this ecoregion is a corridor approximately two miles wide that follows the Leaf River and the portion of the Bouie River below I-59. This corridor is in the Southeastern Floodplains and Low Terraces ecoregion. The characteristics of these ecoregions are described in Table 4.2.

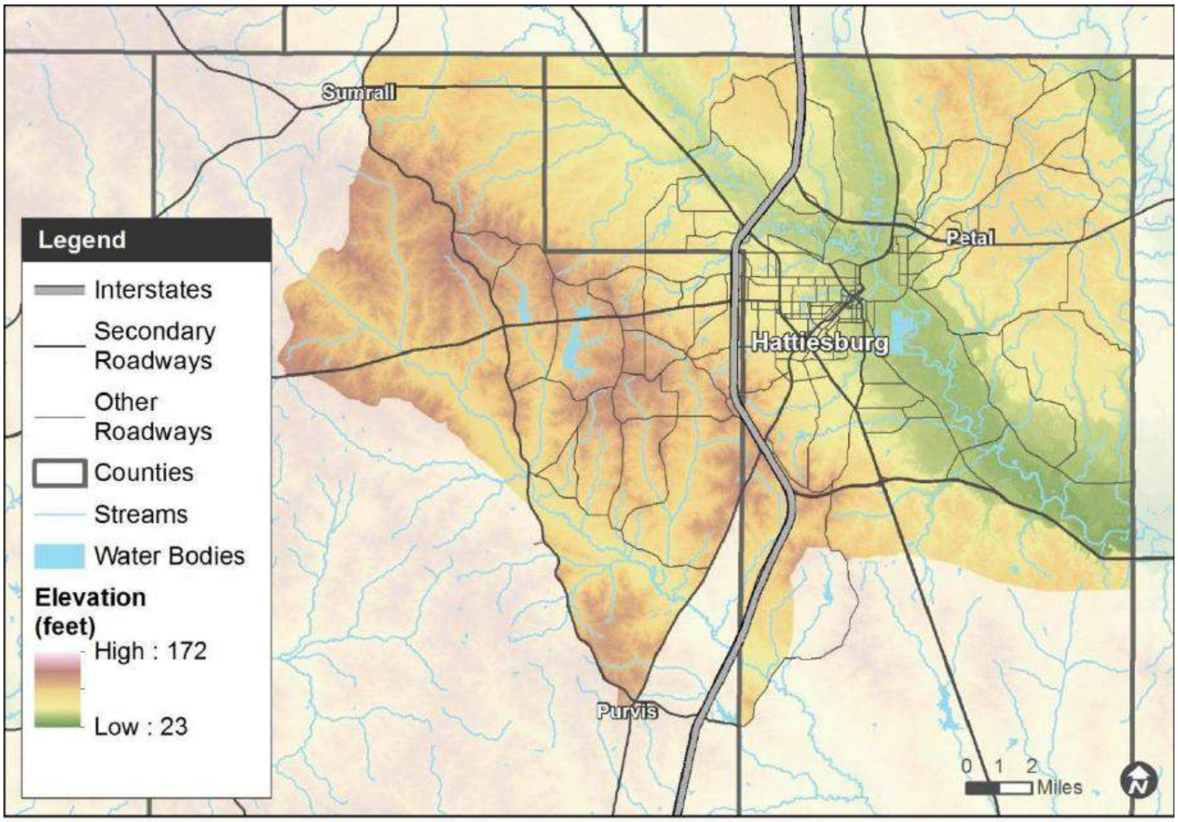
Table 4.2 Ecoregion Characteristics in the Metropolitan Planning Area

Level IV Ecoregion	Physiography	Elevation/ Local Relief (feet)	Geology	Potential Natural Vegetation
Southern Pine Plains and Hills (Southeastern Plains)	Southward-sloping, dissected irregular plains, some low rolling hills, mostly broad gently sloping ridgetops; low to moderate gradient sand and clay bottomed streams.	20-510/ 100-250	Quaternary sandy clay decomposition residuum, alluvial gravel and sand; Tertiary (Miocene) fine to coarse sand, gravelly sand, and clay.	Pine and pine-oak forest. Mostly longleaf pine, some slash pine to the south in wet areas, southern red oak, turkey oak, sand post oak, saw palmetto; some southern floodplain forest with cypress-gum swamp and bottomland hardwoods.
Southeastern Floodplains and Low Terraces (Southeastern Plains)	Major river floodplains and associated low terraces; low gradient streams with sandy and silty substrates, oxbow lakes, ponds, and swamps.	10-250/ 5-35	Quaternary alluvial gravelly sand, quartz gravel and sand, silts, and clays.	Southern floodplain forest. Includes cypress-gum swamp (bald cypress, pond cypress, water tupelo, swamp tupelo) and bottomland hardwood forest (bottomland oaks, sweetgum, American elm, red maple, green ash, water hickory).

Source: EPA, Ecoregions of Mississippi

A Digital Elevation Model (DEM) of the MPA is illustrated in Figure 4.1. What this information indicates is that the MPA is low-lying with some areas of gently rolling terrain. The lowest areas are along the Leaf River and Bouie River while the areas of highest elevation are in Lamar County. There are also ravines along major streams.

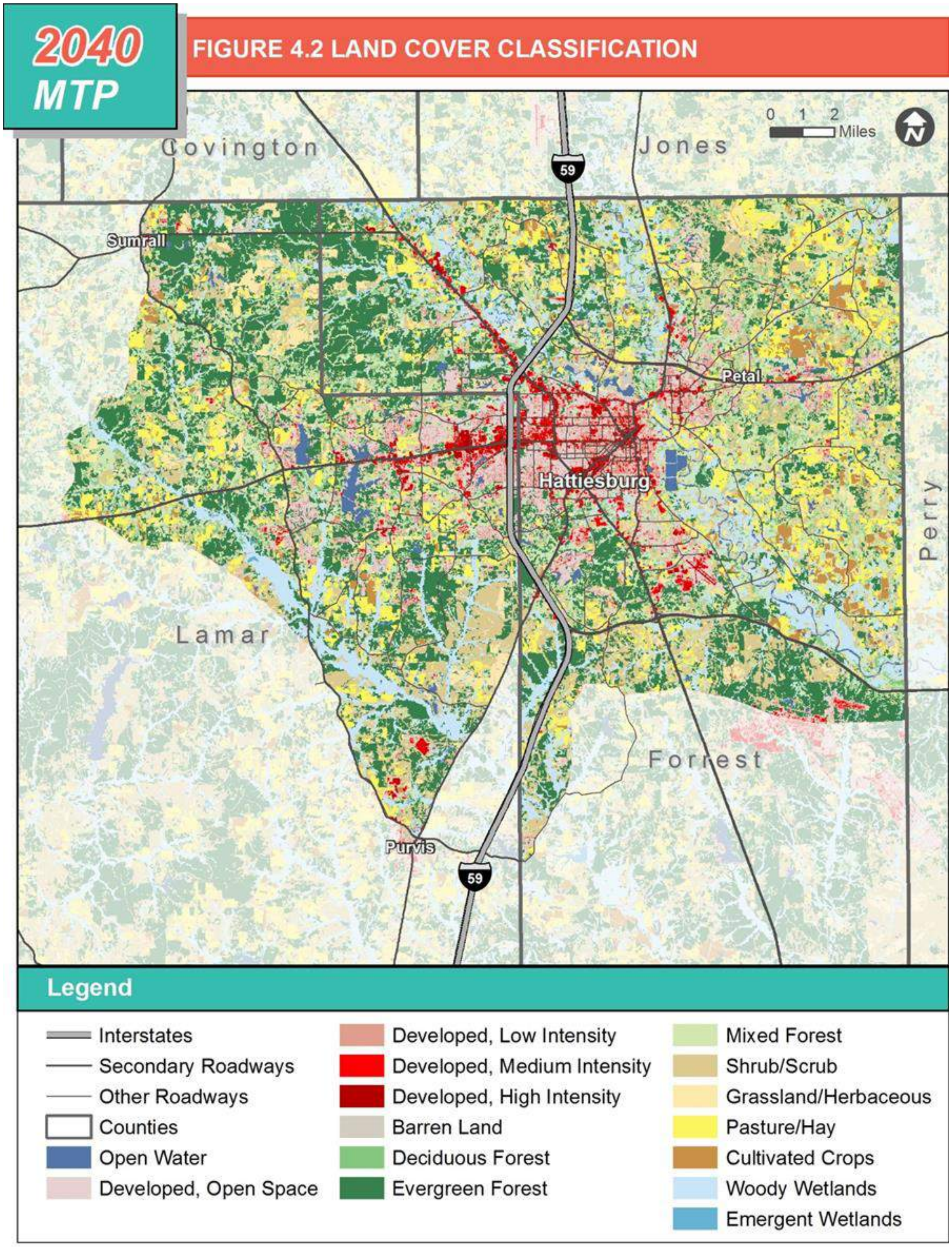
Figure 4.1 Metropolitan Digital Elevation Map



Disclaimer: This map is for planning purposes only.
Map Source: Neel-Schaffer, Inc.
Data Sources: USGS, National Elevation Dataset

Land Cover

The land cover of the MPA is illustrated in Figure 4.2 and summarized in Figure 4.3. According to this information, developed areas only account for 17 percent of the land in the MPA. Forested lands dominate the landscape, making up 40 percent of the land area. However, the portion of the MPA in Lamar County is much more forested than the portion in Forrest County, which is mostly pasture/hay and cultivated crops.

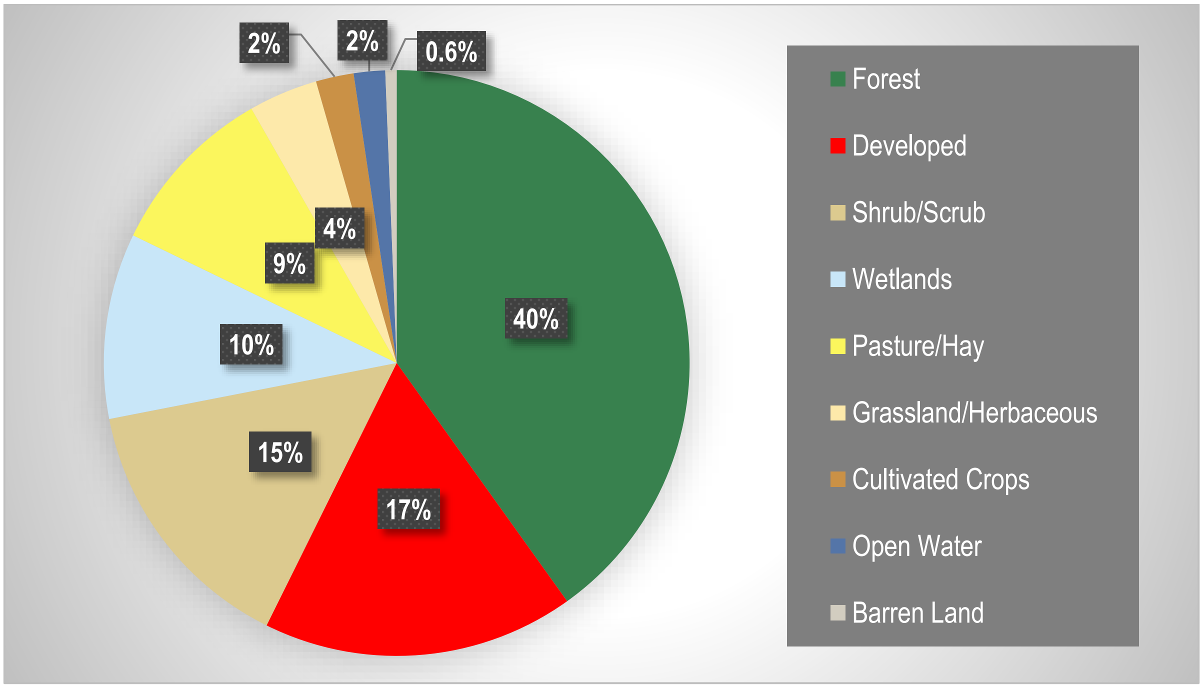


Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: USGS 2011 National Land Cover Database

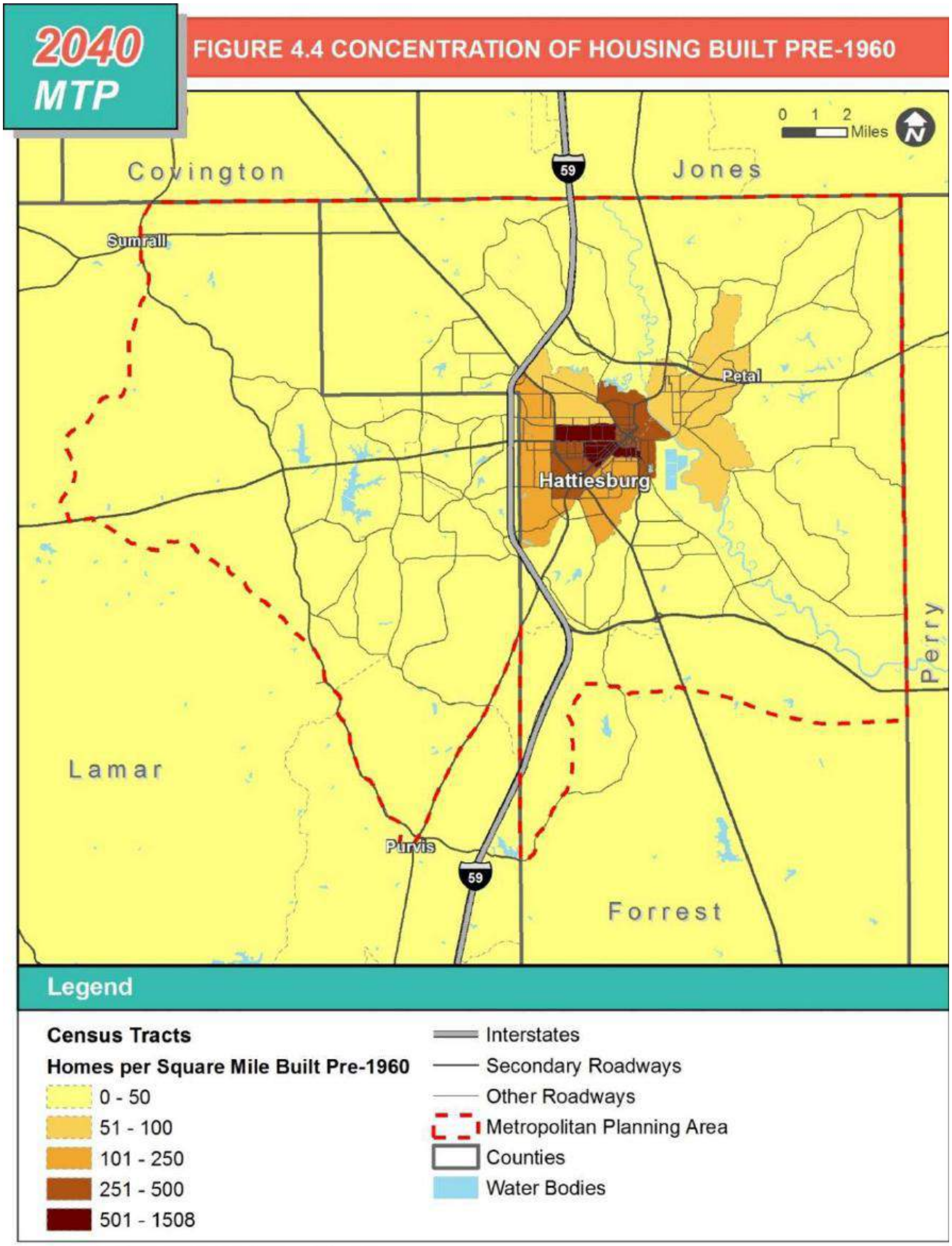
Figure 4.3 Land Cover Classification Breakdown



Source: USGS, 2011 National Land Cover Database

Historical Urban Development

The historical urban development of the MPA offers insights into the likely distribution of historic and other cultural resources. Figure 4.4 shows that the areas with the greatest concentrations of historical housing structures, or those at least 50 years old, are in the center of the city of Hattiesburg. There are likely smaller concentrations not revealed by this information in the historic centers of many of the smaller municipalities within the MPA. This information is merely intended to illustrate general patterns.



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

4.3 Air Quality and Emissions

Air Quality and Transportation

Highway vehicles and non-road equipment are mobile sources of air toxins, compounds which are known or suspected by the EPA to cause cancer or other serious health and environmental effects. Mobile sources, via the combustion of fossil fuels, release nitrogen dioxide and Volatile Organic Compounds (VOC), which chemically react in the presence of heat and sunlight to form ground-level ozone. Ground-level ozone can trigger a variety of health problems such as asthma and can also have harmful effects on sensitive vegetation and ecosystems.

The EPA regulates vehicle emissions and fuel efficiency through its vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy (CAFE) standards. It also regulates and monitors pollutants considered harmful to public health and the environment through the National Ambient Air Quality Standards (NAAQS) authorized by the Clean Air Act (1970). The EPA has set NAAQS for six principal "criteria" pollutants. These are listed in Table 4.3 along with the current standards.

All counties within the MPA are currently in attainment of the NAAQS.

Transportation conformity is a process required of MPOs pursuant to the Clean Air Act Amendments of 1990 (CAAA of 1990) to ensure that federal funding and approval are given to those transportation activities that are consistent with air quality goals. The CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the FHWA be in conformity with the State Implementation Plan (SIP) which represents the state's plan to either achieve or maintain the NAAQS for a particular pollutant.

Should any of the counties within the MPA ever exceed NAAQ standards and are designated as a nonattainment or maintenance area, the MTP will be subject to a conformity analysis. If this were to occur in the future, the transportation model, which forms the basis of transportation decision making, provides numeric outputs that may be utilized in regional air quality modeling.

Table 4.3 National Ambient Air Quality Standards (NAAQS) as of 2015

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 $\mu g/m^3$	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual mean
Ozone		primary and secondary	8-hour	70 ppb	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary	Annual	12 $\mu g/m^3$	Annual mean, averaged over 3 years
		secondary	Annual	15 $\mu g/m^3$	Annual mean, averaged over 3 years
		primary and secondary	24-hour	35 $\mu g/m^3$	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 $\mu g/m^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA

4.4 Public Health

There is a growing number of local and state governments that are performing health impact assessments for transportation projects and programs in order to more comprehensively address public health outcomes. Transportation can affect public health in many ways, but the most commonly discussed include:

- **Safety**: Roadway design can affect the risk for traffic related injuries and fatalities. Between 2011 and 2013, there was an average of 15 crashes per year in the Hattiesburg MPA that resulted in at least one fatality.
- **Air Quality**: Air pollution from vehicle emissions worsens chronic respiratory diseases, such as asthma.
- **Noise Pollution**: Noise pollution can cause hearing loss, stress related illnesses, high blood pressure, speech interference, and sleep disruption.
- **Physical Activity**: A lack of sufficient bicycle and pedestrian infrastructure can limit opportunities for physical activity.
- **Accessibility**: Transportation can limit access to healthy food, recreational opportunities, and healthcare facilities.

Transportation-Related Health Statistics in the Region

The role of transportation in public health outcomes is especially important in the MPA. Table 4.4 shows county public health indicators that are influenced by the transportation system. For the most part, the counties in the MPA have slightly better health indicator measures than Mississippi as a whole, but lag far behind the 90th percentile of U.S. counties in all selected measures. Forrest County is slightly worse than Lamar County in all selected measures except that a higher percentage of its population has access to exercise opportunities.

Since it is obvious that the counties in the Hattiesburg MPA are less healthy than the top 10 percent of U.S. counties in health areas strongly influenced by transportation, it is useful to compare the counties to their peers. When compared to peer areas, using the Center for Disease Control's (CDC) Community Health Status Indicators program, data show more nuanced transportation and health-related issues that burden the residents of the counties in the MPA. For example, while obesity is high in Forrest and Lamar counties, only Lamar County has a high obesity rate when compared to its peers. Table 4.5 shows the public health indicators where the MPA counties perform in the bottom quartile when compared to their peer counties. The issues highlighted by this peer analysis could potentially be improved by increasing physical activity, increasing access to opportunities for exercise and parks, and improving roadway safety.

Table 4.4 Selected County Public Health Indicators

Place	Percentage of Adults Reporting Poor or Fair Health	Average Number of Physically Unhealthy Days in Last 30 Days	Average Number of Mentally Unhealthy Days in Last 30 Days	Percentage of Adults that are Obese	Percentage of Adults Reporting as Physically Inactive	Percentage of Population With Access to Exercise Opportunities
Forrest County	19.9%	3.9	4.4	34.5%	33.0%	78.9%
Lamar County	18.6%	3.4	3.7	33.6%	27.8%	57.8%
Mississippi	21.5%	4.1	4.1	35.3%	32.5%	59.0%
Top U.S. Counties*	10.0%	2.5	2.3	25.0%	20.0%	92.0%

Note: * 90th percentile, i.e., only 10% are better.

Source: 2015 County Health Rankings, University of Wisconsin Population Health Institute

Table 4.5 Selected Regional Public Health Indicators below Peer Areas

Health Indicator	Forrest County	Lamar County
Motor vehicle deaths	X	X
Diabetes deaths	X	
Alzheimer's disease deaths	X	X
Chronic lower respiratory disease deaths	X	
Stroke deaths		X
Adult obesity		X
Adult overall health status		X
Older adult depression	X	X
Adult physical inactivity		X
Access to parks		X

Source: CDC, Community Health Status Indicators, 2015

Transportation and Physical Activity

While transportation planning typically addresses safety, air quality, noise pollution, and accessibility, only recently has the planning process begun to consider the impact of transportation on physical activity. Of particular focus in transportation planning is the impact of the built environment on walking and biking.

Walking and biking are important physical activities because they are regular, light to moderate physical activities which can significantly decrease a person's risk for cardiovascular disease, colon cancer, type 2 diabetes, obesity, osteoporosis, and depression. Walking and biking can also improve psychological well-being and quality of life. Therefore, providing convenient and attractive pedestrian and bicycle infrastructure and encouraging walking and biking can improve public health outcomes for a community.

4.5 Project Development Considerations

This section outlines how the MTP addresses environmental mitigation of proposed transportation projects.

Wetlands, Waterways, and Flooding

Transportation projects were evaluated for proximity to wetlands, impaired waters, flood zones, and navigable waters. While transportation projects should be sensitive to all bodies of water, these water bodies merit special attention for the following reasons:

- Wetlands have many environmental benefits, most notably water purification, flood protection, shoreline stabilization, groundwater recharge and streamflow maintenance, and fish and wildlife habitat. Wetlands are protected by the Clean Water Act.
- Impaired waters are already too polluted or otherwise degraded to meet the state water quality standards.
- Encroaching on or changing the natural floodplain of a water course can result in catastrophic flooding of developed areas.
- Structures built across navigable waterways must be designed in consultation with the Coast Guard, as required by the Coast Guard Authorization Act of 1982.

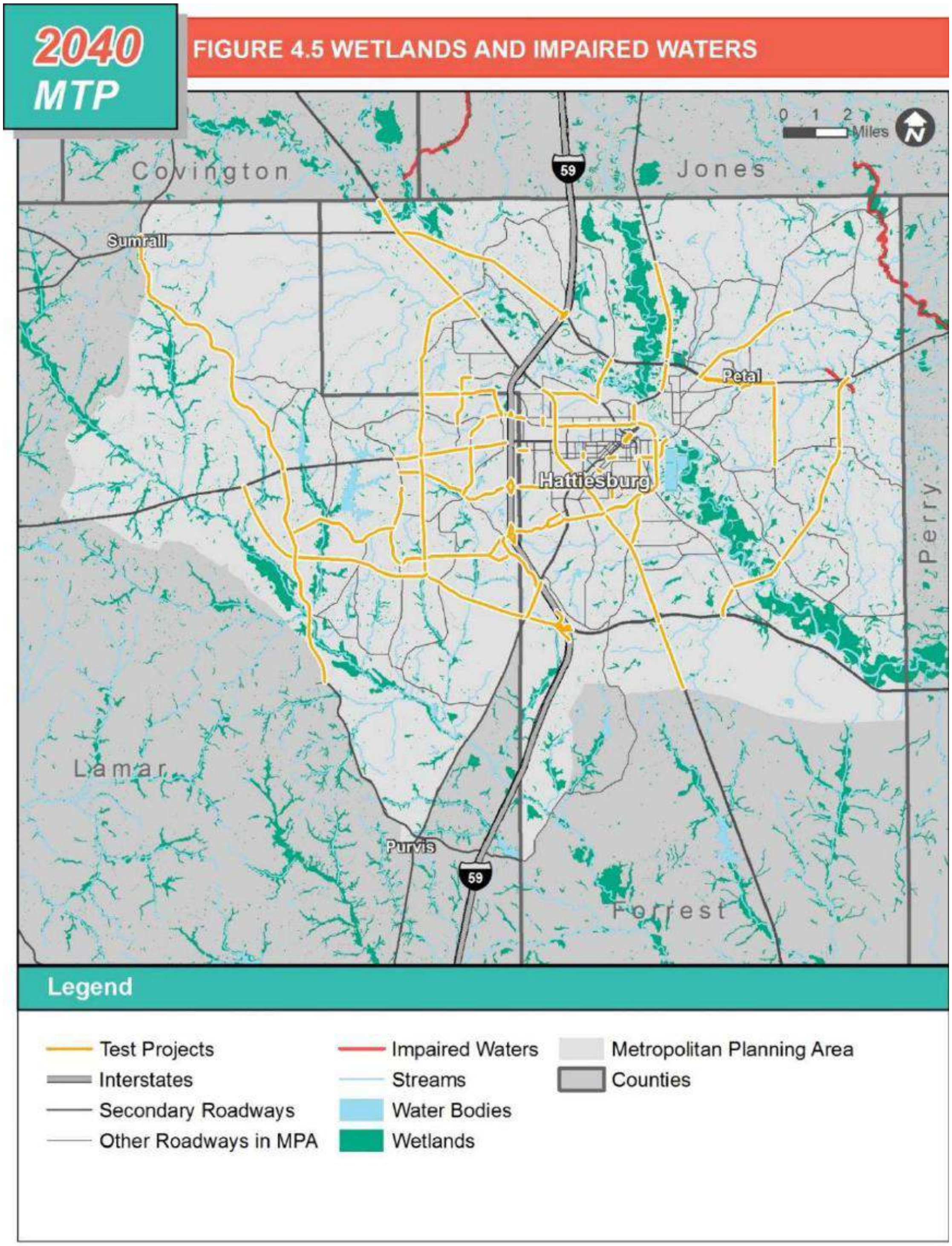
Figure 4.5 displays the proposed MTP transportation projects along with the location of wetlands and impaired waters. Figure 4.6 displays the proposed MTP transportation projects and flood zones.

There are no navigable waterways within the MPA that are part of the U.S. Army Corps of Engineers Navigable Waterway Network. Navigable waterways are defined as waters that have been used in the past, are now used, or are susceptible to use as a means to transport interstate or foreign commerce up to the head of navigation.

Mitigation

This early in the planning stage, there are not enough resources available to assess project level impacts to specific wetlands. As individual projects proceed through the MDOT project delivery process and NEPA process, it is anticipated that project sponsors will:

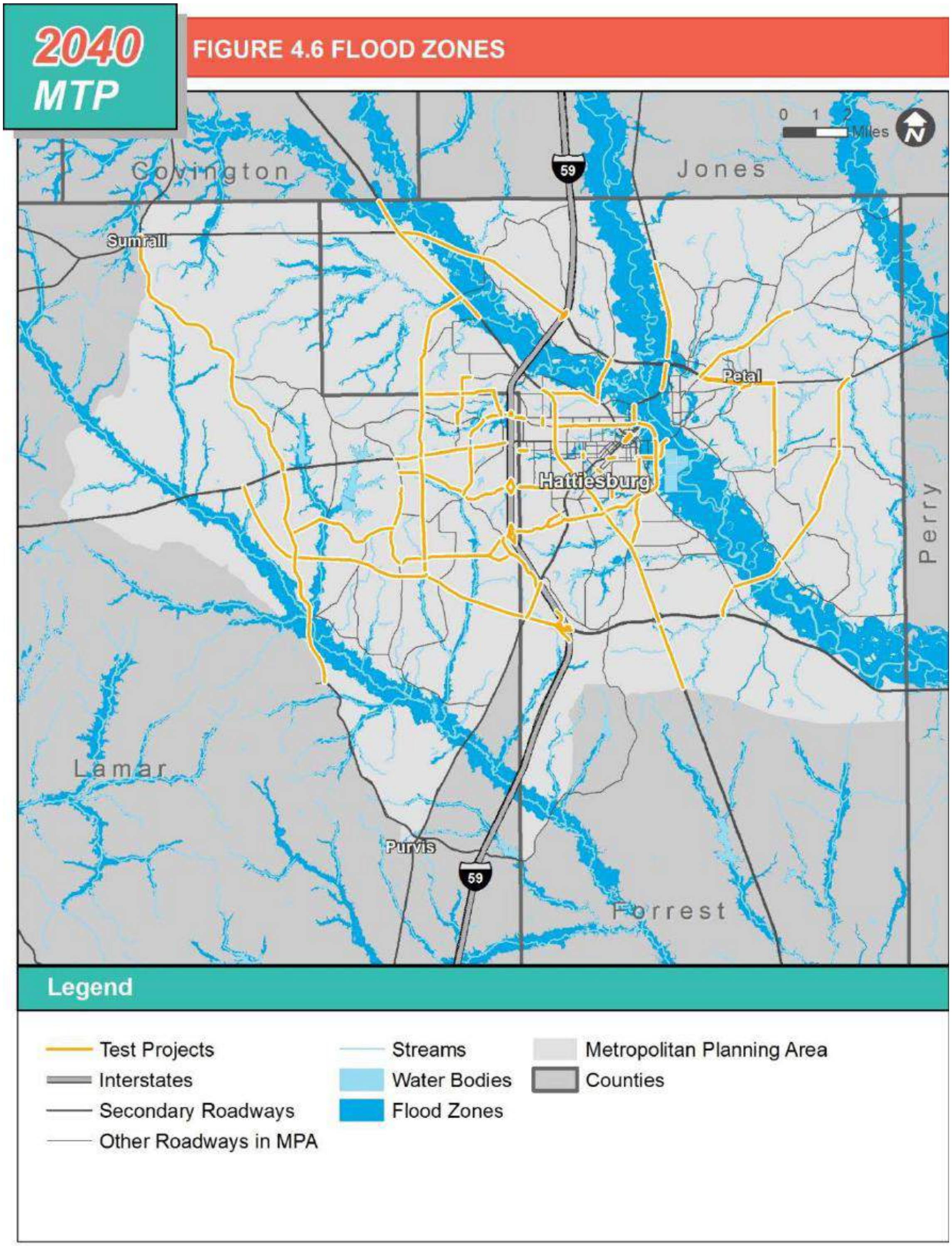
- Ensure that transportation facilities constructed in floodways will not increase flood heights.
- Take steps to avoid wetland and flood zone impacts where practicable.
- Consider strategies which minimize potential impacts to wetlands and flood zones.
- Provide compensation for any remaining unavoidable impacts through activities to restore or create wetlands.
- Projects near impaired waters should consider measures to improve the quality of these waters.



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FWS; EPA



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FEMA

Wildlife

Transportation projects were evaluated for proximity to identified critical habitat areas for threatened and endangered species and wildlife refuges.

The Endangered Species Act (ESA) [16 U.S.C. 1531 et. seq.] of 1973, as amended, was enacted to provide a program for the preservation of endangered and threatened species, and to provide protection for the ecosystems upon which these species depend for their survival. All federal agencies or projects utilizing federal funding are required to implement protection programs for designated species and to use their authorities to further the purposes of the act.

An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those which have been formally submitted to Congress for official listing as threatened or endangered.

Species may be considered endangered or threatened when any of the five following criteria occurs:

1. The current/imminent destruction, modification, or curtailment of their habitat or range
2. Overuse of the species for commercial, recreational, scientific, or educational purposes
3. Disease or predation
4. The inadequacy of existing regulatory mechanisms
5. Other natural or human-induced factors affect continued existence.

Section 4(f) of the Department of Transportation (DOT) Act of 1966 affords protection to wildlife or waterfowl refuges when USDOT funds are invested in a project. There are no wildlife management areas or refuges within the MPA.

Table 4.6 lists species classified as endangered or threatened within the MPA counties. Species with ranges unrefined beyond the state level are not included. Figure 4.7 displays the proposed MTP transportation projects along with the location of identified critical habitat areas. Note that not all protected species have identified critical habitat areas.

Mitigation

Preliminary planning undertaken within the context of development of the MTP does not include resources sufficient to assess project specific impacts to species habitats. Table 4.6 is incorporated to establish the potential need for further study as projects are carried forward through the MDOT project delivery process, the NEPA process, design, and construction. Projects will be developed in consultation with U.S. Fish and Wildlife Service and MDWFP, and to the extent practicable, actions which impact critical habitats will be avoided.

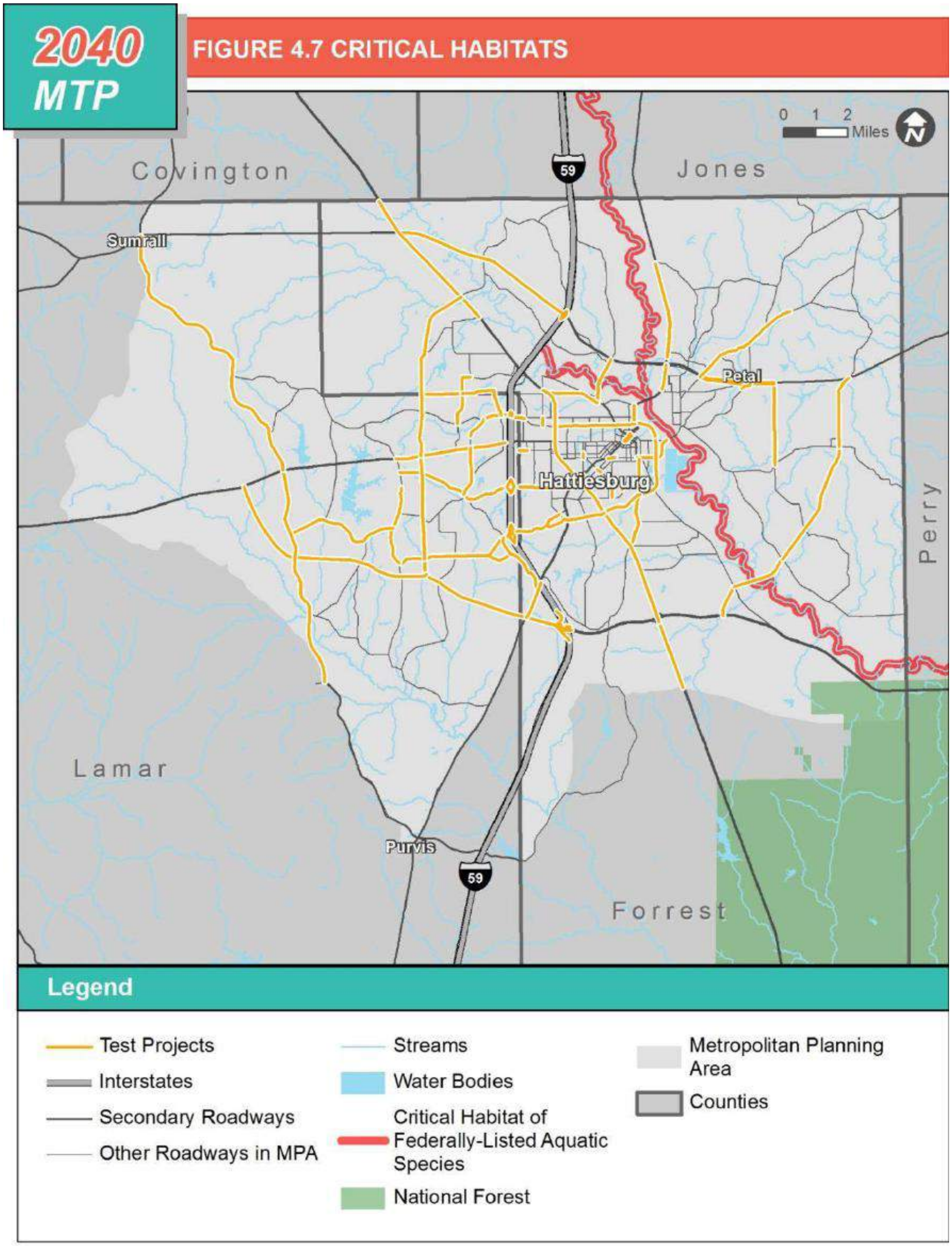
Table 4.6 Species Identified under Endangered Species Act in Region

Group	Name	Status	Identified Critical Habitat	Forrest County	Lamar County
Bird	Red-cockaded woodpecker (Picoides borealis)	Endangered	yes	yes	yes
Bird	Wood stork (Mycteria americana)	Threatened	no	yes	yes
Ferns and Allies	Louisiana quillwort (Isoetes louisianensis)	Endangered	no	yes	no
Fish	Atlantic sturgeon (Gulf subspecies) (Acipenser oxyrinchus (=oxyrhynchus) desotoi)	Threatened	yes	yes	no
Fish	Pearl darter (Percina aurora)	Candidate	no	yes	no
Mammal	Louisiana black bear (Ursus americanus luteolus)	Threatened	yes	yes	yes
Mammal	American black bear (Ursus americanus)	Similarity of Appearance (Threatened)	no	yes	yes
Reptile	Yellow-blotched map turtle (Graptemys flavimaculata)	Threatened	no	yes	no
Reptile	Black pine snake (Pituophis melanoleucus lodingi)	Threatened	proposed	yes	yes
Reptile	Gopher tortoise (Gopherus polyphemus)	Threatened	no	yes	yes

Source: U.S. Fish and Wildlife Service, Environmental Conservation Online System

In addition to federally protected species, transportation projects should be sensitive to species that are protected by state law. Mississippi's endangered species law, the Nongame and Endangered Species Conservation Act of 1974, declares that "species or subspecies of wildlife indigenous to the state should be accorded protection in order to maintain and to the extent possible enhance their numbers." An endangered species or subspecies of wildlife is one whose survival and continued welfare in the state is in jeopardy or is likely to become so in the near future. Mississippi's official list of endangered species is reviewed every two years by the MDWFP, and may be amended by additions or deletions as deemed appropriate. MDWFP is responsible for management of endangered species and enforcement of the Nongame and Endangered Species Conservation Act.

The only state-protected species whose range could potentially include parts of the MPA are the Dusky Gopher Frog, Rainbow Snake, and Southern Hognose Snake. All have a state protection status of "Listed Endangered".



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: FWS

Historic and Recreational Resources

Transportation projects were evaluated for proximity to historic sites and publicly owned recreational facilities.

Section 4(f) of the Department of Transportation (DOT) Act of 1966 affords protection to publicly owned parks and recreation areas and all historic sites listed or eligible for listing on the National Register of Historic Places when USDOT funds are invested in a project.

In order to be eligible for the National Register of Historic Places (NRHP), a district, site, building, structure, or object must possess integrity of location, design, setting, materials, workmanship, feeling, and association and generally must be at least 50 years old. It will also be evaluated by the following criteria:

- Association with events that have made a significant contribution to the broad patterns of our history; or
- Association with the lives of significant persons in or past; or
- Embodiment of the distinctive characteristics of a type, period, or method of construction, or representative of the work of a master, or possession of high artistic values, or representative of a significant and distinguishable entity whose components may lack individual distinction; or
- Provision or likelihood to provide information important in history or prehistory.

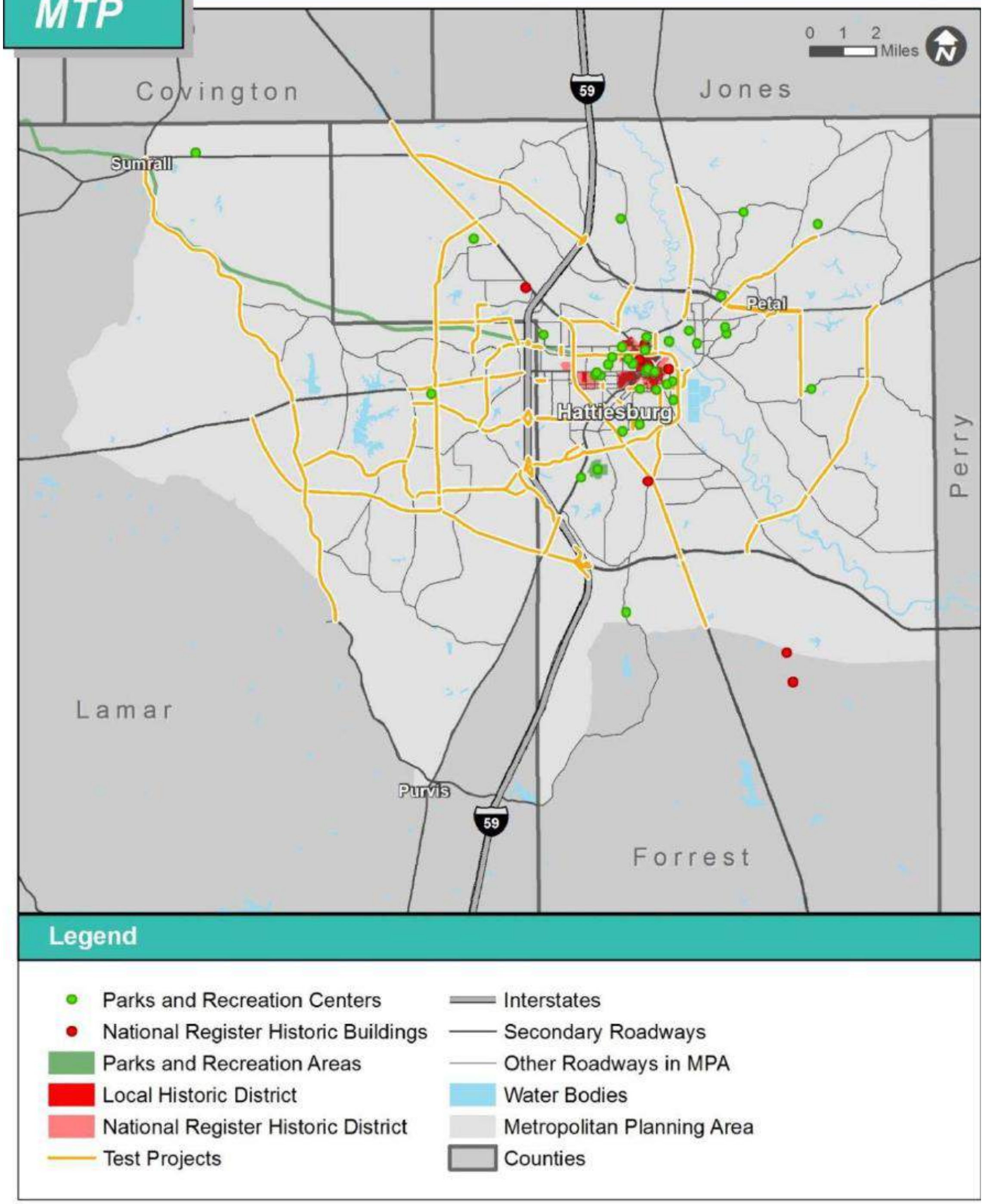
Figure 4.8 shows historic sites and districts listed on the National Register as well as local historic districts. It is important to note that the local historic districts are not necessarily protected by 4(f) regulations unless they meet NRHP eligibility. Furthermore, there may be additional properties not listed on either register which are eligible for the NRHP. Figure 4.8 excludes historic features deemed 'restricted' or 'sensitive', such as sensitive archaeological sites and shows the major publicly owned parts and recreation areas..

Mitigation

Projects will be developed in consultation with the State Historic Preservation Office (SHPO) and to the extent practicable; actions which adversely impact NRHP properties and publicly owned recreation areas will be avoided. When historic properties are adversely affected, mitigation will include data recovery as appropriate to document the essential qualities of the historic resources. When publicly owned recreation areas are adversely affected, appropriate compensation will be provided.

2040 MTP

FIGURE 4.8 HISTORIC AND RECREATIONAL RESOURCES



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: NPS; City of Hattiesburg

Potentially Hazardous Properties

Transportation projects were evaluated for proximity to potentially hazardous sites identified by the Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA), commonly known as Superfund. Addressing these early on in the process can reduce costs, delays, and liabilities.

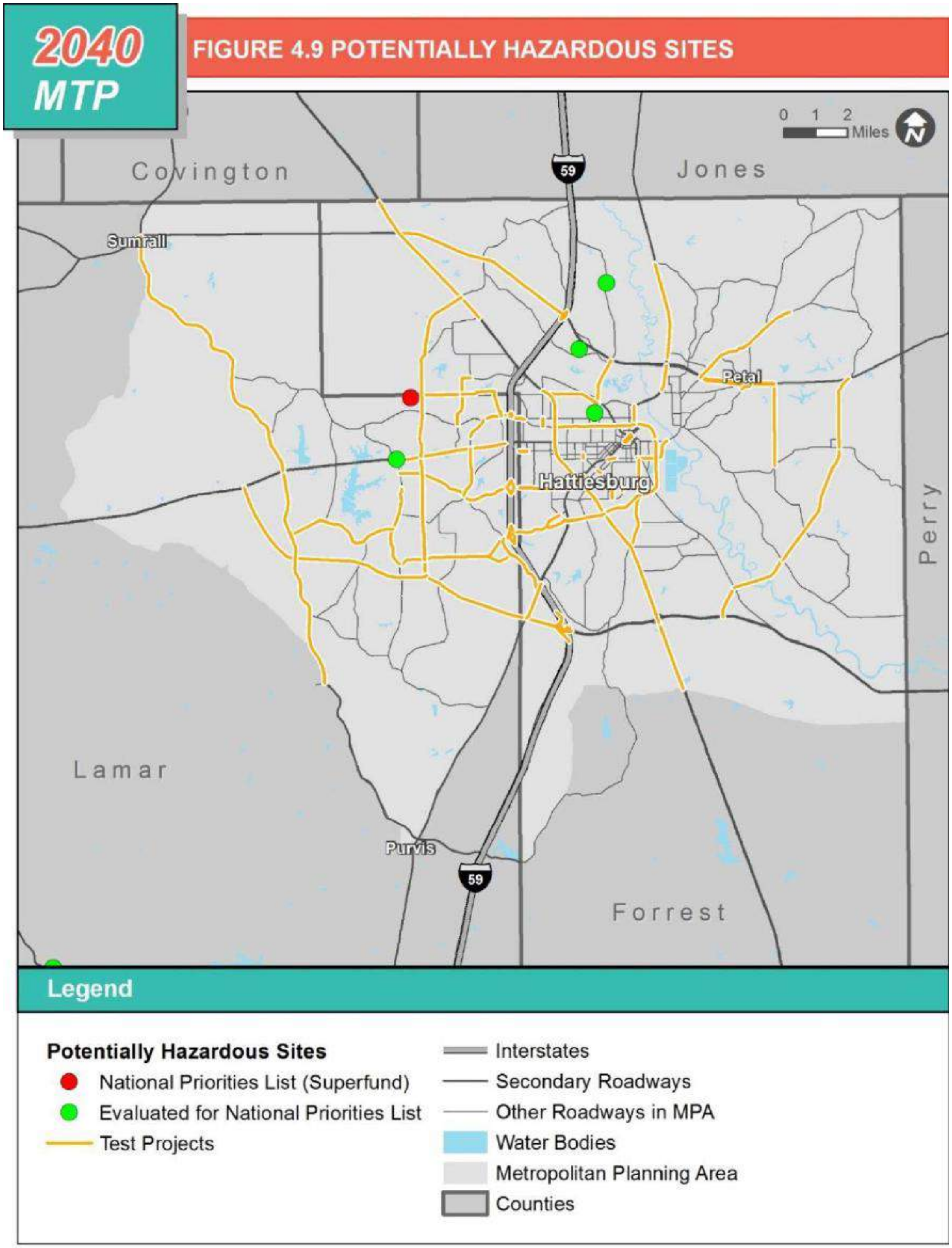
CERCLA was enacted in 1980 and established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enabled the revision of the National Contingency Plan, which established the National Priorities List (NPL).

The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

Using the EPA's Clip N Ship application, it was determined that there is one site in the MPA listed on the NPL in the MPA, the Davis Timber Company property in Lamar County. As of 2012, the site had gone through the clean-up process. This site and other sites evaluated for inclusion in the NPL in the MPA are illustrated in Figure 4.9.

Mitigation

At this stage in project development, not enough information is available to determine impacts and mitigation. However, transportation projects affected by or affecting potentially hazardous properties will be evaluated during the MDOT project delivery process, the NEPA process, design, and construction.



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: EPA CERCLIS

Community Impacts

A transportation project may produce various impacts to public spaces, residences, and businesses.

Mitigation

Impacts associated with specific projects will be assessed in conformance with local, state, and federal regulations, NEPA guidance, and the MDOT project delivery process.

Certain impacts, such as those associated with an increase in traffic related noise, can potentially be mitigated. Also, to the extent practicable, projects should be developed using Context Sensitive Solutions.

Environmental Justice

Executive Order 12898 establishes guidance on federal actions, which includes projects receiving federal funds, to address EJ in minority populations and low-income populations (February 11, 1994). The order specifies actions to be taken on a range of issues that are intended to promote nondiscrimination in federal actions, to provide minority and low-income communities equal access to public information regarding a federal action, and to provide an opportunity for public participation in the evaluation of a federal action in matters relating to human health and the environment. In particular, the order stipulates that:

> "To the greatest extent practicable and permitted by law… each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations… (Order Section I-101)
>
> Each Federal Agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons…from participation in, denying persons the benefits of, or subject persons…to discriminations under such programs, policies, and activities, because of their race, color, or national origin (Order Section 2-2)."

Figure 4.10 shows TAZs in the MPA which are likely to have disproportionately high concentrations of minority and/or low-income persons. Since TAZs vary in density and populations are not evenly distributed throughout TAZs, this map is mainly meant for illustrative purposes. All TAZs exceeding the MPA average for percent minority (38.7

percent) and/or percent living in poverty (23.3 percent) are classified as areas with potential EJ concerns. TAZs exceeding one and a half times the MPA average for these attributes are further classified as areas with potentially high EJ concerns.

Mitigation

In an attempt to prevent disproportionately high and adverse effects on minority or low-income populations early in the planning process, the 2040 MTP determines the relative likelihood of EJ issues for all transportation projects. Projects with a relatively higher likelihood of EJ issues are then awarded less points in the project prioritization process.

In order to determine a project's propensity for EJ issues, the MTP compares the socioeconomic composition of a project corridor to the socioeconomic composition of the MPA as a whole. Project corridors are defined as a quarter mile on either side of a project. Using data from the Census Bureau, calculations are made to determine if these corridors are home to a disproportionately high concentration of minorities or persons living in poverty. The generalized process is as follows:

- The overall percentage of minority population (non-White or Hispanic) is calculated for the entire MPA. This is 38.7 percent.
- The overall percentage of the population, excluding group quarters population, living in poverty is calculated for all block groups intersecting the entire MPA. This is 23.3 percent.
- Each proposed roadway project is buffered by a quarter mile radius.
- Socioeconomic data for this buffer area are calculated using a GIS process that distributes 2010 Census and 2009-2013 American Community Survey socioeconomic data from census blocks and block groups to existing residential areas within the buffer area. Population residing in institutional facilities, such as prisons and nursing homes, are excluded from the analysis.

This is a high-level planning exercise and is not intended to be as detailed as a project-specific environmental analysis. However, by screening proposed transportation projects for potential EJ issues, the MTP seeks to avoid funding projects with potentially disproportionately high and adverse impacts to minority and low-income populations and to identify high-priority projects that may warrant greater community outreach early on in the project development process.

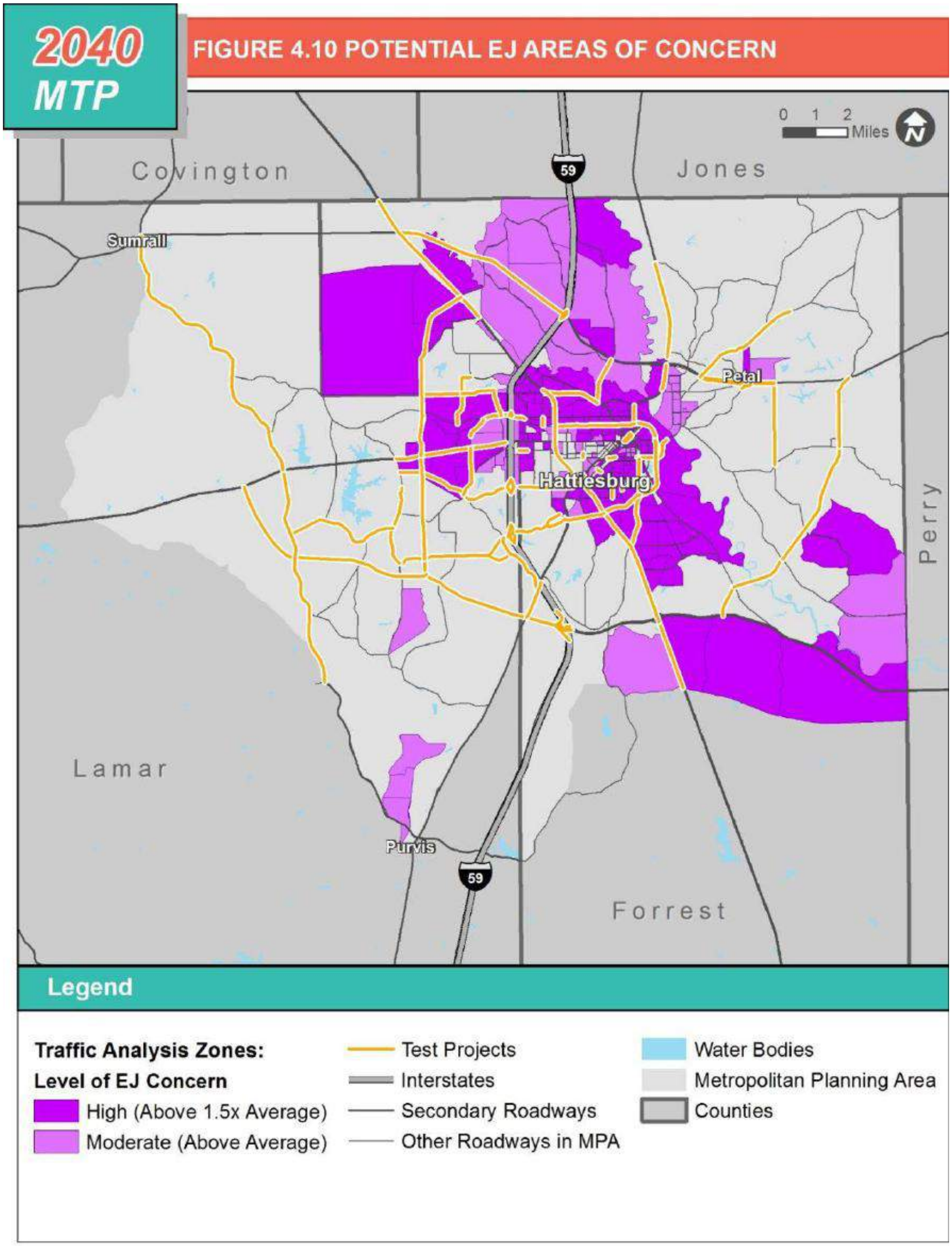


FIGURE 4.10 POTENTIAL EJ AREAS OF CONCERN

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census and 2009-13 ACS

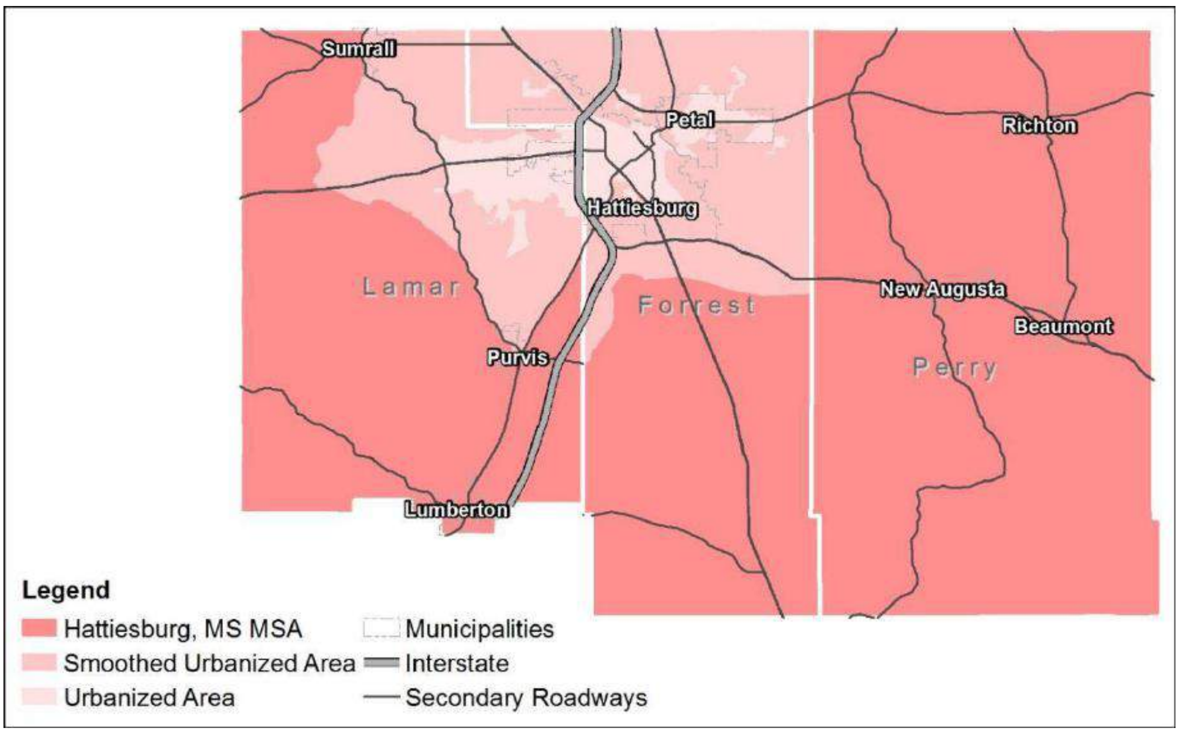
5.0 Current Land Use, Population, Economic, and Travel Patterns

5.1 Regional Context

The U.S. Office of Management and Budget (OMB) defines Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (μSAs) as core-based statistical areas that include the county or counties containing a core urban area and any adjacent counties that have a high degree of social and economic integration, as measured by commuting to work. For this reason, these geographic areas are useful for understanding the broader context of land use, population, economic, and travel patterns in a region.

The Hattiesburg MPA contains the Hattiesburg MSA's core urban area, the Hattiesburg urbanized area, and is situated entirely within the MSA, which consists of Forrest, Lamar, and Perry counties. These areas are illustrated in Figure 5.1 below.

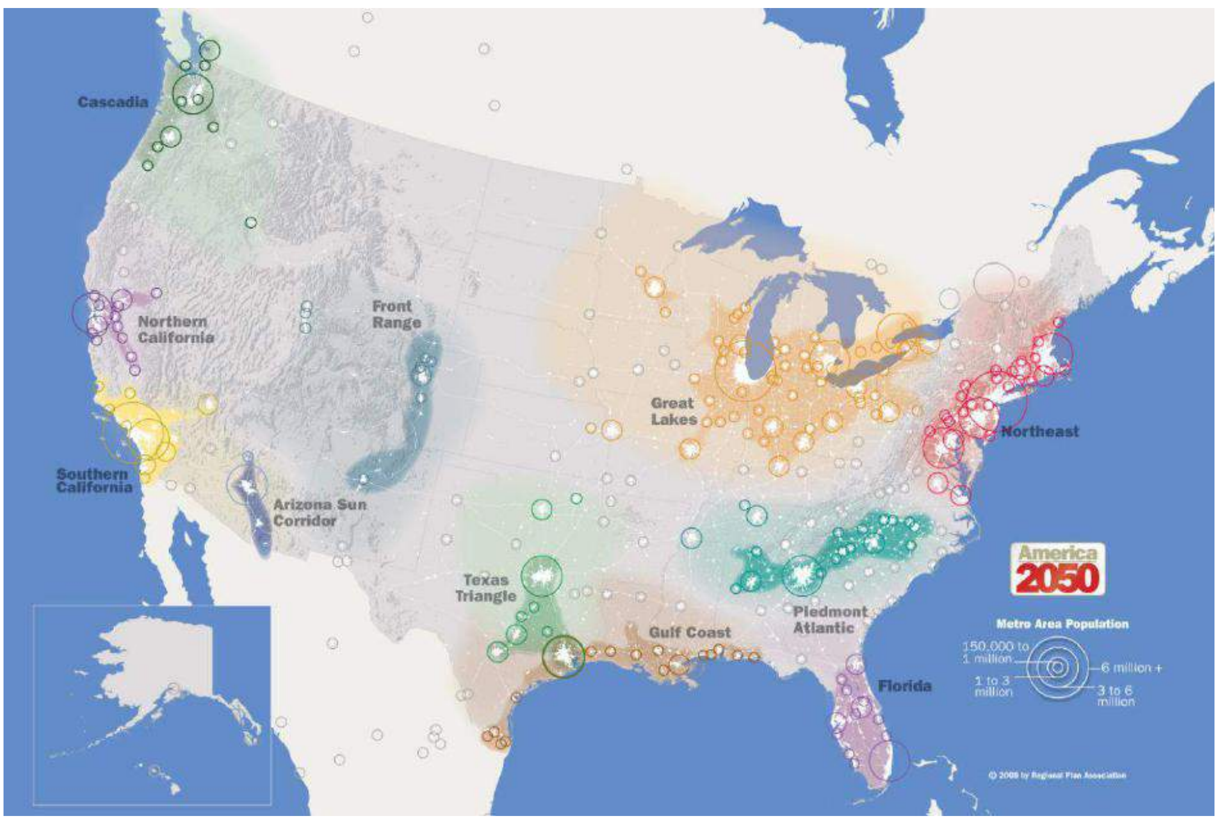
Figure 5.1 Components of Hattiesburg, MS Metropolitan Statistical Area



Beyond the MSA, the Hattiesburg MPA is typically not considered to be a part of a U.S. megaregion, or a large geographic area encompassing multiple major and minor metropolitan areas. However, according to the American 2050 project by the Regional Plan Association, it is within the area of influence for the Gulf Coast megaregion, as illustrated in Figure 5.2.

While the definition and classification of megaregions varies, they are important for transportation planning because they indicate strong economic and social ties in a geographic area that is larger thanMPAs. Because of this, regional planning coordination becomes increasingly important in the megaregions. In the future, the HPFLMPO will more than likely begin to coordinate transportation planning efforts with nearby MPOs in the Gulf Coast Megaregion, such as the Mississippi Gulf Coast MPO or New Orleans MPO.

Figure 5.2 Megaregions in the United States



Source: Regional Plan Association, 2015

5.2 Land Use Patterns

As indicated in Figure 4.2 of chapter 4, most of the developed land in the MPA is centered around the cities of Hattiesburg and Petal. Areas classified as urban by the Census Bureau are similarly concentrated around these cities, as illustrated in Figure 5.3.

Population densities, employment densities, and activity densities within the MPA are illustrated in Figures 5.4 through 5.9.

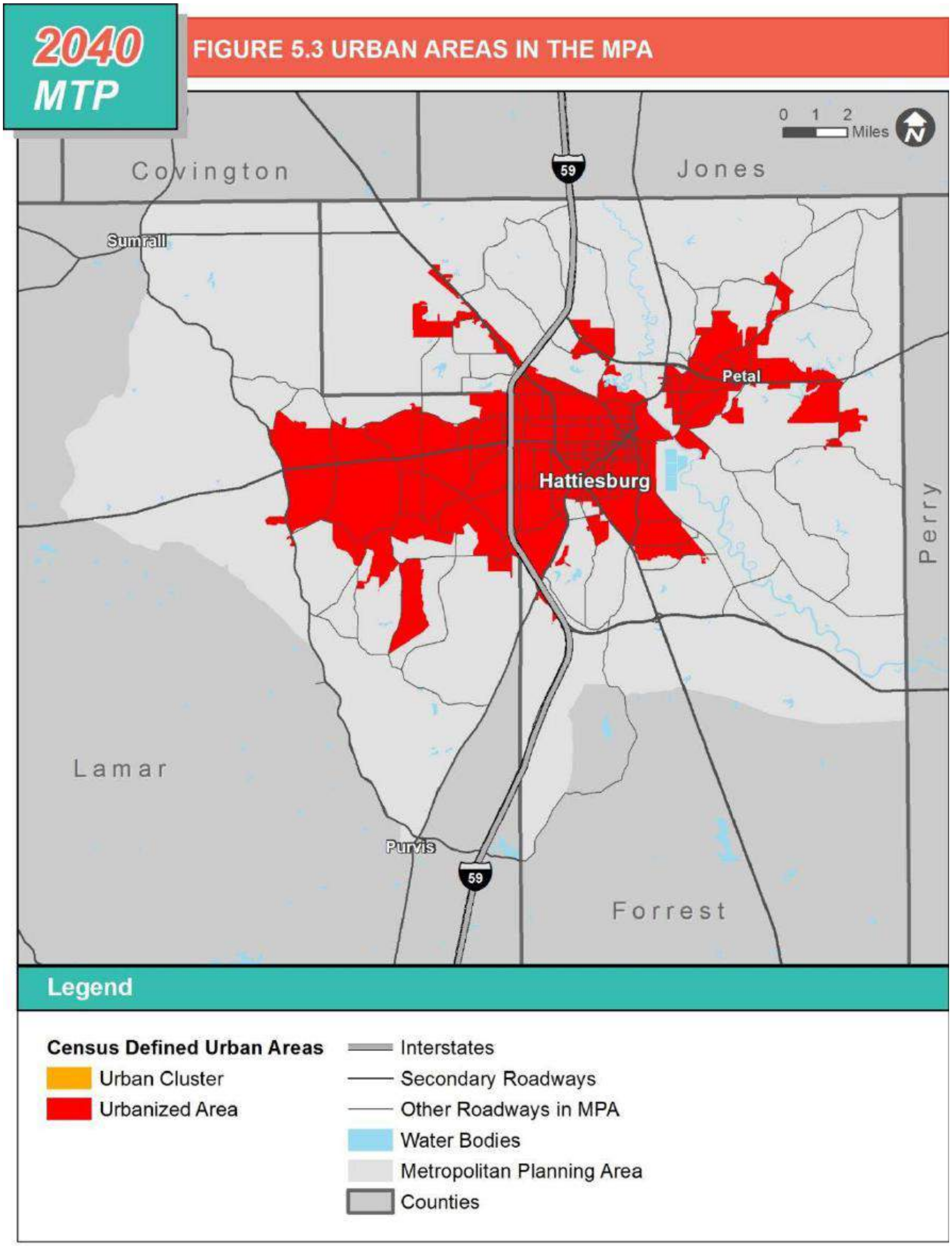
Population densities in the MPA are the greatest within the city of Hattiesburg, with a smaller concentration also occurring near the Central Business District (CBD) of the city of Petal.

Employment densities are the greatest in four key employment centers: the Hattiesburg CBD; the Midtown/Forrest General Hospital/University of Southern Mississippi area; the Turtle Creek Mall/Wesley Medical Center area; and the Cloverleaf Mall/Walmart area.

Retail and Food Service employment (NAICS 44-45, 722) is concentrated most heavily along Hardy Street from the Turtle Creek Mall area to Midtown. A smaller corridor stretches along US 11 from the Cloverleaf Mall area to the Hattiesburg CBD. Office employment (NAICS 51-56, 62) is concentrated most heavily near the two major hospitals, Forrest General Hospital and Wesley Medical Center, as well as the Hattiesburg CBD. The heaviest concentrations of industrial employment (NAICS 21, 31-33, 42, 48-49) are near the Hattiesburg-Forrest County Industrial Park and Hattiesburg Chain Municipal Airport. Industrial employment is also concentrated near the Marshall Durbin plant and on some railroad corridors and US 49, northwest of I-59.

Activity density, or the combination of population and employment density, is important to discuss, since some areas may not have significantly high population or employment density alone but still generate significant activity. By looking at these two factors together, one gets a better understanding of the impact of mixed-use areas, whether those uses are mixed vertically or horizontally.

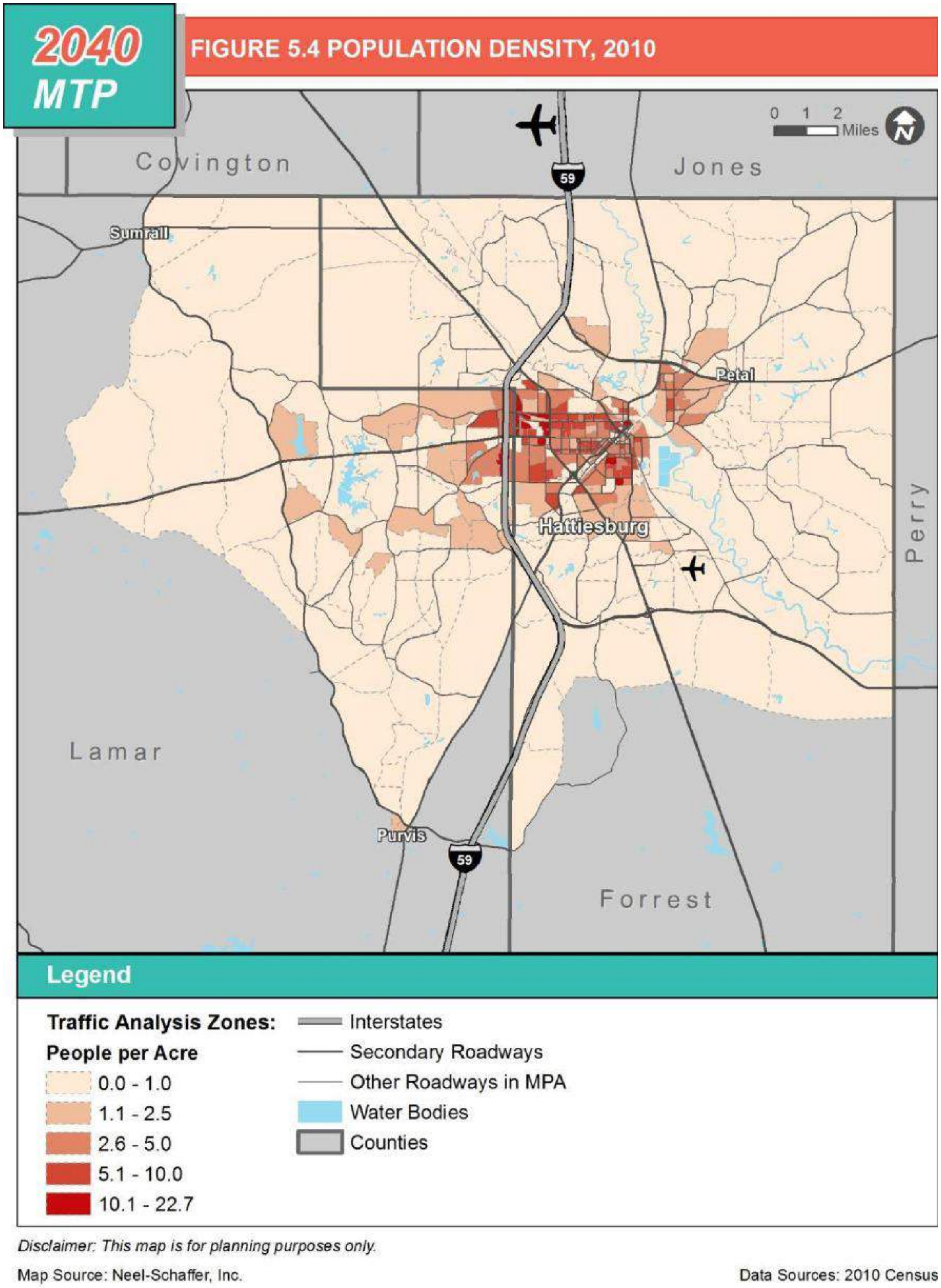
The general land use patterns described above are consistent with existing land use maps and zoning regulations for the local governments in the MPA.



Disclaimer: This map is for planning purposes only.

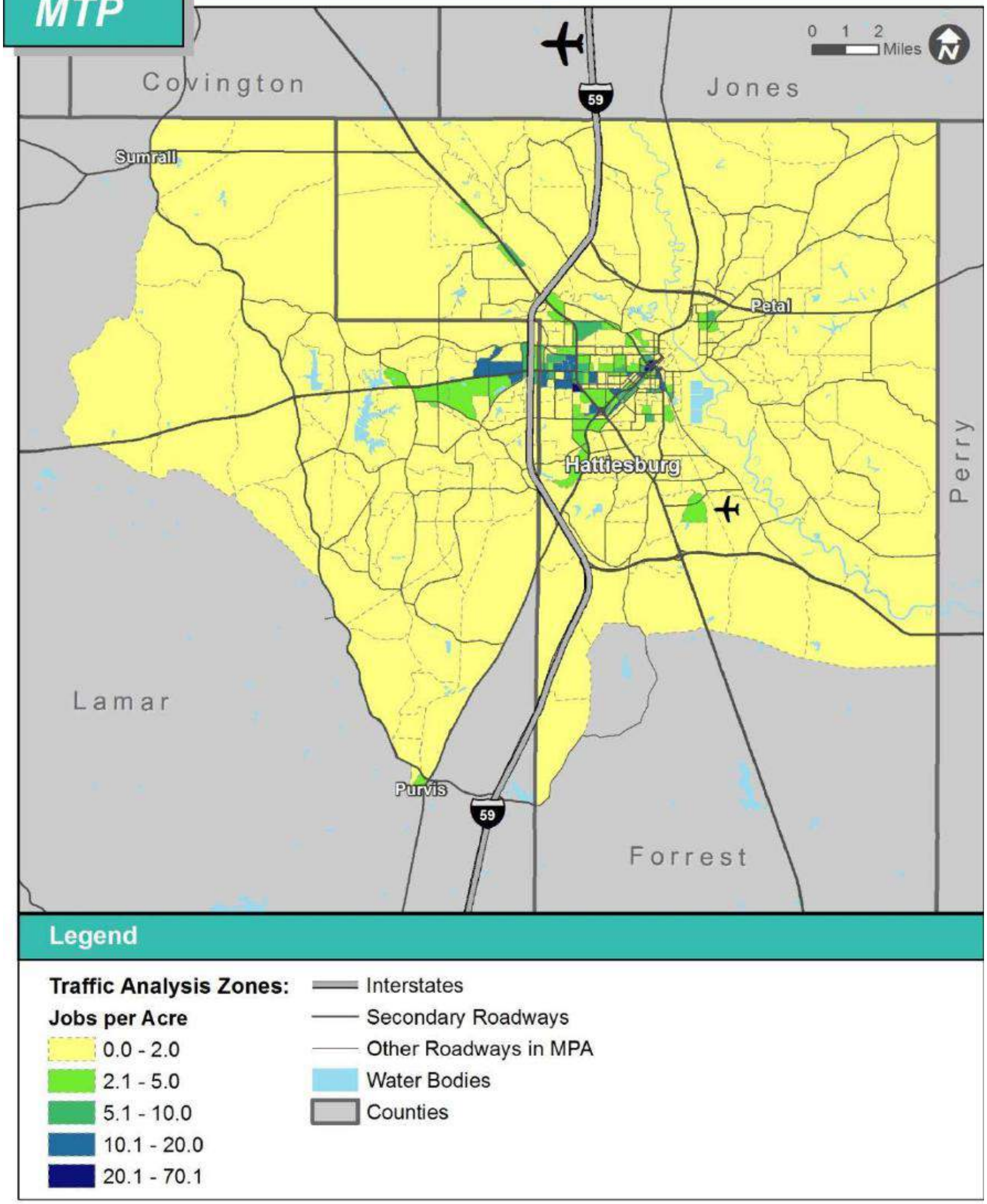
Map Source: Neel-Schaffer, Inc.

Data Sources: Census Bureau


2040
MTP
FIGURE 5.4 POPULATION DENSITY, 2010
0 1 2
Miles
N
Covington
Jones
Sumrall
Petal
Hattiesburg
Perry
Lamar
Purvis
59
Forrest
Legend
Traffic Analysis Zones:
People per Acre
0.0 - 1.0
1.1 - 2.5
2.6 - 5.0
5.1 - 10.0
10.1 - 22.7
Interstates
Secondary Roadways
Other Roadways in MPA
Water Bodies
Counties
Disclaimer: This map is for planning purposes only.
Map Source: Neel-Schaffer, Inc.
Data Sources: 2010 Census

2040 MTP

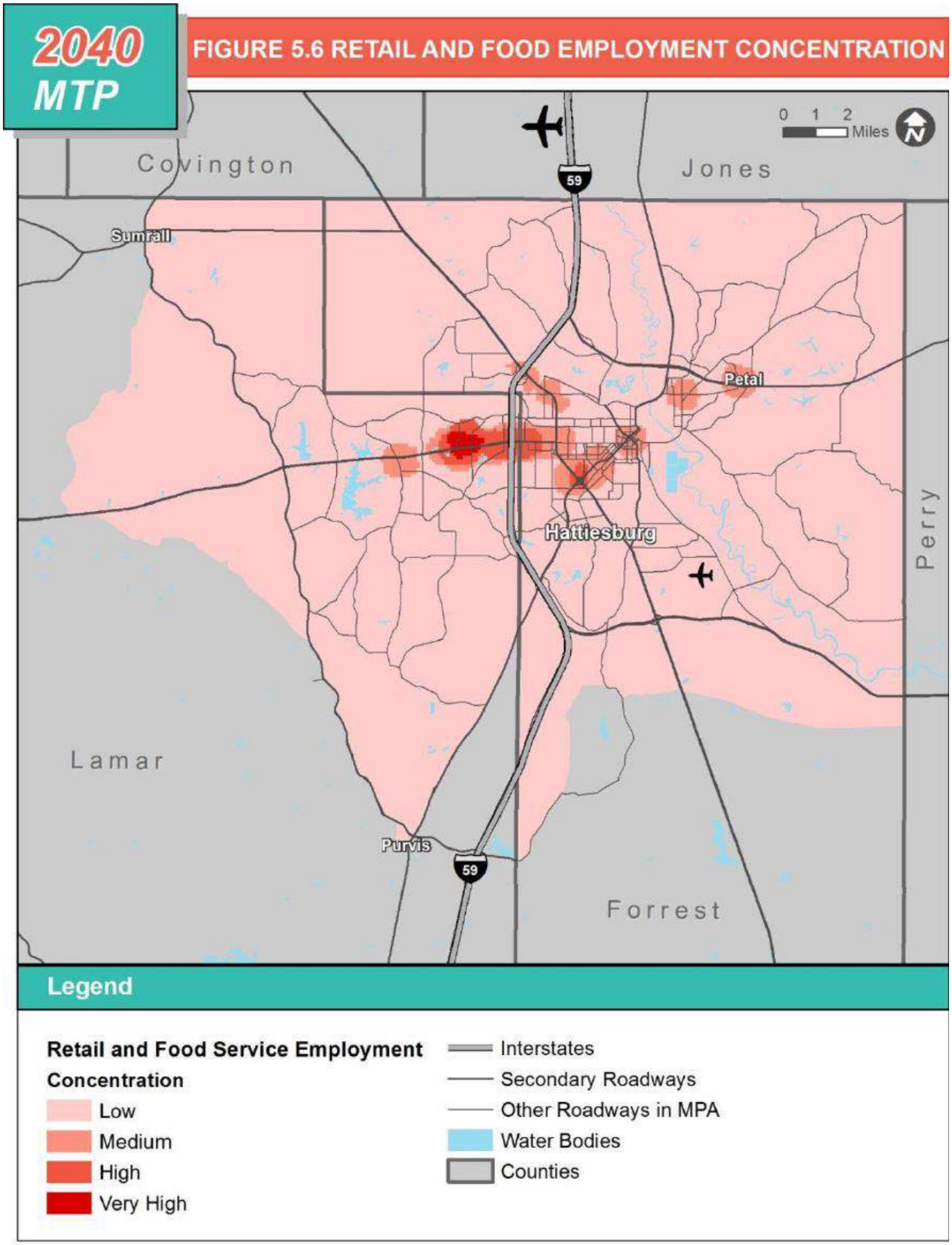
FIGURE 5.5 EMPLOYMENT DENSITY, 2010



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

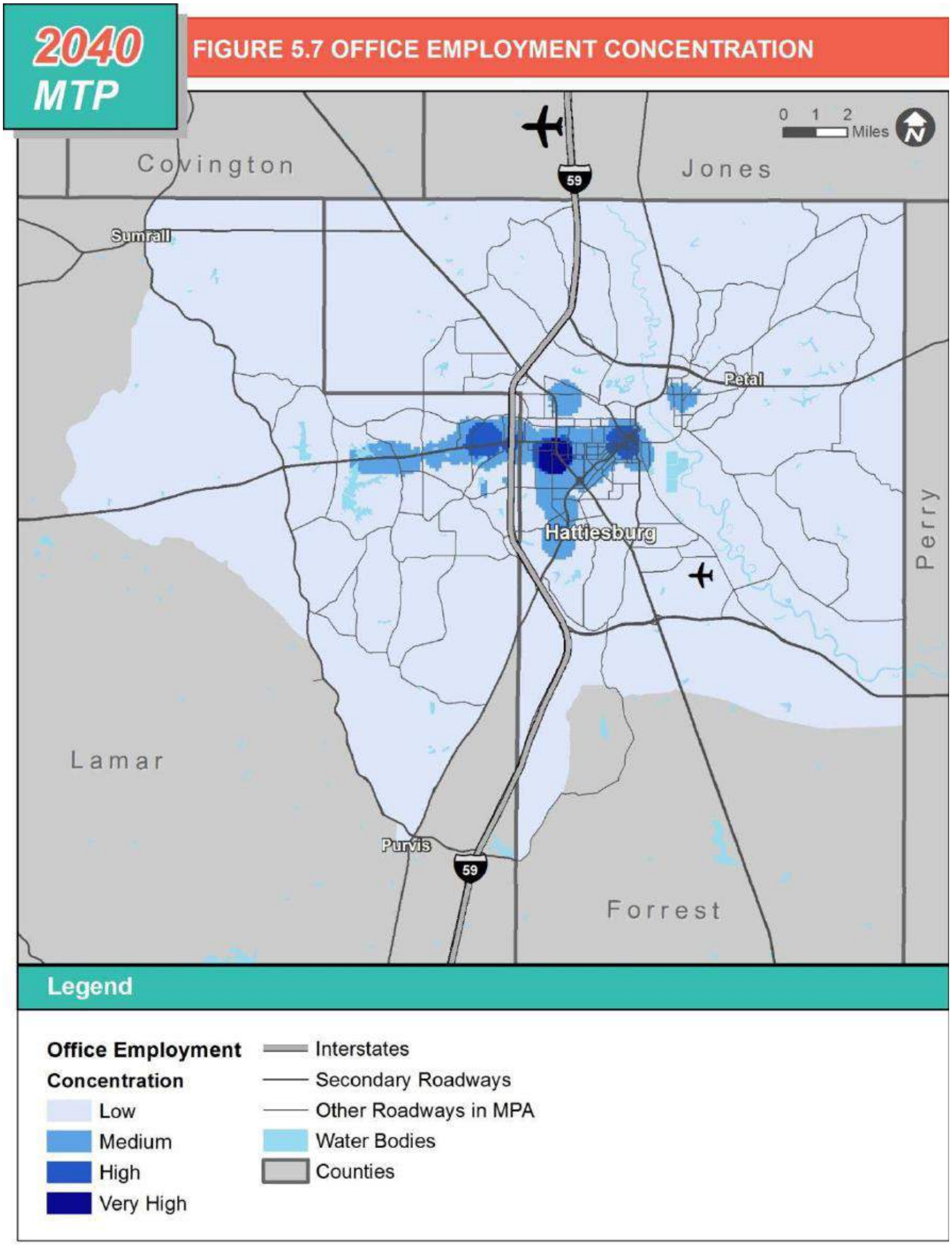
Data Sources: InfoUSA



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

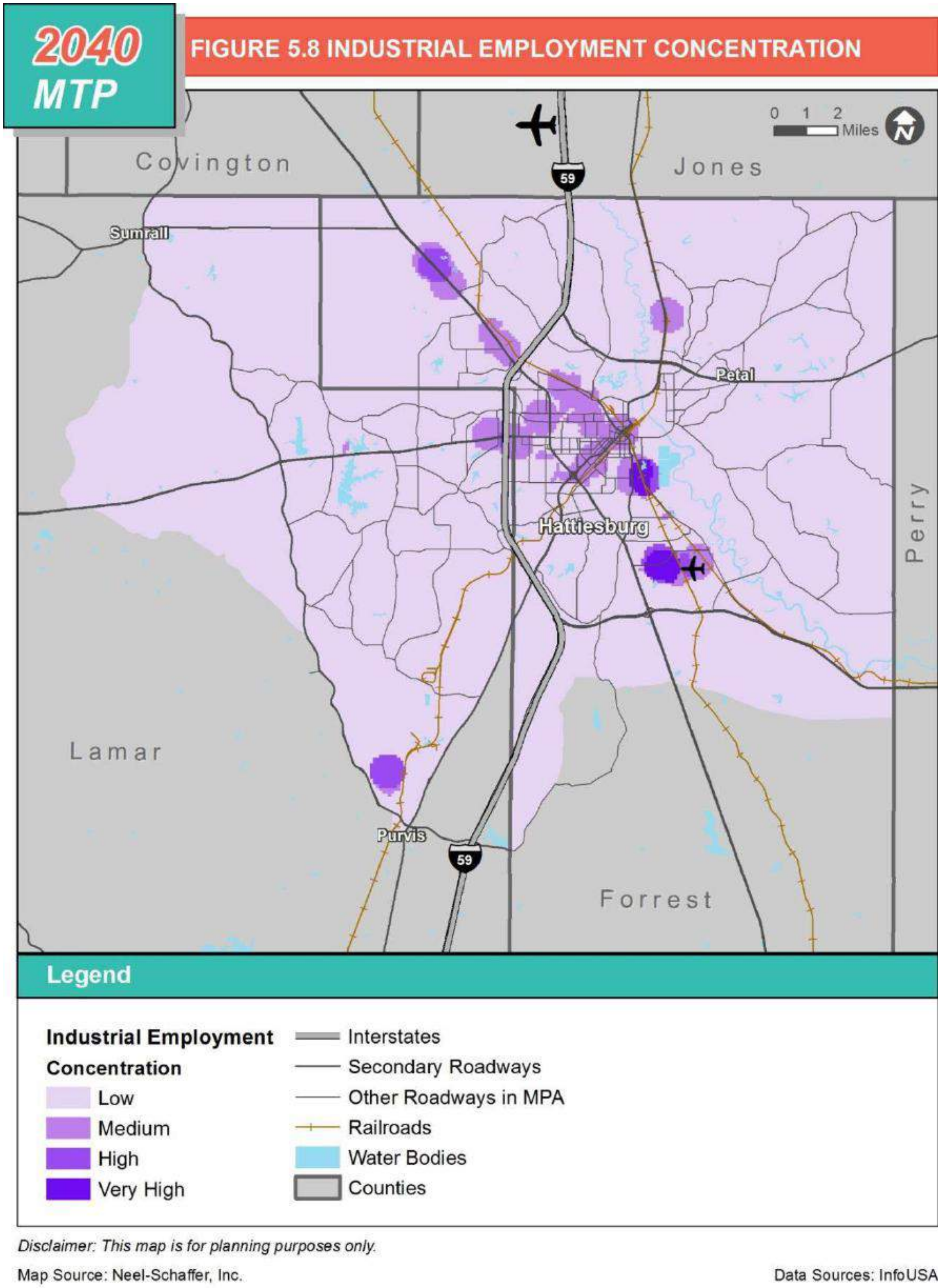
Data Sources: InfoUSA

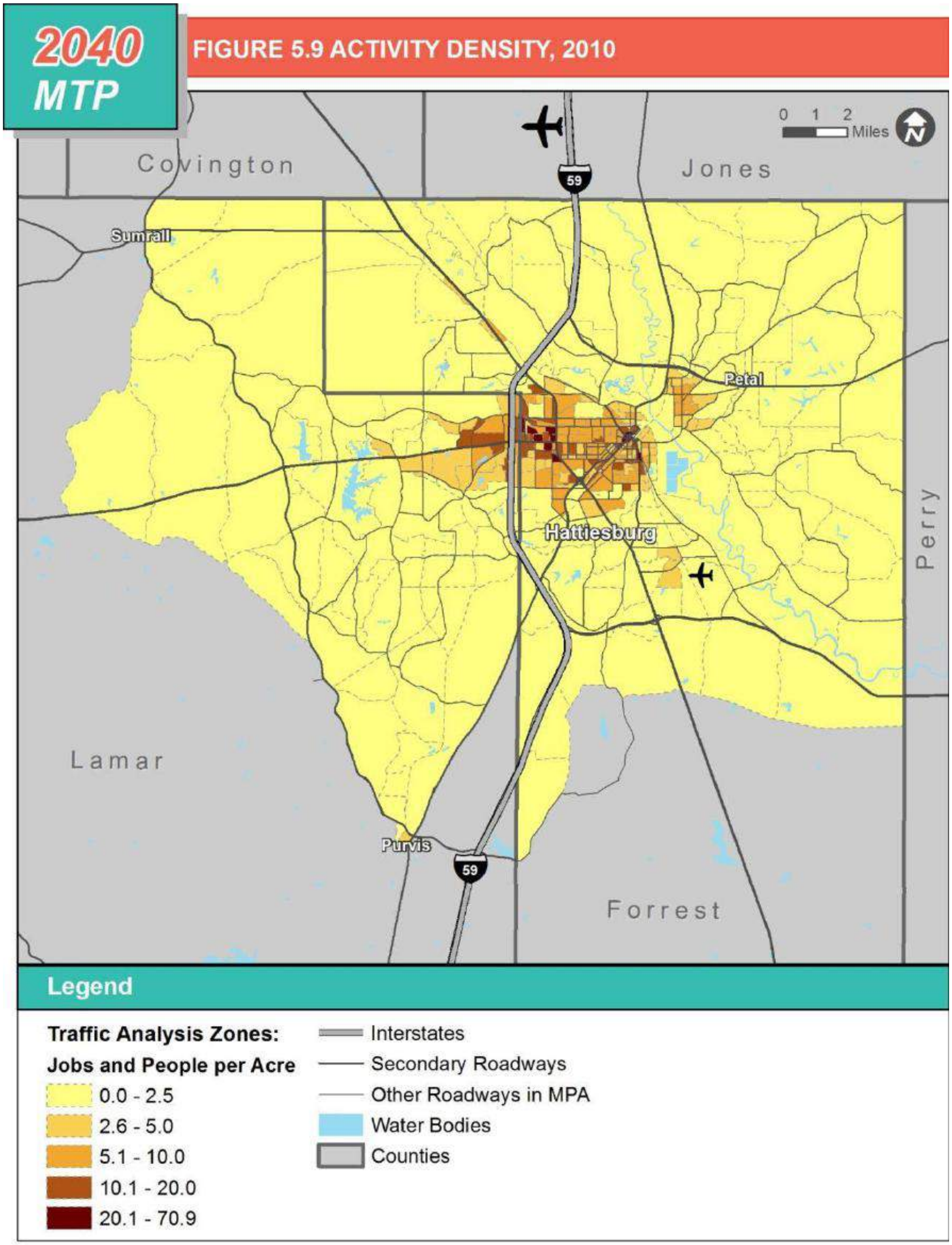


Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: InfoUSA


2040 MTP
FIGURE 5.8 INDUSTRIAL EMPLOYMENT CONCENTRATION
0 1 2 Miles
N
Covington
Jones
59
Sumrall
Petal
Hattiesburg
Perry
Lamar
Purvis
Forrest
Legend
Industrial Employment Concentration
Low
Medium
High
Very High
Interstates
Secondary Roadways
Other Roadways in MPA
Railroads
Water Bodies
Counties
Disclaimer: This map is for planning purposes only.
Map Source: Neel-Schaffer, Inc.
Data Sources: InfoUSA



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census and InfoUSA

5.3 Population and Economic Trends

Population Trends

Historical Trends

Between 2000 and 2010, growth in the MPA greatly outpaced Mississippi and the U.S. as a whole. However, population growth has been much more rapid in Lamar County than in Forrest County, which actually lagged both Mississippi and the nation as a whole. Table 5.1 provides a summary of the population changes in the Hattiesburg MPA.

By municipality, Petal had the highest increase in population. However, much of that is likely due to the dramatic expansion of the city through annexation during this period.

Figure 5.10 shows changes in occupied housing units from 2000 to 2010 by Traffic Analysis Zone (TAZ). This map indicates that most growth has occurred at the edges of the urban area, especially in unincorporated areas.

Figure 5.11 shows areas that transitioned from either undeveloped to developed or from a lower intensity of development to a higher intensity of development from 2001 to 2011. Outside of a few major industrial and commercial developments, most of these areas are new subdivisions. These newly developed areas are consistent with the high growth areas illustrated in Figure 5.10.

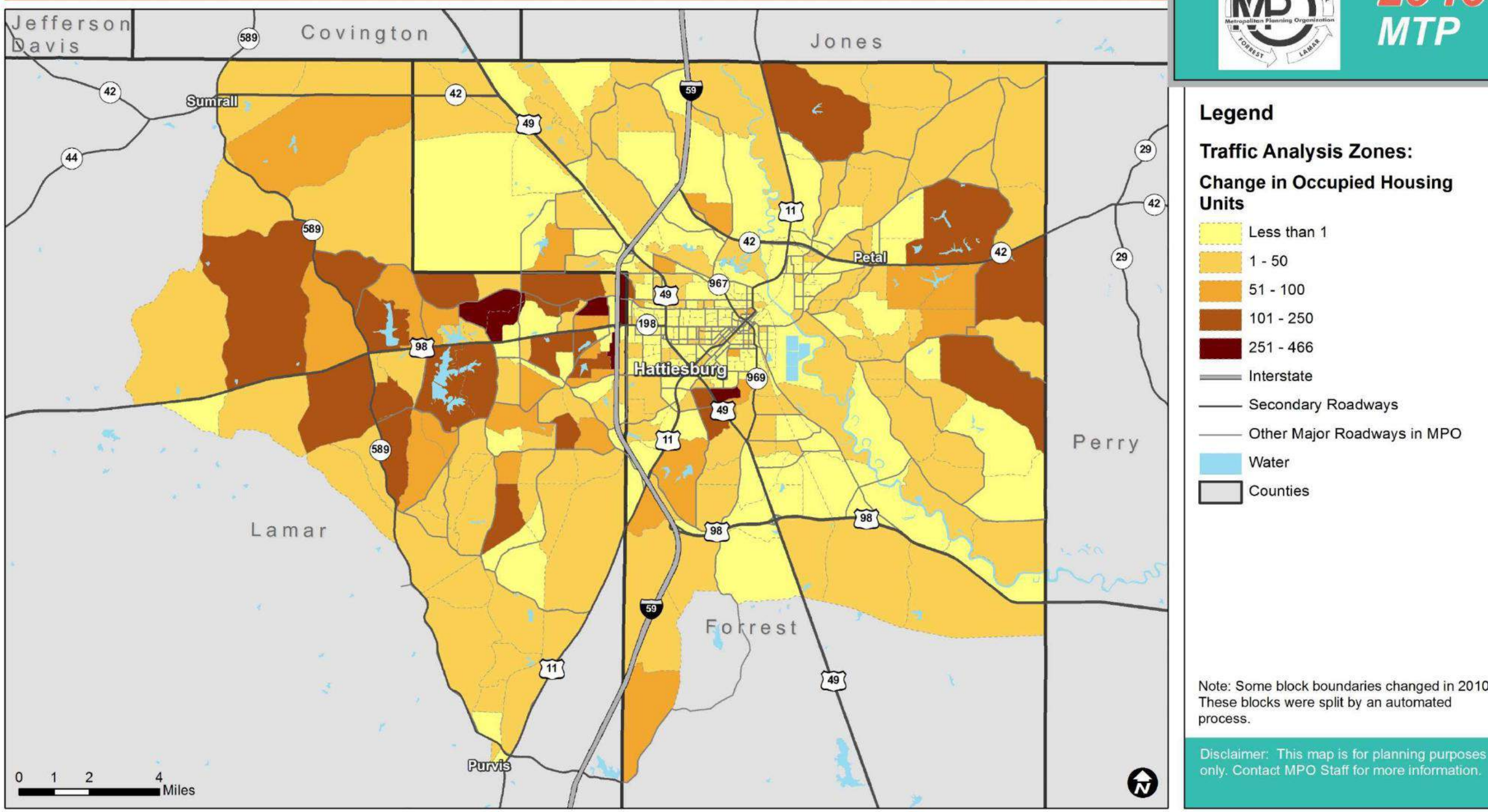
Table 5.1 Population Change in MPA and Local Jurisdictions, 2000 to 2010

Place	2000	2010	Change 2000 to 2010		
			Number	Percent	Annualized Growth Rate
Hattiesburg	44,779	45,989	1,210	2.7%	0.27%
Petal	7,579	10,454	2,875	37.9%	3.27%
Purvis	2,164	2,175	11	0.5%	0.05%
Sumrall	1,005	1,421	416	41.4%	3.52%
Forrest County	72,604	74,934	2,330	3.2%	0.32%
Lamar County	39,070	55,658	16,588	42.5%	3.60%
Metropolitan Planning Area	91,137	106,413	15,276	16.8%	1.56%
Mississippi	2,844,658	2,967,297	122,639	4.3%	0.42%
United States	281,421,906	308,745,538	27,323,632	9.7%	0.93%

Source: U.S. Census Bureau

2040 MTP

FIGURE 5.10 DISTRIBUTION OF HOUSING UNIT GROWTH, 2000-2010

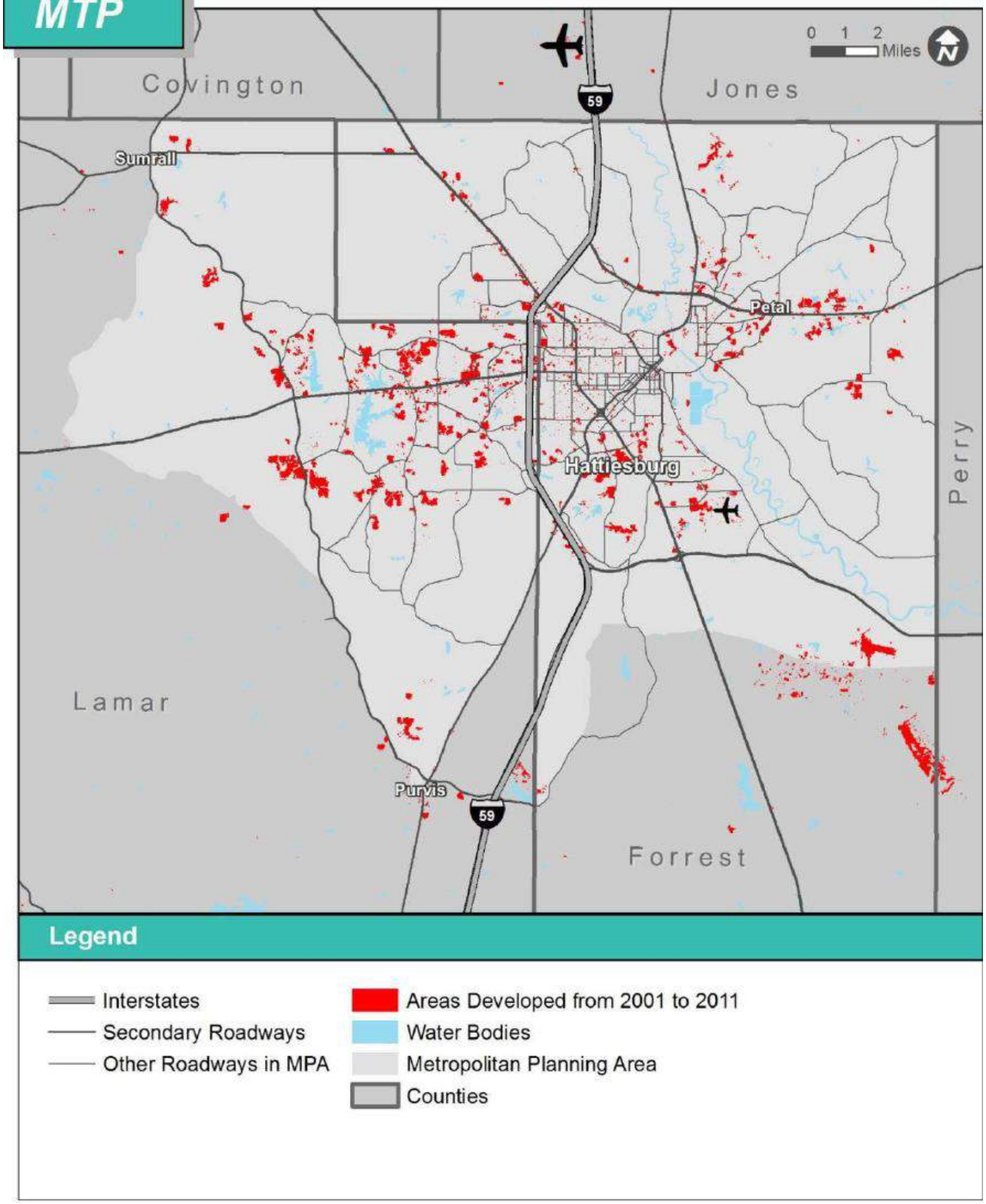


Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 and 2000 Census

2040 MTP

FIGURE 5.11 AREAS DEVELOPED FROM 2001 TO 2011



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: USGS 2011 National Land Cover Database

Recent Trends

Population estimates from 2014 suggest a continuation of historical trends, more or less. Lamar County is outpacing the U.S. in population growth while Forrest County is lagging behind the U.S's annualized growth rate. However, the rate of growth in Forrest County and Hattiesburg appear to have increased, with both now growing faster than the state as a whole.

Because residential building permit data is unavailable for unincorporated areas in Forrest and Lamar counties, the only conclusion that can be drawn from residential building permit data is that Hattiesburg is outpacing Petal and the smaller municipalities in new housing unit construction by a large margin.

Table 5.2 Estimated Population Change in MPO Jurisdictions, 2010 to 2014

Place	2010	2014 (estimate)	Change 2010 to 2014		
			Number	Percent	Annualized Growth Rate
Hattiesburg	45,989	47,016	1,027	2.2%	0.55%
Petal	10,454	10,727	273	2.6%	0.65%
Purvis	2,175	2,322	147	6.8%	1.65%
Sumrall	1,421	1,702	281	19.8%	4.61%
Forrest County	74,934	76,330	1,396	1.9%	0.46%
Lamar County	55,658	60,099	4,441	8.0%	1.94%
Mississippi	2,967,297	2,994,079	26,782	0.9%	0.30%
United States	308,745,538	318,857,056	10,111,518	3.3%	1.08%

Source: U.S. Census Bureau

Table 5.3 Housing Units Permitted, 2012-2014

Permit-Issuing Jurisdiction	Housing Units
Hattiesburg	484
Petal	59
Sumrall	54
Purvis	1

Notes: If annual information is not provided by a permit-issuing place, data is imputed by the Census Bureau. Forrest County and Lamar County do not issue building permits for unincorporated areas within their jurisdiction.
Source: U.S. Census Bureau, Building Permits Survey

Low-Income Populations

Low-income areas are important to consider because they are less likely to own a vehicle or commute to work by driving. They are therefore, more dependent on walking, biking, carpooling, or using transit. From 2009 to 2013, the percentage of people living below the federal poverty threshold in the in the MPA counties was 23.2 percent. This percentage was above both the United States (15.4 percent) and the state of Mississippi (22.7 percent).

However, because the federal poverty threshold is a national standard, it is not sensitive to regional variations in cost of living. In areas with a relatively low cost of living, such as Mississippi, using the federal poverty measure means that poverty is exaggerated in many areas. In order to address this issue, the number of households participating in the Supplemental Nutrition Assistance Program (SNAP) will be utilized instead. This program, also known as Food Stamps, takes into account variations in the cost of living between different states.

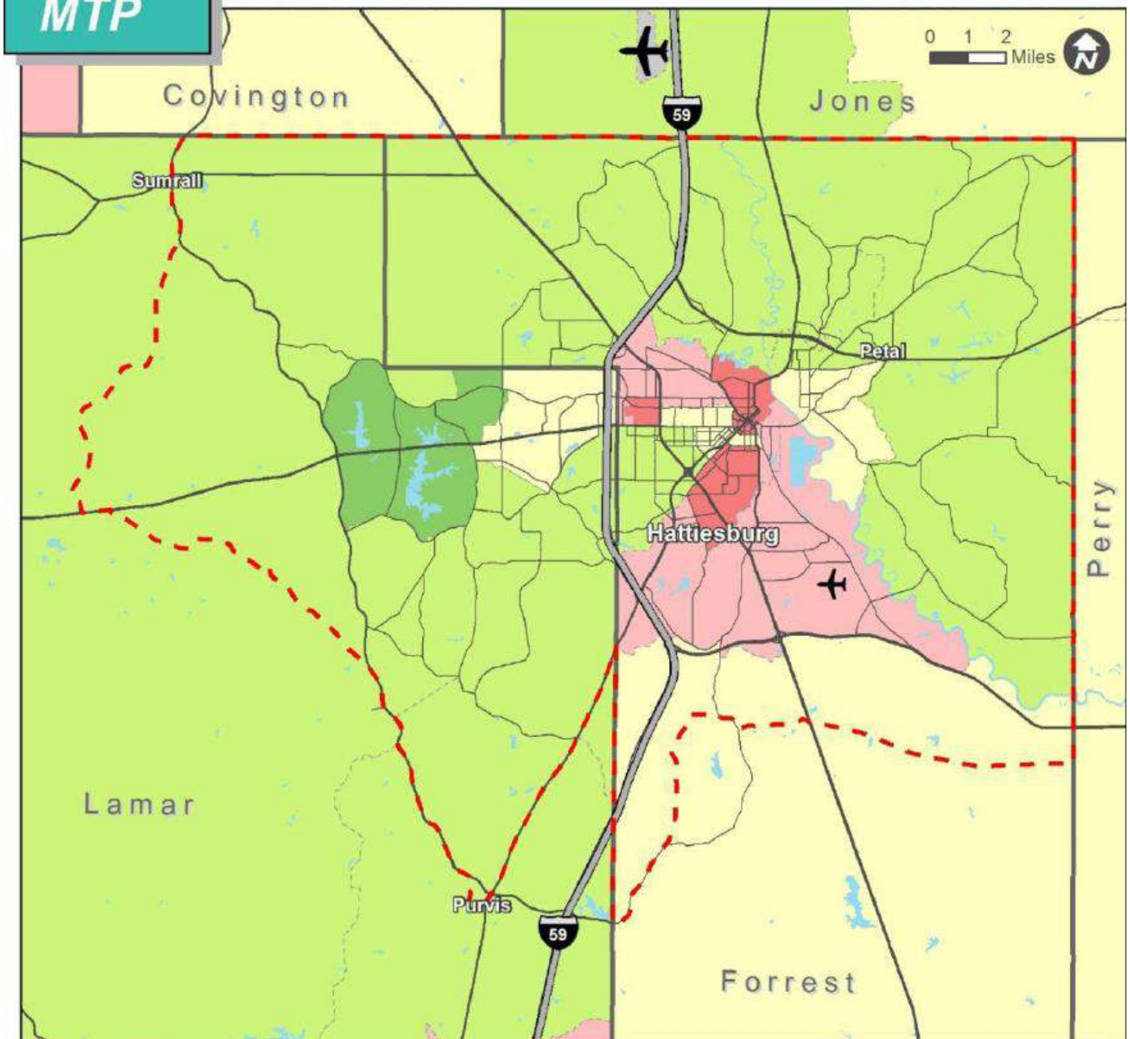
From 2009 to 2013, the percentage of households receiving food stamps in the counties in the MPA was 17.1 percent. This percentage was in between that of the United States (12.4 percent) and the state of Mississippi (17.4 percent).

As shown in Figures 5.12 and 5.13, there is great variation in the concentration of low-income households within the MPA. Figure 5.12 shows median household income levels throughout the region by comparing the median household income of each census tract to the median household income of the Hattiesburg MSA, which was $41,297 (in 2013 dollars) from 2009-2013. This map suggests that the area north of Hardy Street and east of I-59 and the area southeast of US 11 in Hattiesburg are mostly low-income areas. On the other end of the spectrum, the areas around Canebrake Lake and Hennington Lake in Lamar County appear to be relatively affluent.

Figure 5.13 shows that the greatest concentrations of people living in poverty are within the city of Hattiesburg, especially along the Hardy Street corridor and a large area around William Carey University.

2040 MTP

FIGURE 5.12 MEDIAN HOUSEHOLD INCOME BY CENSUS TRACT



Legend

Census Tracts

Median Annual Household Income (2013 dollars)

- $12,188 - $20,649
- $20,650 - $33,038
- $33,039 - $41,297
- $41,298 - $74,335
- $74,336 - $81,712

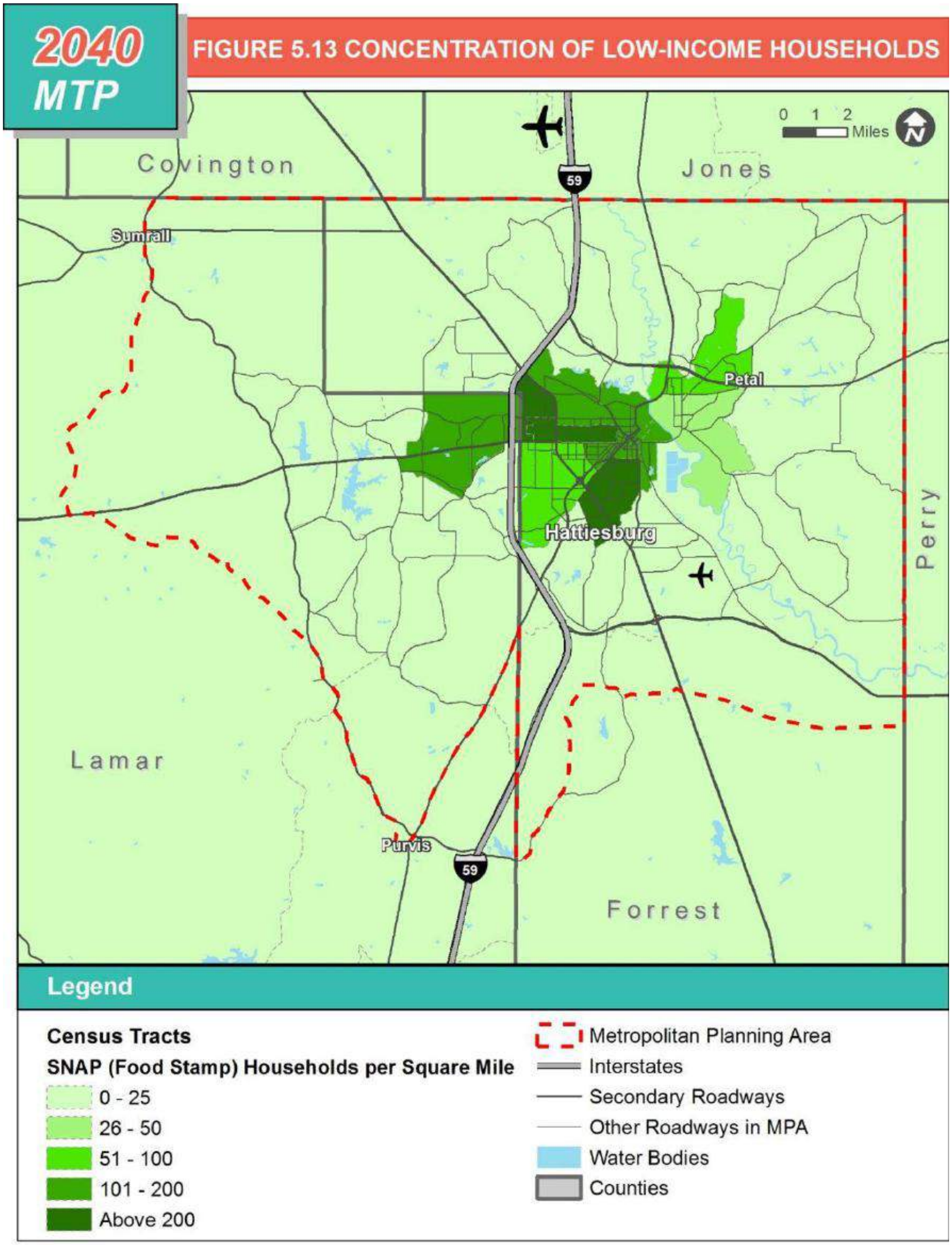
- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Notes: AMI = Area Median Income. Areas with no households are shown in gray.

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

Employment Trends

Historical employment data is not available at a geographic level that would allow for detailed analysis of employment within the MPA. However, county-level data from the Bureau of Economic Analysis (BEA) for select industries was obtained for Forrest and Lamar counties.

The change in total employment (full-time and part-time) from 2009 to 2013 in the MPA counties by industry is shown in Table 5.4. While population growth in the MPA outpaces the U.S., employment growth from 2009 to 2013 in the MPA appears to actually have grown slightly slower than the U.S. at 3.2 percent versus 4.7 percent growth. General trends from the BEA data show that:

- The healthcare and social assistance industry had the greatest absolute increase, with about 783 jobs added.
- The construction, state and local government, and educational services had the greatest decreases with a loss of approximately 550, 400, and 300 respectively.
- Employment in the mining industry grew significantly in both absolute and percentage terms.

Table 5.4 Change in Employment in MPA Counties by Industry, 2009-2013.

Description	2009	2013	Change	
			Number	Percent
Total employment	75,949	78,370	2,421	3.2%
Farm employment	914	838	-76	-8.3%
Forestry, fishing, and related activities	503	530	27	5.4%
Mining	482	750	268	55.6%
Utilities	616	639	23	3.7%
Construction	4,838	4,294	-544	-11.2%
Manufacturing	3,559	3,922	363	10.2%
Wholesale trade	1,808	1,932	124	6.9%
Retail trade	10,202	10,288	86	0.8%
Transportation and warehousing	2,128	2,385	257	12.1%
Information	623	649	26	4.2%
Finance and insurance	2,770	2,922	152	5.5%
Real estate and rental and leasing	2,654	2,850	196	7.4%
Professional, scientific, and technical services	(D)	(D)	(D)	(D)
Management of companies and enterprises	(D)	(D)	(D)	(D)
Administrative and waste management services	3,665	4,242	577	15.7%
Educational services	1,630	1,324	-306	-18.8%
Health care and social assistance	8,351	9,134	783	9.4%
Arts, entertainment, and recreation	1,108	1,088	-20	-1.8%
Accommodation and food services	7,041	7,266	225	3.2%
Other services, except public administration	4,138	4,726	588	14.2%
Federal, civilian government	875	779	-96	-11.0%
Military	986	1,176	190	19.3%
State and local government	13,720	13,296	-424	-3.1%

Note: (D) = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Source: U.S. Department of Commerce, Bureau of Economic Analysis

5.4 Freight Demand

While locally-serving freight trips only make up a portion of all freight trips, understanding local demand for freight within the MPA is critical for ensuring that the region's transportation system is moving goods in an efficient manner and enabling the region to be economically competitive.

Specialized Freight Generating Industries

As the "Hub City" for the Mississippi Pine Belt region, the Hattiesburg MPA is home to a large number of freight-generating establishments that locate in the MPA for its proximity to major transportation facilities, skilled workforce, and large market of consumers. However, in order to better understand the magnitude of certain freight-generating industries, it is necessary to compare the relative size of freight-generating industries within the MPA to that of Mississippi and the United States as a whole.

Of particular interest for freight planning are the mining, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, and accommodation and food services industries. This section will focus on these industries and subsectors within these industries.

In order to identify the freight-generating industries in which the MPA specializes, location quotients were calculated for Forrest County and Lamar County combined. Location quotients are ratios that compare an industry's percentage of total employment in one area to that same industry's percentage of total employment in a larger, more all-encompassing area, such as a state or country. In this manner, they highlight specialized industries by pointing out which industries employ a disproportionately high number of people when compared to the state or country as a whole. Typically, a location quotient of 1.2 or higher indicates a specialized industry.

Specialized Freight-Generating Industries

To start off, location quotients for broadly defined freight-generating industries are provided in Table 5.5. The data source for this information is the Bureau of Economic Analysis' (BEA) Local Area Personal Income and Employment, which is the most complete, publicly available data source for employment.

The data indicates that the Hattiesburg MPA is specialized in the retail trade industry and accommodation and food services industry when compared to the nation and state. Aside from these two industries, it does not appear that the MPA is specialized in any other broadly defined freight-generating industry. However, it may be specialized in subsectors within these broadly defined industries, as will be discussed next.

Table 5.5 Location Quotients for Freight-Generating Industries in the MPA, 2013

Industry	Employment	Percent of Total	MS Location Quotient	U.S. Location Quotient
Mining (NAICS 21)	750	1.0%	0.85	1.09
Construction (NAICS 23)	4,294	5.5%	0.93	1.08
Manufacturing (NAICS 31-33)	3,922	5.0%	0.54	0.72
Wholesale trade (NAICS 42)	1,932	2.5%	0.98	0.71
Retail trade (NAICS 44-45)	10,288	13.1%	1.22	1.30
Transportation and warehousing (NAICS 48-49)	2,385	3.0%	0.86	0.92
Accommodation and food services (NAICS 72)	7,266	9.3%	1.17	1.29
Total employment	78,370	100.0%	n/a	n/a

Note: MPA is defined for these purposes as the combined total of Forrest and Lamar counties.

Source: U.S. Bureau of Economic Analysis, Table CA25N

Specialized Subsectors of Freight-Generating Industries

In order to drill down and determine what sub-sectors of freight-generating industries are specialized in the MPA, a different data source is utilized, the Quarterly Census of Employment and Wages from the Bureau of Labor Statistics (BLS). While this data source does not capture as many jobs as the BEA source, it does provide a higher level of detail. Still, as with the previous source, some industry subsectors are not disclosed for confidentiality purposes. These subsectors, many of which may represent specializations for the MPA, cannot be included in the analysis. It is also worth noting that the BLS source undercounts contracted jobs, which are common in some of the major freight generating industries, especially mining and construction.

Table 5.6 highlights specialized subsectors of freight-generating industries. With the caveat that specialized subsectors with only a few employers may not be captured due to confidentiality issues, the following trends in specialization can be observed:

- Mining
    - The MPA is not specialized in any subsector in this industry from, at least using the data available. There are also relatively few jobs in the mining industry in the MPA.
- Construction
    - The MPA is specialized in the "construction of buildings" subsector when compared to the nation. While there are many jobs in this subsector, no establishment comprises a large percentage of all jobs.
- Manufacturing
    - The MPA is specialized in the "food manufacturing," "printing and related support activities," "non-metallic mineral product manufacturing," and "machinery manufacturing" subsectors. Major employers in these subsectors include Marshall Durbin Poultry, Borden Dairy, Kohler Co., and Johnson Controls.
- Wholesale Trade
    - The MPA is not specialized in the wholesale trade of either durable goods or nondurable goods. However, these subsectors still employ a large number of workers and the MPA is nearly specialized in the wholesale trade of durable goods when compared to the state. Major employers in the wholesale trade industry include the Sam's Club Distribution Center and Lowe's Flatbed Distribution, both of which deal with durable goods.
- Retail Trade
    - The MPA is specialized in many subsectors. The most specialized subsectors with a high number of jobs include: "sporting goods, hobby, book, and music stores;" "general merchandise stores;" "furniture and home furnishings stores;" and "clothing and clothing accessories stores." Major employers in all specialized retail subsectors include Academy Sports and Outdoors, Mississippi Music Inc., Walmart, Dirt Cheap, At Home, Lowe's Home Improvement, and Home Depot.

- Transportation and Warehousing
  - While there are many jobs in transportation and warehousing industry as a whole in the MPA, the MPA is not specialized in the "truck transportation" subsector. No establishment comprises a large percentage of all transportation and warehousing jobs.
- Accommodation and Food Services
  - The MPA is specialized in the "food services and drinking places" subsector. While there are many jobs in this subsector, no establishment comprises a large percentage of all jobs.

Table 5.6 Location Quotients for Subsectors of Freight-Generating Industries in the MPA, 2014

Subsector	Freight Generator Type	Employees	Percent of Total	MS Location Quotient	U.S. Location Quotient
Mining (NAICS 21)					
Support activities for mining	D&P	184	0.3%	0.81	1.03
Construction (NAICS 23)					
Construction of buildings	D&P	659	1.2%	1.11	1.20
Heavy and civil engineering construction	D&P	394	0.7%	0.73	1.07
Specialty trade contractors	D&P	950	1.7%	0.69	0.60
Manufacturing (NAICS 31-33)					
Food manufacturing	D&P	1,097	2.0%	0.97	1.81
Printing and related support activities	D&P	100	0.2%	1.31	0.54
Plastics and rubber products manufacturing	D&P	247	0.4%	0.80	0.90
Nonmetallic mineral product manufacturing	D&P	187	0.3%	1.15	1.20
Fabricated metal product manufacturing	D&P	123	0.2%	0.25	0.21
Machinery manufacturing	D&P	553	1.0%	0.89	1.21
Wholesale trade (NAICS 42)					
Merchant wholesalers, durable goods	D&P	1,002	1.8%	1.15	0.85
Merchant wholesalers, nondurable goods	D&P	585	1.1%	0.88	0.71
Retail trade (NAICS 44-45)					
Motor vehicle and parts dealers	D&P	1,017	1.8%	1.17	1.34
Furniture and home furnishings stores	D&P	280	0.5%	1.67	1.52
Building material and garden supply stores	D&P	690	1.2%	1.11	1.39

Subsector	Freight Generator Type	Employees	Percent of Total	MS Location Quotient	U.S. Location Quotient
Food and beverage stores	D&P	874	1.6%	0.92	0.72
Health and personal care stores	D&P	557	1.0%	1.17	1.34
Gasoline stations	D&P	729	1.3%	1.00	2.04
Clothing and clothing accessories stores	D&P	742	1.3%	1.42	1.33
Sporting goods, hobby, book and music stores	D&P	543	1.0%	2.34	2.17
General merchandise stores	D&P	2,433	4.4%	1.34	1.91
Miscellaneous store retailers	D&P	417	0.7%	1.35	1.25
Transportation and warehousing (NAICS 48-49)					
Truck transportation	P	392	0.7%	0.42	0.68
Accommodation and food services (NAICS 72)					
Accommodation	D	479	0.9%	0.34	0.62
Food services and drinking places	D	6,333	11.4%	1.43	1.46

Notes: D = Delivery and P = Production; Subsector not included if employed less than 100 employees.

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2014 Annual Average

Freight Transported by Subsector of Freight-Generating Industries by Weight

As shown in Table 5.7, the top 10 subsectors of freight-generating industries account for about 98 percent of all freight tonnage from major freight-generating establishments. These industry subsectors speak both to the role of the Hattiesburg MPA as the urban center of the Pine Belt region of Mississippi and to the specialized industries in the local economy.

Freight delivered to or shipped from merchant wholesaler establishments (durable and nondurable) account for over half of all freight generated by weight in the MPA. This is not surprising given the role of wholesale in the distribution of goods in urban areas and the presence of major wholesale establishments in the MPA such as Sam's Club Distribution Center and Lowe's Flatbed Distribution.

Other major freight generating industries that serve the basic needs of the Hattiesburg MPA include nonmetallic mineral product manufacturing, chemical manufacturing, food manufacturing, building material and garden equipment and supplies dealers, beverage and tobacco product manufacturing, paper manufacturing, and wood product manufacturing. Economic theory suggests that many of these industries, which produce consumable products, tend to be located close to points of consumption in order to reduce transportation costs and maximize profits.

Several of the industry subsectors in the top 10 also speak to the Hattiesburg MPA's specializations, such as petroleum and coal products manufacturing. Some of the subsectors mentioned as serving basic needs above may also be specialized subsectors, such as food manufacturing.

Table 5.7 Top 10 Freight-Generating Industry Subsectors by Weight in the MPA, 2011

Rank	Subsector	Tonnage	Percentage
1	Merchant Wholesalers, Durable Goods	6,306,424	55.2%
2	Nonmetallic Mineral Product Manufacturing	1,370,598	12.0%
3	Petroleum and Coal Products Manufacturing	741,543	6.5%
4	Merchant Wholesalers, Nondurable Goods	671,950	5.9%
5	Chemical Manufacturing	520,631	4.6%
6	Food Manufacturing	426,718	3.7%
7	Building Material and Garden Equipment and Supplies Dealers	380,765	3.3%
8	Beverage and Tobacco Product Manufacturing	330,259	2.9%
9	Paper Manufacturing	315,199	2.8%
10	Wood Product Manufacturing	80,477	0.7%

Note: Only includes freight from major freight-generating establishments in IHS database.

Source: Transearch; IHS Freight Finder

Major Commodities Transported

Commodity flows are not available for the Hattiesburg area from the FHWA's Freight Analysis Framework. However, commodity flow data from Transearch/IHS Freight Finder was obtained. According to this data, the following six commodities make up approximately 90 percent of the total freight tonnage generated by major freight-generating establishments in the MPA in 2011:

1. Non-metallic Minerals (54 percent);
2. Bulk Movement in Boxcars (11 percent);
3. Chemical or Allied Products (8percent);
4. Clay, Concrete, Glass or Stone Products (7 percent);
5. Coal (5 percent); and
6. Food or Kindred Products (5 percent).

Tables 5.8 and 5.9 illustrate the differences between the top ten commodities for inbound (Table 5.8) and outbound (Table 5.9) freight by weight for all major freight-generating establishments in the MPA.

Table 5.8 Top 10 Commodities Shipped to Major Freight Generating Establishments by Weight

	Goods	Tons	Percent
1	Non-metallic Minerals	1,543,829	34.9%
2	Chemicals or Allied Products	800,523	18.1%
3	Coal	628,185	14.2%
4	Bulk Movement in Boxcars	321,259	7.3%
5	Petroleum or Coal Products	317,936	7.2%
6	Food or Kindred Products	251,470	5.7%
7	Farm Products	212,179	4.8%
8	Clay, Concrete, Glass or Stone Products	143,261	3.2%
9	Lumber or Wood Products, excluding Furniture	90,267	2.0%
10	Waste or Scrap Materials	36,716	0.8%

Source: Transearch; IHS Freight Finder, 2011

Table 5.9 Top 10 Commodities Shipped from Major Freight Generating Establishments by Weight

	Goods	Tons	Percent
1	Non-metallic Minerals	4,667,739	66.7%
2	Bulk Movement in Boxcars	947,400	13.5%
3	Clay, Concrete, Glass or Stone Products	693,370	9.9%
4	Food or Kindred Products	285,293	4.1%
5	Miscellaneous Freight Shipments	138,349	2.0%
6	Chemicals or Allied Products	83,451	1.2%
7	Lumber or Wood Products, excluding Furniture	78,095	1.1%
8	Pulp, Paper, or Allied Products	36,171	0.5%
9	Petroleum or Coal Products	34,680	0.5%
10	Waste or Scrap Materials	13,775	0.2%

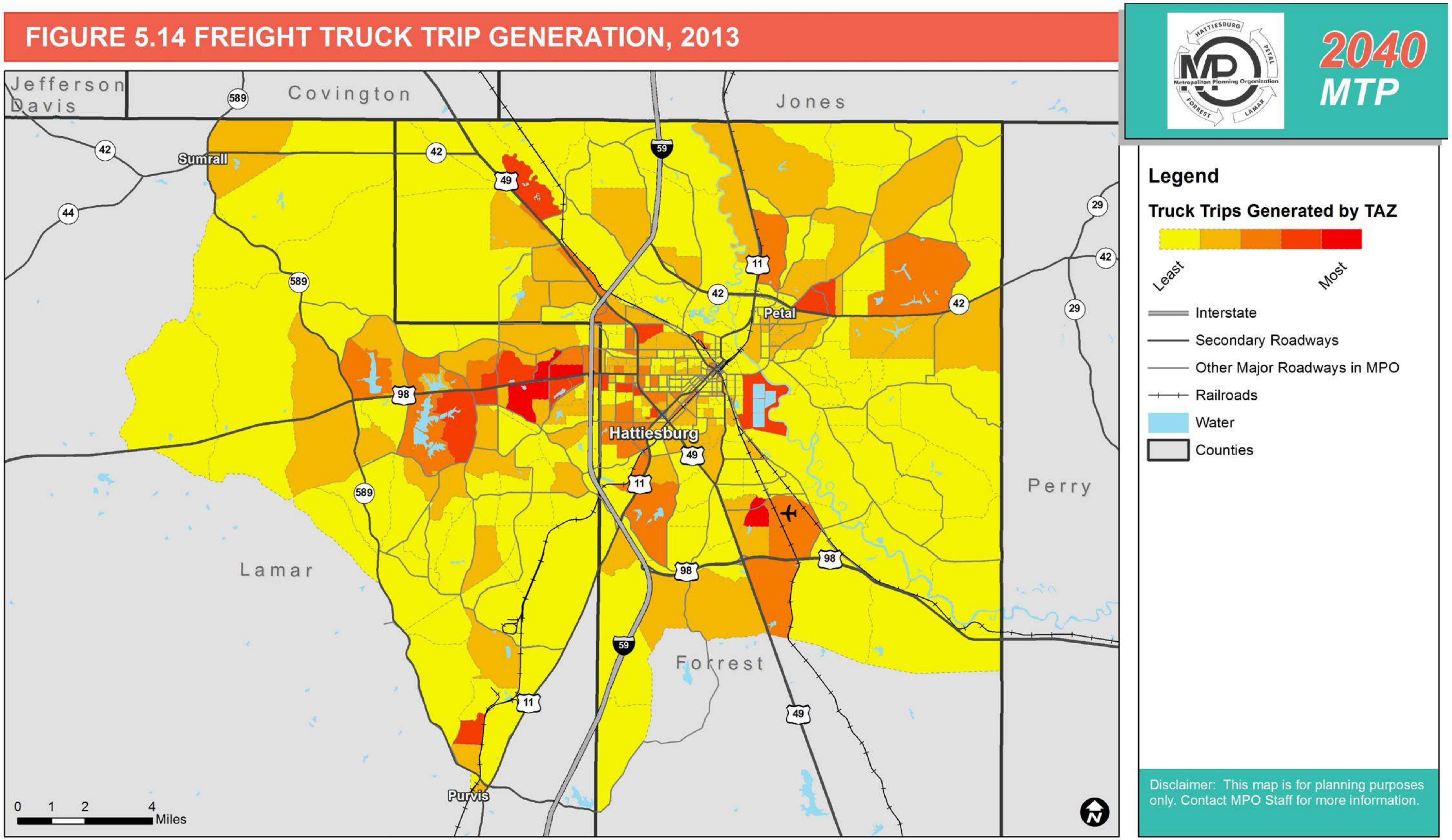
Source: Transearch; IHS Freight Finder, 2011

Generation of Freight Trips in MPO

There are many industrial, wholesale trade, commercial, and other establishments in the MPA that generate freight truck trips. Figure 5.14 illustrates the number of freight trips generated by TAZ.

This map shows that there are several clusters of relatively high freight demand in the MPA. These areas include the US 98/Hardy Street commercial corridor, the US 49 industrial corridor, the Hattiesburg-Forrest County Industrial Park; the Purvis-Lamar County Industrial Park; and smaller concentrations of freight demand such as the areas around the Petal Walmart and Marshall Durbin poultry plant.

FIGURE 5.14 FREIGHT TRUCK TRIP GENERATION, 2013



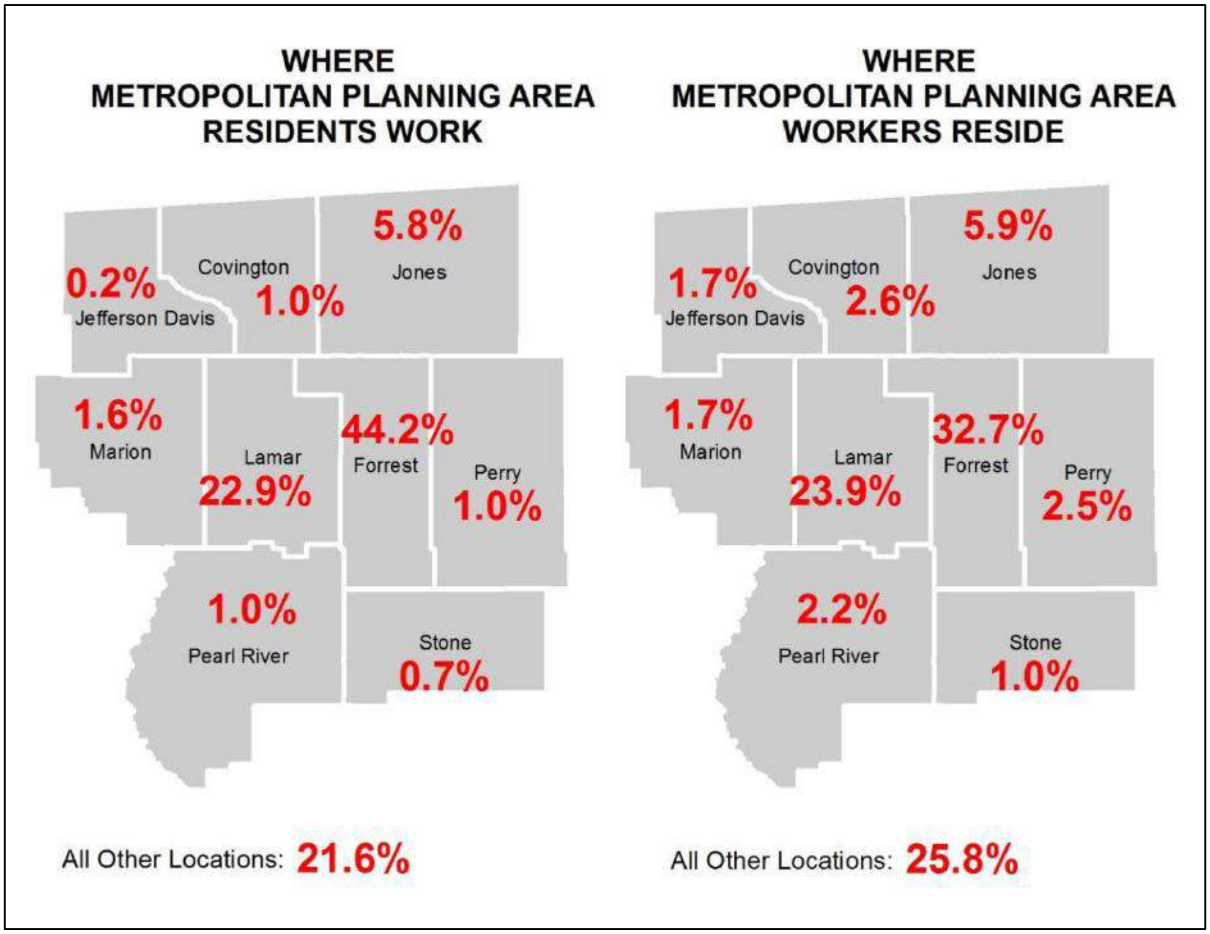
Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

5.5 Travel Patterns

Commuting patterns shed some light on travel patterns, even though work trips only account for approximately 20 percent of all trips. The Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program provides detailed commuting data. Commuting patterns from this dataset are illustrated in Figure 5.15 below.

Figure 5.15 Commuting Patterns within the Combined Statistical Area



Source: LEHD 2013

Most MPA residents work in the two counties within the MPA. However, about 33 percent work outside the MPA, with adjacent Jones County (5.8 percent), Harrison County (2.9 percent), and Hinds County (2.7 percent) being the three largest outside destinations.

Only about 57 percent of the workers are also residents in the MPA. Of all outside sources of MPA workers, Jones County (5.9 percent), Harrison County (2.7 percent), and Covington County (2.6 percent) are the three largest. For some of the surrounding counties, especially the more rural counties, workers commuting to the Hattiesburg MPA make up a significant percentage of their county's total workforce.

As illustrated in Figure 5.16, travel time to work is relatively short within the MPA. From 2009 to 2013, there were no census tracts where the mean travel time to work was over 46 minutes. Virtually all workers reside in tracts that have mean commute times under 30 minutes. Commute times are shortest in tracts near major employment centers, such as the Midtown area and Hattiesburg CBD.

Table 510 shows that, from 2009 to 2013, just over 80 percent of commuters in the MPA counties drove alone to work and 10 percent carpool. Walking and biking to work was uncommon, as was commuting by transit. However, there are areas where commuting by walking or by public transit are more likely to occur, as illustrated in Figure 5.17.

Areas with higher rates of commuting by transit and walking are mostly located around the University of Southern Mississippi and in low-income tracts near the Hattiesburg CBD. These areas appear to somewhat relate to areas where a high percentage of households lack regular access to a vehicle, as shown in Figure 5.18.

There are some areas in the MPA where over 20 percent of households do not have regular access to a vehicle. Overall though, about 7 percent of all MPA households do not have access to a vehicle.

Table 5.10 Means of Transportation to Work in Metropolitan Planning Area Counties

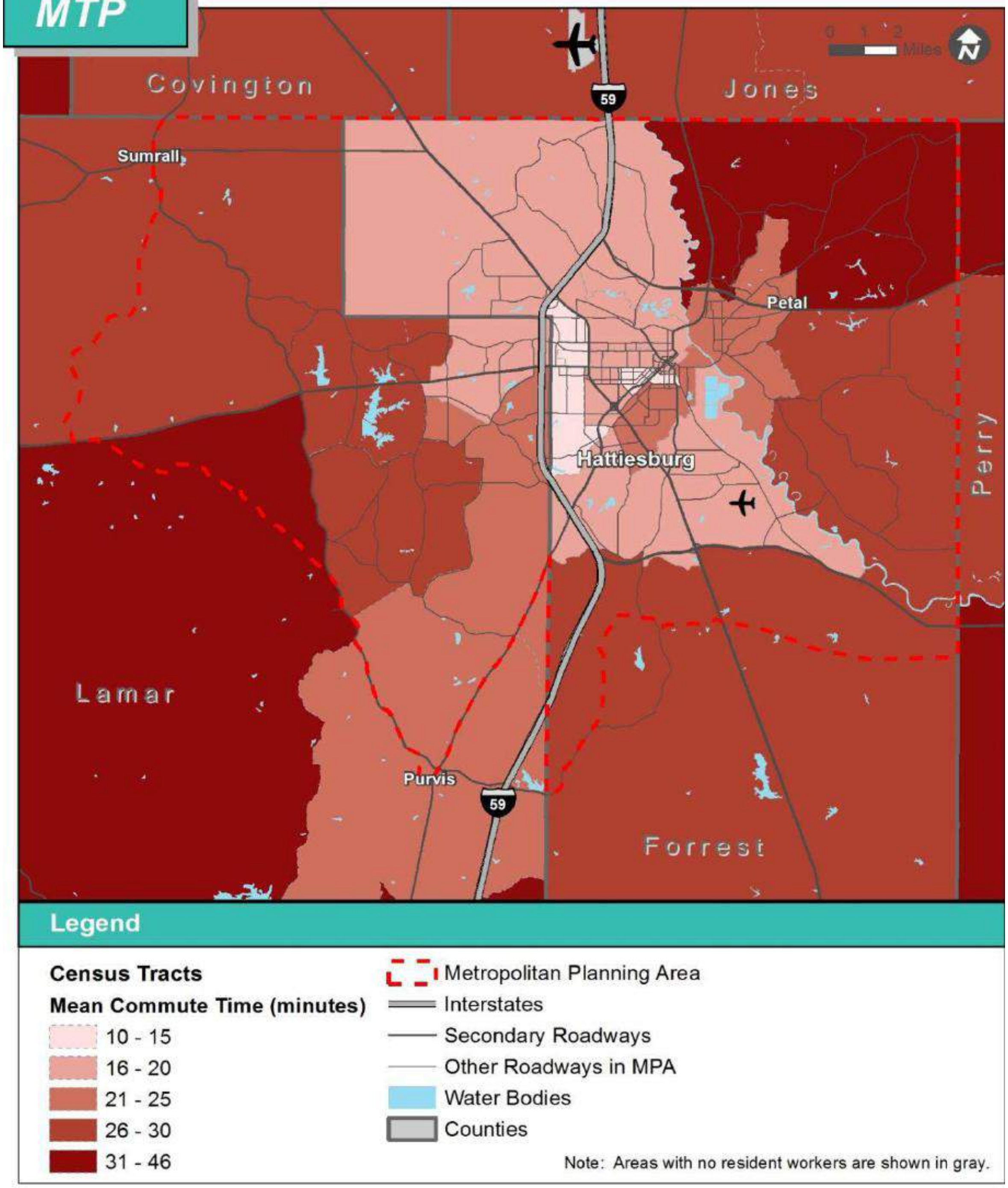
	Commuters	Percent of Total
Total	57,067	100.0%
Drove Alone	47,789	83.7%
Carpooled	5,856	10.3%
Other	1,528	2.7%
Walked	1,407	2.5%
Bicycled	271	0.5%
Rode Transit	216	0.4%

Note: Commuters excludes those that work at home.

Source: Census Bureau, 2009-2013 ACS

2040 MTP

FIGURE 5.16 MEAN TRAVEL TIME TO WORK



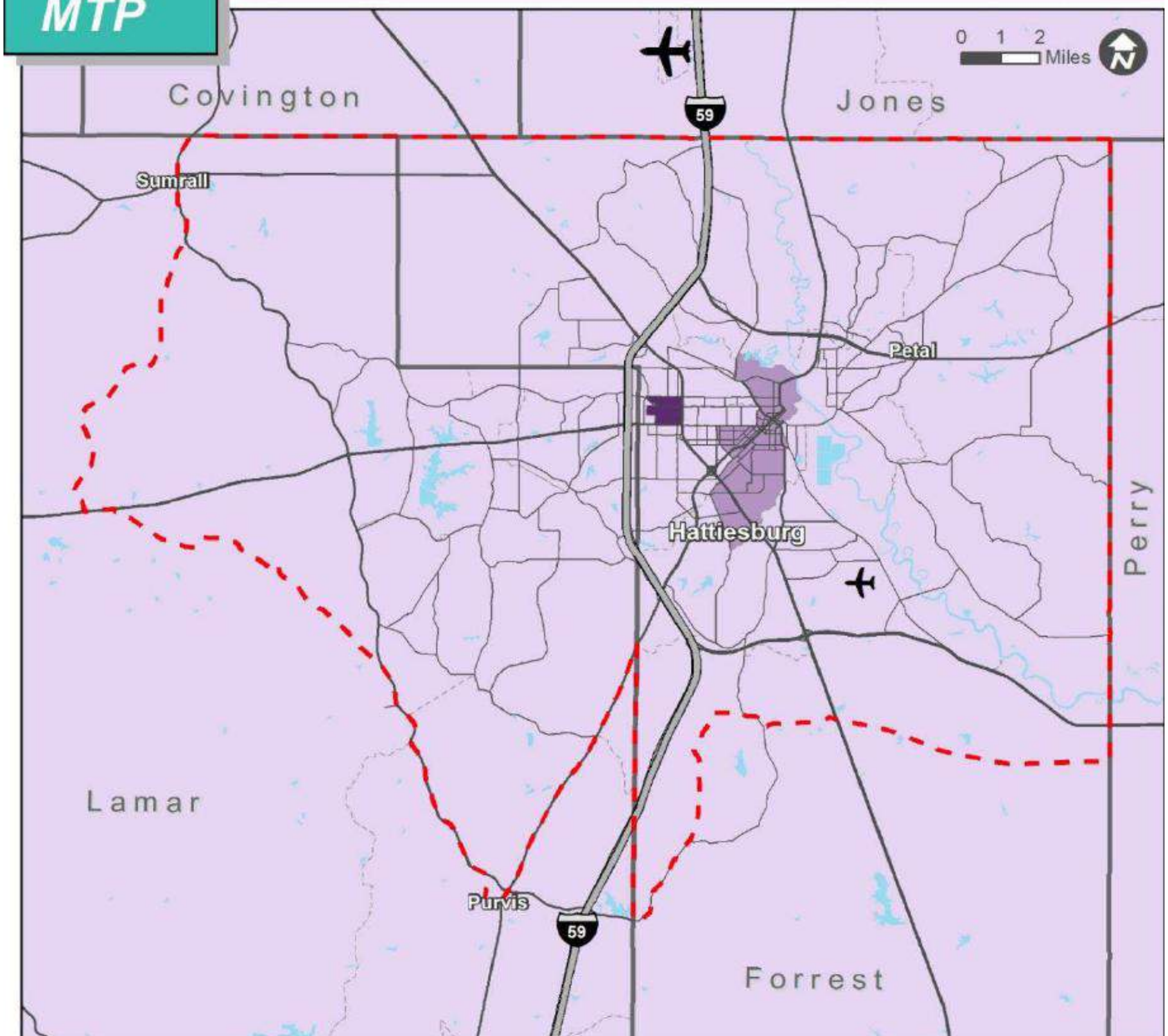
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

2040 MTP

FIGURE 5.17 WORKERS COMMUTING BY TRANSIT OR WALKING



Legend

Census Tracts

Workers Commuting by Transit or Walking

- 0% - 5%
- 6% - 10%
- 11% - 20%
- Above 20%

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

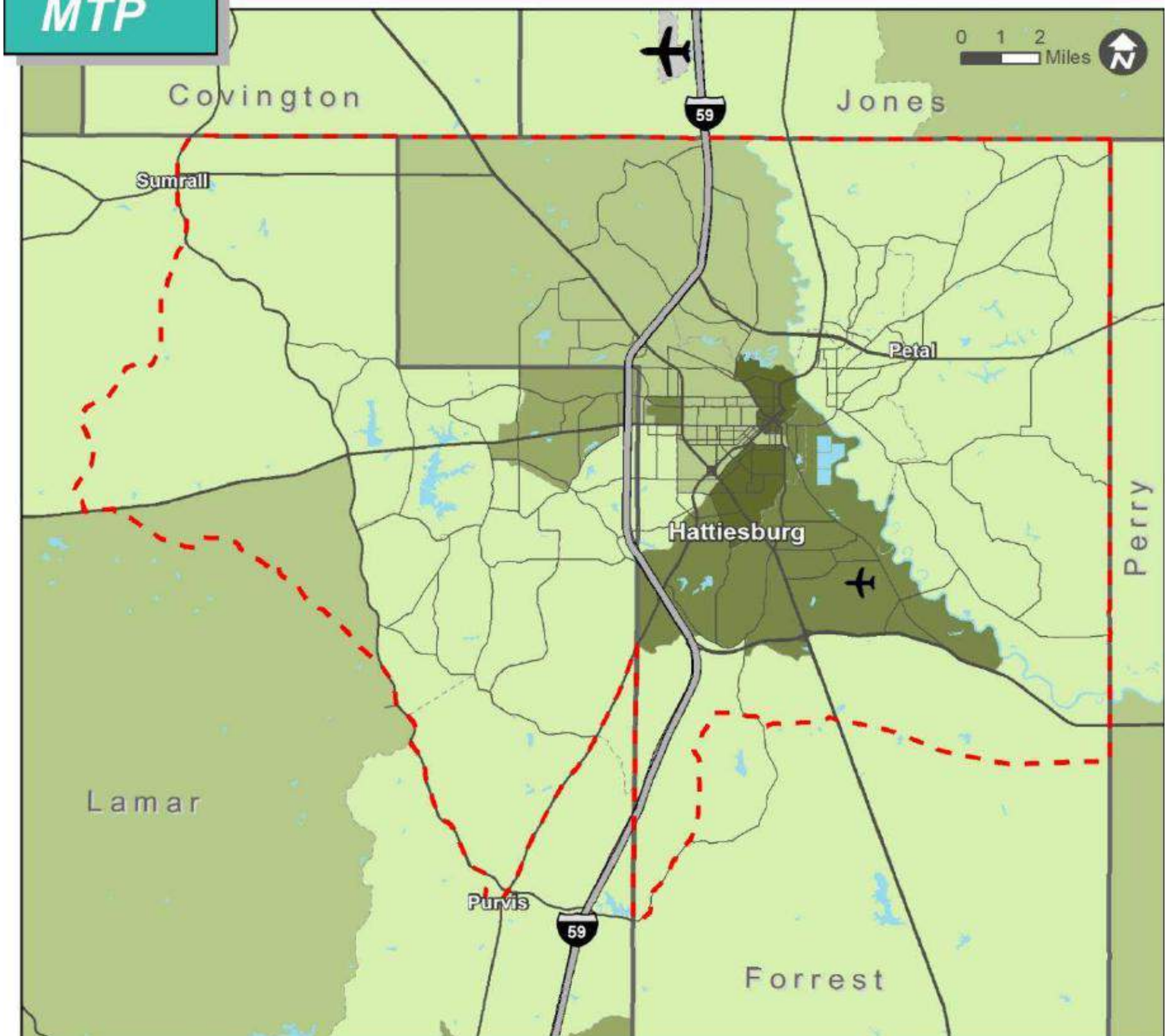
Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

2040 MTP

FIGURE 5.18 HOUSEHOLDS WITH NO ACCESS TO A VEHICLE



Legend

Census Tracts

Percentage of Households with No Vehicle

- 0% - 5%
- 6% - 10%
- 11% - 15%
- 16% - 20%
- Over 20%

- Metropolitan Planning Area
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Counties

Note: Areas with no households are shown in gray.

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

6.0 The Existing Transportation System

Planning for future transportation system improvements starts with evaluating the existing transportation system. This chapter identifies the conditions and characteristics of the existing transportation system.

6.1 Roadways and Bridges

The region's roadways and bridges are used by personal motor vehicles, public and private transportation providers, freight trucks, and bicyclists. For this reason the region's roadways and bridges are of great importance.

For households in small urbanized areas like Hattiesburg, traveling by motor vehicle is the primary means of transportation. According to the 2009 National Household Travel Survey (NHTS), approximately 75 percent of all household trips in urbanized areas with populations between 50,000 and 200,000 were made in a motor vehicle. This means that the condition of the MPO's roadways and bridges affect the overwhelming majority of household travel.

The needs of bicyclists, public transit, and freight will be discussed in greater detail later in this chapter. The focus of this section will be on household travel by motor vehicle.

The Roadway Network

Several federal and state highways serve the study area. These facilities constitute the main network of roadways in the area. The most significant of these facilities are described in Table 6.1.

Table 6.1 Major Roadways

Roadway	Description
I-59	I-59 begins at an intersection with I-10/I-12 in Slidell, LA and travels north to I-24 near Chattanooga, TN. It travels through the study area from south to north, proceeding through Hattiesburg on the western side of the study area.
US 49	US 49 begins in Gulfport, MS at its intersection with US 90, proceeding northward to Hattiesburg and Jackson, and ending in Piggott, AR at US 62. US 49 proceeds through the study area from southeast to northwest.
US 98	US 98 proceeds from west to east through the study area, part of which is along Hardy Street. This highway begins in Natchez, MS at US 84 and ends in Palm Beach, FL at FL A1A.
US 11	US 11 parallels I-59 through the study area, and this highway was the original north-south highway through the study area from New Orleans, LA to Meridian, MS.
MS 42	MS 42 proceeds through the study area from west to east connecting Sumrall and Petal. A portion of this highway runs concurrently with US 49 and I-59, and another portion is designated as the Evelyn Gandy Parkway.

Roadway	Description
MS 589	MS 589 traverses through the western end of the study area from south to north connecting Sumrall and Purvis.
MS 198	MS 198 connects I-59 to US 49 from west to east, along Hardy Street. This highway is an old alignment of US 98.

Roadways by Functional Classification

Each type of roadway serves a function in the overall roadway network. Roadways are divided into functional classes based on their intended balance of mobility (speed) and access to adjacent land. Their designs vary in accordance with this functional classification.

Interstates: These facilities are divided highways with full control of access and grade separations at all intersections. The controlled access character of interstates results in high-lane capacities, which are three times greater than the individual lane capacities of urban arterial streets.

Expressways: These facilities provide for movement of large volumes of traffic at relatively high speed, and are primarily intended to serve long trips. Expressways have some grade separated intersections, while the majority of the intersections are widely spaced and signalized.

Arterials: These facilities are important components of the overall transportation system. They serve both as feeders to interstates and expressways, and as principal travel ways between major land use concentrations within the study area. Arterials are typically divided facilities (undivided where right-of-way limitations exist) with relatively high traffic volumes and traffic signals at major intersections. The primary function of arterials is to move traffic; they are the main means of local travel. A secondary function of arterials is land access.

Collectors: These facilities provide both land service and traffic movement functions. Collectors serve as intermediate feeders between arterials and local streets and primarily accommodate short distance trips. Since collector streets are not intended to accommodate long through trips, they are generally not continuous for any great length.

Local Streets: The sole function of these facilities is to provide access to immediately adjacent land. Within the local street classification, three subclasses are established to indicate the type of area served: residential, industrial, and commercial. These streets are not included in the computer network, with the exception of a few segments that provide connectivity in the model network and improve the reliability of the model.

Figure 6.1 illustrates the functional classification of the Hattiesburg MPA's roadways and Table 6.2 summarizes this information by centerline miles and lane miles.

Table 6.2 Roadway Model Network Lane Mileage by Functional Class

Functional Class	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
Interstate	22	6.7%	89	10.3%
Principal Arterial	62	18.8%	256	29.6%
Minor Arterial	76	22.7%	170	19.6%
Collector	172	51.8%	350	40.5%
Total	**332**	**100.0%**	**865**	**100.0%**

Note: Does not include local roads

Source: Hattiesburg Regional Travel Demand Model

Roadways by Maintenance Responsibility

Since most roadways are local roads, it is not surprising that nearly 60 percent of roadways are maintained by counties or municipalities, as indicated in Table 6.3 and illustrated in Figure 6.2. All of the principal arterials and many of the minor arterials are state highways or federal highways and are state-maintained roadways. All of the roadways classified functionally as local are maintained by a county or municipal agency. Most collectors are also maintained by a county or municipal agency.

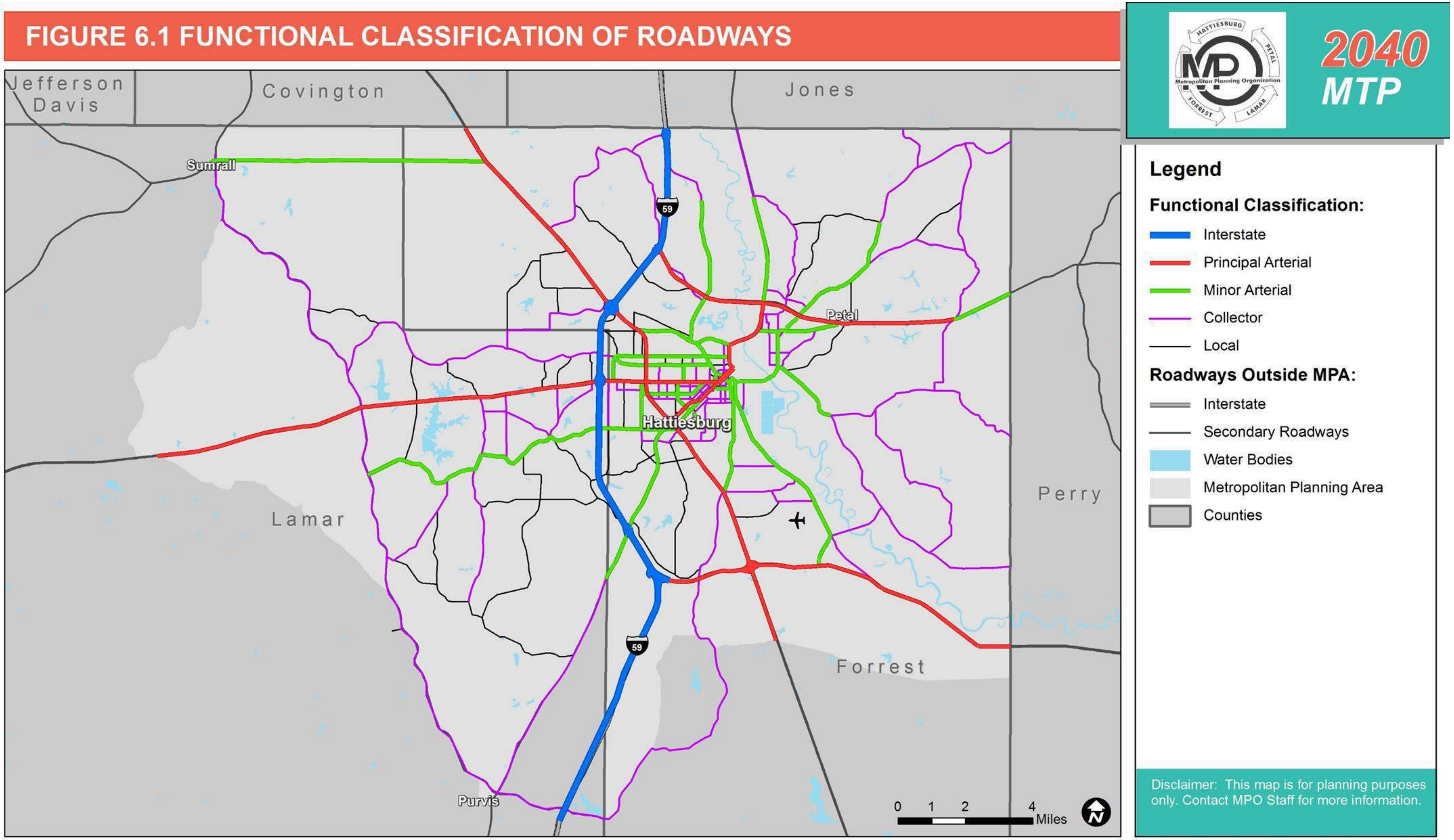
Table 6.3 Roadway Network Centerline Mileage by Maintenance Responsibility

Maintenance Responsibility	Centerline Miles		Lane Miles	
	Miles	Percent	Miles	Percent
State	134	40.4%	449	51.9%
County or Municipality	198	59.6%	416	48.1%
Total	**332**	**100.0%**	**865**	**100.0%**

Note: Excludes local roads

Source: Hattiesburg Regional Travel Demand Model

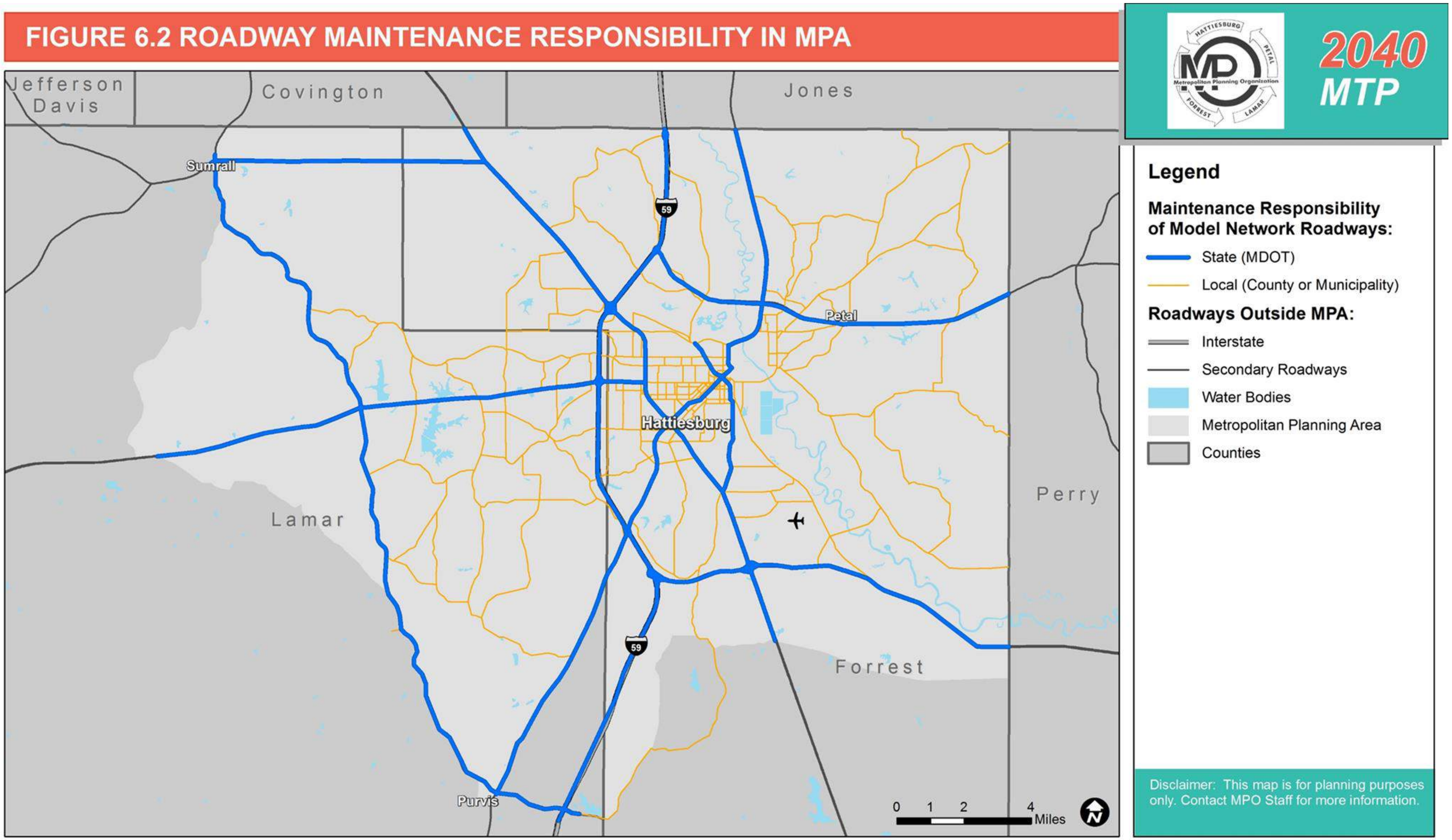
FIGURE 6.1 FUNCTIONAL CLASSIFICATION OF ROADWAYS



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 6.2 ROADWAY MAINTENANCE RESPONSIBILITY IN MPA



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

Pavement Conditions

Maintaining sufficient pavement conditions ensure that roadways operate at their full capacities and provide roadway users with safer, more comfortable travel experiences that minimize vehicle wear and tear.

Results from the 2040 MTP public input meeting showed that road and bridge conditions were one of the public's top priorities. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over one-third of all funding to maintaining roads. On average, the public rated their current satisfaction with road and bridge conditions as fair.

Pavement Conditions on National Highway System

Pavement condition ratings for all interstates and a sample of non-interstate National Highway System (NHS) pavements were determined using the 2013 Highway Performance Monitoring System (HPMS) data submitted by MDOT to the Federal Highway Administration (FHWA). The HPMS is a national level highway information system that includes data on the extent, condition, performance, and use and operating characteristics of the nation's highways. HPMS data is sample data, collected across the entire federal-aid eligible system, for interstate, arterial and collector networks. The pavement condition provided is based on the International Roughness Index (IRI), cracking, rutting, and faulting.

As part of the implementation of the Moving Ahead for Progress in the 21st Century Act (MAP-21) signed into law in 2012, pavement condition performance monitoring will be required by MPOs in the near future. The proposed performance measures classify pavement conditions using a combination of data from the HPMS, including IRI, cracking, rutting, and faulting. All pavements on the NHS will be classified as either in good, fair, or poor condition. Because the 2013 HMPS data only provides the IRI rating, this is what is used to discuss existing pavement conditions for the MTP.

Table 6.4 shows the percentage of the Hattiesburg MPA's NHS and additional lane miles that are currently in good, fair, poor, and very poor condition based on the IRI. The ranges for IRI values in Table 6.4 are consistent with what proposed FHWA rulemaking indicates will be federal performance measure thresholds with the exception of very poor, which is intended to further distinguish pavement conditions. Approximately four percent of the total NHS lane miles and approximately six percent of the total lane miles with data are in poor or very poor condition.

It is important to note that the 2013 HPMS data is nearly three years old and does not account for recent repaving or reconstruction of roadways since at least January, 2013.

Figure 6.3 shows that the worst pavement conditions are around the Hattiesburg Central Business District (CBD) and US 49 northwest of I-59. All of the interstate system in the MPA is in fair or better condition.

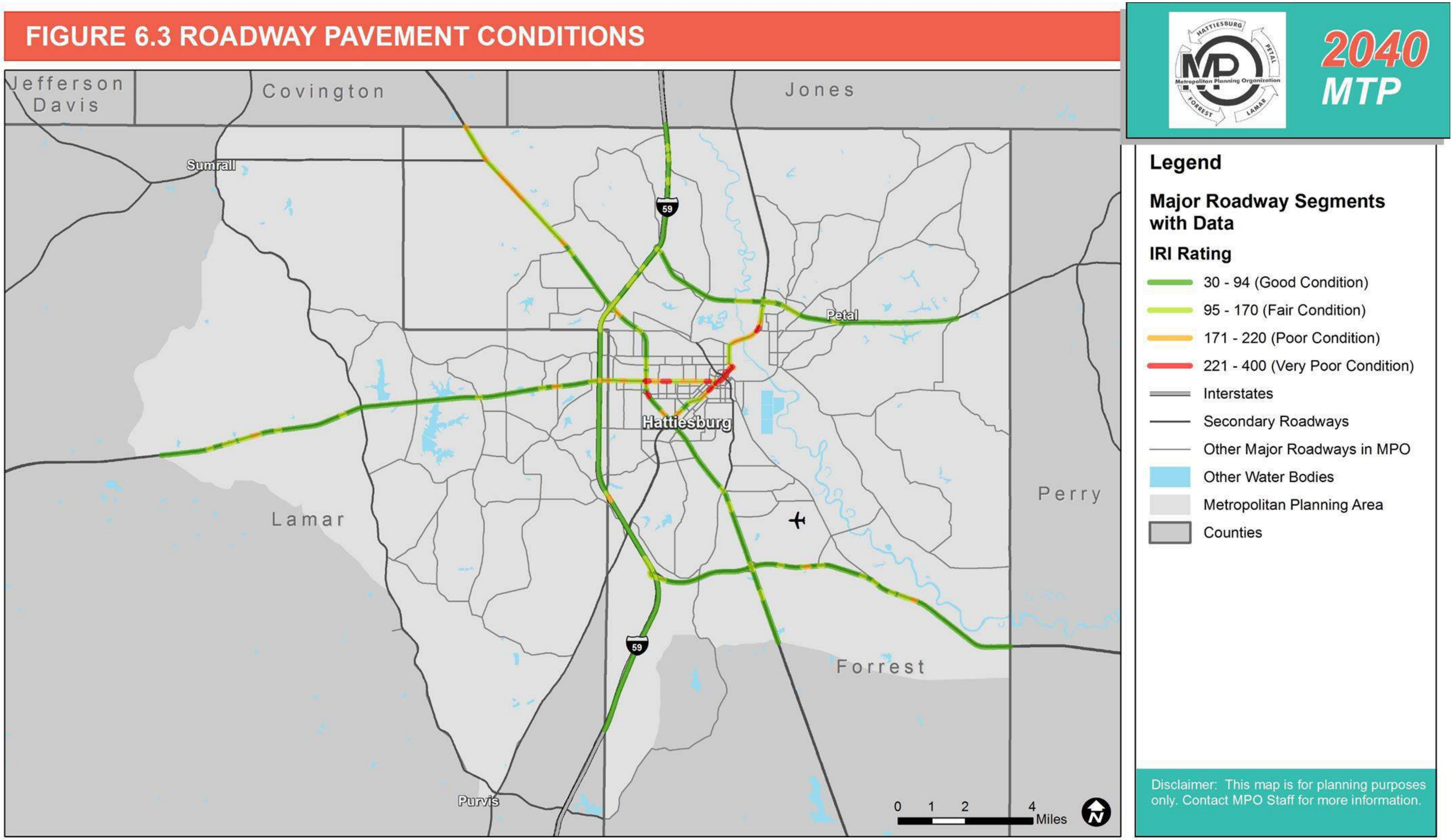
Table 6.4 Pavement Condition for Roadways

IRI Rating	NHS Routes[1]		All Routes with Data[2]	
	Lane Miles	Percent of Total	Lane Miles	Percent of Total
Good (<95)	232.9	78.2%	237.5	75.2%
Fair (95-170)	53.0	17.8%	58.6	18.5%
Poor (170-220)	10.0	3.4%	15.4	4.9%
Very Poor (>220)	1.9	0.6%	4.4	1.4%
Total	**297.7**	**100.0%**	**315.9**	**100.0%**

Note: [1]Includes all NHS routes except for STRAHNET Connector along Weldy Rd.
[2]Only additional route is US 11 from US 49 to MS 42.

Source: USDOT, 2013 Highway Performance Monitoring System

FIGURE 6.3 ROADWAY PAVEMENT CONDITIONS



Map Source: Neel-Schaffer, Inc.

Data Sources: USDOT, 2013 Highway Performance Monitoring System

Bridge Conditions

Bridges are a critical part of the overall transportation network, serving as important connections over waterways, providing grade separation between roadways and other transportation facilities, and connecting transportation facilities to each other. Bridges must be maintained and upgraded as needed to ensure that they are not serving as safety or environmental hazards, bottlenecks, or limitations to freight movement.

As previously mentioned, results from the 2040 MTP public input meeting showed that the public places a high priority on maintaining the current transportation system. In a funding allocation exercise where the public was asked to allocate future transportation dollars by improvement type, the public allocated over one-third of all funding to maintaining roads, which includes bridges. On average, the public rated their current satisfaction with road and bridge conditions as fair.

There are nearly 350 bridges within, or within close proximity, to the Hattiesburg MPA. Most of these are crossing waterways, but there are also many structures crossing over other roadways and railroads. According to National Bridge Inventory (NBI) data, no bridges are of historic significance in the Hattiesburg MPA inventory.

Bridge Conditions and Sufficiency Ratings

Bridge conditions for all bridges in the United States with public roads passing above or below are included in the NBI which defines bridges to include bridge-length culverts. This data source is updated annually and provides valuable condition information.

As part of the implementation of MAP-21, bridge condition performance monitoring will be required by MPOs in the near future. The proposed performance measures for bridges are the percentage of NHS bridges classified as being in good condition and the percentage of NHS bridges classified as being in poor condition. The proposed definition of good and poor are based on a structure’s deck, superstructure, and substructure rating or culvert rating.

Table 6.5 shows the number and percentage of bridges classified by FHWA condition for both NHS bridges alone and for all bridges. Nearly all of the bridges on the NHS system in the MPA are in fair or good condition. Nineteen bridges in the Hattiesburg MPA are defined as poor by the proposed FHWA standards. Figure 6.4 shows the location of bridges in poor condition. Only two of the bridges in poor condition are on NHS routes.

Table 6.5 Bridges by Condition

Condition	NHS Bridges in MPA		All Bridges in MPA	
	Number	Percent	Number	Percent
Good Condition	53	72.6%	210	61.8%
Fair Condition	18	24.7%	59	17.4%
Poor Condition	2	2.7%	19	5.6%
No Data	0	0.0%	52	15.3%
Total	**73**	**100.0%**	**340**	**100.0%**

Source: National Bridge Inventory

FHWA may use the deck area of bridges to define the percentage of NHS bridges classified as being in good condition and poor condition. Table 6.6 shows this breakdown for both NHS and all bridges in the Hattiesburg MPA. The percentage of deck area in poor condition for both the NHS and for all bridges is higher than the percentage of the number of bridges in poor condition. This indicates that the bridges in poor condition are relatively large in size.

Table 6.6 Bridge Deck Area by Condition

Condition	NHS Bridges in MPA		All Bridges in MPA	
	Square Meters	Percent	Square Meters	Percent
Good Condition	62,561	78.4%	111,302	76.2%
Fair Condition	10,693	13.4%	25,272	17.3%
Poor Condition	6,584	8.2%	9,567	6.5%
Total Deck Area	**79,838**	**100.0%**	**146,141**	**100.0%**

Note: About 15 percent of bridges did not have deck dimensions. Culverts also do not have deck dimensions.

Source: National Bridge Inventory

Another way of evaluating bridge condition is their sufficiency rating assigned in the NBI. Historically, in order to be eligible for federal funds for bridge rehabilitation or replacement, a bridge must have a sufficiency rating of 80 or lower for rehabilitation and below 50 for replacement. Table 6.7 shows that 19 bridges, just over five percent of all bridges, in the Hattiesburg MPA may warrant replacement while another 94 may warrant rehabilitation. Figure 6.4 illustrates the sufficiency ratings of bridges in poor condition.

Table 6.7 Bridges by Sufficiency Rating

Sufficiency Rating	NHS Bridges in MPA		All Bridges in MPA	
	Number	Percent	Number	Percent
Above 80	54	74.0%	175	51.5%
50-80	19	26.0%	94	27.6%
Less than 50	0	0.0%	19	5.6%
No Data	0	0.0%	52	15.3%
Total	**73**	**100.0%**	**340**	**100.0%**

Source: National Bridge Inventory

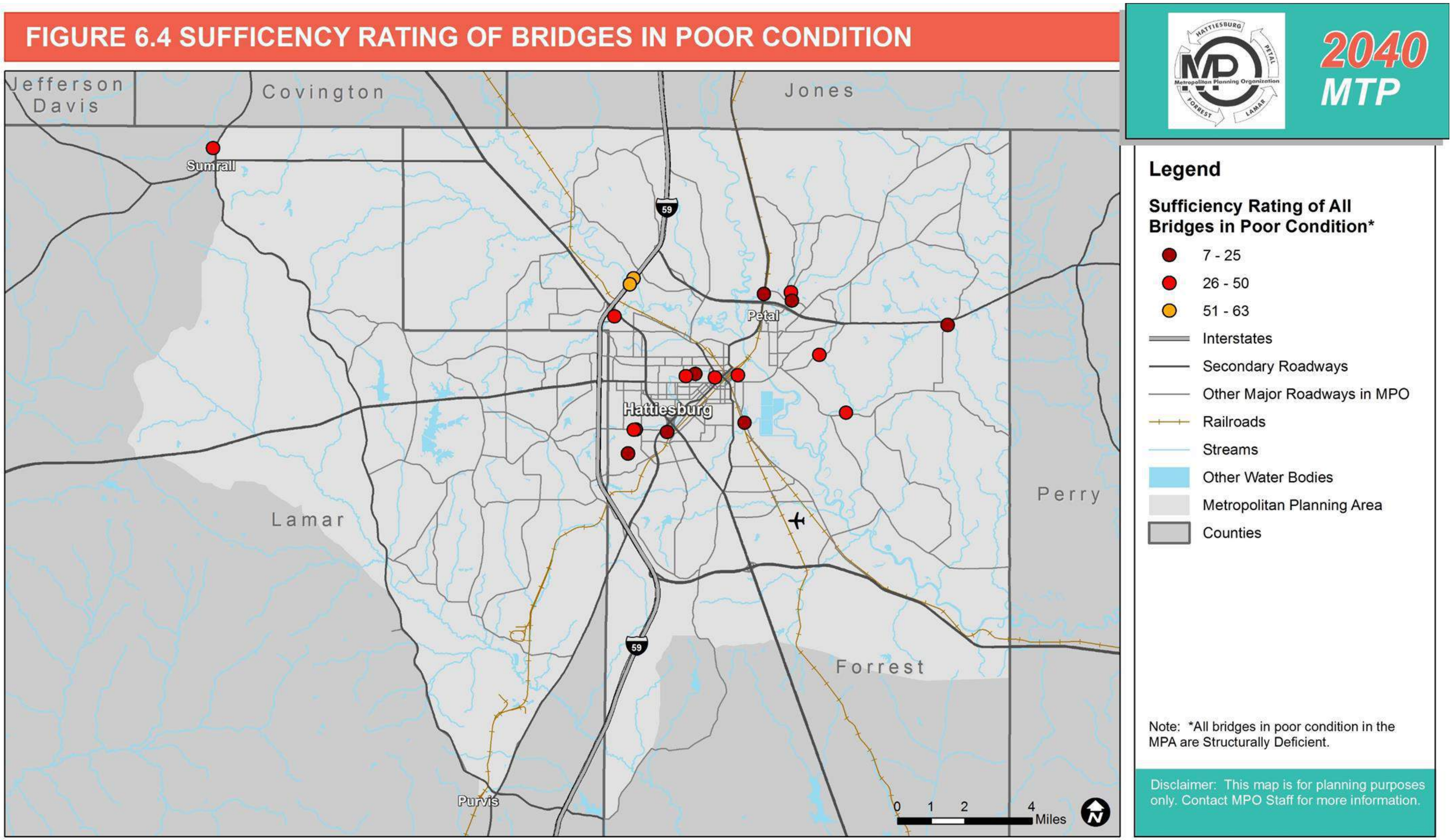
Structurally Deficient and Functionally Obsolete Bridges

Aside from the sufficiency rating, bridges constructed more than ten years ago in the NBI are evaluated to determine if they are either "structurally deficient" or "functionally obsolete." Neither of these designations necessarily means that a bridge is unsafe. Structural deficiency is characterized by deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. A "structurally deficient" bridge typically requires significant maintenance and repair to remain in service and would eventually require major rehabilitation or replacement to address the underlying deficiency. A bridge is considered "functionally obsolete" when it does not meet current design standards (for criteria such as lane width), either because the volume of traffic carried by the bridge exceeds the level anticipated when the bridge was constructed and/or the relevant design standards have been revised. Addressing functional obsolescence may require the widening or replacement of the structure.

There are 19 structurally deficient bridges in the Hattiesburg MPA, two of which are on the NHS. There are also an additional 34 functionally obsolete bridges in the MPA, none of which are on the NHS.

In addition to the two bridge condition performance measures which MPOs must track, all states must ensure that no more than ten percent of the total deck area of NHS bridges in the state is classified as structurally deficient.

FIGURE 6.4 SUFFICENCY RATING OF BRIDGES IN POOR CONDITION



Map Source: Neel-Schaffer, Inc.

Data Sources: USDOT, 2013 National Bridge Inventory

Traffic, Congestion, and Reliability

The number of daily trips by trip purpose in 2013, as estimated by the Travel Demand Model is summarized in Table 6.8. This data shows that just over one in thirteen vehicle trips is originating outside of the MPA and that internal commercial and truck vehicle trips (e.g., freight, taxi, etc.) account for about one in ten vehicle trips. Most household vehicle trips originating in the MPA begin or end at home.

Table 6.8 Daily Vehicle Trips by Purpose, 2013

Trip Purpose	Vehicle Trips	Percent
Home-Based Work	83,706	16.5%
Home-Based Other	183,361	36.0%
Non-Home Based	97,181	19.1%
Commercial Vehicle	32,995	6.5%
Truck	9,829	1.9%
External-Internal	88,296	17.3%
External-External	13,852	2.7%
Total	**509,220**	**100.0%**

Source: Hattiesburg Travel Demand Model, NSI

Table 6.9 shows how these trips are distributed onto the modeled transportation network, which excludes most of the local roads. Most of the delay (about 74 percent) is estimated to occur on the principal arterials and interstates, which are also where most vehicle miles traveled and vehicle hours occur. Conversely, there is little delay estimated to occur on collectors and travel on these roadways only account for 16 percent of vehicle miles traveled and 18 percent of vehicle hours traveled.

Table 6.9 Roadway System Travel Characteristics, 2013

Functional Class	Daily Vehicle Miles Traveled (VMT)		Daily Vehicle Hours Traveled (VHT)		Daily Vehicle Hours of Delay	
	Number	Percent	Number	Percent	Number	Percent
Interstate	621,013	23.77%	11,219	16.70%	1,877	12.40%
Principal Arterial	1,134,731	43.44%	30,592	45.54%	9,269	61.24%
Minor Arterial	442,742	16.95%	13,551	20.17%	2,291	15.14%
Collector	413,955	15.85%	11,813	17.59%	1,698	11.22%
Total	**2,612,441**	**100.00%**	**67,175**	**100.00%**	**15,134**	**100.00%**

Source: Hattiesburg Travel Demand Model, NSI

Figure 6.5 confirms that vehicular traffic in the Hattiesburg MPA is greatest on I-59, US 98, and US 49. These areas have estimated average daily volumes exceeding 30,000 vehicles.

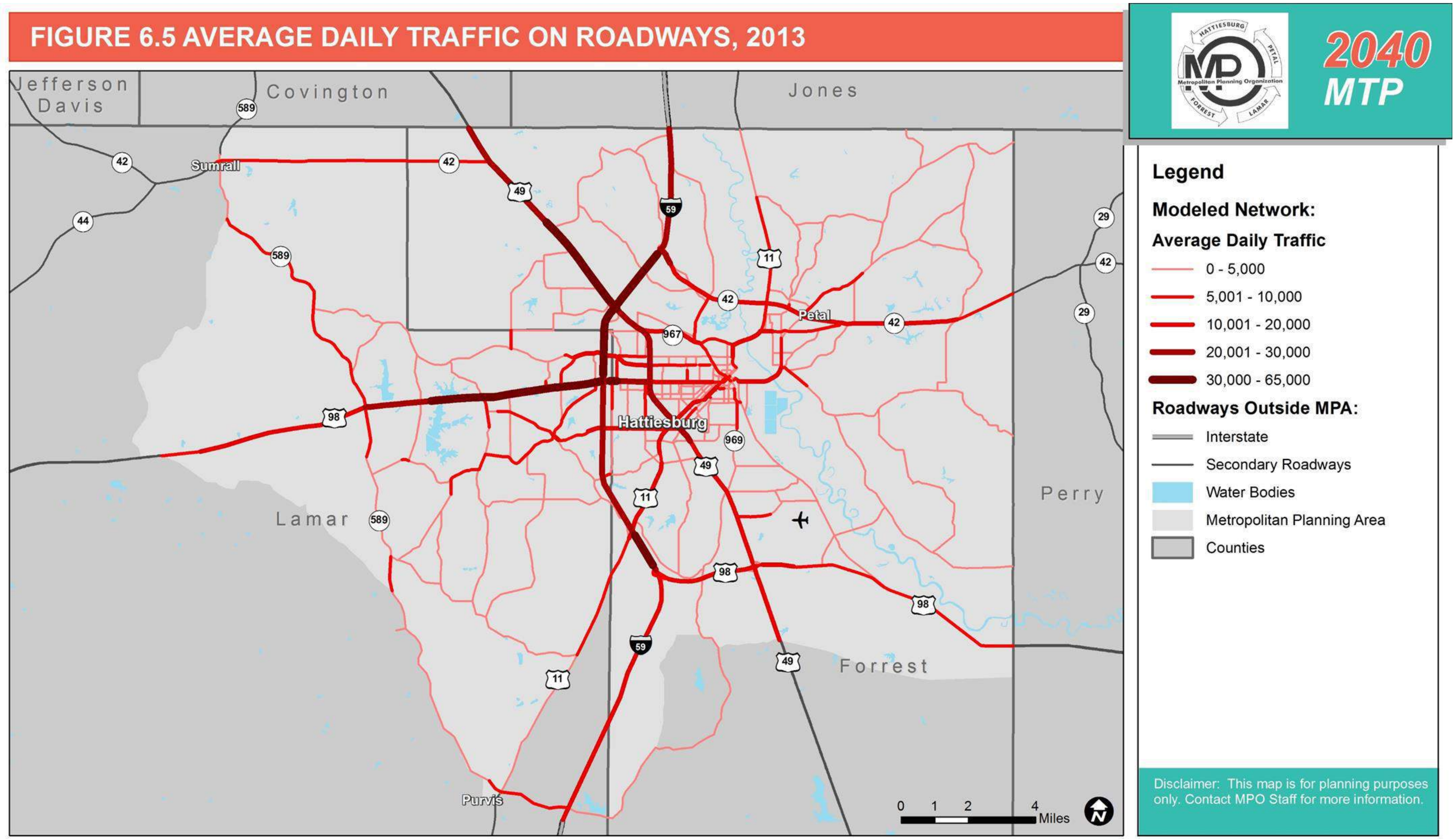
Traffic is better understood when roadway capacities are taken into account. Volume to capacity (V/C) ratios are often used to illustrate congestion on roadway segments. Figure 6.6 shows these V/C ratios for the major roadways in the Hattiesburg MPA. Currently only twelve roadway segments, summarized in Table 6.10, exceed a V/C ratio of 1.00. These twelve segments are mostly near the intersections of roadways and/or at interstate interchanges with high traffic volumes with a V/C ratio range of 1.00 to 1.59. This suggests that peak period congestion is currently an issue in the Hattiesburg MPA.

Table 6.10 Roadway Corridors with Volumes Exceeding Capacity, 2013

Roadway	From/To	Length (miles)
US 98	W Lake Rd to King Rd	1.56
US 98	Lakewood Dr to Weathersby Rd	0.19
US 98	Mayfair St to Coca Cola Dr	0.20
US 98	Westover Dr to N 38th Ave	0.64
I-59 NB Clover On-Ramp	@ US 98	0.12
I-59 C-D Rd	I-59 NB Clover On-Ramp to I-59 NB On-Ramp	0.20
I-59 NB On-Ramp	I-59 C-D Road to I-59	0.04
I-59 SB Off-Ramp	@ US 98	0.21
W 4th St	Westover Dr to N 38th Ave	0.76
MS 42	SB Ramps to NB Ramps on I-59	0.11
MS 42	0.3 mi N of Peps Point Rd to Rawls Springs Rd	1.13
MS 42	Blackwell Blvd to Rawls Springs Loop Rd	0.29

Source: Hattiesburg Travel Demand Model, NSI

While most of the region's roadways do not have daily volumes that exceed their daily capacities, there may still be congestion issues at specific times, notably peak periods. Travel time reliability addresses this issue by evaluating how travel times vary in time, typically by time of day. For the purposes of the MTP, travel time reliability analysis will focus on peak periods. Reliability issues related to traffic incidents, construction, special events, or other events would require a more detailed analysis.

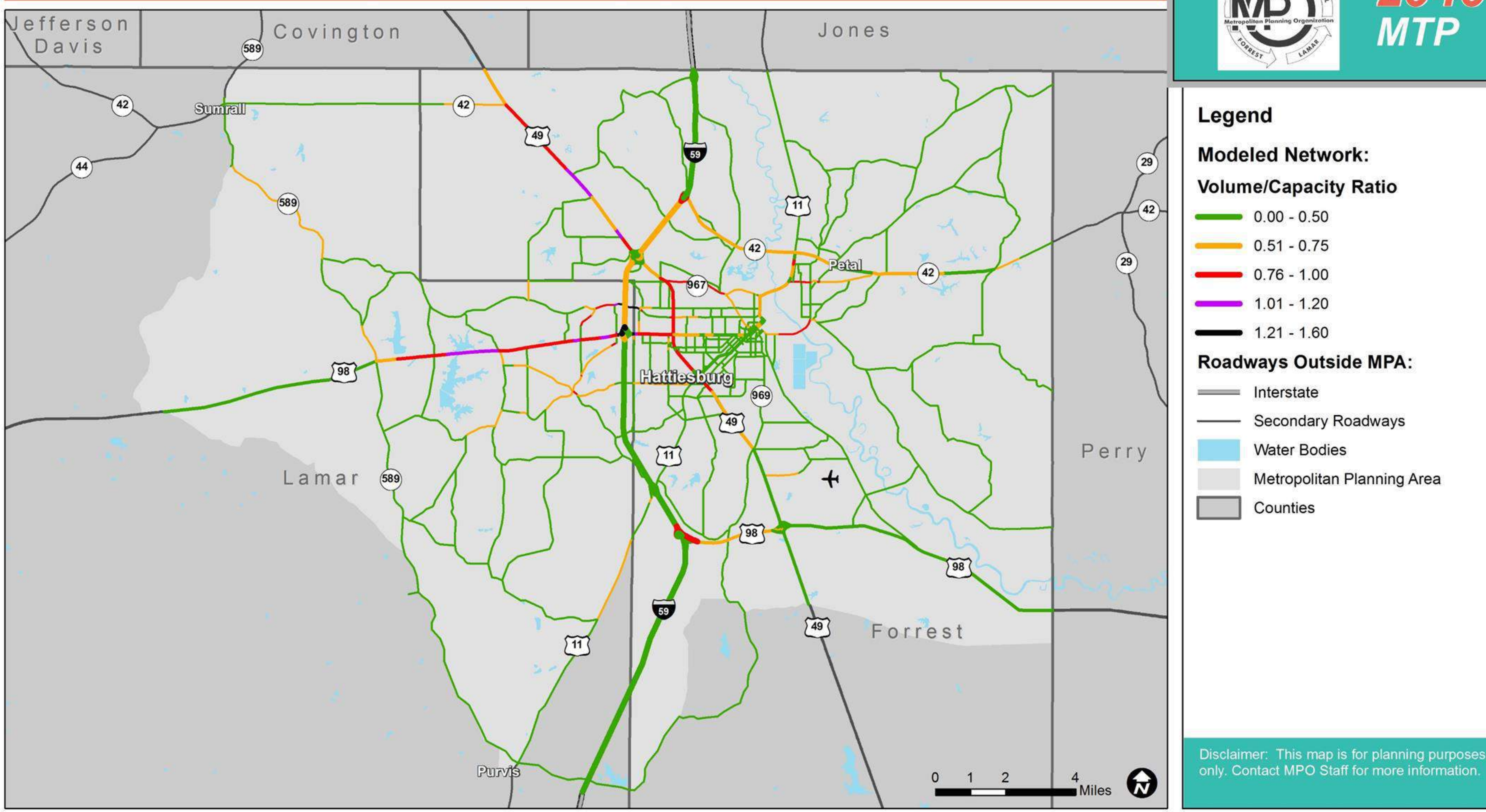


Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 6.6 EXISTING ROADWAY CONGESTION, 2013

2040 MTP



Map Source: Neel-Schaffer, Inc.

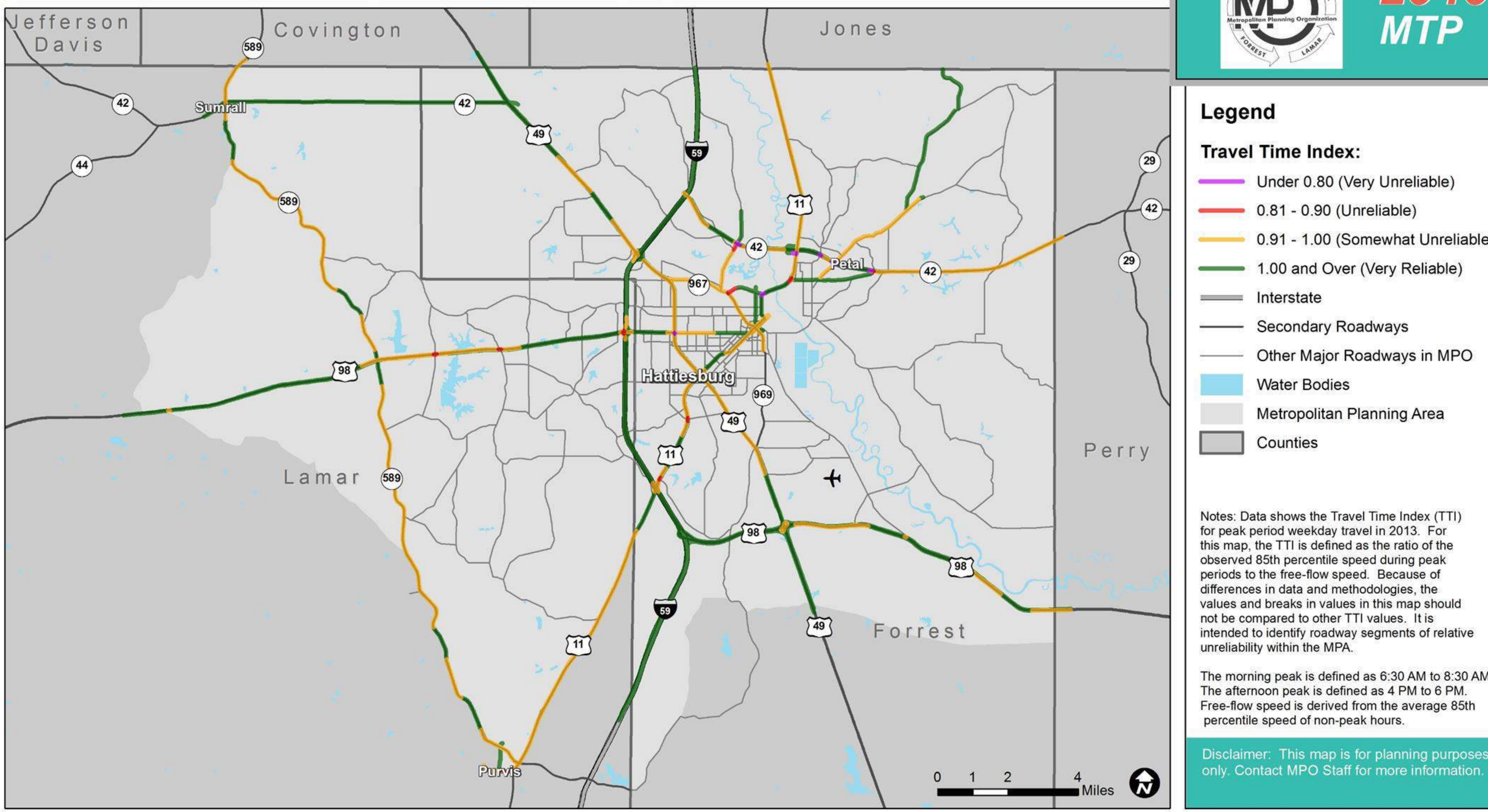
Data Sources: Hattiesburg Regional Travel Demand Model

Figure 6.7 and Figure 6.8 show Travel Time Indices (TTI) for major roadways during AM and PM peak periods in the Hattiesburg MPA. The TTI is the ratio of actual travel time to free-flow travel time and illustrates areas that experience congestion during peak periods.

Travel time reliability overall is worse in the PM peak than in the AM peak. Typically, roadway segments that experience AM reliability issues also experience PM reliability issues. Areas experiencing relatively high peak-period congestion, as indicated by the TTI include:

- US 98 (Hardy Street) from Old US 11 to US 49
- Morriston Road and Mars Hill Road near Morriston.
- Several intersections in and around Petal.

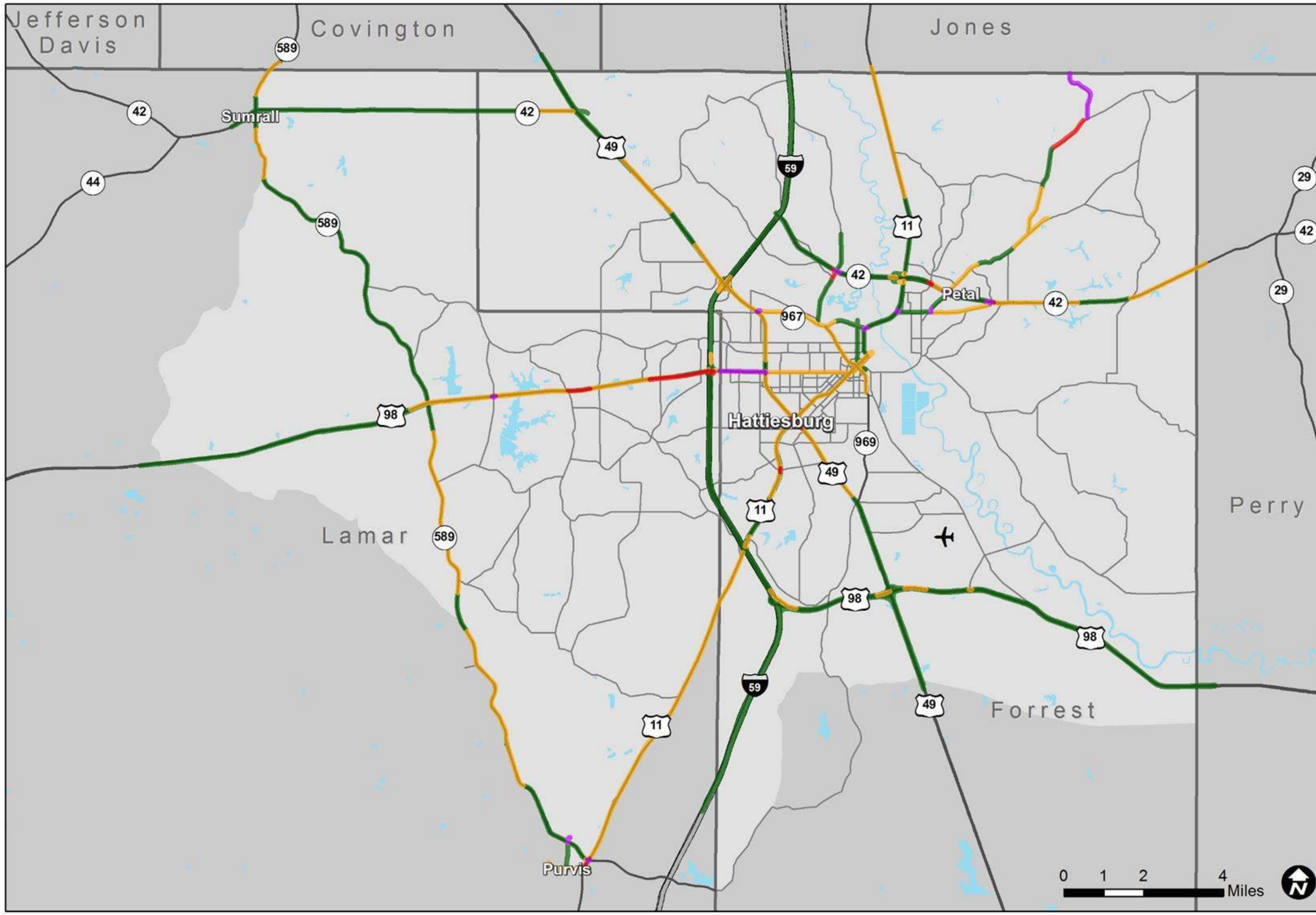
FIGURE 6.7 TRAVEL TIME RELIABILITY, AM PEAK



Map Source: Neel-Schaffer, Inc.

Data Sources: INRIX

FIGURE 6.8 TRAVEL TIME RELIABILITY, PM PEAK



2040 MTP

Legend

Travel Time Index:

- Under 0.80 (Very Unreliable)
- 0.81 - 0.90 (Unreliable)
- 0.91 - 1.00 (Somewhat Unreliable)
- 1.00 and Over (Very Reliable)
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water Bodies
- Metropolitan Planning Area
- Counties

Notes: Data shows the Travel Time Index (TTI) for peak period weekday travel in 2013. For this map, the TTI is defined as the ratio of the observed 85th percentile speed during peak periods to the free-flow speed. Because of differences in data and methodologies, the values and breaks in values in this map should not be compared to other TTI values. It is intended to identify roadway segments of relative unreliability within the MPA.

The morning peak is defined as 6:30 AM to 8:30 AM. The afternoon peak is defined as 4 PM to 6 PM. Free-flow speed is derived from the average 85th percentile speed of non-peak hours.

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: INRIX

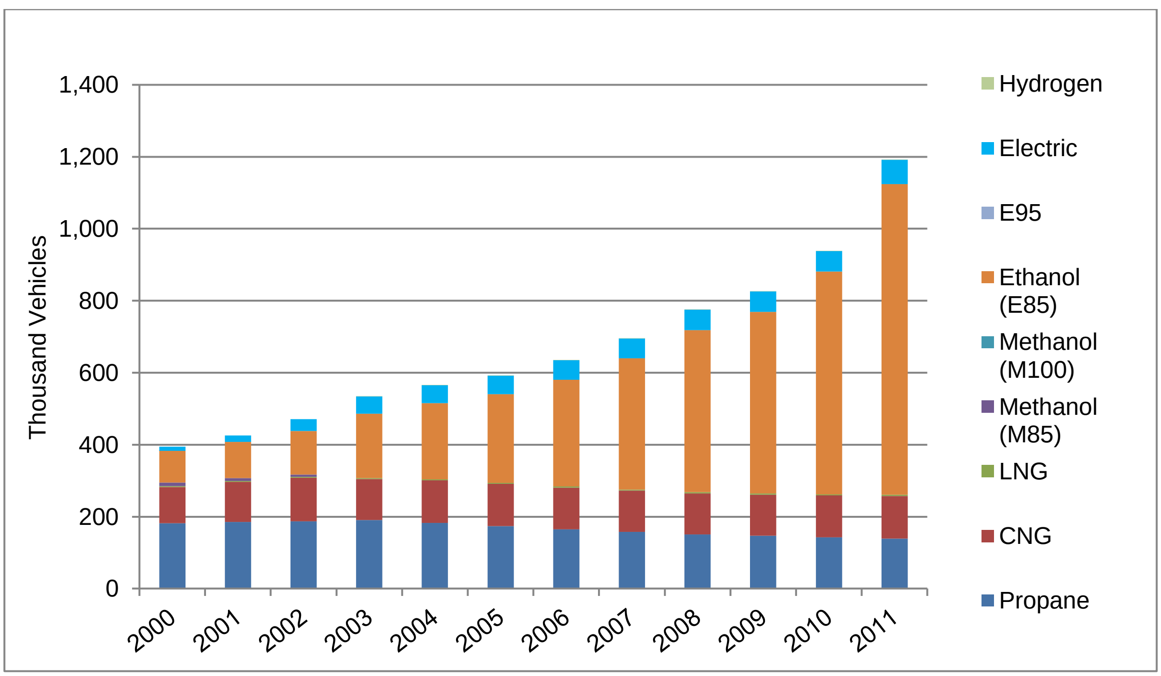
Alternative Fuel Vehicles and Stations

Alternative Fuel Vehicles (AFVs) are vehicles which rely on fuels that are substantially non-petroleum, yield substantial energy security benefits, and offer substantial environmental benefits. These include fuels such as liquefied petroleum gas (propane), Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), 85% and 100% Methanol (M85 and M100), 85% and 95% Ethanol (E85 and E95), electricity, and hydrogen. E85 and E95 should be distinguished from the more universal E10 and E15 fuels which have lower concentrations of ethanol and thus are not considered low-carbon. AFVs also include hybrid vehicles.

<u>Existing Stock of AFVs</u>

Local information on the number of AFVs in use was not available at the time of this plan. However, data from the U.S. Department of Energy's Alternative Fuels Data Center indicate that, nationally, the AFVs in widest use today are those that run on E85, propane, compressed natural gas, and electricity. The number of AFVs in use increased steadily from 1995 to 2011, largely due to federal policies that encourage and incentivize the manufacture, sale, and use of vehicles that use non-petroleum fuels. The popularity of ethanol vehicles grew widely during this time period while the number of other alternative fueled vehicles remained relatively constant.

Figure 6.9 Alternative Fuel Vehicles in Use in United States, 2000-2011



Source: U.S. Department of Energy, Alternative Fuels Data Center

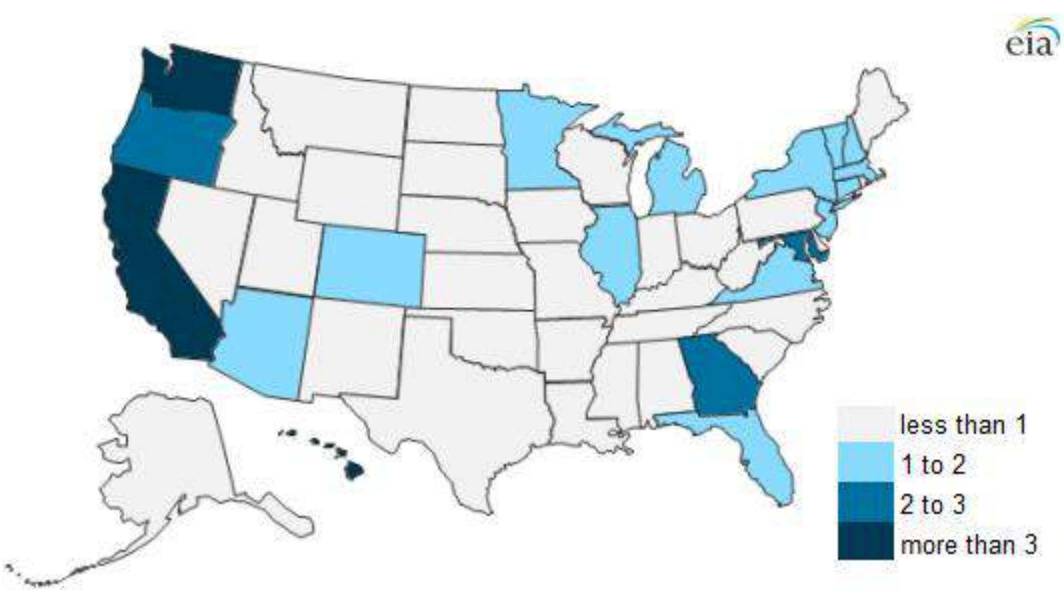
Though the federal dataset that tracked AFVs in use up to 2011 does not have more recent information available, recent data from other sources show that the number of electric vehicles has begun to steadily increase. At the same time, there is growing concern that biofuels such as ethanol may have an overall environmental impact that is worse than petroleum based fuels, once indirect emissions and land use impacts are taken into account.

According to 2013 data from the U.S. Energy Information Administration's *Annual Energy Outlook*, the most popular alternative fuel sources for cars and light-duty trucks in the U.S. are E85 (flex-fuel vehicles) and electricity (hybrid electric vehicles and plug-in electric vehicles). In 2013, ethanol AFVs accounted for slightly over five percent of all cars and light-duty trucks, which includes fleet vehicles. Electric AFVs only accounted for slightly over one percent.

While AFVs are gaining market share amongst light-duty household and fleet vehicles, conventional fuel vehicles (gasoline and diesel) accounted for nearly 99% of all light-medium, medium, and heavy-duty trucks on the road in 2013.

It should be noted that the popularity of different AFVs varies greatly by region, with E85 AFVs being more popular in the Midwest and electric AFVs, especially plug-in electric vehicles, being more popular on the West Coast, as shown in Figure 6.10.

Figure 6.10 Plug-In Electric Vehicles per 1,000 Registered Vehicles



Source: U.S. Energy Information Administration, based on Federal Highway Administration data and R.L. Polk & Company. Published December 10, 2014

<u>AFV Stations</u>

At the national level, over 60% of all AFV stations are for electric vehicles and approximately 18% are for propane. E85 accounts for15% and CNG 5%. All other types are less than 1%. At the state level, Mississippi has not invested as heavily in AFV stations for electric vehicles, E85, or CNG. Instead, about 84% of the AFV stations are propane. It is important to note that publicly accessible AFV stations are constructed and managed both by private entities and local governments.

The availability of AFV stations in the Hattiesburg MPA mirrors that of Mississippi as a whole. There are four public AFV stations in the MPA: three for propane and one for electric vehicles. Per capita, the Hattiesburg MSA has an above average number of propane stations and below average number of electric stations. The national average and top five small MSAs are shown in tables 6.12 and 6.13 for comparison.

Table 6.11 Alternative Fuel Vehicle Stations in the Hattiesburg MPA

Facility	Address	County	Type
Blossman Gas Inc	5536 Highway 42 Hattiesburg, MS	Forrest	Propane
Herring Gas Co	594 Highway 589 Purvis, MS	Lamar	Propane
U-Haul	918 Broadway Dr Hattiesburg, MS	Forrest	Propane
Petro Automotive Group	6248 Highway 98 W Hattiesburg, MS	Lamar	Electric

Source: 2015 National Transportation Atlas

Table 6.12 Propane Vehicle Stations per Capita in Small MSAs (<250,000 pop.)

Rank	Metropolitan Statistical Area	Public Propane Fuel Stations	Population (2014)	Stations per 100,000
1	Wichita Falls, TX	8	151,536	5.3
2	Abilene, TX	8	166,900	4.8
3	Longview, TX	9	217,481	4.1
4	Bismarck, ND	5	126,526	4.0
5	Gadsden, AL	4	103,531	3.9
21	Hattiesburg, MS	4	149,312	2.7
Average of Small MSAs with at least 1 station				1.6

Note: Includes planned and temporarily unavailable stations
Source: 2015 National Transportation Atlas; 2014 American Community Survey

Table 6.13 Electric Vehicle Stations per Capita in Small MSAs (<250,000 pop.)

Rank	Metropolitan Statistical Area	Public Electric Charging Stations	Population (2014)	Stations per 100,000
1	Corvallis, OR	15	86,316	17.4
2	Bloomington, IL	29	188,917	15.4
3	Kahului-Wailuku-Lahaina, HI	25	163,108	15.3
4	Wenatchee, WA	14	114,392	12.2
5	Napa, CA	16	141,667	11.3
142	Hattiesburg, MS	1	149,312	0.7
Average of Small MSAs with at least 1 station				2.3

Note: Includes planned and temporarily unavailable stations
Source: 2015 National Transportation Atlas; 2014 American Community Survey

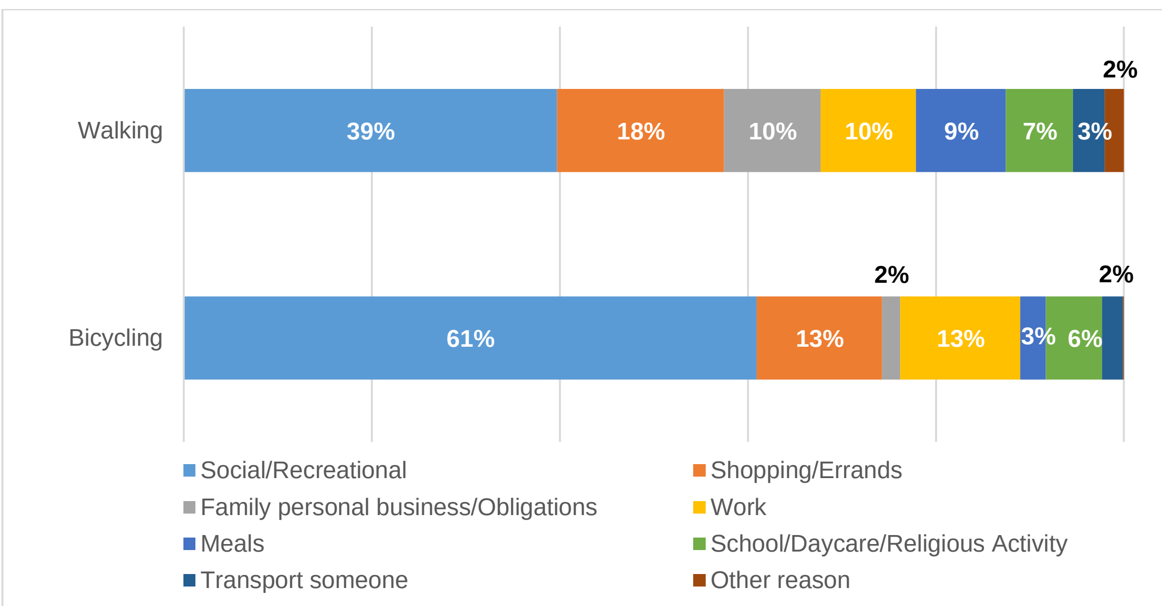
6.2 Bicycle and Pedestrian

Bicycle and pedestrian conditions are often discussed alongside each other. However, their role within the transportation system is very different. First of all, in small urbanized areas like Hattiesburg, the 2009 National Household Travel Survey (NHTS) indicates that walking accounts for 11 percent of all household trips while bicycling only accounts for one (1) percent. Pedestrian trips are not only more common, but they also are of critical importance for those who do not drive and physically cannot or choose not to bicycle.

Survey data showing trip purposes by mode also highlights some of the differences between walking and bicycling in small urbanized areas. While the predominant trip purpose for both walking and bicycling, aside from returning home, is social/recreational purposes, walking has a higher percentage of its trips that are utilitarian in nature, such as shopping/errands and family personal business/obligations. Furthermore, the percentage of all trips made by bicycling for social/recreational purpose is much higher than for walking.

It is important to note that while these household travel patterns represent urbanized areas on average, there are many areas where pedestrian and bicycle trips are more utilitarian and similar to overall travel patterns. Typically, this would be expected in areas with attractive pedestrian and bicycle environments that encourage walking and biking.

Figure 6.11 Walking and Bicycling Trip Purposes



Source: 2009 National Household Travel Survey

Existing Conditions

Sidewalk and Bicycle Facility Coverage

For the MTP, an inventory obtained from the city of Hattiesburg of existing sidewalks and bicycle facilities in the Hattiesburg MPA was used as a starting point. Figure 6.13 shows that sidewalks and bicycle facilities are not common throughout the MPA or even in all urban areas. Sidewalk coverage is best within the Central Business Districts (CBDs) of Hattiesburg, and to some extent near the University of Southern Mississippi (USM). Bicycle facilities are very sparse, though they are also more common near the Hattiesburg CBD and USM. It is worth noting that the Longleaf Trace extends westward beyond the MPA to Prentiss, MS.

Existing Traffic and Usage Patterns

No information on pedestrian or bicycle traffic is available for the Hattiesburg MPA. The distribution of demand will be discussed later, but for purposes of understanding actual usage of pedestrian and bicycle infrastructure, work and school trips are discussed.

As shown in Table 6.14, bicycle and pedestrian trips make up less than three (3) percent of work commute trips in the Hattiesburg MPA. However, this was not always the case, as illustrated in Figure 6.12. Hattiesburg, like many metropolitan areas in the Southeastern United States, saw extensive automobile-oriented suburban growth during the latter half of the 20th century. While this growth pattern enabled workers to live in larger houses on larger lots, it also meant that they typically lived too far from their workplace to make walking or biking to work an attractive option. In areas where transit was not available, this meant an almost complete reliance on the automobile to get to work, either by driving alone or carpooling.

For many of the same reasons that walking and biking to work decreased, school children have become less likely to walk or bike to school. Furthermore, in order to reduce operating and capital costs, new schools have tended to be fewer but larger and located at the urban fringe because of more affordable, available land. This is in marked contrast to the historical role of schools in American cities as a neighborhood anchor. According to the National Center for Safe Routes School's 2011 report, How Children Get to School:

- From 1969 to 2009, the percent of children 5 to 14 years of age that usually walked or bicycled to school dropped from 48 percent to 13 percent; and
- From 1969 to 2009, the percent of children in grades K–8 that lived within one mile of school dropped from 41 percent to 31 percent.

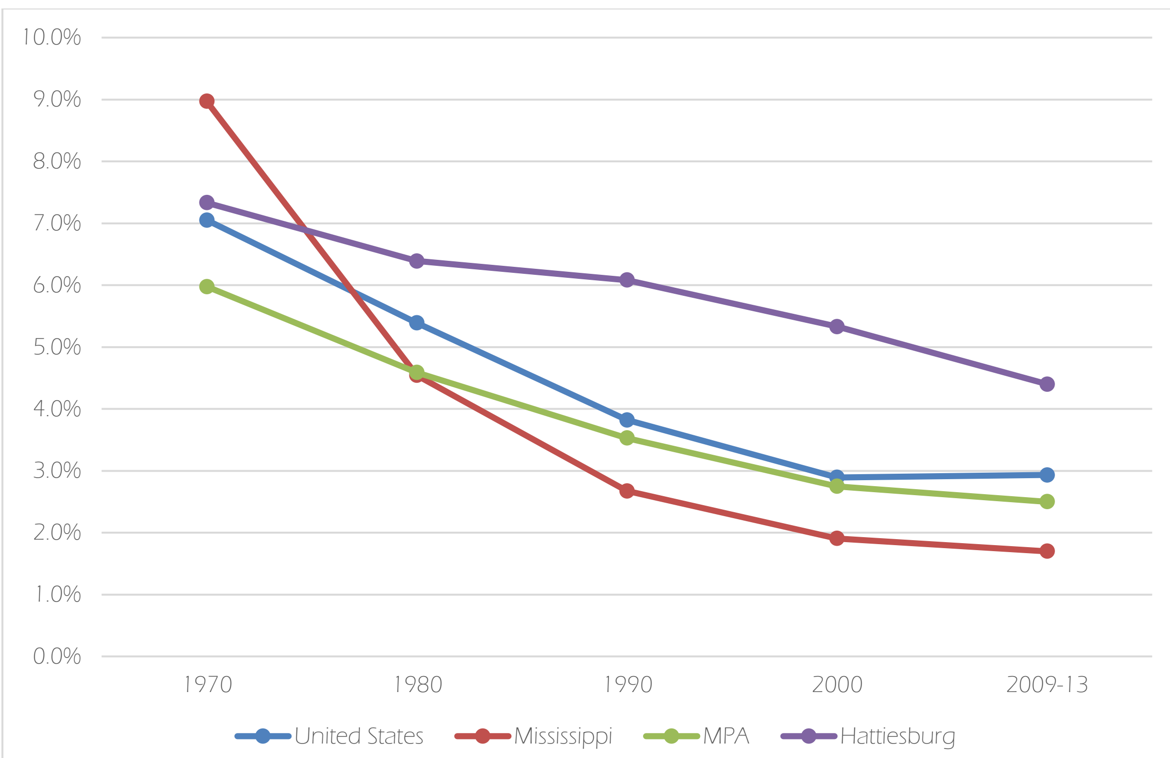
Table 6.14 Means of Transportation to Work

Mode	United States	Mississippi	MPA	Hattiesburg
Drove Alone	79.8%	85.6%	83.7%	80.0%
Carpooled	10.2%	11.0%	10.3%	10.4%
Rode Transit	5.2%	0.5%	0.4%	0.5%
Walked	2.9%	1.7%	2.5%	4.4%
Bicycled	0.6%	0.1%	0.5%	1.3%
Other	1.2%	1.2%	2.7%	3.3%

Note: Excludes those that worked at home. For MPA, mode share was derived from all block groups intersecting the MPA.

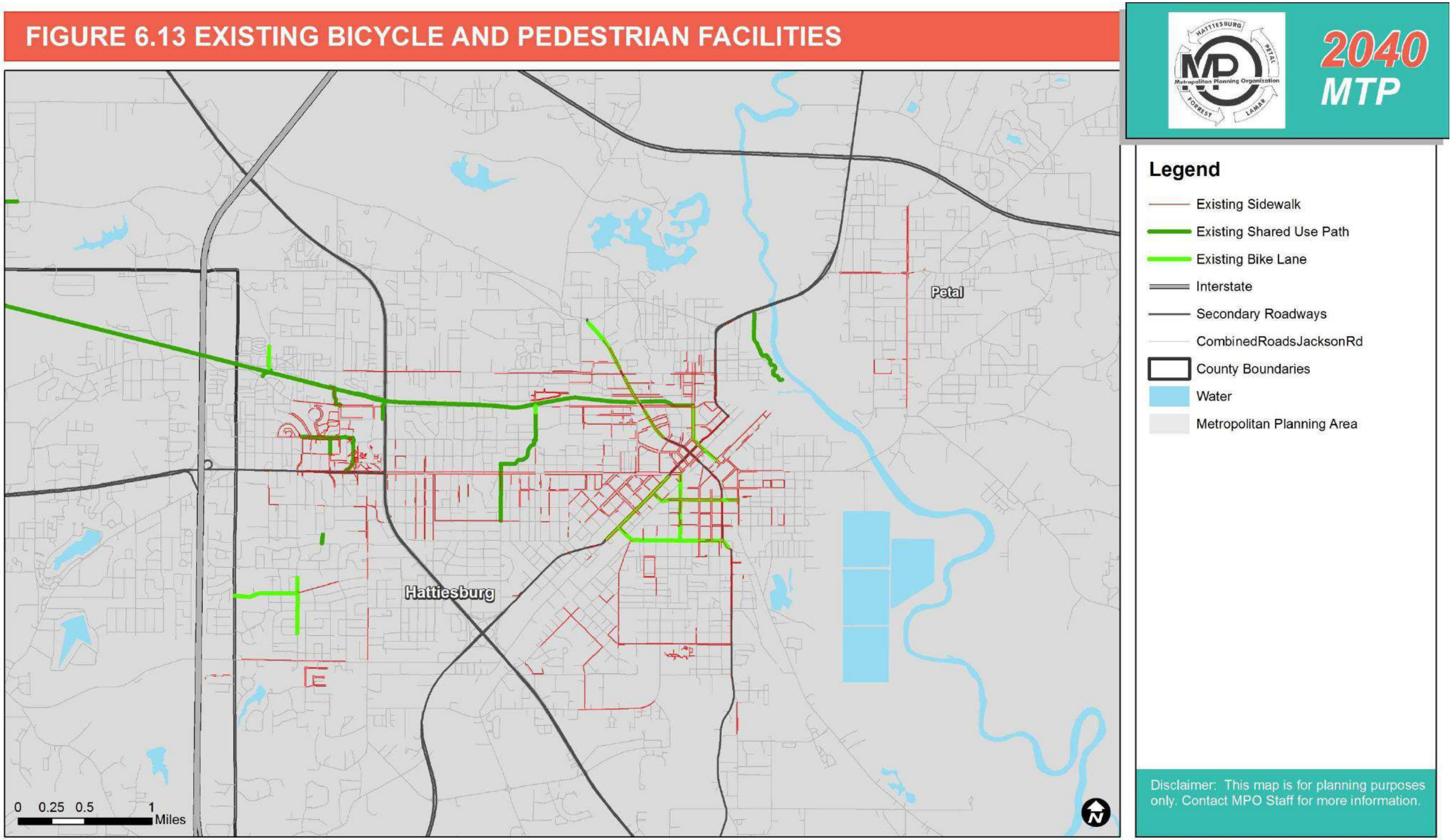
Source: 2009-2013 ACS

Figure 6.12 Percentage of Commuters Walking to Work, 1970-present



Source: National Historic Geographic Information Systems

FIGURE 6.13 EXISTING BICYCLE AND PEDESTRIAN FACILITIES



Map Source: Neel-Schaffer, Inc.

Data Sources: City of Hattiesburg; Neel-Schaffer, Inc.

Latent Demand Score Analysis

In order to better understand the existing potential demand for pedestrian and bicycle trips, a latent demand score analysis was conducted that attempts to illustrate potential demand based on characteristics of the built environment, location of major attractors, and demographics.

The demand analysis is the same for pedestrians and bicyclists. The mapping exercise used fine-grained information to assess an area's potential demand for pedestrian or bicycle trips based on a 0-100 scale. Points were awarded based on the factors summarized in Table 6.15.

Figure 6.14 shows the results of the latent demand score analysis. Again, this exercise reflects relative potential demand, not absolute demand. Simply put, it shows which areas are most likely to have high or low demand relative to all other areas within the MPA. It does not attempt to quantify the actual number of bicycle or pedestrian trips occurring in these areas.

The analysis indicates that potential bicycle and pedestrian demand is greatest around USM and an area extending from just north of the Hattiesburg CBD to William Carey University. There are also smaller areas of high demand, such as an area south of Hardy Street between Weathersby Road and I-59, parts of Petal, Midtown, and many areas between the Hattiesburg CBD and USM.

Table 6.15 Pedestrian Demand Analysis Factors

Factor	Measure	Maximum Points
Land Use	Population and Jobs per Acre	30
	Within half mile of Popular Destination(s)[1]	15
Demographic	Elderly (65+) and Youth (<15) population per Acre	10
	Non-institutionalized Adults with no Vehicle Available and On-Campus Student Housing Population per Acre	25
Travel Environment	Intersections per square mile[2]	20
	Total Possible Points	100

Notes: [1]Popular destinations are parks, major recreation centers, schools, libraries, hospitals, grocery stores, pharmacies, convenience stores, cafes, and restaurants/bars. Universities were weighted 10x, other schools and hospitals were weighted 5x and grocery stores, pharmacies, and convenience stores and parks/rec centers were weighted 2x.
[2]Intersections with at least 4 segments are weighted 2x.

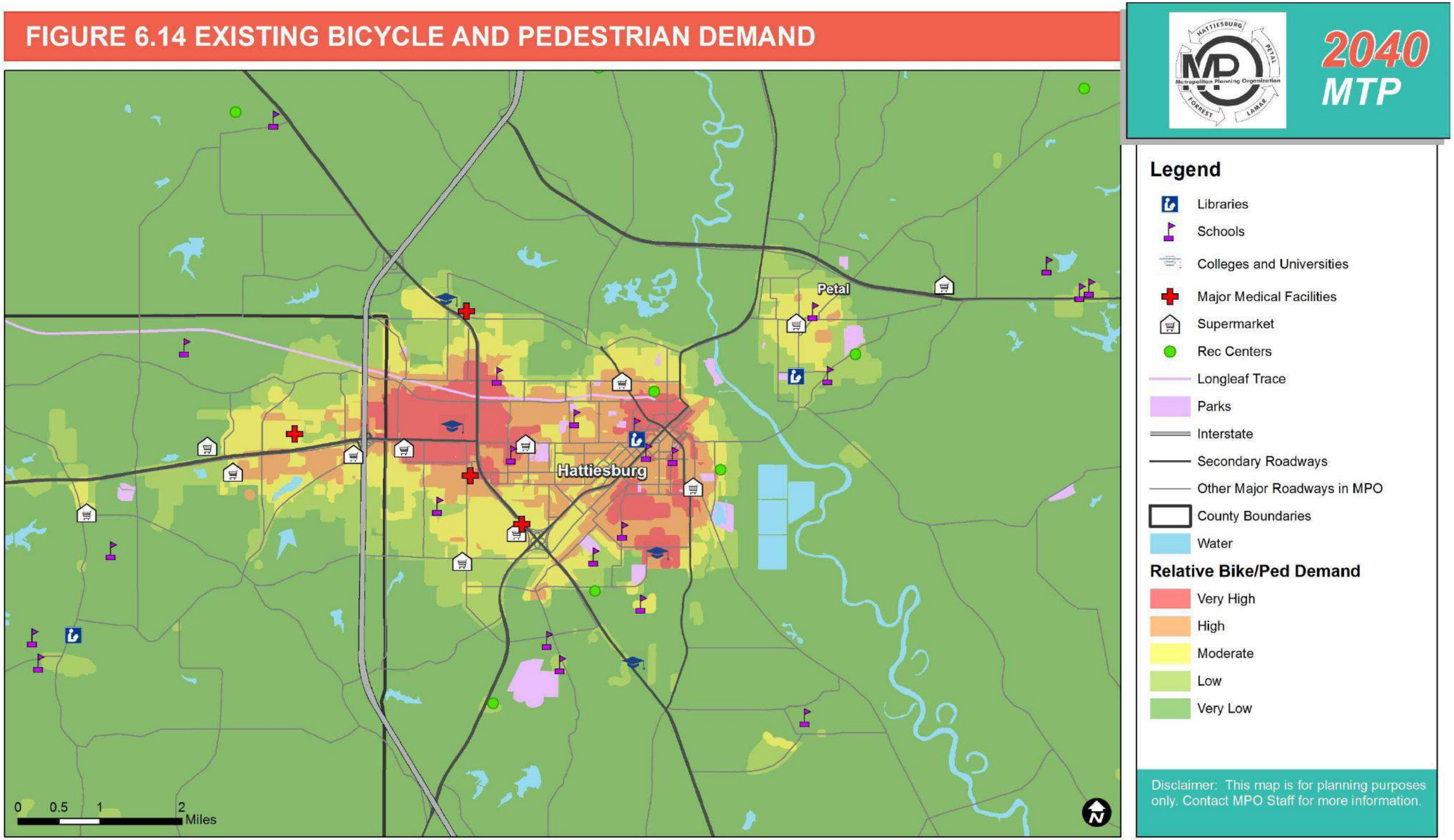
Existing Plans

In April, 2015, the MPO adopted its Pathways Master Plan which provides a clear framework for the development of new facilities, programs, and policies that will support safe and convenient walking and biking conditions for transportation and recreation.

The plans primary recommendations include the following:

- Bicycle and pedestrian infrastructure recommendations. This includes highlighting priority pedestrian corridors and zones and identifying a system of on-street bikeways and shared-use paths.
- Recommended support facilities and programs that can encourage, enforce, and educate those in the community about walking and biking.
- A short-term action plan for policy changes, programmatic changes, and infrastructure improvements.

FIGURE 6.14 EXISTING BICYCLE AND PEDESTRIAN DEMAND



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.; InfoUSA; Census Bureau

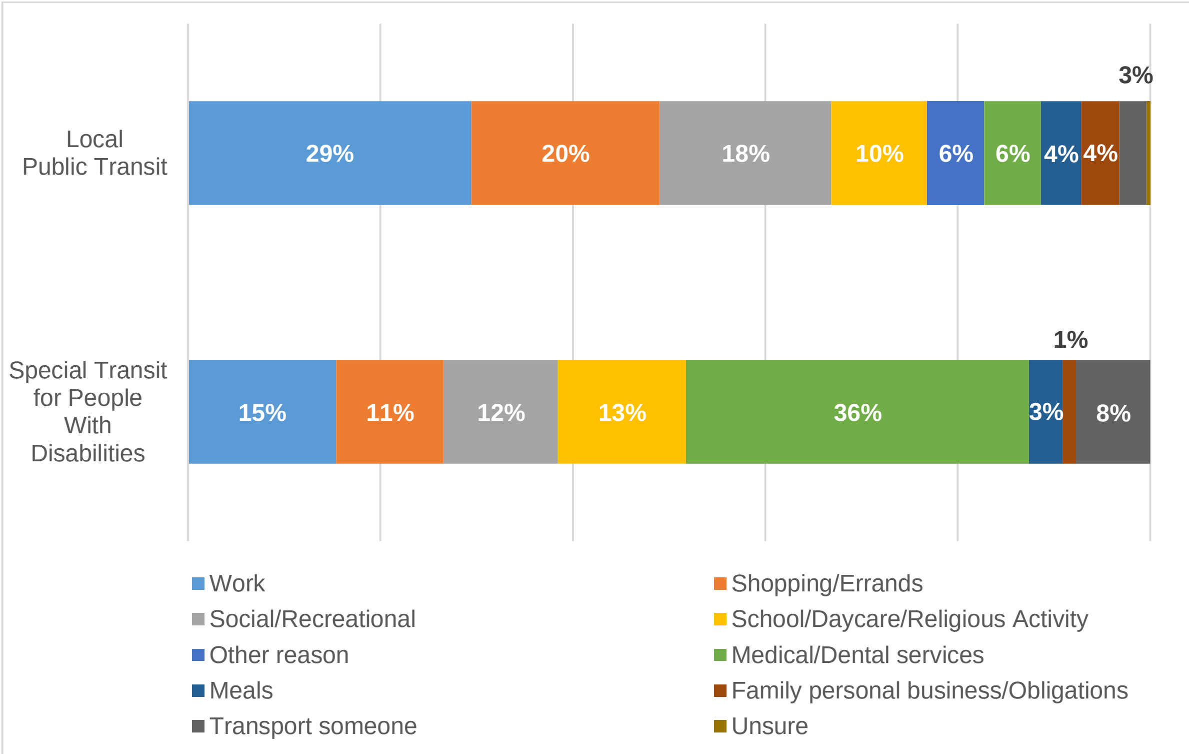
6.3 Public Transit

Public transit provides people with mobility and access to employment, shopping, medical care, and other destinations and opportunities. For those that have no other choice, either because of economic or physical limitations, it is a lifeline service. For others, it reduces the burden of transportation costs and serves a convenient alternative to driving, among other things. Public transit also has significant benefits for the community as a whole as it can increase local business access to skilled workers, reduce congestion and emissions, reduce urban sprawl, and foster walkable communities.

However, in small urbanized areas like Hattiesburg, the 2009 National Household Travel Survey (NHTS) indicates that local public transit trips only account for only 2.3 percent of all trips. According to the survey data, the predominant trip purpose for local public transit in these areas, aside from returning home, is for work-related trips (29 percent), while shopping/errand trips (20 percent) and social/recreational trips (18 percent) also account for a sizable percentage of all local transit trips.

Paratransit service and other demand response services for people with disabilities are also important in small urbanized areas because fixed route transit service may not be easily accessible. As Figure 6.15 shows, 36 percent of all non-home bound trips for this type of transit service are medical-related. Work-related trips are the second most common, but only account for 15 percent of trips.

Figure 6.15 Public Transit Trip Purposes



Note: Local Public Transit includes local public bus, commuter bus, shuttle bus, commuter train, subway/elevated train, street car/trolley, special transit-people w/disabilities, and ferry.

Source: 2009 National Household Travel Survey

Local Public Transit Providers

There are many transit providers in the Hattiesburg MPA. Hub City Transit (HCT), the city of Hattiesburg's transit system, along with a few smaller transit providers support the needs of urban, rural, low-income, disabled, and elderly populations. While there are as many as five (5) agencies utilizing Federal Transit Administration (FTA) funds for service in the MPA, the primary provider of concern in the MPA is HCT.

Hub City Transit

HCT offers fixed route and paratransit services for certified users (disabled or temporary impairment) for trips within the city of Hattiesburg. As the primary provider of public transit in the MPA, HCT services will be the focus of the 2040 MTP.

The HCT system operates four fixed routes Monday through Friday, from 6:00 a.m. to 6:30 p.m., excluding major holidays. Routes operate on a pulse, or hub-and-spoke system, with all buses returning to the Hattiesburg Train Depot at hourly intervals.

For persons with permanent or temporary disabilities, HCT provides a paratransit service which complements its fixed route system. This service is for passengers who have a temporary or permanent impairment that prevents independent use of fixed route services. The service operates at the same times as the fixed route service.

Other Providers

The following agencies utilize FTA funds for transit service in the Hattiesburg MPA oriented to the elderly and disabled or rural community residents: Community Development, Inc.; Pine Belt Mental Healthcare Resources; Southern Mississippi Planning and Development District; and Five County Child Development Program, Inc./Five County Community Transportation Program.

Coordination of Services

Coordination of transportation services is required by the State of Mississippi's policies and goals for administering public transportation services. Stakeholders meet to achieve the following goals:

- More efficient service delivery;
- More cost effective service delivery;
- Increased capacity;
- Easier access; and
- A better quality of life.

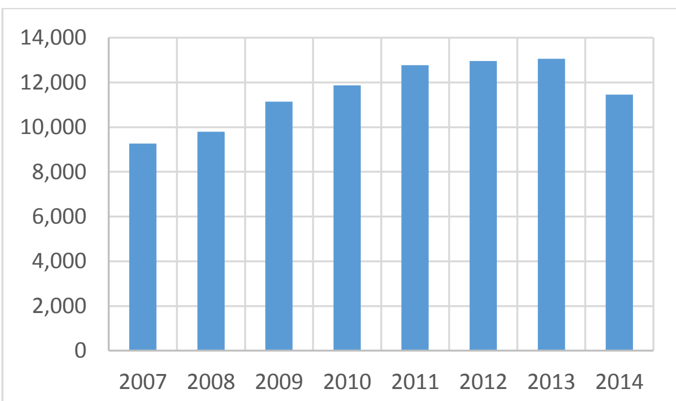
The state is divided into six (6) Regional Coordination Groups tasked with assessing transportation needs, identifying service gaps, and developing alternatives and recommendations to address unmet needs and gaps. The Hattiesburg MPA is part of the Southern Mississippi Transit (SMT) group. TRANS-CON is made up of transit representatives from Jefferson Davis, Covington, Jones, Wayne, Marion, Lamar, Forrest, Perry, Greene, Pearl River, Stone, George, Hancock, Harrison, and Jackson counties.

Intercity Transit

The Hattiesburg MPA is served by two major intercity transit services, Amtrak and Greyhound Lines. Amtrak passenger train service operates out of the Hattiesburg Train Depot while the Greyhound stop is on US 49 near Rawls Springs.

The Hattiesburg Train Depot is only served by one Amtrak route, the Crescent Route between New Orleans and New York, pictured in Figure 6.16. A New York-bound train stops in Hattiesburg at 9:30 a.m. and a New Orleans-bound train stops in Hattiesburg at 4:38 p.m. In 2014, Amtrak ridership at the Hattiesburg Train Depot was 11,448. Since 2007, ridership has increased from just over 9,000, as shown in Figure 6.17.

Figure 6.17 Hattiesburg Amtrak Ridership, 2007-14



Source: National Association of Railroad Passengers, 2013; Amtrak

Figure 6.16 Crescent Amtrak Route

Image Source: Neel-Schaffer, Inc.

Local Fixed Route Service

Operating Characteristic Trends

Table 6.16 shows operating characteristics of HCT's fixed route system from Fiscal Years 2012 and 2013, the only available recent data on the National Transit Database.

This operating information shows that HCT's fixed route service has been stable in terms of the service provided and ridership. Operating costs increased significantly from 2012 to 2013 but without additional information, it is not clear if that was a temporary or long-term trend. The system is not very productive or efficient, though this is likely the result of land use patterns and is typical of fixed route transit service in small urban areas in the South. The system is heavily subsidized, as fares made up only 3-6 percent of operating costs.

Table 6.16 Recent Operating Characteristics for Hub City Transit Fixed Routes

General Performance	2012	2013
Service Area Population	47,230	47,556
Passenger Trips	86,302	91,591
Total Operating Expense	641,349	867,600
Service Supply and Quality		
Vehicles Operated in Maximum Service	4	4
Vehicle Revenue Miles	111,061	175,963
Vehicle Revenue Hours	10,824	10,560
Average Age of Fleet	7.2	5.2
Service Consumption		
Passenger Trips per Capita	1.83	1.93
Passenger Trips per Revenue Mile	0.78	0.52
Passenger Trips per Revenue Hour	7.97	8.67
Efficiency		
Operating Expense per Capita	$13.58	$18.24
Operating Expense per Passenger Trip	$ 7.43	$ 9.47
Operating Expense per Revenue Mile	$ 5.77	$ 4.93
Operating Expense per Revenue Hour	$59.25	$82.16
Farebox Recovery		
Fare Revenue	$38,741	$31,526
Farebox Recovery Ratio	6.04%	3.63%

Note: Service Area is City of Hattiesburg population as of July 1 from Population Estimates Program

Source: National Transit Database

Route Information

Figure 6.18 shows the HCT fixed routes, which are limited to the City of Hattiesburg. All of these routes operate with headways of one hour and pulse at the Hattiesburg Train Depot, making transfers between routes convenient. A 2012 ridership survey shows that daily ridership ranges from around 25 to 125 boardings, depending on the route. This information is shown in Table 6.17.

Table 6.17 Hub City Transit Route Ridership

Route	2012 Daily Ridership Survey
Route 1 – Hardy Street	127
Route 2 – Dabbs & Cloverleaf	102
Route 3 – Mobile & Broadway	99
Route 4 – Palmers Crossing	23

Source: City of Hattiesburg

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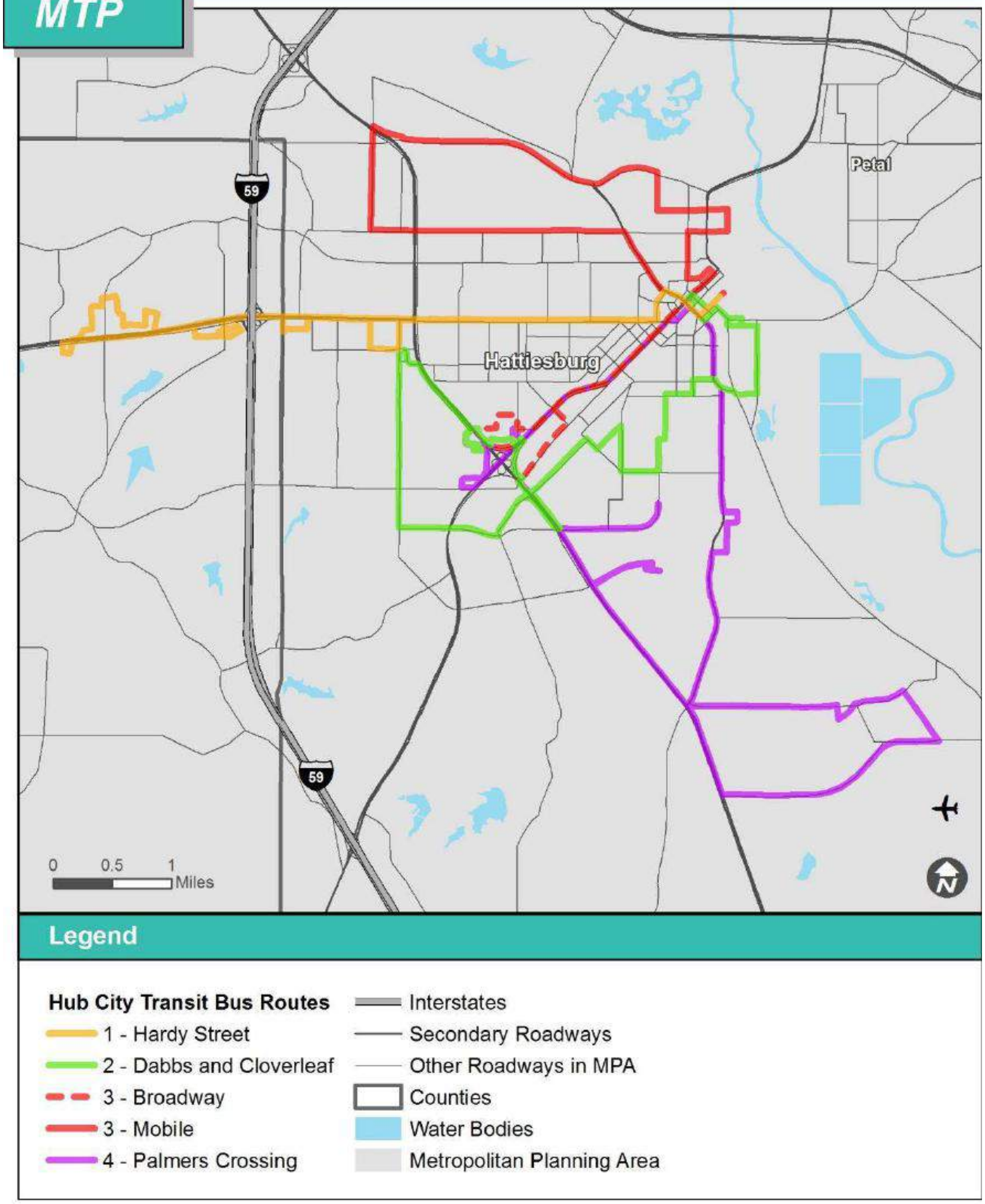
FIGURE 6.18 HUB CITY TRANSIT ROUTES, 2015



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

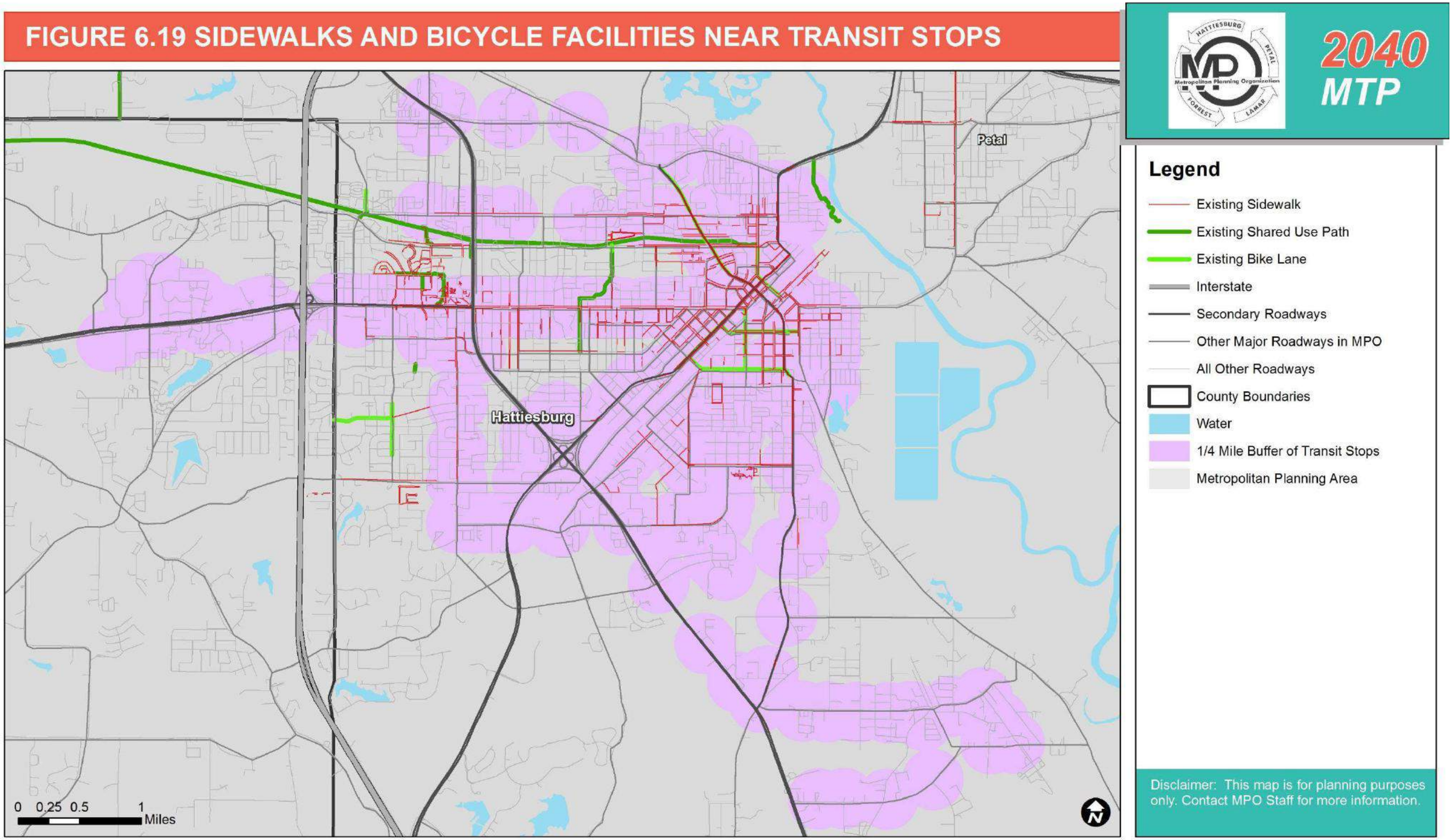
Data Sources: City of Hattiesburg

Hub City Bus Stop Accommodations and Accessibility

Although information on the number of ADA compliant landing pads and surrounding ADA compliant ramps was not available, an inventory of sidewalks in the MPO was obtained from the City of Hattiesburg. Figure 6.19 shows these sidewalks in relation to quarter mile buffers of existing stop locations. Because sidewalk coverage is poor in many parts of the Hattiesburg MPA, many of the areas around transit stops also have poor sidewalk coverage. The only area with a relatively complete sidewalk is the area around the Hattiesburg CBD.

Connectivity between public transit and bicycle facilities are also important since bicycling may extend the reach of transit. This is why it is important to have bicycle racks on buses and to have bicycle racks at stops where demand is anticipated. Existing bicycle facilities are also shown in Figure 6.19.

FIGURE 6.19 SIDEWALKS AND BICYCLE FACILITIES NEAR TRANSIT STOPS



Map Source: Neel-Schaffer, Inc.

Data Sources: City of Hattiesburg

Service Area Demographics

To gain a better understanding of the users of the HCT system a comparison was made between the demographic characteristics of the Hattiesburg MPA and the service area of HCT. Table 6.18 provides a comparison of key demographic attributes.

This information shows that HCT providers better coverage to minority areas than the MPA population as a whole. It also shows that the transit systems provides better coverage to employment than to residential areas. Both of these characteristics are typical of transit systems.

Table 6.18 Service Area Characteristics Comparison

Characteristic	Metropolitan Planning Area	Quarter Mile of HCT Stops	HCT Percentage of MPA Total
Total Households	41,263	10,642	25.8%
Total Population	106,413	27,090	25.5%
Minority	41,182	18,749	45.5%
Total Employment	69,505	39,682	57.1%

Source: 2010 Census; InfoUSA

Local Transit Paratransit Service

HCT provides complementary paratransit service Monday through Friday from 6:00 a.m. to 6:30 p.m., for qualified individuals with mobility impairments who are unable to use the fixed route service. The paratransit service is a demand-response, advance reservation, address-to-address and curb to curb service. Eligible passengers are not required to live within Hattiesburg City limits of service area. Wheelchair accessible vehicles are available to assist in transporting persons with disabilities.

Transit Vehicle and Facility Conditions

Vehicle Conditions

HCT currently has nine fixed route, diesel-fueled buses and four diesel-fueled paratransit vehicles. HCT also utilizes two gasoline-fueled support/service vehicles. All vehicles are currently ADA accessible.

As shown in Table 6.19, half of the fixed route buses have at least four years of useful life and the other half have eight years. Given that all of the buses were ranked in good condition, through preventative maintenance these vehicles should last long past their useful lives.

The paratransit vehicle conditions shown in Table 6.20 show that most of the vehicles had low mileage in 2013.

Table 6.19 Existing Bus Conditions, 2013

Length	29’	29’	27’	25’	25’
Capacity	45	35	27	32	22
Vehicles	2	1	1	2	3
Average Lifetime Miles	207,797	9,438	31,228	124,586	114,250

Source: National Transit Database

Table 6.20 Existing Paratransit Vehicle Conditions, 2013

Length	25’	25’
Capacity	17	16
Vehicles	1	3
Average Lifetime Miles	96,925	17,425

Source: National Transit Database

Facility Conditions

The Hattiesburg Train Depot serves as the bus transfer facility for HCT in addition to being served by Amtrak. Initial renovations to this facility were completed in 2007 to better accommodate transportation uses and to restore its historic character. The facility remains in good condition and is heavily used by passengers and transit vehicles.

Regional Transit Demand Analysis

In order to assess the existing and future demand for transit services in the Hattiesburg MPA, a series of analyses are conducted. First, a Transit Supportive Index is developed in order to quantify existing transit demand throughout the region. Then, existing concentrations of transit-dependent populations and future growth areas are identified. Finally, after evaluating all of this information, a set of long-term regional transit corridors is recommended along which future transit service should be encouraged.

Transit Supportive Index

The regional demand analysis uses a GIS-based approach to identify areas of transit demand throughout the Hattiesburg MPA. There are a number of factors that can be analyzed to evaluate and predict transit demand in an area. Given the availability of data and regional scope of the 2040 MTP, a Transit Supportive Index was developed for the Hattiesburg MPA that includes the following factors.

Household density – A higher concentration of population in an area creates more potential transit riders in an area. This is especially true of very dense areas, where other factors, such as parking availability or congestion, may influence demand.

Employment density – A higher concentration of employment in an area creates more potential transit riders in an area. This is especially true of very dense areas, where other factors, such as parking availability or congestion, may influence demand. Some studies argue that employment density is more important for predicting ridership than residential densities.

Activity density – In areas with both residential areas and employment, it is appropriate to consider a combined density.

Low-income household density – Low-income persons are more likely to ride transit due to a greater likelihood that they do not have regular access to a vehicle or seek to minimize travel by automobile for economic reasons.

Low-income employment density – Low-income persons are more likely to ride transit due to a greater likelihood that they do not have regular access to a vehicle or seek to minimize travel by automobile for economic reasons.

Density of adults without a vehicle – Persons without access to a vehicle are more likely to ride transit due to a lack of other options. A person may lack a vehicle because of economic reasons, physical or mental ability, or because of a decision to live a car-free lifestyle.

Street connectivity – A well connected street network, assuming sufficient pedestrian infrastructure is provided, enables pedestrians to directly and conveniently access a transit stop or their destination. All things being equal, an area with better connectivity is more likely to attract a higher number of transit riders than an area with poor connectivity. Furthermore, connectivity increases the likelihood that a transit route will be able to serve an area in an efficient manner, with minimal deviations.

It is important to note that the index is a relative measure of transit demand. It does not estimate an actual number of transit trips generated. Instead, it is intended as a tool to identify corridors and nodes in the region with the highest transit demand.

Table 6.21 shows the Transit Supportive Index criteria and measurements. For each density criterion, an area's value is calculated. Before being assigned a score, all criteria values are multiplied by an area's street connectivity factor. Based on these adjusted values, areas are then assigned a Transit Supportive Index score of one through five, with five being the most transit supportive. Thresholds separating the index scores are based on existing literature and are tailored to the Hattiesburg MPA in order to give a sufficient distribution of scores.

Figure 6.20 illustrates the distribution of transit demand throughout the region using the Transit Supportive Index.

Table 6.21 Transit Supportive Index Criteria

Criteria	Measurement	Index Score				
		1	2	3	4	5
Residential Density	Households per acre	0 to 1	1 to 2	2 to 4	4 to 7	7+
Employment Density	Employment per acre	0 to 5	5 to 10	10 to 25	25 to 50	50+
Low-Income Residential Density	Households using food stamps per acre	0 to 0.33	0.33 to 0.66	0.66 to 1.33	1.33 to 2.33	2.33+
Low-Income Employment Density	Employment per acre for predominantly low-income industries	0 to 2.5	2.5 to 5	5 to 12.5	12.5 to 25	25+
Residential Vehicle Availability	Adults without vehicle per acre	0 to 0.25	0.25 to 0.5	0.5 to 1	1 to 1.75	1.75+
Activity Density	Sum of highest residential and employment density value	0 to 3.75	3.75 to 7.5	7.5 to 18.75	18.75 to 37.5	37.5+
Street Connectivity	Percentage of intersections that are four-way	33%-50%, multiply values by 1.25; >50%, multiply values by 1.5				

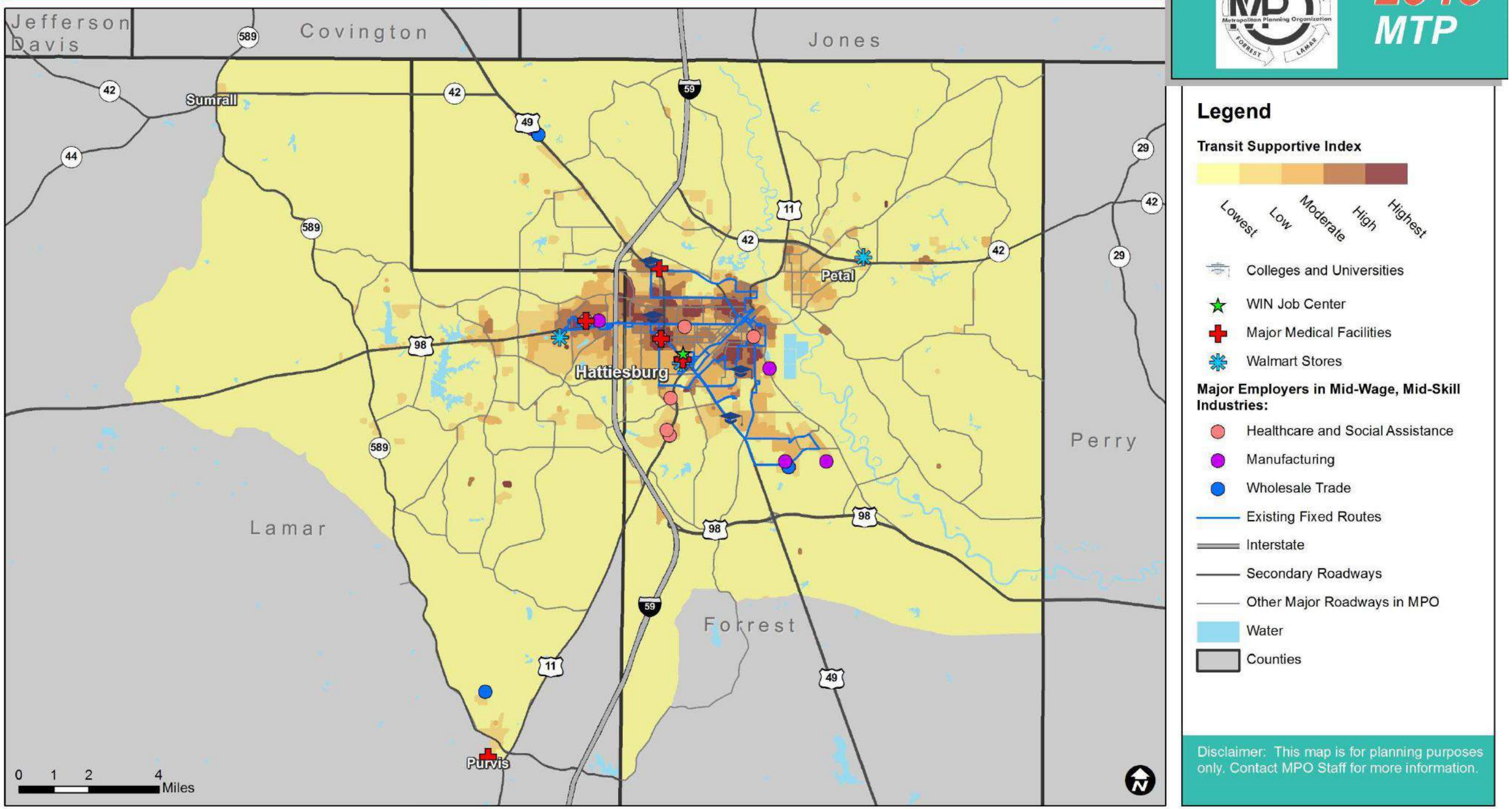
Based upon Figure 6.20 there are several areas of moderate to high demand within the Hattiesburg MPA that are not currently served byHCT. Still, most of the high demand areas currently have good coverage, even if service is infrequent or indirect.

The areas of highest demand are near the major hospitals, USM, a corridor along 4th Street from USM to the Hattiesburg CBD, and the area from the Hattiesburg CBD to William Carey University. These areas have the greatest potential to support higher frequency transit and Transit-Oriented Development that minimizes the need for a personal automobile. Furthermore, they are already the home or workplace of many transit-dependent people.

Major destinations were not given unique consideration in the analysis for the Transit Supportive Index. However, as shown in Figure 6.20, the index did a good job of capturing most major destinations, including WIN job centers (workforce development centers), major hospitals, major institutions of higher learning, and Walmart stores.

Figure 6.20 also shows the location of major employers in industries which represent “ladders of opportunity” for low-income workers in the MPA, industries including healthcare and social assistance, manufacturing, and wholesale trade. Many of the major employers in these mid-wage, mid-skill industries are currently covered by HCT routes

FIGURE 6.20 REGIONAL TRANSIT DEMAND ANALYSIS



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.; InfoUSA; Census Bureau

Transit-Dependent Populations

In order to ensure that the needs of the transit-dependent population are being addressed by the transit demand analysis, the concentration of various transit-dependent populations were mapped. This mapping exercise also illustrates areas that may not be adequately served by existing HCT sit routes.

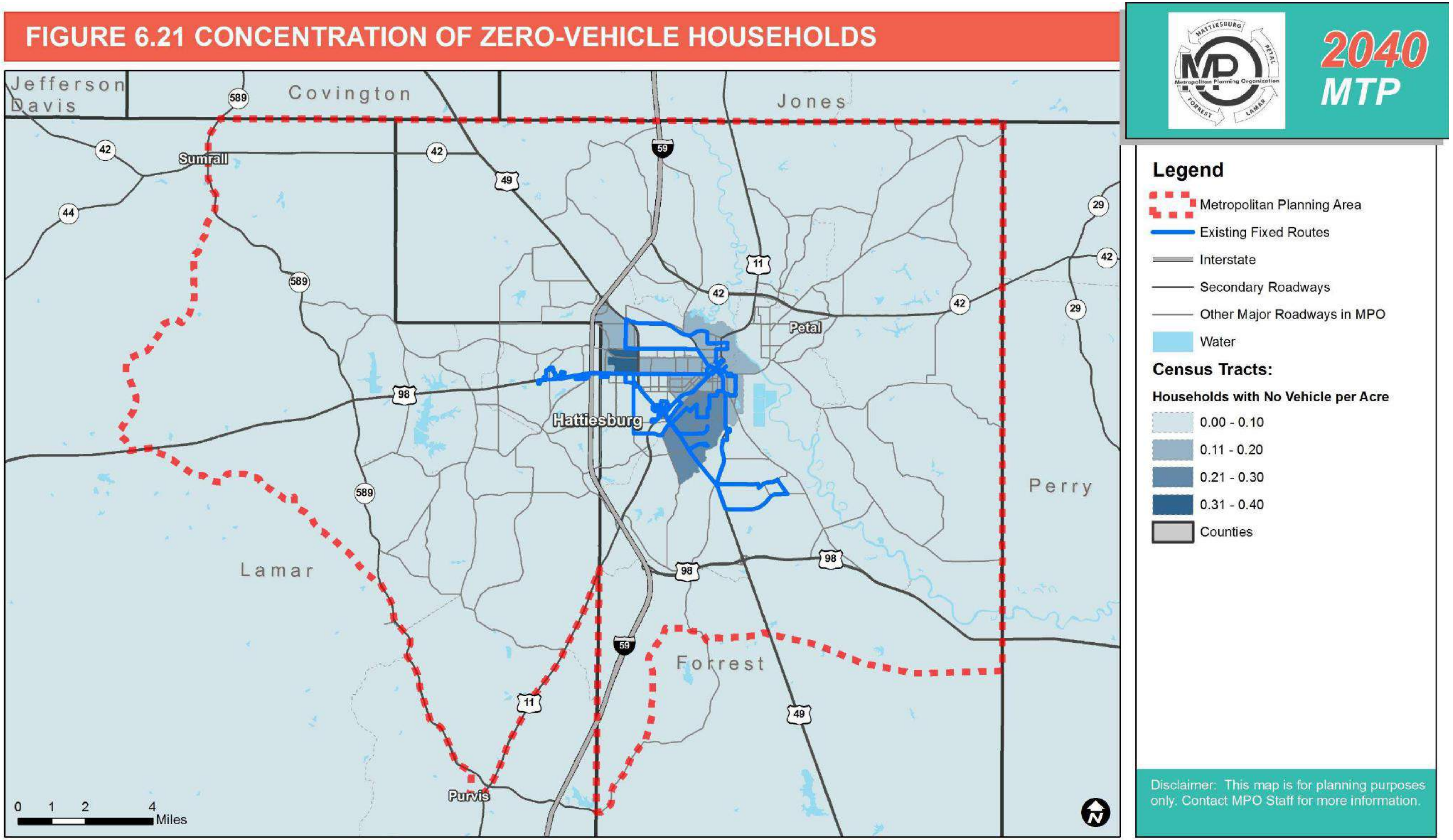
Figure 6.21 illustrates the concentration of households without regular access to a vehicle. The highest concentration is near USM, where about 25 percent of households do not have access to a vehicle. The area from the Hattiesburg CBD to William Carey University also has a high concentration of households without regular access to a vehicle. HCT currently provides good coverage to these areas.

Figure 6.22 depicts the concentration of low-income households. These households may have access to a car but due to economic reasons are more-likely to rely on transit. The distribution of high density clusters of low-income households is similar to that of households without access to a vehicle. Again, HCT currently covers most of these areas.

Figure 6.23 shows the concentration of persons with disabilities. These households rely on transit simply because of physical or mental limitations. The distribution of concentrations of disabled persons is more widespread than the previous two transit-dependent populations. The two highest concentrations are in areas from the Hattiesburg CBD to William Carey University and from the CBD to USM.

Figure 6.24 shows the concentration of persons aged 65 or older. Similar to disabled persons, this population is more likely to rely on transit because of physical or mental limitations. The highest concentrations of elderly persons are in an area from Midtown to Lincoln Road and an area immediately southeast of the Hattiesburg CBD.

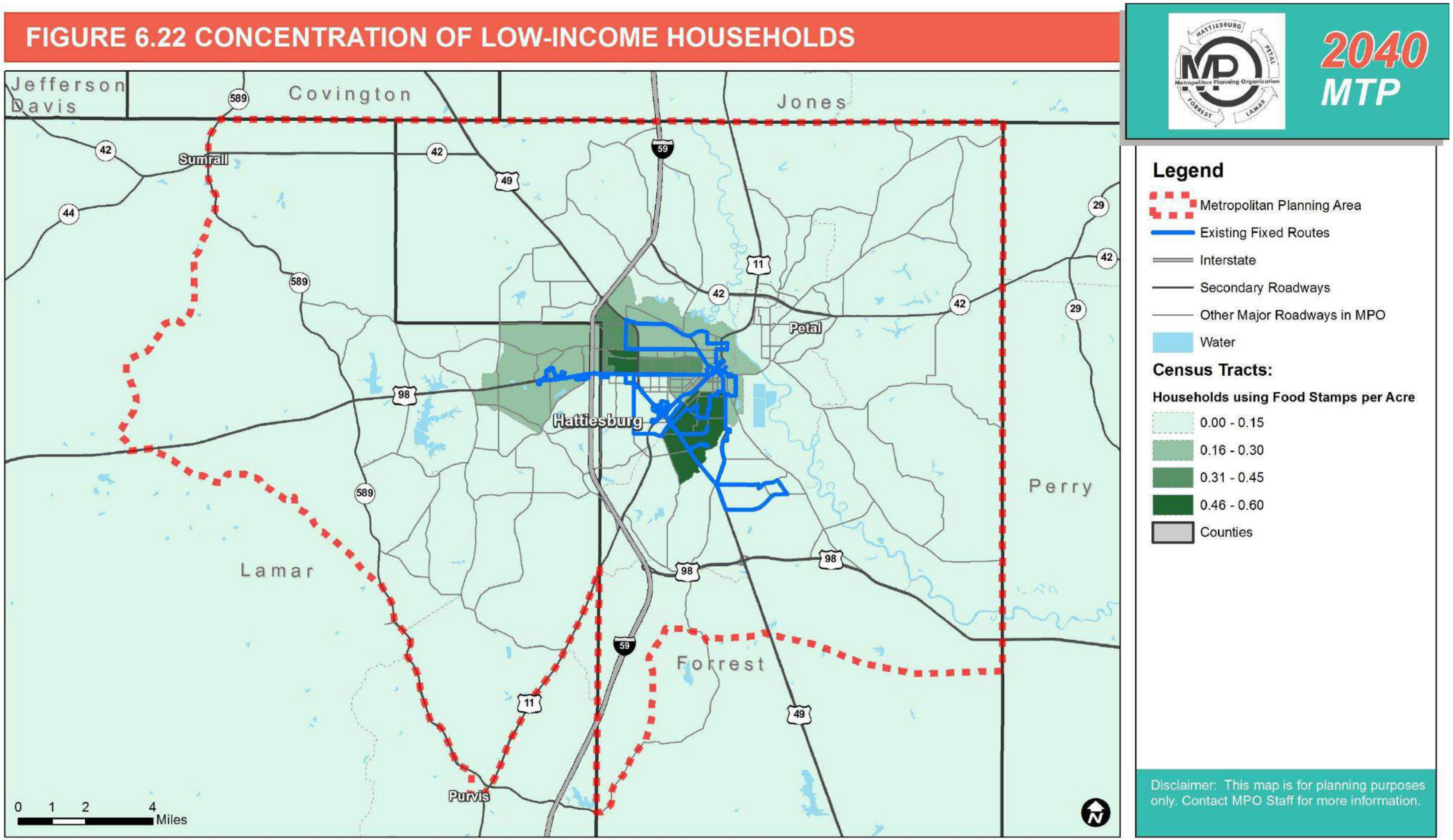
FIGURE 6.21 CONCENTRATION OF ZERO-VEHICLE HOUSEHOLDS



Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

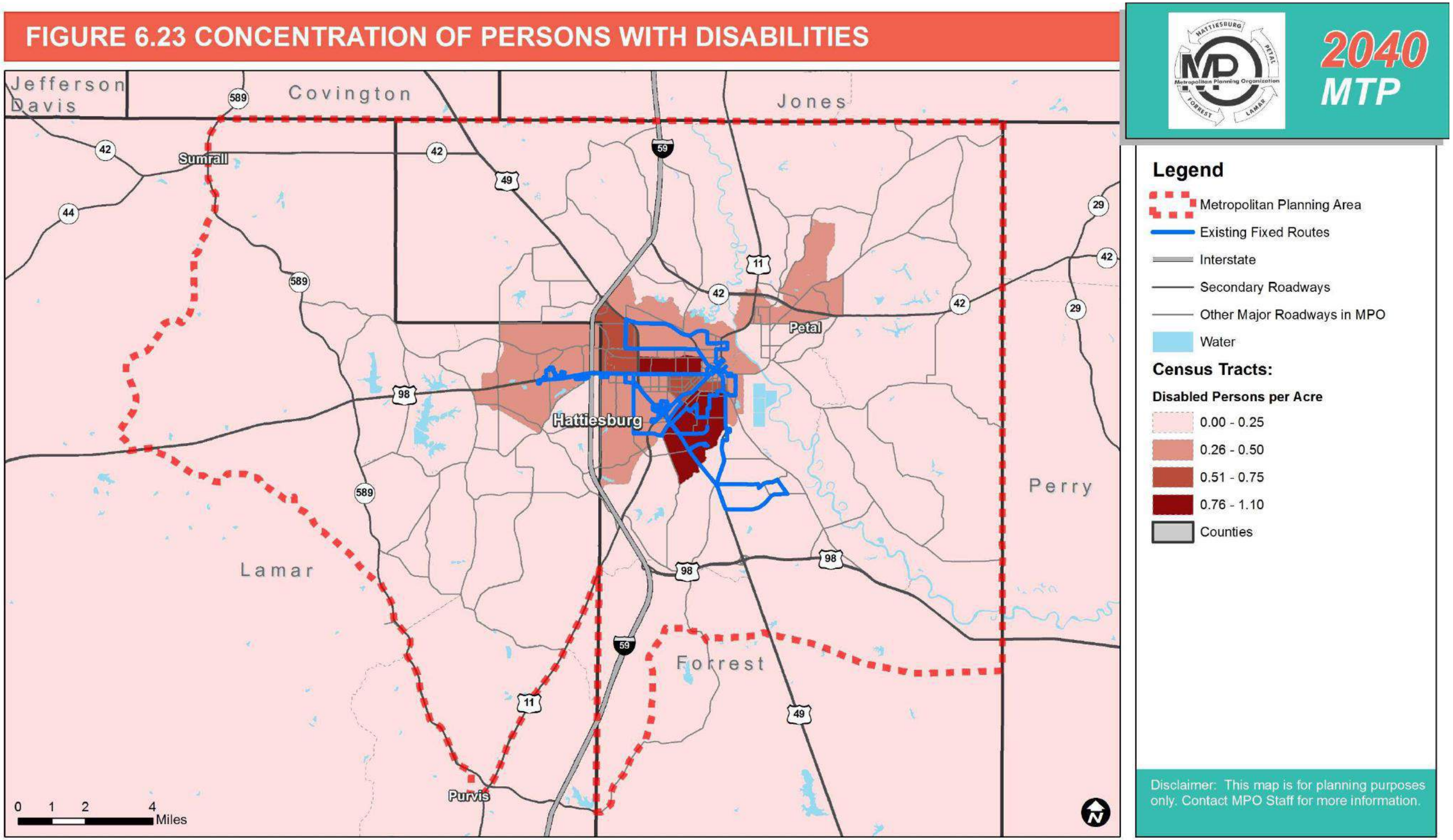
FIGURE 6.22 CONCENTRATION OF LOW-INCOME HOUSEHOLDS



Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

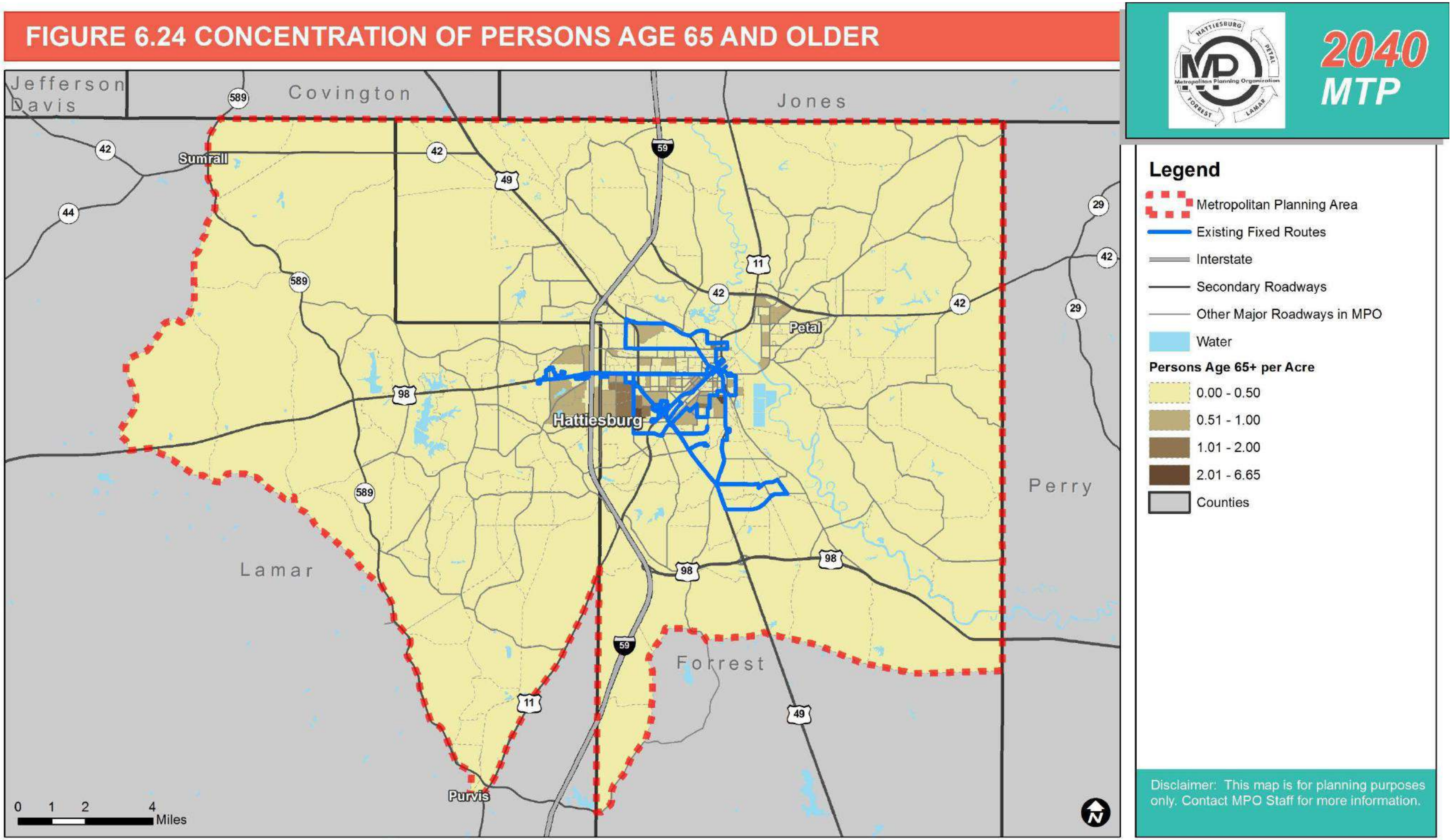
FIGURE 6.23 CONCENTRATION OF PERSONS WITH DISABILITIES



Map Source: Neel-Schaffer, Inc.

Data Sources: 2009-2013 ACS

FIGURE 6.24 CONCENTRATION OF PERSONS AGE 65 AND OLDER



Map Source: Neel-Schaffer, Inc.

Data Sources: 2010 Census

Peer Comparison

A peer comparison analysis is a benchmarking tool that allows an area to compare itself to areas with similar conditions. Ideally, the peer group has elements in common with the transit system studied such as population of area served, geographical location (state or region), and type of services offered.

Because the 2040 MTP is regional and long-term in nature, the criteria to select peer systems are somewhat different from the typical criteria used by transit agencies in short-range transit development plans. For the MTP, the focus is on the entire Hattiesburg, MS urbanized area versus the service area of a particular agency.

Selection Criteria

Selection criteria utilized intended to highlight urban areas that are very similar to the Hattiesburg, MS urbanized area in terms of urban structure, land use patterns, and demographics. These three factors, outside of the type and level of transit service provided, are the primary drivers of transit demand and barriers. By selecting peer areas similar to Hattiesburg in these regards, we can highlight areas that are operating under similar constraints yet producing different results. This is a beginning step that may involve further exploring transit service in other areas and learning from their decisions.

The selection criteria include: location in the south; urbanized area size; urbanized area population density; urbanized area's share of MSA population; similar college/university influence; similar low-income population; similar influence of military and retirement communities; and comparable transit service.

Table 6.22 shows the demographics and urban sprawl index of the five selected peer areas using these criteria. The selection criteria and methodology are further outlined below.

In South Region of United States

Areas outside of the Census Bureau's South Region were removed. This was done because state and local transit funding is lower in this region and the public perception of transit is much lower. This left 194 UZAs.

Urbanized Area Size

That UZA must have a 2010 population within 75 percent of the Hattiesburg UZA (80,358). This corresponds to a range from 50,000 to 140,627 and reduces the number of potential peers to 94 UZAs.

Urbanized Area Population Density

For the remaining UZAs, those whose population density exceeded 25 percent of Hattiesburg's population density (1,142 persons per square mile [ppsm]) were excluded. This corresponds to a range from 857 to 1,428 ppsm and reduces the number of potential peers to 52 UZAs.

UZA's Share of MSA Population

UZAs that have a substantial portion of their overall area that is part of an MSA with another UZA or is contiguous with another UZA are excluded. This is done so that, like Hattiesburg, selected peer UZAs are not part of a larger region with a high level of commuting between multiple urbanized areas. In these more polycentric regions, there would likely be a higher demand for transit because of a bigger region. This reduced the remaining number of potential peers to 33 UZAs.

Similar College/University Influence

UZAs must be within 50 percent of Hattiesburg's percentage of the population18 and over enrolled in college or graduate school (19.7 percent). This corresponds to a range from 9.9 percent to 29.6 percent. This reduced the remaining number of potential peers to 14 UZAs.

Similar Low-income Population

UZAs must be within 25 percent, or 6.8 percentage points, of percentage of households receiving food stamps. This corresponds to a range from 14.7 percent to 24.5 percent. This reduced the remaining number of potential peers to 11 UZAs.

Similar influence of Military and Retirement Communities

UZAs must be within 25 percent of Hattiesburg's percentage of population that is retired, removing all above 18.4 percent. This reduced the remaining number of potential peers to 8 UZAs.

Any area with a sizable percentage of workforce in military removed. This reduced the remaining number of potential peers to 7 UZAs.

Comparable Transit Service

Of the 7 remaining UZAs, only 5 areas had what would be considered a small urban, fixed-route system supplemented by paratransit. Other areas were better categorized as a demand response system, which would not lend to comparability to a fixed route system.

Table 6.22 Characteristics of Selected Peer Urbanized Areas

Urbanized Area (UZA)	Population (2010)	Population Density (ppsm)	Percent of Population 18 and over in College	Percent of Households Using Food Stamps	Percent of Population Retired
Cleveland, TN	66,777	1,223	11.4%	20.8%	17.7%
Jackson, TN	71,880	1,406	13.5%	20.6%	16.8%
Jonesboro, AR	65,419	1,394	14.6%	17.5%	14.7%
Monroe, LA	116,533	1,422	9.9%	18.8%	14.1%
Rome, GA	60,851	1,277	11.3%	20.0%	16.3%
Average of Selected Peers	76,292	1,344	12.1%	19.5%	15.9%
Hattiesburg, MS	80,358	1,165	19.7%	19.6%	14.7%

Source: Census Bureau, 2010 Census and 2009-2013 American Community Survey

Peer Comparison

Table 6.23 on the following page provides service area information and operational characteristics for the primary fixed route transit systems operating in the selected peer urban areas. This information is broken down into transit system characteristics; service supplied and consumed, operating efficiency, and fare revenue. The follow trends can be gleaned from this information:

- Demographics and Land Use
    - HCT serves the lowest density service area of all the peer UZA systems. This could make it more difficult for Hattiesburg to achieve higher efficiencies when compared to its peers. However, without route information from other agencies, it is not possible to know a more accurate measure of service area density: the density of all areas within a quarter mile of all bus stops.
- Transit System Size
    - HCT operates a lower number of vehicles than most of the peer areas but is similar to systems in Cleveland, TN (CUATS) and Jonesboro, AR (JET).

- Service Supplied and Consumed
  - HCT is on par with CUATS and JET in terms of service provided. However, Jackson, TN (JTA); Monroe, LA (Monroe Transit); and Rome, GA (RTD) all provide significantly higher levels of service.
  - Similarly, after accounting for the differences in level of service supplied, it becomes clear that HCT, CUATS, and JET are unproductive when compared to JTA, Monroe Transit, and RTD.
- Cost Efficiency
  - Despite being similar in productivity to CUATS and JET, HCT is much less cost efficient to operate. In fact, it is at or near the bottom in all three cost efficiency measures.
- Fare Revenue
  - HCT's low average fare could explain its low cost efficiency when compared to CUATS and JET, which provide similar levels of service and are similarly productive.
  - HCT has the lowest average fare and the lowest farebox recovery ratio, the percentage of operating costs covered by fare revenues.

This peer comparison suggests that HCT is providing a lower level of service than many of its peers. Also, likely because of its lower fares, HCT is slightly more productive than CUATS and JET, which provide similarly low levels of service. However, its lower fares also likely explain why HCT is less cost-efficient than either of these two systems.

Table 6.23 Operating Characteristics for Fixed Route Services in Peer Urbanized Areas

Transit System Characteristics	Cleveland, Tennessee	Jackson, Tennessee	Jonesboro, Arkansas	Monroe, Louisiana	Rome, Georgia	Peer Average	Hattiesburg, Mississippi
Fixed Route Systems	CUATS	JTA	JET	Monroe Transit	RTD	n/a	HCT
Service Area Population	66,333	67,685	51,804	50,000	36,159	54,396	47,556
Service Area Square Miles	24	59	39	31	32	37	54
Service Area Population Density (ppsm)	2,764	1,155	1,328	1,613	1,130	1,598	876
Vehicles Operated in Maximum Services	5	9	3	15	27	12	4
Service Supplied and Consumed							
Annual Vehicle Revenue Miles	211,320	568,940	192,780	776,328	454,104	440,694	175,963
Annual Vehicle Revenue Hours	19,936	39,570	10,710	55,467	29,425	31,022	10,560
Annual Unlinked Trips	92,872	600,624	58,206	1,265,378	1,054,484	614,313	91,591
Passenger Trips per Capita	1.4	8.9	1.1	25.3	29.2	11.3	1.9
Passenger Trips per Revenue Mile	0.4	1.1	0.3	1.6	2.3	1.4	0.5
Passenger Trips per Revenue Hour	4.7	15.2	5.4	22.8	35.8	19.8	8.7
Cost Efficiency							
Operating Expense per Vehicle Revenue Mile	$3.42	$4.24	$3.00	$5.57	$5.10	$4.70	$4.93
Operating Expense per Vehicle Revenue Hour	$36.29	$60.95	$54.00	$78.01	$78.78	$66.79	$82.16
Operating Expense per Passenger Trip	$7.79	$4.02	$9.94	$3.42	$2.20	$3.37	$9.47
Fare Revenue							
Average Fare	$0.41	$0.66	$0.73	$0.68	$0.49	$0.60	$0.34
Farebox Recovery Rate	5.2%	16.4%	7.3%	19.8%	22.5%	17.9%	3.6%

Source: National Transit Database, 2013 Reporting Information for “Municipal Bus” service.

6.4 Freight

Freight Movement

Movement by Weight and Value for Trucks and Rail

The Hattiesburg MPA is one of the lowest freight generating urban areas in Mississippi, both in terms of weight and value of commodities transported. Using data obtained from Transearch/IHS Freight Finder, general trends in freight movement can be observed.

In 2011, Forrest County was the 18th highest truck freight-generating county in Mississippi, but still trailed counties from other metropolitan areas as well as several non-metropolitan counties. Lamar County was even lower, at 32nd. In terms of value though, Forrest County fared a little better, ranking 13th and Lamar County ranked 37th.

This information suggests that Forrest County is generating relatively high-value freight while Lamar is generating relatively low-value freight.

Table 6.24 shows that in 2011, truck freight originating or destined for Forrest and Lamar counties accounted for less than three percent of either truck freight volume by weight or value in Mississippi. For rail, the two counties accounted for eight percent of all rail freight volume by weight in Mississippi and four percent of all rail freight value.

Table 6.24 Inbound and Outbound Freight Movement by Weight and Value in MPA Counties, 2011

	Truck		Rail	
	Tons	Value	Tons	Value
Forrest County, MS	2,072,118	$2,153,484,948	1,033,168	$713,690,333
Lamar County, MS	1,123,982	$712,026,545	905,644	$156,191,215
MPA Counties	3,196,100	$2,865,511,492	1,938,812	$869,881,549
Mississippi	115,368,000	$116,161,879,000	24,986,000	$23,909,792,000

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Still, it should be noted that the information above does not include through traffic, which is the majority of freight transported in Mississippi, as indicated in Table 6.25. Nearly 60 percent of all truck freight volume by weight is through traffic in Mississippi, while nearly 80 percent of all rail freight volume by weight is through traffic.

Table 6.25 Freight Movement in Mississippi by Direction by Weight, 2011

	Inbound	Outbound	Intrastate	Through	Total
Truck	45,579,000	37,366,000	32,423,000	154,033,000	269,401,000
Rail	14,804,000	8,734,000	1,448,000	93,389,000	118,375,000

Source: Transearch/IHS Freight Finder

Table 6.26 Inbound and Outbound Freight Truck Movement in MPA by Direction by Weight, 2011

	From Outside Mississippi	To Outside Mississippi	From Other Mississippi County	To Other Mississippi County	Within County	Total
Forrest County, MS	634,554	534,500	253,264	646,331	3,469	2,072,118
Lamar County, MS	268,967	364,654	179,053	308,368	2,940	1,123,982
MPA Counties	903,521	899,154	432,317	954,699	6,409	3,196,100

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Movement for Other Modes

While data on truck and rail freight is available from the Transearch/IHS data, other modes were not available for the MPA counties. Furthermore, because of the MPA's size and relatively low freight volumes, the FHWA's Freight Analysis Framework (FAF) commodity flow data is not available for any geography relevant to the MPA. However, we can glean some information from the state of Mississippi's data.

Table 6.27 shows that, in Mississippi, truck and rail modes account for about 94 percent of all ton-miles of freight in the state. Since there are no water ports in the MPA, it can be assumed that the truck and rail modes account for the overwhelming majority of ton-miles in the MPA as well. A key difference between the two modes of freight movement is that rail tends to travel much greater distances, nearly 750 miles compared to about 275 miles for trucks.

Table 6.27 Means of Transporting Freight Originating in Mississippi, 2012

	Ton-miles (millions)		Average miles per shipment	
	Number	Percent change from 2007	Number	Percent change from 2007
All Modes	24,662	-28.4%	420	-40.7%
Truck	16,443	-8.6%	278	16.5%
Rail	6,646	-8.3%	726	-19.3%
Inland Water	1,451	-60.3%	S	S
Parcel, U.S.P.S. or Courier	109	-46.1%	625	-45.9%
Air	S	S	885	-11.0%
Pipeline	S	S	S	S
Deep Sea	S	S	S	S
Great Lakes	S	S	S	S
Other Modes	13	-100%	0	-100%

Note: "S" = Withheld because estimate did not meet publication standards.

Source: U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Census Bureau, 2012 Commodity Flow Survey.

Freight Origins and Destinations

Given that approximately 80 percent of all rail volume by weight in Mississippi is through traffic, no origin or destination data was analyzed for rail freight beyond the state level. These state level trends can be found in MDOT's Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN). Major trading partners by rail are widely distributed across North America.

For truck traffic, origin and destination data is more relevant as less than 60 percent of freight truck traffic is through traffic.

Intra-Metropolitan Trucking Origins and Destinations

Less than one percent of all inbound freight volume by weight transported by trucks in the MPA counties actually originates in the MPA counties. Similarly, less than one percent of all outbound freight volume by weight transported by trucks in the MPA counties is destined for the MPA counties.

This information suggests that the MPA is very dependent on outside freight to meet its need for goods and commodities and that the freight that does originate in the MPA is overwhelmingly not locally-serving. Simply put, most inbound freight comes from outside of the MPA and most outbound freight is destined for an area outside of the MPA.

Major Outside Truck Trading Partners

The overwhelming majority of all inbound (99 percent) and all outbound (99 percent) freight volume by weight transported by trucks in the MPA originates or is destined for an area outside of the MPA.

Table 6.28 shows the top ten outside trading partners by weight. These trading partners accounted for about 55 percent of all freight volume by weight transported by trucks in 2011. Most of the major trading partners are relatively close and located in or near major metropolitan areas. Note that trading partners within Mississippi are provided as counties and outside of Mississippi they are provided as Bureau of Economic Analysis (BEA) regions, which are larger than a Metropolitan Statistical Area (MSA).

Table 6.28 Major Outside Truck Trading Partners Ranked by Total Tons, 2011

Rank	Trading Partner	Inbound		Outbound		Total	
		Tons	Share of All Tons	Tons	Share of All Tons	Tons	Share of All Tons
1	Louisiana Portion of New Orleans BEA	178,464	9.6%	338,750	25.3%	517,214	16.2%
2	Marion County, MS	323,874	17.4%	5,768	0.4%	329,641	10.3%
3	Mobile, AL BEA	102,694	5.5%	116,958	8.7%	219,652	6.9%
4	Hinds County, MS	115,731	6.2%	23,877	1.8%	139,608	4.4%
5	Louisiana Portion of Baton Rouge BEA	68,753	3.7%	63,535	4.7%	132,288	4.1%
6	Jones County, MS	8,025	0.4%	114,144	8.5%	122,169	3.8%
7	Walthall County, MS	109,543	5.9%	2,548	0.2%	112,091	3.5%
8	Jackson County, MS	67,206	3.6%	16,532	1.2%	83,738	2.6%
9	Birmingham, AL BEA	35,855	1.9%	22,655	1.7%	58,510	1.8%
10	Houston, TX BEA	15,165	0.8%	35,480	2.7%	50,644	1.6%

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Trucking Network and Facilities

Network

The MPA has no active intermodal terminal facilities, roadways designated as intermodal connectors, or roadways designated as part of the draft National Primary Freight Network (NPFN). However, there are several major roadways designated as Tier I and Tier II corridors in the Mississippi Freight Network (MFN), including:

1. Interstate 59 is part of the Tier I Picayune-Hattiesburg-Meridian Corridor;
2. US 49 is part of the Tier I Jackson-Hattiesburg-Gulfport Corridor; and
3. US 98 is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.

In addition to the above roadways, MS 589 from US 98 to I-59 is listed as a key connector for the Tier II US 98 corridor in the MFN. All of these elements of the freight network are illustrated in Figure 6.25.

Facilities

There are no active intermodal terminal facilities listed by the Bureau of Transportation Statistics in the MPA. The Miller Transporters, Inc. Rail/Truck intermodal facility in northern Hattiesburg is listed but is currently inactive.

Beyond intermodal terminal facilities, there are many trucking establishments within the MPA. These establishments provide both local and long distance trucking services. Figure 6.25 shows the location of the major trucking establishments within the MPA.

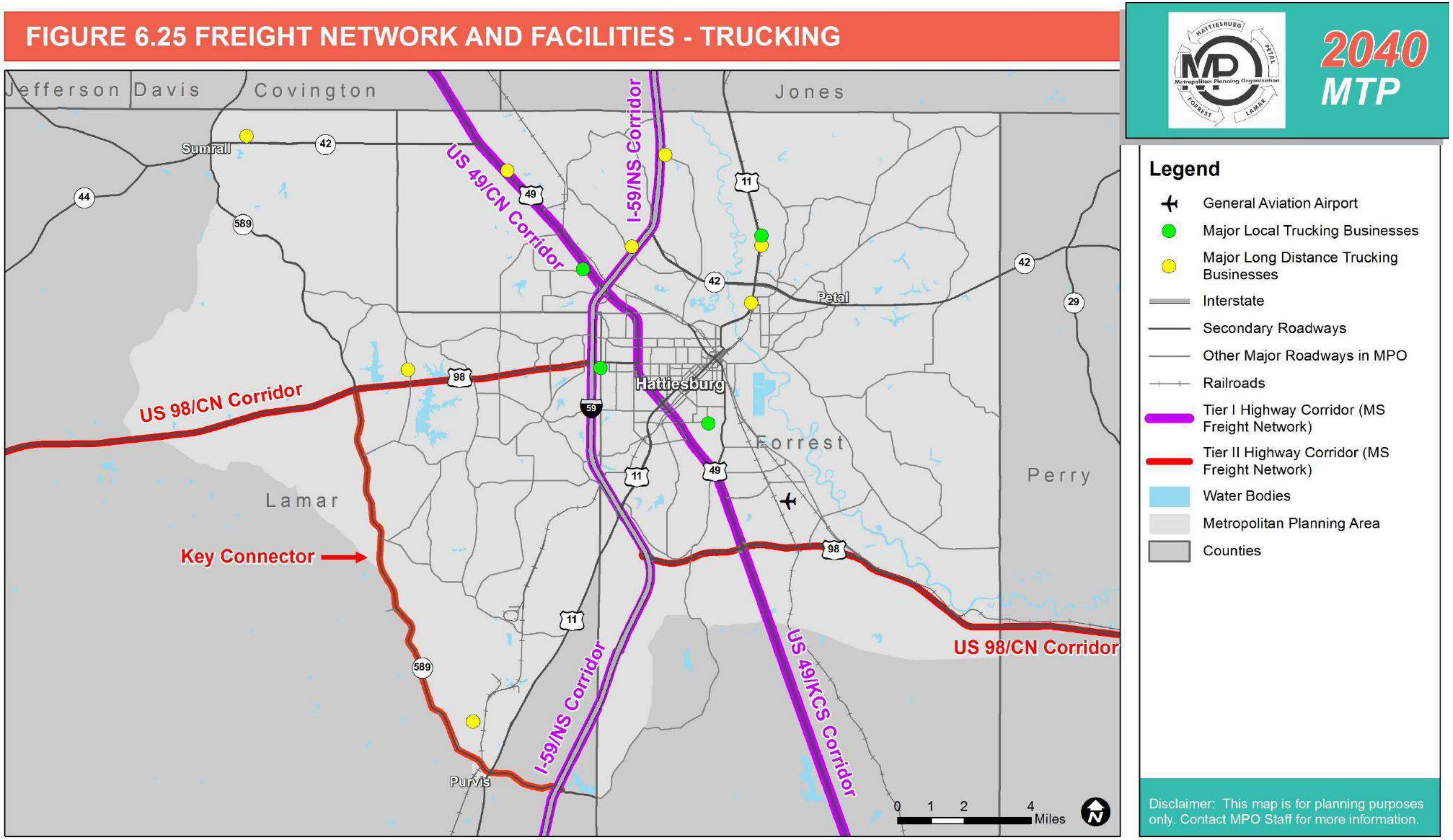
Traffic

In an effort to better understand freight needs, a statewide freight demand model was developed for MDOT for its 2040 update to the statewide long-range transportation plan. One output of this model is the estimated daily freight truck volumes on major roadways in the State. These estimated volumes are illustrated in Figure 6.26.

The estimated freight truck volumes suggest the following trends:

- Freight truck traffic is greatest on I-59, US 49, and US 98. These correspond to the roadways included in the MFN.
- Freight truck traffic is also relatively high on portions of MS 42, MS 11 and a few other roadways segments.

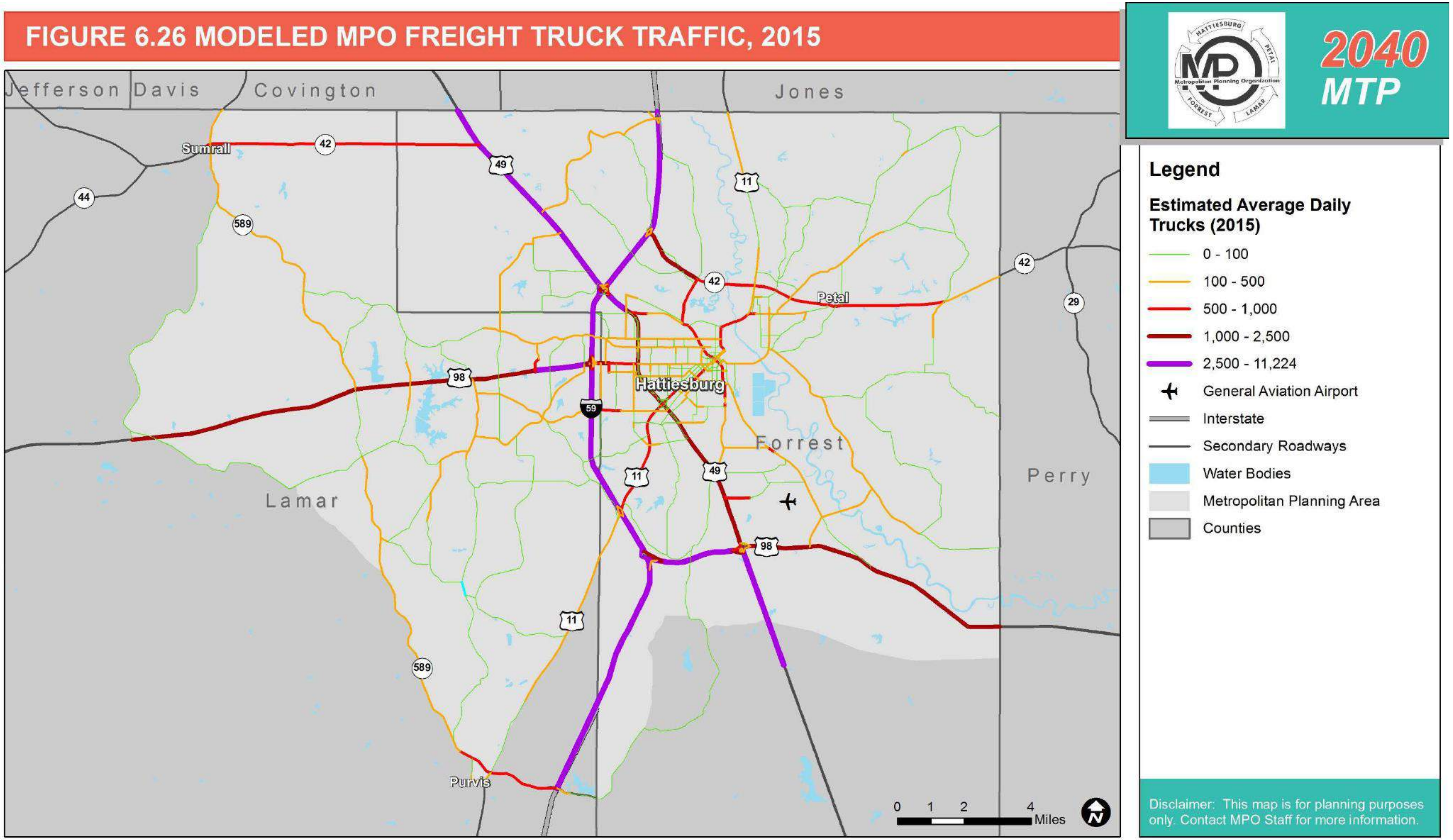
FIGURE 6.25 FREIGHT NETWORK AND FACILITIES - TRUCKING



Map Source: Neel-Schaffer, Inc.

Data Sources: 2014 National Transportation Atlas; USDOT; MDOT; Hattiesburg Travel Demand Model; Census Bureau

FIGURE 6.26 MODELED MPO FREIGHT TRUCK TRAFFIC, 2015



Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

Rail Network and Facilities

Network

The MPA has approximately 65 miles of railroads. The majority of this is Class I railroads that are designated as part of the Tier I or Tier II freight corridors in the MFN. The draft NPFN does not include railroads.

The railroads in the MPA that are part of the MFN corridors are as follows:

1. Norfolk Southern Railway is part of the Tier I Picayune-Hattiesburg-Meridian Corridor;
2. Canadian National Railway and Kansas City Southern Railway are part of the Tier I Jackson-Hattiesburg-Gulfport Corridor; and
3. Canadian National Railway is part of the Tier II McComb-Hattiesburg-Lucedale Corridor.

Figure 6.27 shows railroads in the MPA along with the MFN corridors. Non-main lines are also shown.

Facilities

There are no active intermodal terminal facilities listed by the Bureau of Transportation Statistics in the MPA. The Miller Transporters, Inc. Rail/Truck intermodal facility along Canadian National Railway tracks in northern Hattiesburg is listed but is currently inactive.

There are two line-haul railroad establishments within the MPA: the Norfolk Southern establishment in Downtown Hattiesburg and the Kansas City Southern Railway establishment near Camp Shelby. Line-haul railroad establishments provide for the intercity movement of trains between the terminals and stations on main and branch lines of a long-distance rail network, excluding local switching services.

There are two major railroad yards within the MPA: the Hattiesburg Yard in in Downtown Hattiesburg and the Dragon Yard near US 11 between Petal and the Leesville community. Railroad yards are a combined series of tracks that allow for the efficient storage, processing, and/or loading/unloading of railroad cars.

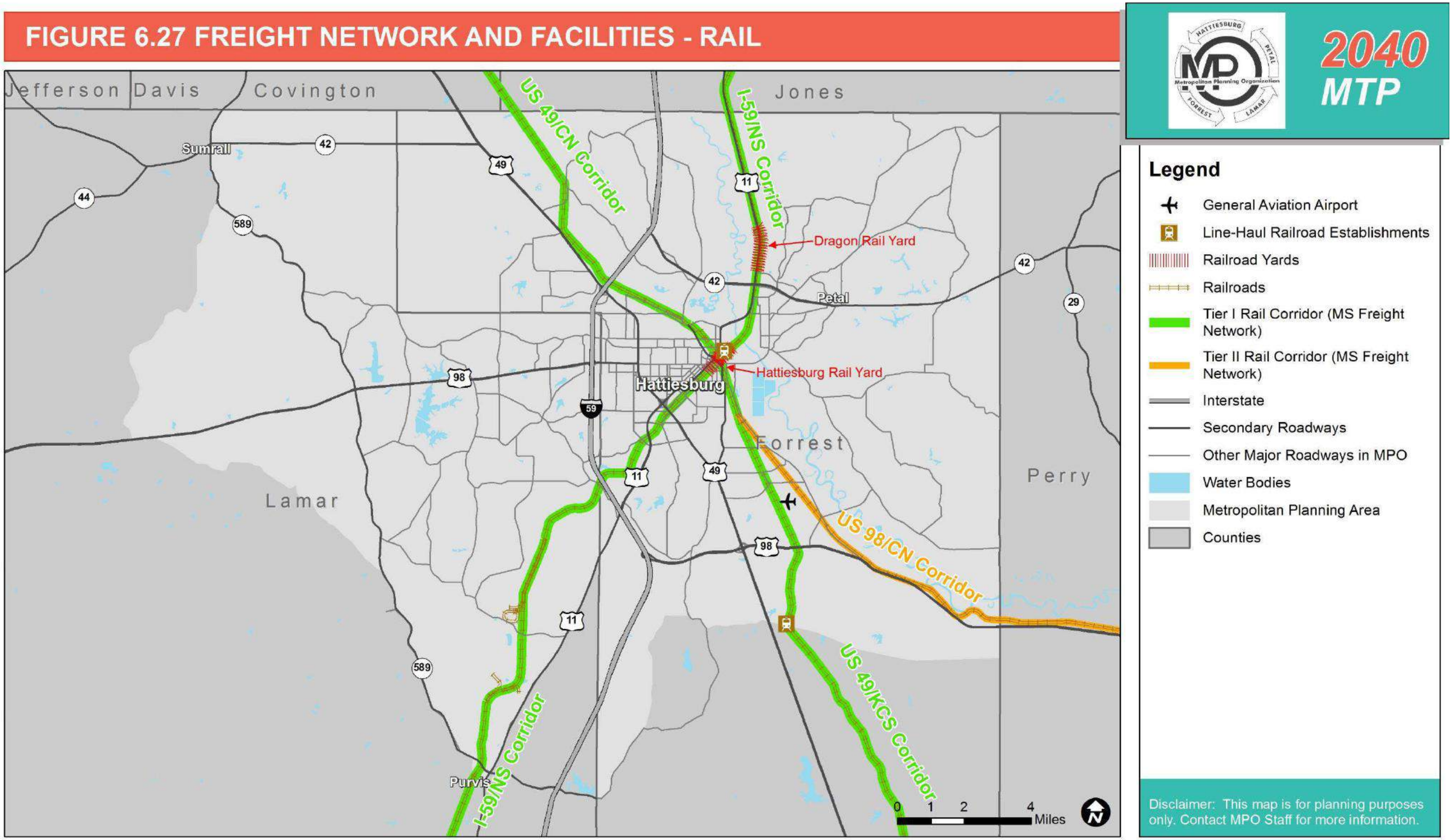
Figure 6.27 shows the location of the line-haul establishments and railroad yards within the MPA.

Traffic

In an effort to better understand freight needs, a statewide freight demand model was developed for MDOT for its 2040 update to the statewide long-range transportation plan. One output of this model is the estimated annual flow, in tons, on railroads along most MFN corridors in the State. These estimated flows for railroads in the MPA are illustrated in Figure 6.28.

While the relative amount of traffic on the major railroad corridors in the MPA may be better understood with this information, it is important to note that these annual flows are for entire railroad corridors and do not show variation along the route. Still, variation may not be that significant since the majority of rail traffic in Mississippi is through traffic.

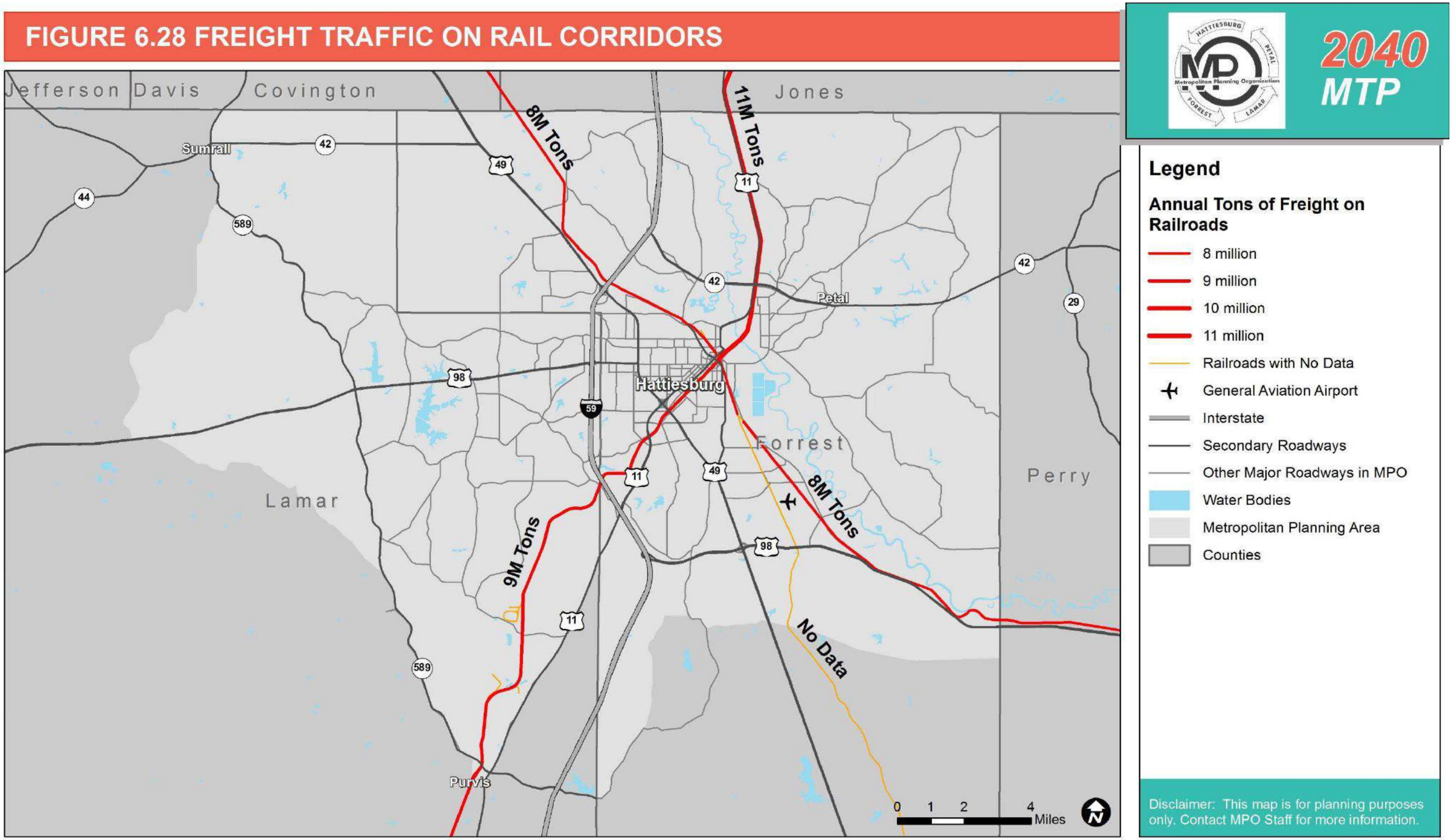
FIGURE 6.27 FREIGHT NETWORK AND FACILITIES - RAIL



Map Source: Neel-Schaffer, Inc.

Data Sources: 2014 National Transportation Atlas; InfoUSA; MDOT; Hattiesburg Travel Demand Model; Census Bureau

FIGURE 6.28 FREIGHT TRAFFIC ON RAIL CORRIDORS



Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

Airports

Facilities

While only a small amount of freight is typically shipped by air, these commodities tend to be high in value. Also, the area around airports also tends to serve as distribution and manufacturing hubs.

There is only one public-use airport in the MPA, the Hattiesburg-Bobby L. Chain Municipal Airport. However, the regional airport serving Hattiesburg, the Hattiesburg-Laurel Regional Airport, is immediately north of the MPA in Jones County.

Cargo Volume

The Hattiesburg-Laurel Regional Airport only handled approximately 6,500 pounds of domestic freight and mail cargo in 2013 and 2014, ranking 624th of 820 U.S. airports.

No cargo data was available for Hattiesburg-Bobby L. Chain Municipal Airport.

Statewide Freight Plan

The Mississippi Statewide Freight Plan (MSFP) was completed in February 2015. This plan is a comprehensive evaluation of the state's freight transportation system that allows for efficient planning and investment in the preservation, improvement, and strategic expansion of the state's freight system. Of particular importance, the MSFP does the following:

1. Identifies highway and rail freight corridors of statewide significance. These corridors are called Mississippi Freight Network (MFN) corridors and are classified into Tier I and Tier II corridors, as noted previously.
2. Identifies improvement strategies through a needs assessment, with a focus on ensuring continued efficient and safe movement of freight within the key freight corridors.

The MFN corridors have been highlighted in previous chapters of the 2040 MTP. The potential freight improvement projects specific to the Hattiesburg MPA in the MSFP are summarized below. High-priority, short-range improvement recommendations are in italics.

1. Safety and security improvements
    - Safety improvements along US 49 (Tier I corridor) and along US 98 (Tier II corridor). These improvements may be outside of the MPA.
    - Upgrade all Tier I rail corridor grade crossings (collector road or higher) to full active crossing warning devices.
    - Upgrade all US 98 public corridor crossings along the CN main line with at least 2 active warning devices.
2. Infrastructure preservation
    - Reconstruct two US 98 bridges to lift weight restrictions. These bridges may be outside of MPA.
    - Reconstruct two US 49 bridges to lift weight restrictions. *These bridges may be outside of MPA.*
    - Raising I-59, US 49 bridges to meet 16′ clearance performance standard. Not all bridges along these corridors currently meet this performance standard set by the MSFP. However, there may be no bridges in need of raising within the MPA.
3. Operational efficiency enhancement
    - Leverage deployment of the Hattiesburg region ITS Incident Management System and TMC Operations to include expanded commercial vehicle elements.

The MSFP also sets performance standards for Tier I and Tier II corridors. While beyond the scope of the 2040 MTP, further analysis of the MPA’s corridors with respect to these standards could identify high priority areas for improvement.

6.5 Safety

The safety element of the 2040 MTP focuses on gathering and analyzing available safety data and then identifying general hazardous areas. Due to the limited scope of this study, it does not identify location specific recommendations for the identified hazardous locations. However, potential countermeasures which could be used to mitigate various crash types have been included in Chapter 3: Future Transportation Needs.

Roadways Crash Data Analysis

According to the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), between 2011 and 2013 approximately 33,000 fatalities have occurred on United States' roadways each year. Every crash, regardless of the severity, costs money and time in damages, emergency services, and delays. These costs affect both governments and taxpayers. Despite the trend of reduced crashes over previous years, crashes and roadway safety still need to be addressed. One of the goals of this plan is to improve travel safety by reducing the risk of crashes on the roadways.

Crash records, corrected with the MDOT Safety Analysis Management System (SAMS) latitude and longitude data, from Forrest and Lamar Counties in the MPO study area from 2011 to 2013 were used in the crash analysis of the study area. The crash records included the time and location of the crash, severity of the crash, and crash location conditions. A total of 14,248 automobile only crashes occurred within the study area. Table 6.29 shows a breakdown of the crashes by county and year.

Table 6.29 Automobile Crashes by Year, 2011-2013

Crash Year	Forrest	Lamar	Total
2011	2,845	1,954	4,799
2012	2,818	1,760	4,578
2013	2,913	1,958	4,871
Total	**8,576**	**5,672**	**14,248**

Source: SAMS, 2011- 2013

Roadway Crash Trends

The first step in improving travel safety is determining the cause of the crashes. This study analyzed the time of day, roadway surface conditions, roadway lighting, crash severity, collision type, and whether or not alcohol was involved in the crashes. This information is presented and discussed on the following pages.

For each crash, the data shows approximately what time of day the crash occurred. These times are divided into hourly increments as shown in Table 6.30. Within the study area, approximately 81 percent of the crashes occurred from 7:00 AM to 7:00 PM, which corresponds with typical travel to work, school, and other various activities. The highest number of crashes occurred between 12:00 PM and 6:00 PM, when traffic is likely to be the heaviest. The number of crashes was much lower between 12:00 AM and 6:00 AM, when businesses and schools are closed and traffic is typically lighter.

Table 6.30 Automobile Crashes by Time of Day, 2011-2013

Hour Beginning	Forrest	Lamar	Number of Crashes	Percentage
Midnight	108	43	151	1.1%
1:00 AM	89	35	124	0.9%
2:00 AM	103	28	131	0.9%
3:00 AM	48	21	69	0.5%
4:00 AM	39	20	59	0.4%
5:00 AM	60	32	92	0.6%
6:00 AM	119	66	185	1.3%
7:00 AM	429	254	683	4.8%
8:00 AM	403	207	610	4.3%
9:00 AM	336	181	517	3.6%
10:00 AM	426	265	691	4.8%
11:00 AM	510	349	859	6.0%
12:00 PM	684	524	1,208	8.5%
1:00 PM	644	475	1,119	7.9%
2:00 PM	639	460	1,099	7.7%
3:00 PM	773	512	1,285	9.0%

Hour Beginning	Forrest	Lamar	Number of Crashes	Percentage
4:00 PM	723	492	1,215	8.5%
5:00 PM	753	567	1,320	9.3%
6:00 PM	501	389	890	6.2%
7:00 PM	339	235	574	4.0%
8:00 PM	258	195	453	3.2%
9:00 PM	248	142	390	2.7%
10:00 PM	193	107	300	2.1%
11:00 PM	151	73	224	1.6%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The roadway surface condition at the time of the crash may also be a contributing factor. A breakdown of the surface conditions for all crashes in the study area is shown in Table 6.31. Approximately 2,500 (about 18 percent) crashes occurred during wet pavement conditions. Nearly 12,000 crashes, approximately 81 percent, occurred during dry conditions. Although wet roadway surface conditions could have been a factor in some instances, the majority of the crashes were unaffected by wet conditions.

Table 6.31 Automobile Crashes by Roadway Surface Conditions, 2011-2013

Roadway Surface Condition	Forrest	Lamar	Number of Crashes	Percentage
Dry	6,977	4,632	11,609	81.5%
Wet	1,529	999	2,528	17.7%
Water	27	25	52	0.4%
Snow	1	-	1	0.0%
Ice	1	-	1	0.0%
Sand/Mud/Dirt/Oil/Gravel	5	2	7	0.0%
Unlisted	36	14	50	0.4%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The lighting conditions during the time of each crash are also considered in this analysis. Table 6.32 includes a breakdown of the crashes that occurred under various lighting conditions. Over 76 percent of the crashes occurred during daylight. About 12 percent of crashes occurred when it was dark outside with street lights, and about 10 percent of the crashes occurred at night with no street lights.

Table 6.32 Automobile Crashes by Roadway Lighting, 2011-2013

Lighting	Forrest	Lamar	Number of Crashes	Percentage
Daylight	6,458	4,401	10,859	76.2%
Dark – Lit	1,191	580	1,771	12.4%
Dark – Unlit	783	600	1,383	9.7%
Dawn	40	19	59	0.4%
Dusk	104	72	176	1.2%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

Crash severity should also be considered, and this data is shown in Table 6.33. Within the study area, 14,248 automobile crashes occurred between 2011 and 2013, with 46 crashes claiming lives and 3,133 crashes causing injuries. Only 0.7 percent of the total crashes resulted in a fatality or severe injury. Just over 78 percent of the crashes had no injuries reported.

Table 6.33 Automobile Crashes by Severity, 2011-2013

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	31	15	46	0.3%
Severe	28	24	52	0.4%
Moderate	409	295	704	4.9%
Complaint	1,447	930	2,377	16.7%
No Injury	6,661	4,408	11,069	77.7%
Unlisted	0	0	0	0.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The type of collision is also an important factor in determining the cause of crashes. Table 6.34 shows the number of crashes by collision type that occurred between 2011 and 2013. The four highest collision types, making up nearly 86 percent of the crashes in the study area, were rear-end collisions, angle collisions, sideswipe collisions, and run off road collisions. Rear-end crashes account for the majority of the collisions (just above 36 percent) and are typically concentrated at or near signalized intersections. According to the crash data, angle crashes are the second most common collision type followed by sideswipe crashes.

Table 6.34 Automobile Crashes by Collision Type, 2011-2013

Collision Type	Forrest	Lamar	Number of Crashes	Percentage
Run off road	1,106	813	1,919	13.5%
Vehicle overturn	23	9	32	0.2%
Object fell from vehicle	28	10	38	0.3%
Other object in road	71	52	123	0.9%
Roadside object	89	50	139	1.0%
Parked vehicle	295	140	435	3.1%
Rear end	2,933	2,241	5,174	36.3%
Left turn same roadway	440	260	700	4.9%
Left turn cross traffic	3	1	4	0.0%
Right turn cross traffic	0	1	1	0.0%
Head on	62	42	104	0.7%
Sideswipe	918	603	1,521	10.7%
Angle	2,324	1,273	3,597	25.2%
Hit and Run	91	75	166	1.2%
Animal	173	93	266	1.9%
Other	18	9	27	0.2%
Unknown	2	0	2	0.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

The last factor considered in this analysis is whether or not alcohol was involved in these crashes. Alcohol is a factor in many crashes across the United States, so it is worth evaluating in this study. Table 6.35 shows a breakdown of alcohol involvement for crashes that occurred in the study area between 2011 and 2013. About 3 percent of overall crashes in the study area involved alcohol. Of the 46 total fatal crashes within the study area, 4 were fatal crashes related to alcohol involvement, resulting in a nearly 10 percent share of total fatality crashes being alcohol related.

Table 6.35 Alcohol Involvements in Automobile Crashes, 2011-2013

Alcohol	Forrest	Lamar	Number of Crashes	Percentage
Alcohol involved	273	149	422	3.0%
Alcohol not involved	8,303	5,523	13,826	97.0%
Total	**8,576**	**5,672**	**14,248**	**100.0%**

Source: SAMS, 2011- 2013

Crash Locations

There were about 7,500 intersection crashes in the study area over a three year period, 2011 to 2013. The total crashes at each intersection were computed by locating the crashes that occurred within 100 feet of that intersection. Table 6.36 shows the top 10 intersections with the highest crash frequency in each county. Table 6.37 shows the top 20 intersections with the highest crash frequency as well as the severity of the crashes. Table 6.38 shows the collision types that occurred at the top 20 intersections. Table 6.39 and Table 6.40 display the locations of the top intersections with rear end and right angle crashes respectively, along with the intersection control at respective intersection.

Since the nature of this study is to only identify trends, this study did not attempt to analyze each location and corresponding crash records but merely depended on the data included in crash databases provided by MDOT.

Table 6.36 Top 10 Intersections with High Automobile Crash Frequency by County, 2011-2013

Forrest		Lamar	
Intersection	Crashes	Intersection	Crashes
US 49 @ MS 198 (Hardy St)	159	US 98 (Hardy St) @ Westover Dr	308
US 49 @ Classic Dr	148	US 98 (Hardy St) @ Weathersby Rd	178
MS 198 (Hardy St) @ N 38th Ave	127	US 98 (Hardy St) @ Cross Creek Pkwy	133
US 49 @ Eddy St/Cloverleaf Dr	106	MS 198 (Hardy St) @ S 40th Ave	132
US 49 @ W Pine St	85	US 98 (Hardy St) @ I-59 SB Off Ramp	111
US 49 @ Mamie St	78	US 98 @ King Rd/Old Hwy 11	103
US 49 @ N 31st Ave	70	US 98 @ MS 589	79
N 38th Ave @ W 4th St	65	Lincoln Rd @ Oak Grove Rd	43
Lincoln Rd @ 28th Ave	54	US 98 @ Cole Rd	39
US 49 @ Helveston Rd/Wisteria Dr	54	W 4th St @ Westover Dr/West Hills Dr	38

Source: SAMS, 2011- 2013

Table 6.37 Top 20 Intersections with High Automobile Crash Frequency by Severity, 2011-2013

Rank	Location	Crashes	Fatal	Severe	Moderate	Complaint	No Injury
1	US 98 (Hardy St) @ Westover Dr	308	0	0	6	55	247
2	US 98 (Hardy St) @ Weathersby Rd	178	0	0	3	23	152
3	US 49 @ MS 198 (Hardy St)	159	0	0	2	32	125
4	US 49 @ Classic Dr	148	0	0	7	31	110
5	US 98 (Hardy St) @ Cross Creek Pkwy	133	0	0	8	23	102
6	MS 198 (Hardy St) @ S 40th Ave	132	0	0	3	22	107
7	MS 198 (Hardy St) @ N 38th Ave	127	0	0	2	7	118
8	US 98 (Hardy St) @ I-59 SB Ramp	111	0	1	3	19	88
9	US 49 @ Eddy St/Cloverleaf Dr	106	0	0	2	10	94
10	US 98 @ King Rd/Old Hwy 11	103	0	0	4	14	85
11	US 49 @ W Pine St	85	0	0	0	24	61
12	US 98 @ MS 589	79	0	0	7	13	59
13	US 49 @ Mamie St	78	0	0	2	21	55
14	US 49 @ N 31st Ave	71	0	0	2	23	46
15	N 38th Ave @ W 4th St	66	0	0	1	6	59
16	Lincoln Rd @ 28th Ave	54	0	0	2	7	45
17	US 49 @ Helveston Rd/Wisteria Dr	54	1	0	5	18	30
18	US 49 @ Old Hwy 42	47	0	0	2	14	31
19	US 11 (Broadway Dr) @ Lincoln Rd	45	0	0	1	9	35
20	MS 42 (Evelyn Gandy Pkwy) @ E Central Ave/Byrd Pkwy	44	0	0	2	11	31
	Total	**2,128**	**1**	**1**	**64**	**382**	**1,680**

Source: SAMS, 2011- 2013

Table 6.38 Top 20 Intersections with High Automobile Crash Frequency by Collision Type, 2011-2013

Rank	Intersection	Crashes	Run off road	Vehicle Overturn	Object fell from vehicle	Other object in road	Parked vehicle	Rear end	Left turn same roadway	Head on	Sideswipe	Angle	Hit and Run
1	US 98 (Hardy St) @ Westover Dr	308	0	0	0	0	0	215	20	0	57	15	1
2	US 98 (Hardy St) @ Weathersby Rd	178	1	0	0	0	0	128	14	1	17	16	1
3	US 49 @ MS 198 (Hardy St)	159	5	1	2	1	0	103	9	1	24	13	0
4	US 49 @ Classic Dr	148	2	0	0	1	0	97	7	1	19	21	0
5	US 98 (Hardy St) @ Cross Creek Pkwy	133	0	0	0	0	0	76	20	0	17	19	1
6	MS 198 (Hardy St) @ S 40th Ave	132	0	0	0	0	0	86	9	0	31	6	0
7	MS 198 (Hardy St) @ N 38th Ave	127	2	0	0	0	0	79	9	0	10	27	0
8	US 98 (Hardy St) @ I-59 SB Ramp	111	3	0	0	0	0	85	1	0	13	9	0
9	US 49 @ Eddy St/Cloverleaf Dr	106	0	0	0	0	0	78	8	1	8	10	1
10	US 98 @ King Rd/Old Hwy 11	103	0	0	0	0	0	65	18	0	12	7	1
11	US 49 @ W Pine St	85	1	0	1	0	0	54	11	0	6	12	0
12	US 98 @ MS 589	79	0	0	0	0	1	57	12	0	4	5	0
13	US 49 @ Mamie St	78	0	0	0	0	0	58	6	0	4	10	0
14	US 49 @ N 31st Ave	71	2	1	0	0	0	36	9	0	5	18	0
15	N 38th Ave @ W 4th St	66	1	0	1	0	0	31	6	1	7	19	0
16	Lincoln Rd @ 28th Ave	54	1	0	0	0	0	34	1	0	4	13	1
17	US 49 @ Helveston Rd/Wisteria Dr	54	1	0	0	0	0	23	17	0	4	9	0
18	US 49 @ Old Hwy 42	47	2	0	0	0	0	32	4	0	6	3	0
19	US 11 (Broadway Dr) @ Lincoln Rd	45	1	0	0	0	0	26	6	0	5	7	0
20	MS 42 (Evelyn Gandy Pkwy) @ E Central Ave/Byrd Pkwy	44	0	0	0	0	0	30	9	0	1	4	0
	Total	**2,128**	**22**	**2**	**4**	**2**	**1**	**1,393**	**196**	**5**	**254**	**243**	**6**

Source: SAMS, 2011- 2013

Table 6.39 Top Intersections with High Automobile Rear-End Crash Frequency, 2011-2013

Rank	Intersection	Number of Crashes	Intersection Control
1	US 98 (Hardy St) @ Westover Dr	215	Signal
2	US 98 (Hardy St) @ Weathersby Rd	128	Signal
3	US 49 @ MS 198 (Hardy St)	103	Signal
4	US 49 @ Classic Dr	97	Signal
5	MS 198 (Hardy St) @ S 40th Ave	86	Signal
6	US 98 (Hardy St) @ I-59 SB Off Ramp	86	Signal
7	MS 198 (Hardy St) @ N 38th Ave	79	Signal
8	US 49 @ Eddy St/Cloverleaf Dr	78	Signal
9	US 98 (Hardy St) @ Cross Creek Pkwy	76	Signal
10	US 98 @ King Rd/Old Hwy 11	65	Signal

Source: SAMS, 2011- 2013

Table 6.40 Top Intersections with High Automobile Angle Crash Frequency, 2011-2013

Rank	Intersection	Number of Crashes	Intersection Control
1	US 49 W Service Rd @ W 7th St	30	Unsignalized
2	MS 198 (Hardy St) @ N 38th Ave	27	Signal
3	US 49 @ Classic Dr	21	Signal
4	US 98 (Hardy St) @ Cross Creek Pkwy	19	Signal
5	N 38th Ave @ W 4th St	19	Signal
6	US 49 @ N 31st Ave	18	Signal
7	US 98 (Hardy St) @ Weathersby Rd	16	Signal
8	US 11 @ W Central Ave	16	Unsignalized
9	US 98 (Hardy St) @ Westover Dr	15	Signal
10	US 11 @ Sullivan Kilrain Rd	15	Unsignalized

Source: SAMS, 2011- 2013

Crash Rates

Crash rates for the study area were based on the model network layer and base year (2013) volumes obtained from the Hattiesburg MPO travel demand model. The length of each segment was calculated and the corresponding daily traffic volumes from the model are used in the crash rate equation. The equation that was used to calculate segment crash rates is:

$$Segment\ Crash\ Rate = \frac{N * 10^6}{365 * ADT * L}$$

Where: Segment Crash Rate = crashes per million vehicle miles traveled.

N = average annual crash frequency of the segment

ADT = average daily traffic of the segment

L = length of the segment in miles

Table 6.41 shows the ten segments with the highest crash frequencies in the study area, as well as their corresponding crash rates, while Table 6.42 shows the ten segments with the highest automobile crash rates in the study area (segments with ADT greater than 10,000 and length greater than 0.1 miles).

Table 6.41 Top 10 High Automobile Crash Frequency Segments and Crash Rates, 2011-2013

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
US 98 (Hardy St)	W Hospital Dr/ Fairfield Dr	Mayfair Rd	108	36	47,043	0.27	7.88
Cross Creek Pkwy	US 98 (Hardy St)	.22 miles North of US 98 (Hardy St)	81	27	8,256	0.22	41.02
I-59	MS 589	US 98E	80	27	16,686	7.14	0.61
US 98 (Hardy St)	Weathersby Rd	W Hospital Dr/ Fairfield Dr	65	22	43,269	0.33	4.21
US 98 (Hardy St)	Lake Forgetful	Cross Creek Pkwy	58	19	38,228	0.50	2.78
N 38th Ave	Pearl St	Mable St	56	19	8,504	0.26	23.87
MS 198 (Hardy St)	S 34th Ave	N 32nd Ave	45	15	27,697	0.17	8.69

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
US 98	Gravel Pit Rd	Pioneer Rd South	45	15	39,453	0.09	11.35
S 40th Ave	MS 198 (Hardy St)	O'Ferrall Dr	41	14	6,932	0.10	56.68
I-59	US 49	River Rd Underpass	41	14	39,789	1.33	0.71

Note: *Crash Rate is expressed in crashes per million vehicle miles traveled

Source: SAMS, 2011- 2013

Table 6.42 Top 10 High Automobile Crash Rate Segments, 2011-2013

Segment	From	To	Total Crashes	Annual Crash Frequency	ADT	Length	Crash Rate*
Cross Creek Pkwy	US 98 (Hardy St)	.22 miles N of US 98 (Hardy St)	81	27	8,256	0.22	41.02
N 38th Ave	Pearl St	Mable St	56	19	8,504	0.26	23.87
W 4th St	Westover Dr	0.13 mi E of Westover Dr	24	8	11,362	0.13	15.40
MS 198 (Hardy St)	N 32nd Ave	31st Ave	40	13	27,664	0.11	12.26
W 4th St	Weathersby Rd	Madison Pl	20	7	9,561	0.19	10.21
Weathersby Rd	US 98 (Hardy St)	Methodist Blvd	22	7	7,753	0.25	10.17
MS 198 (Hardy St)	N 35th Ave	S 34th Ave	34	11	28,849	0.12	9.08
MS 198 (Hardy St)	S 34th Ave	N 32nd Ave	45	15	27,697	0.17	8.69
MS 198 (Hardy St) Eastbound	I-59 SB Off Ramp	I-59 NB On Ramp	38	13	28,868	0.12	8.61
US 49	0.11 mi S of 4th St Underpass	4th St Underpass	22	7	22,223	0.11	8.28

Note: *Crash Rate is expressed in crashes per million vehicle miles traveled

Source: SAMS, 2011- 2013

The equation that was used to calculate intersection crash rates is:

$$Intersection\ Crash\ Rate = \frac{N * 10^6}{365 * ADT}$$

Where: Intersection Crash Rate = crashes per million vehicles entering.

N = average annual crash frequency of the segment

ADT = average daily traffic of the segment

Table 6.43 shows the ten intersections with the highest crash rates in the study area.

Table 6.43 Top 10 High Crash Rate Intersections, 2011-2013

Location	Total Crashes	Annual Crash Frequency	ADT	Crash Rate*
US 98 (Hardy St) @ Westover Dr	308	103	70,441	3.99
Lincoln Rd @ 28th Ave	54	18	12,619	3.91
US 49 @ Classic Dr	148	49	39,292	3.44
US 98 @ MS 589	79	26	23,001	3.14
US 98 (Hardy St) @ Weathersby Rd	178	59	52,917	3.07
MS 198 (Hardy St) @ N 38th Ave	127	42	38,124	3.04
US 49 @ W Pine St	85	28	26,132	2.97
N 38th Ave @ W 4th St	66	22	21,026	2.87
MS 198 (Hardy St) @ S 40th Ave	132	44	43,583	2.77
US 98 (Hardy St) @ Cross Creek Pkwy	133	44	44,021	2.76

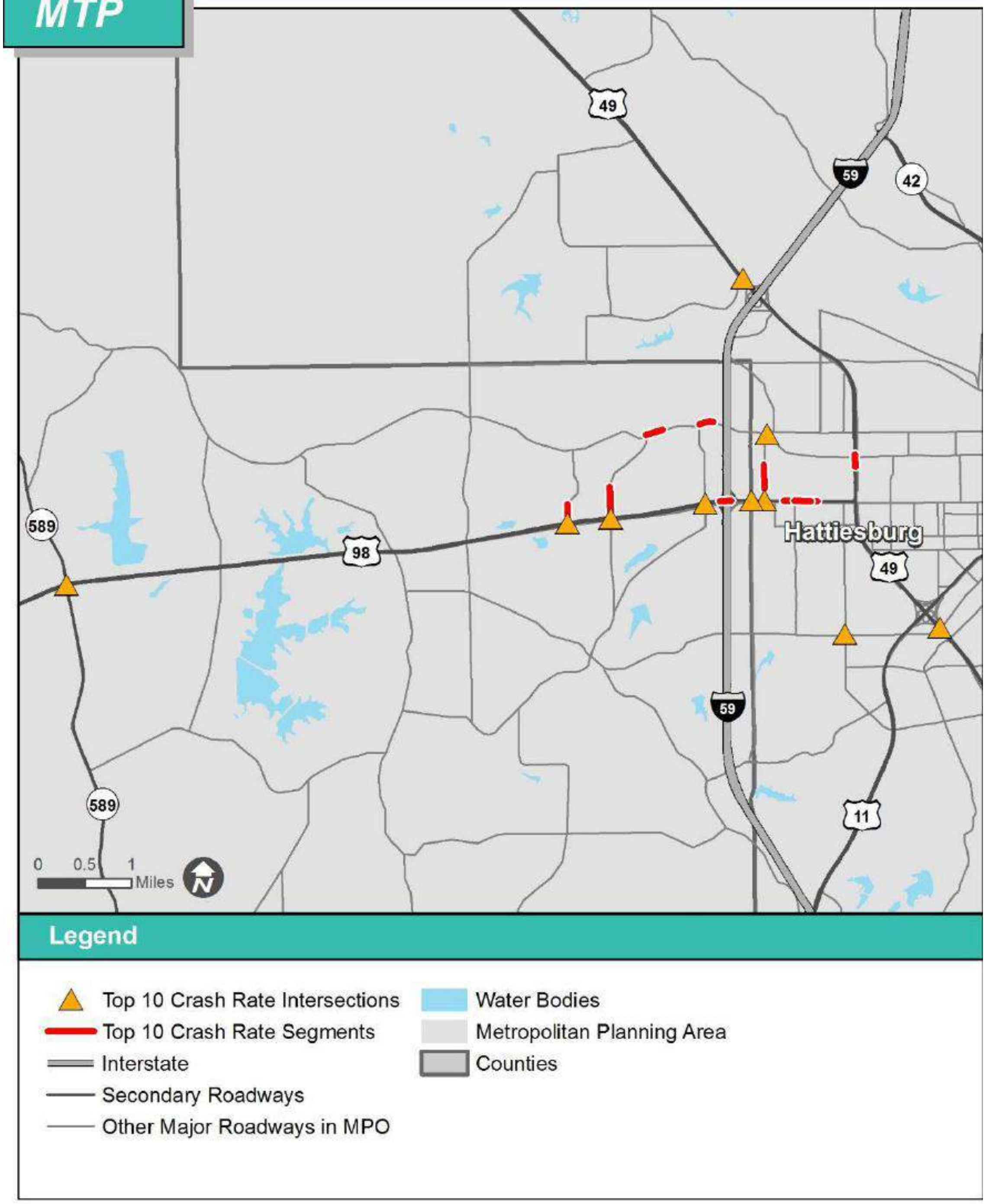
Note: *Crash Rate is expressed in crashes per million vehicles entering

Source: SAMS, 2011- 2013

Figure 6.29 illustrates the locations of the top 10 crash rate intersections and segments.

2040 MTP

FIGURE 6.29 HIGH AUTOMOBILE CRASH RATE AREAS



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: SAMS, 2011-2013

Mississippi Strategic Highway Safety Plan

A Strategic Highway Safety Plan (SHSP) is a statewide-coordinated safety plan that was developed to reduce fatalities along state highways and all public roads.

The State of Mississippi maintains a SHSP that was put in place as part of the SAFETEA-LU requirements. The original SHSP was developed in 2007 using the 4Es of traffic safety: Engineering, Enforcement, Emergency response, and Education. The 2007 SHSP, completed by the Mississippi Department of Transportation (MDOT) and the Mississippi Department of Public Safety (MDPS), set a goal of reducing traffic-related fatalities to 700 traffic fatalities by 2011, but this was considered a stretch goal since the average number of traffic fatalities during the study period (2000 to 2007) was almost 900 traffic fatalities per year, and the trend was flat. The 2007 SHSP identified five critical emphasis areas and sixteen critical strategies. In 2013, the SHSP was updated to build upon the original SHSP, with a new identified goal of reducing annual traffic fatalities by 25 percent by 2017, exceeding the national goal of reducing traffic fatalities by half over the next 20 years.

Mississippi has a long tradition of investing in all phases of highway safety. Examples of strategies, based on the 4Es and data collection, include:

- Engineering: Edge treatments including rumble strips and wider edge lines; Performing roadway safety assessments; MDOT's Safety Analysis Management System (SAMS) to design and develop a web-based geographic information system (GIS)-enabled application; and the Office of State Aid Road Construction (OSARC) overseeing more than 10,000 miles of county highway and construction to American Association of State Highway and Transportation Officials (AASHTO) standards.
- Enforcement: Primary safety belt law enacted in May 2006, as well as a strong "Click It or Ticket" Public Information and Education (PI&E) campaign to increase seat belt usage; usage of blitz periods throughout the year by use of Mississippi Office of Highway Safety (MOHS) funds to conduct Saturation Patrols, Sobriety Checkpoints, and Selective Traffic Enforcement by local enforcement departments and the Mississippi Highway Patrol; and grants provided by the Federal Motor Carrier Highway Safety Administration (FMCSA) to reduce the number of commercial vehicle collisions on Mississippi roadways.
- Education: The success of the "Drive Sober or Get Pulled Over" PI&E campaign to address driving under the influence (DUI) in increasing DUI arrests in Mississippi, particularly for offenders under 21; and the creation of a Judicial Outreach Liaison (JOL) program to help educate judges across the state regarding impaired-driving issues.

- Emergency Medical Services (EMS): The establishment of a Statewide Trauma System; linking data between EMS, law enforcement, emergency services, and hospitals to produce crash-outcome studies; ensuring EMS management information system maintains the National EMS Information System standards (NEMSIS); and coordination with providers of air medical services resulting in nine established bases in the state.
- Data: The recent investment into data systems technology (SAMS and ReportBeam) to greatly improve data accuracy and timeliness as well as analysis capabilities.

The SHSP was updated in 2013 and includes all elements of the 2007 plan. The updated SHSP:

- Addresses the frequency, rate, and primary factors contributing to fatalities and life-changing injuries on all Mississippi roads
- Is consistent with Federal Highway Administration (FHWA) procedural guidance
- Establishes a mission, vision, and goal for all safety partners in the State of Mississippi
- Incorporates input provided by safety partners representing national, state, and local agencies; and private safety advocacy groups
- Follows a data driven process that considers all users on all roads
- Provides a guide for future safety investments
- Addresses the 4Es of safety (Engineering, Enforcement, Education, and Emergency medical services)

The process in developing the Mississippi SHSP begins with the crash analysis and concludes with the SHSP report and is the culmination of more than a year of work between MDOT and its safety partners. Figure 6.30 shows the process used in developing the Mississippi SHSP.

Figure 6.30 Mississippi SHSP Update Development Process

Source: Mississippi Strategic Highway Safety Program

During the development of the current SHSP, three driver behavior and two highway emphasis areas were identified for implementation of countermeasures based on data availability, improvement potential, and access to resources. The three driver behavior emphasis areas are:

- Seat belts
- Alcohol and drugs
- Unlicensed or suspended licensed drivers

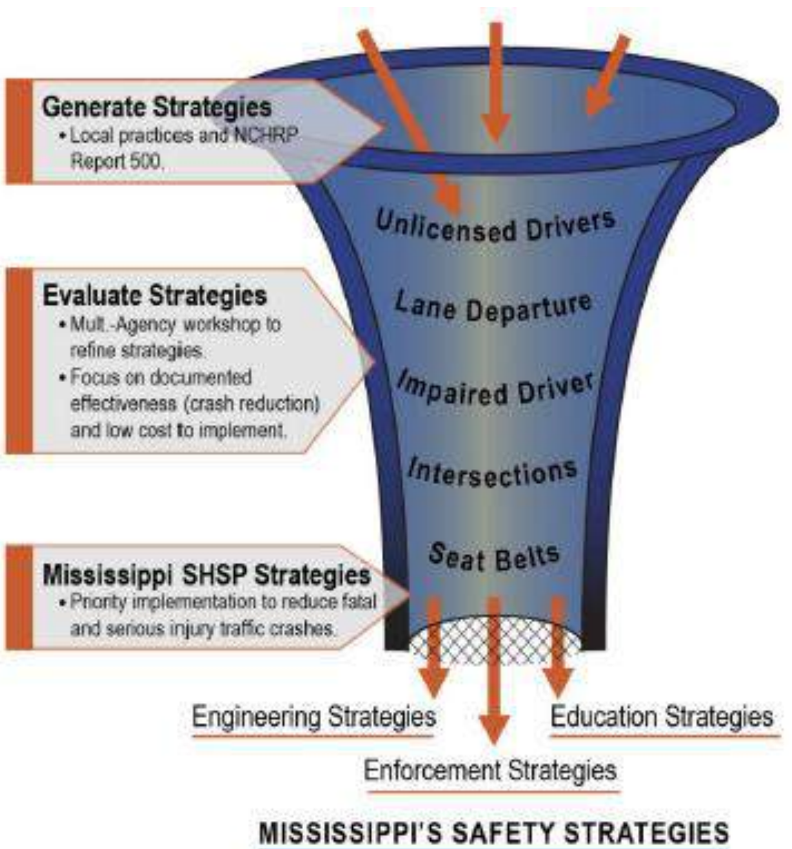
The two highway emphasis areas are:

- Lane departure crashes
- Intersections

In addition, focus has been emphasized on distracted driving and commercial vehicle safety within the state.

During the Safety Strategies Workshop on September 30, 2010 in Jackson, which included a large number of stakeholders, a comprehensive list of potential safety improvement strategies was assembled for each Emphasis Area. Following the workshop, MDOT and MOHS staff evaluated and screened the initial comprehensive lists of safety strategies using crash data, effectiveness, implementation cost, and the input provided by the participants in the Safety Strategies Workshop. Figure 6.31 shows the screening of the initial Safety Strategies for Mississippi.

Figure 6.31 Screening of Initial Safety Strategies for Mississippi



Source: Mississippi Strategic Highway Safety Program

Bicycle and Pedestrian Crash Data Analysis

Crashes involving pedestrians and bicyclists were analyzed based on the crash records from 2011 to 2013 obtained from MDOT's SAMS program and was based on the crash type provided by MDOT. A total of 62 pedestrian crashes and 49 bicycle crashes occurred in the study area during the three year study period and are illustrated in Figure 6.32. Table 6.44 breaks down the number of pedestrian and bicycle crashes by county and by year.

Table 6.44 Pedestrian and Bicycle Crashes (2011 - 2013)

Mode	Year	Forrest	Lamar	Total
Pedestrian	2011	20	3	23
	2012	10	5	15
	2013	15	9	24
Total Pedestrian		**45**	**17**	**62**
Bicycle	2011	14	2	16
	2012	13	2	15
	2013	17	1	18
Total Bicycle		**44**	**5**	**49**

Source: SAMS, 2011-2013

Between 2011 and 2013, four fatal pedestrian crashes and one fatal bicycle crash occurred in the study area, as shown in Tables 6.45 and 6.46. Only about 11 percent of pedestrian crashes and 12 percent of bicycle crashes were property damage only (PDO).

Table 6.45 Pedestrian Crashes by Severity (2011-2013)

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	4	0	4	6.5%
Severe	2	0	2	3.2%
Moderate	18	3	21	33.9%
Complaint	18	10	28	45.2%
No Injury	3	4	7	11.3%
Unlisted	0	0	0	0.0%
Total	**45**	**17**	**62**	**100.0%**

Source: SAMS, 2011-2013

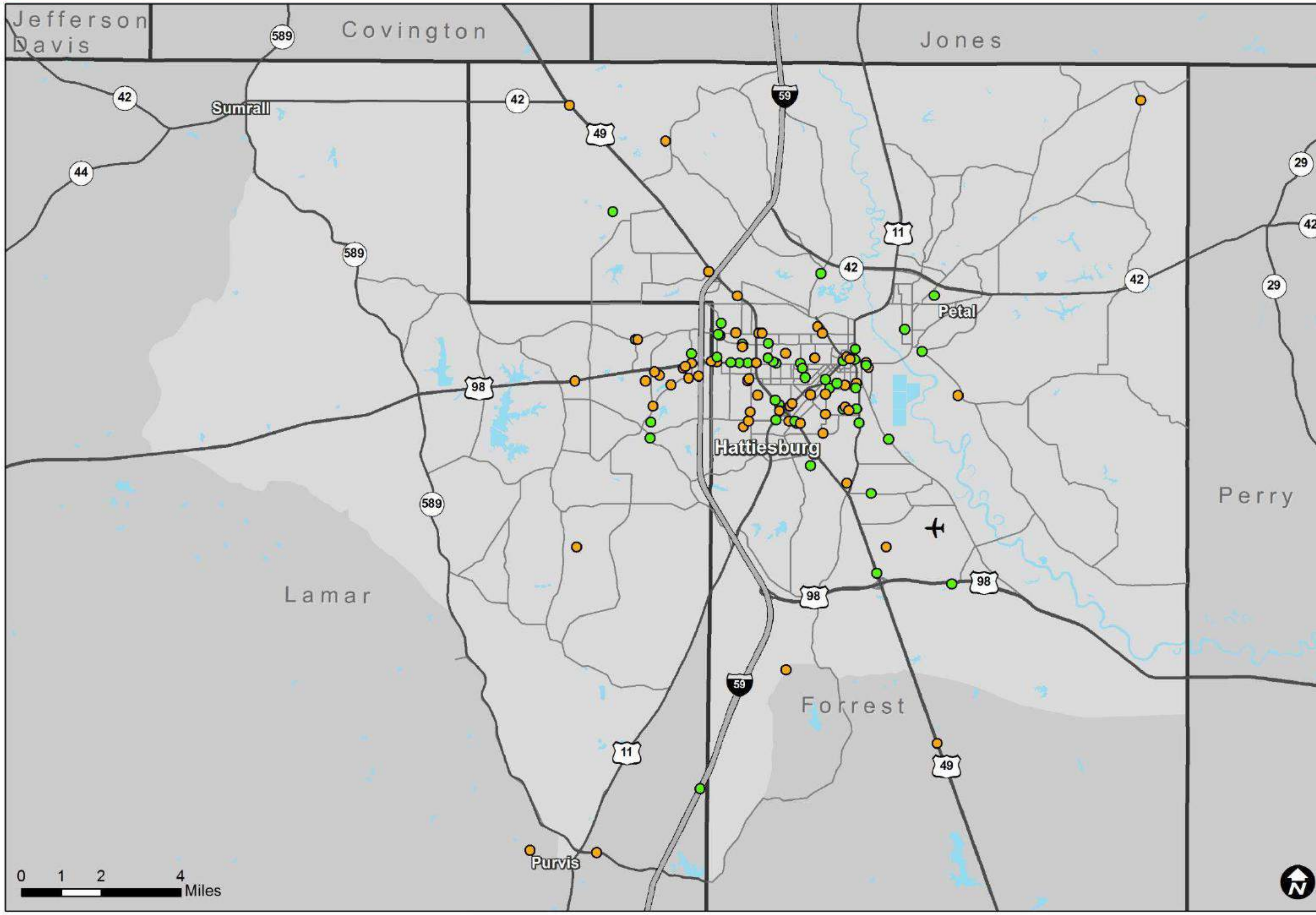
Table 6.46 Bicycle Crashes by Severity (2011-2013)

Severity	Forrest	Lamar	Number of Crashes	Percentage
Fatal	0	1	1	2.0%
Severe	1	0	1	2.0%
Moderate	14	2	16	32.7%
Complaint	23	2	25	51.0%
No Injury	6	0	6	12.2%
Unlisted	0	0	0	0.0%
Total	**44**	**5**	**49**	**100.0%**

Source: SAMS, 2011-2013

FIGURE 6.32 AUTOMOBILE CRASHES INVOLVING BICYCLES AND PEDESTRIANS

2040 MTP



Legend

Crash Type

- Bicycle
- Pedestrian
- Interstate
- Secondary Roadways
- Other Major Roadways in MPO
- Water
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only. Contact MPO Staff for more information.

Map Source: Neel-Schaffer, Inc.

Data Sources: SAMS, 2011-2013

Transit Safety Events Analysis

HCT utilizes a small system waiver and does not report monthly safety or security incidents. Therefore, no safety or security information can be gleaned from the National Transit Database.

Freight Truck Safety Analysis

Crashes involving heavy vehicles were analyzed using crash records from 2011 to 2013 obtained from MDOT's SAMS program. Using latitude and longitude data, crashes involving heavy vehicles were isolated based on location. A total of 170 crashes involving heavy vehicles occurred within the Hattiesburg MPA counties during the three year study period. Table 6.47 shows the number of heavy vehicle crashes by county during the study period.

Table 6.47 Heavy Vehicle Crashes by Year by County (2011-2013)

Crash Year	Forrest	Lamar	Total
2011	36	14	50
2012	42	18	60
2013	35	25	60
Total	**113**	**57**	**170**

Source: SAMS, 2011-2013

Between 2011 and 2013, two fatal crashes involving heavy vehicles occurred within the study area. While this represented just over 1 percent of heavy vehicle crashes, nearly 4 percent of all fatal crashes in the study area involved a heavy vehicle.

Because the number of heavy vehicle crashes represented only 1.2 percent of total crashes during the study period, many locations experienced either zero or very few heavy vehicle crashes. The only two intersections in the study area that experienced at least three heavy vehicle crashes between 2011 and 2013 are:

- US 49 @ Classic Dr (4 crashes)
- US 49 @ Old Hwy 42 (3 crashes)

Table 6.48 shows the roadway segments with high heavy vehicle crash rates, or those segments with crash rates above the MPA average (2.57 crashes per 100,000 truck VMT) and at least 100 daily trucks. Both of these segments are immediately adjacent to the intersection of US 49 and Old Hwy 42, where three crashes occurred from 2011 to 2013, as previously noted.

In order to develop a crash rate for heavy vehicles for roadway segments, segments from the statewide freight network were buffered by 250 feet. All heavy vehicle crashes occurring within a buffer were assigned to that segment. Then, crash rates were calculated as the number of heavy truck crashes per 100,000 truck vehicle miles traveled, using estimated truck volumes from the statewide model. Segments with under 100 daily trucks and/or under 3 heavy vehicle crashes were discarded.

Table 6.48 Roadway Segments with High Heavy Vehicle Crash Rates

Roadway Segment	From	To	Miles	Average Daily Truck Traffic	Heavy Vehicle Crashes, 2011-2013	Heavy Vehicle Crashes per 100,000 Truck VMT
US 49	N 31st Ave	Old Hwy 42	0.16	2,350	4	2.91
US 49	Old Hwy 42	North of Sims Rd	0.13	1,950	3	3.26

Source: SAMS, 2011-2013

Rail Safety Analysis

<u>Rail-Automobile Collisions</u>

Two crashes involving an automobile and train occurred in the Hattiesburg MPA between 2011 and 2013. These locations are:

- Old Okahola Rd @ Norfolk Southern Railway
- E Front St @ Norfolk Southern Railway

<u>Derailments</u>

According to the Federal Rail Administration (FRA), from 2011 to 2013, one trail derailment occurred on a Norfolk Southern Railway in Lamar County. No injuries or fatalities were reported in any of these derailments. The cause of derailment was under investigation as of April 30, 2015.

<u>Railroad Crossings with Active Warning/Control Devices</u>

To avoid collisions, warning/control devices are required at highway-railroad grade crossings. Aside from passive warning devices, such as yield and stop signs, many highway-railroad grade crossings have active warning devices. Active warning devices include devices and controls such as bells, flashing lights, and gates, in addition to passive warning devices.

The MSFP sets a performance standard of having all highway-railroad crossings involving a road functionally classified as a collector road or higher to have an active warning signal.

Out of the 70 at-grade railroad crossings in the Hattiesburg MPA, 42 are across public roads. 18 of these crossings have passive warning devices only. Of these 18, only two are located on streets functionally classified as a collector or higher. Of these two, one crossing is on a railroad in the MFN Tier I category and one is in the Tier II category. These two crossings are highlighted in Table 6.49.

Table 6.49 Major At-Grade Highway-Railroad Crossings Lacking Active Warning Devices on Tier I Railroads

Railroad	MFN Tier	Street	Place	County	Maximum Speed	Average Daily Traffic
CN	Tier I	Mobile St	Hattiesburg	Forrest	49 MPH	2,700
CN	Tier II	Tatum Rd	Hattiesburg	Forrest	49 MPH	1,000

Source: Federal Railroad Administration

6.6 Security

While safety and security are closely related, they are differentiated by the cause of the harm from which the transportation system and its users are being protected. Safety encompasses the prevention of unintentional harm to system users or their property. This includes vehicular crashes (whether of cars, trucks, buses, airplanes, or bicycles), train derailments, slope failures or other sudden destruction of roadways due to natural causes, and falls or injuries to pedestrians due to poorly constructed or absent facilities, among other issues. Security involves the prevention of intentional harm to the transportation system or its users, including theft or dismemberment of elements of transportation infrastructure, assault on users of the system, or large-scale attacks intended to completely disrupt the movement of people and goods.

MPO Role

The main role of MPOs in planning for security is to coordinate with relevant agencies, such as emergency management officials, police and sheriff's departments, fire departments and rescue squads. However, MPO's can take certain measures to improve security prevention, protection, response, and recovery.

Prevention

As related to security, prevention refers to efforts to limit access to resources that may be compromised or efforts to increase surveillance. Examples of prevention measures include access control systems, closed circuit television (CCTV) systems, security alarms, fencing, locks, and architectural barriers. The design of facilities and public spaces can also incorporate features that deter security breaches.

Protection

For facilities that are high vulnerability risks, additional design measures should be considered. These measures would mitigate potential security risks, should they occur.

Response

Redundancy of transportation facilities should be encouraged in capital project planning. This assists in emergency evacuations or detours should a particular segment of the transportation network become unavailable. The use of Intelligent Transportation Systems (ITS) to control traffic signals and other controls also assists in responding to security risks.

Recovery

Short-term and long-term recovery plans should be familiar to transportation decision-makers. This includes everything from evacuating to restoring local businesses and neighborhoods. MDOT has dedicated evacuation routes and there is a hazard mitigation plan for all counties in the MPA.

In the Hattiesburg MPO area, Forrest and Lamar Counties each have their own emergency management bodies. More information can be found on each county's operations at:

Forrest County-
http://forresteoc.com/

Lamar County-
http://www.lamarcounty.com/11/index.php?option=com_content&view=article&id=170&Itemid=109

Ultimately it is the responsibility of each MPO to craft a security policy consistent with its goals, state guidance, and MAP-21. Security will be a consideration in the establishment of MPO goals and the support for MPO funding priorities. The following presents potential areas of focus, recognizing that hurricane evacuation is a primary concern within the Hattiesburg Urbanized Area.

Use of MPO Transportation Model to Assess Evacuation Plans

The TransCAD regional model will be modified to simulate evacuation events, including the investigation of evacuation scenarios both to test the effectiveness of existing plans and to improve plans for routing traffic through the MPO region.

Use of Area Transit Systems to Support Evacuation Events

The MPO will work with local transit providers to investigate opportunities for use of transit vehicles to provide for evacuation of transit dependent populations.

Integration of Intelligent Transportation Systems (ITS) in Evacuation Planning

The MPO supports investment in ITS technologies. The MPO understands the need to study and assess how this technology can be used to assist evacuees in their decision making and expedite their progress during evacuation events.

Integration of Hurricane Evacuation Purpose and Need in Planning for Future Roadway Improvements

As the MTP projects are refined within the context of the MDOT Construction Program, project features will be reviewed for consistency with a hurricane evacuation purpose and need.

Hurricanes

Finally, every hurricane produces a unique evacuation event. Evacuees are influenced by the amount of notice provided in advance of the storm's landfall, as well as the projected storm path and intensity. Information on hurricane evacuation routes and procedures can be found at:

http://mdot.ms.gov/portal/emergency_services.aspx

7.0 Forecasting Future Travel Demand

The following chapter describes how transportation demand in the MPA was forecasted through 2040 for the Metropolitan Transportation Plan (MTP).

7.1 Generalized Travel Demand Forecast Process

The 2040 MTP uses a regional travel demand model to forecast future travel demand. This generalized four-step process is described below. More detailed information can be found in the Appendix.

Step 1: Trip Generation

This is the first step of the travel demand modeling process. This step determines the number and type of trips that will be produced from and attracted to a Traffic Analysis Zone (TAZ), or small geographical area defined specifically for transportation planning purposes. Trip generation relies on socioeconomic and land use data. While this data already exists for the base year, it must be forecasted for future years.

Step 2: Trip Distribution

This step determines trip origins and destinations based on land use patterns and a gravity model, which assumes that travelers will gravitate toward the closest establishment that meets the purpose of their trip.

Step 3: Mode Choice

This step converts person trips to vehicle trips and accounts for the fact that not all trips are made by motor vehicles.

Step 4: Trip Assignment

This is the final step in which vehicular trips are distributed across the roadway network based on a number of factors, most notably travel time.

7.2 Forecasting Population and Employment Changes

Aside from changes to the transportation system, land use changes are the primary drivers of changes in travel demand over time. For modeling purposes, land use changes are measured by changes in the magnitude and distribution of population, employment, and school enrollment. Changes are forecasted at the TAZ level, which is typically comprised of multiple census blocks but is not larger than a census block group.

Data Sources and County Control Totals

Population, employment, and school enrollment information for the base year was compiled for all TAZs using the following sources:

- The 2010 Census provided population and housing information.
- Proprietary employment point data obtained by MDOT from InfoUSA provided detailed information on existing establishments in the MPA, including the number of employees.
- School enrollment data was obtained from the U.S. Department of Education National Center for Education Statistics.

Population and employment forecasts were developed at the county level as part of Mississippi's statewide Long-Range Transportation Plan. These forecasts were developed using a combination of projections, including historical projections and forecasts by Woods & Pool Economics, Inc. and Regional Economic Models Inc. (REMI).

TAZ-Level Forecasts

After developing the county forecasts, population, employment, and school enrollment had to be forecast for all TAZs in the MPO to 2020, 2030, and 2040. The first step in doing these was to determine where future growth would be concentrated. To do this, the MTP Subcommittee, composed of planners, engineers, and other members of the MPO's Technical Committee, identified growth areas by different land use categories within the MPO. The results of this exercise, illustrated in Figure 7.1, were used as a guide in developing forecast numbers at the TAZ level.

Next, a socio-economic forecasting model was developed based on the suitability and attractiveness of an area to develop. This model is summarized by the following steps:

- An area's maximum population and employment, or carrying capacity, is determined based on the amount of developable and re-developable land and the area's likely maximum density (based on a land use classification).

- Next, an area's attractiveness for residential, commercial/professional, and industrial development is calculated. There are three main factors considered, with varying sub-factors depending on the land use attractiveness being measured:
    - Land develop-ability – considering ease of land assembly and presence of flood zones
    - Accessibility – considered regional accessibility to employment and services, and proximity to major roadways, interstate interchanges, rail lines, and intermodal facilities.
    - Demand – considered proximity to major employment centers, retail clusters, industrial clusters, high-growth residential areas, and underserved commercial markets.
- After an area's attractiveness for residential, commercial/professional, and industrial development is calculated, growth is allocated in an iterative process based on this attractiveness score. Iterations continue until the 2020, 2030, or 2040 control total are reached. Individual TAZs may max out before the control total is reached for a given year.

After TAZ-level population and employment forecasts for 2020, 2030, and 2040 were developed by the socioeconomic forecasting model, results were reviewed for consistency with the growth areas identified by the MTP subcommittee and for consistency with recently approved or constructed developments. Adjustments were made where necessary.

With the final TAZ-level population and employment forecasts by year, school enrollment was forecasted using the following approach:

- School-age populations were calculated using a cohort-component approach
- All TAZs were assigned to existing public schools and enrollment was assumed to grow in proportion to the increase in the school-age population. Private school and college/university enrollment was projected to grow in proportion to the increase in total population in the MPO.
- In areas where school sizes increased drastically, new school locations were added.

Summary of Forecasted Change

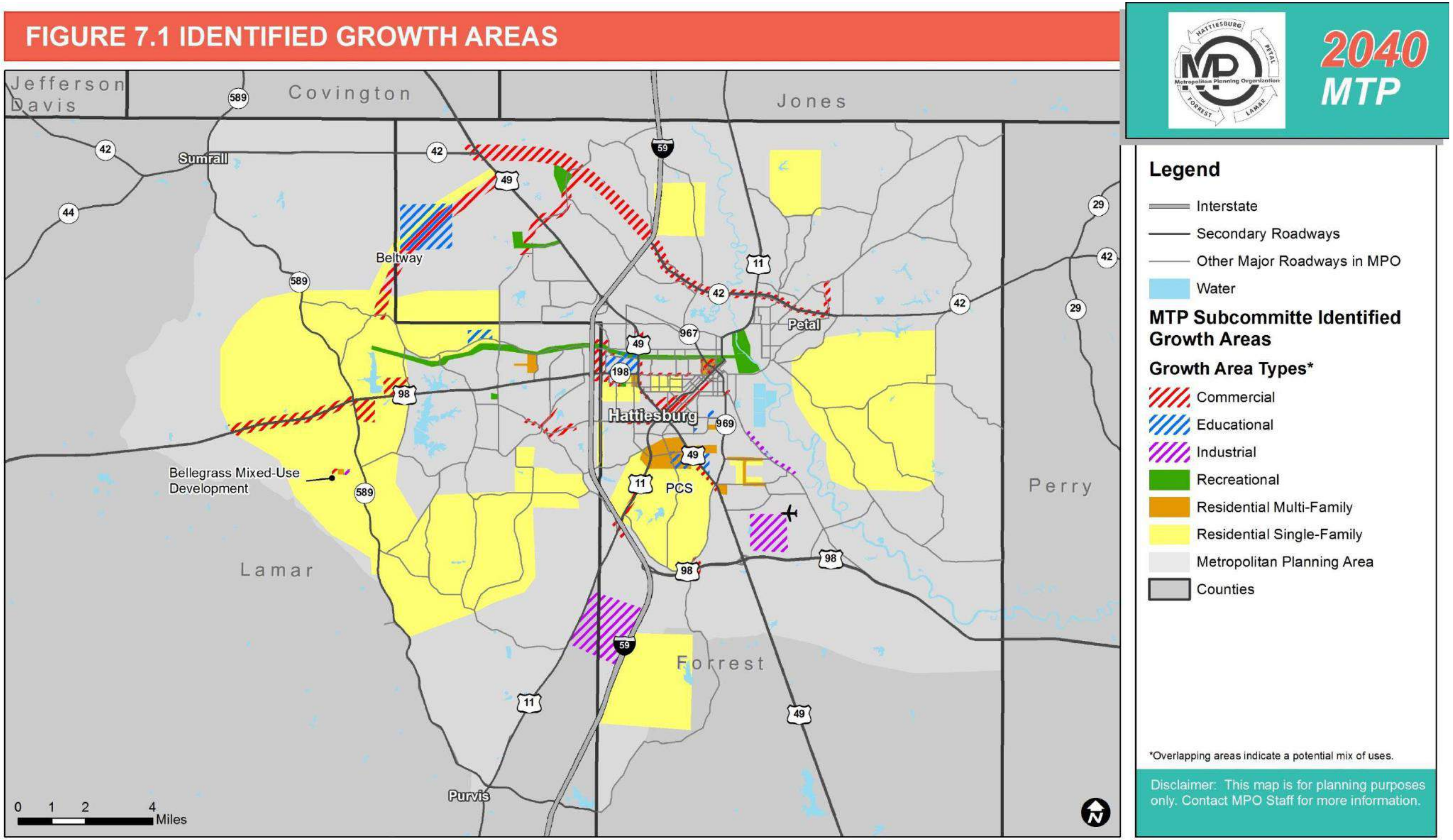
The resulting changes in population and employment through 2040 are shown in Table 7.1 and illustrated in Figures 7.2 through 7.7.

Table 7.1 Change in Population and Employment Variables in MPA, 2013 to 2040

Variable	Description	2013	2040	Change	Percent Change
OCCDU	Occupied Dwelling Units (Households)	41,263	59,971	18,708	45.3%
TOTPOP	Total Population in TAZ	106,413	154,105	47,692	44.8%
TOT_EMP	Total Employment	69,505	97,424	27,919	40.2%
RET_EMP	Retail Employment	15,860	22,829	6,969	43.9%
AMC_EMP	Agriculture, Mining and Construction Employment	3,138	3,288	150	4.8%
MTCUW_EMP	Manufacturing, Transportation/Communications/Utilities and Wholesale Trade Employment	9,974	8,968	-1,006	-10.1%
OS_EMP	Government, Office and Services Employment	39,442	61,251	21,809	55.3%
OTH_EMP	Other Employment	1,091	1,088	-3	-0.3%
SCHATT	School Enrollment	39,837	55,870	16,033	40.2%

Source: Hattiesburg Regional Travel Demand Model

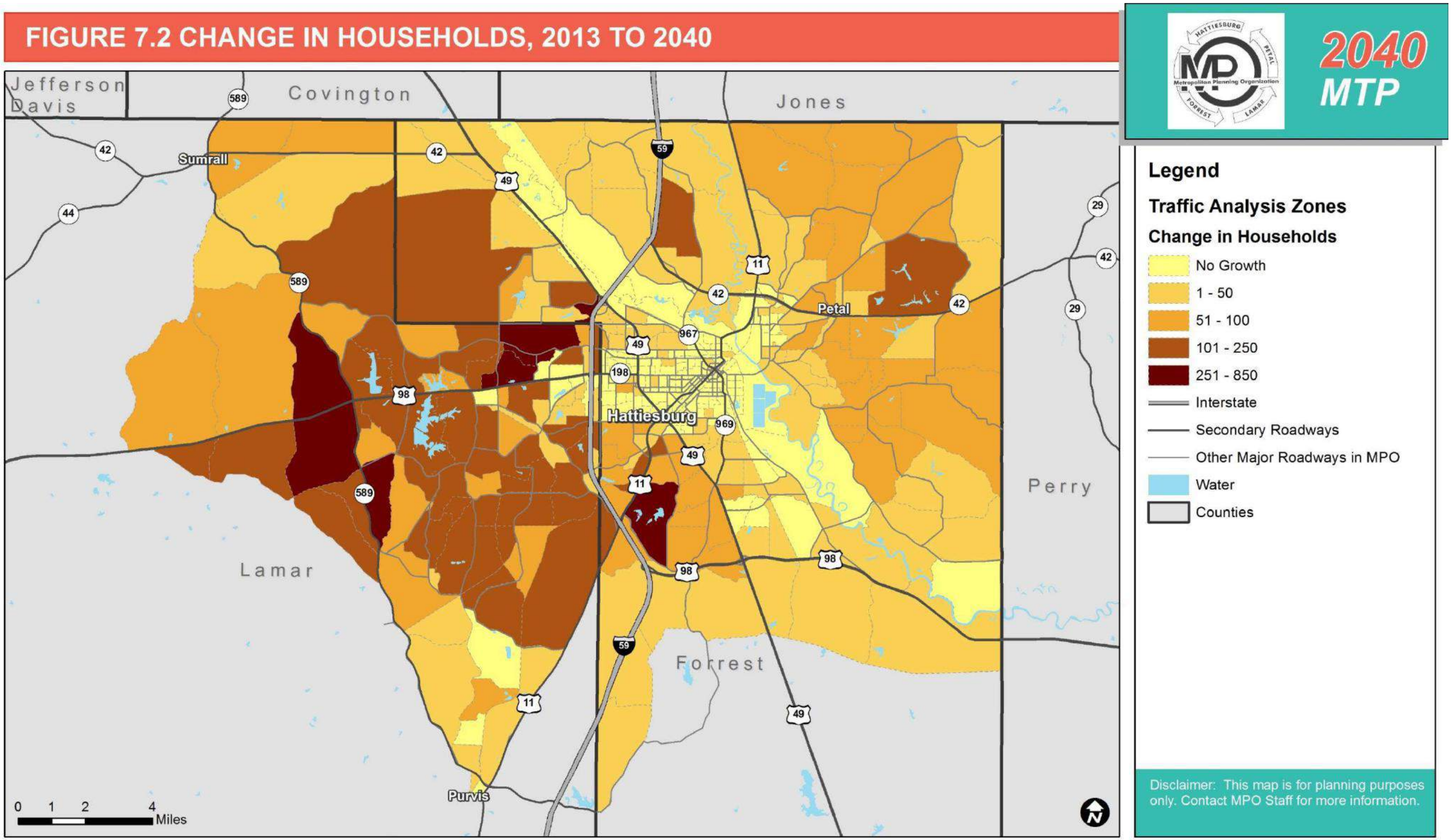
FIGURE 7.1 IDENTIFIED GROWTH AREAS



Map Source: Neel-Schaffer, Inc.

Data Sources: MTP Subcommittee Meeting

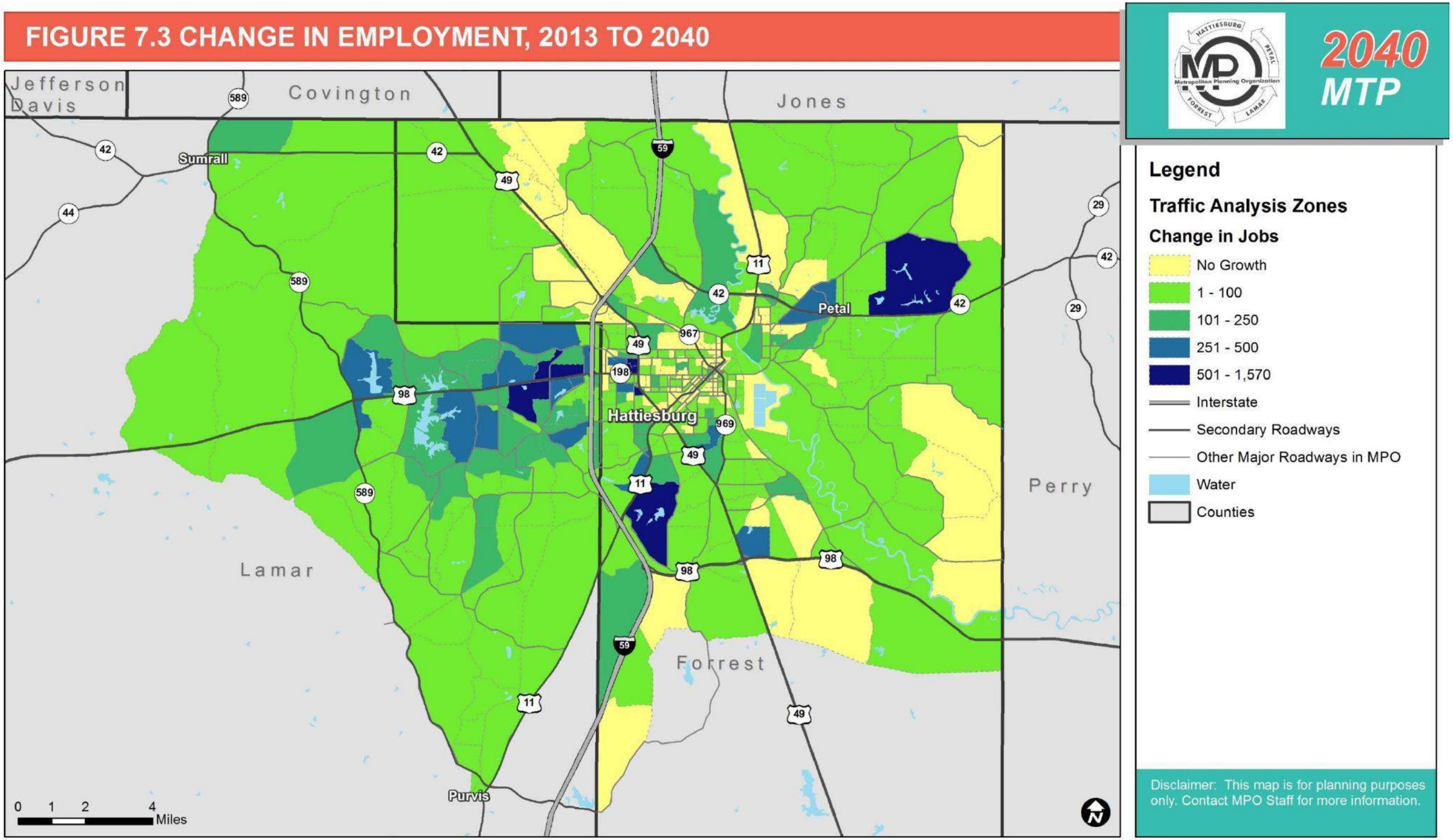
FIGURE 7.2 CHANGE IN HOUSEHOLDS, 2013 TO 2040



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 7.3 CHANGE IN EMPLOYMENT, 2013 TO 2040

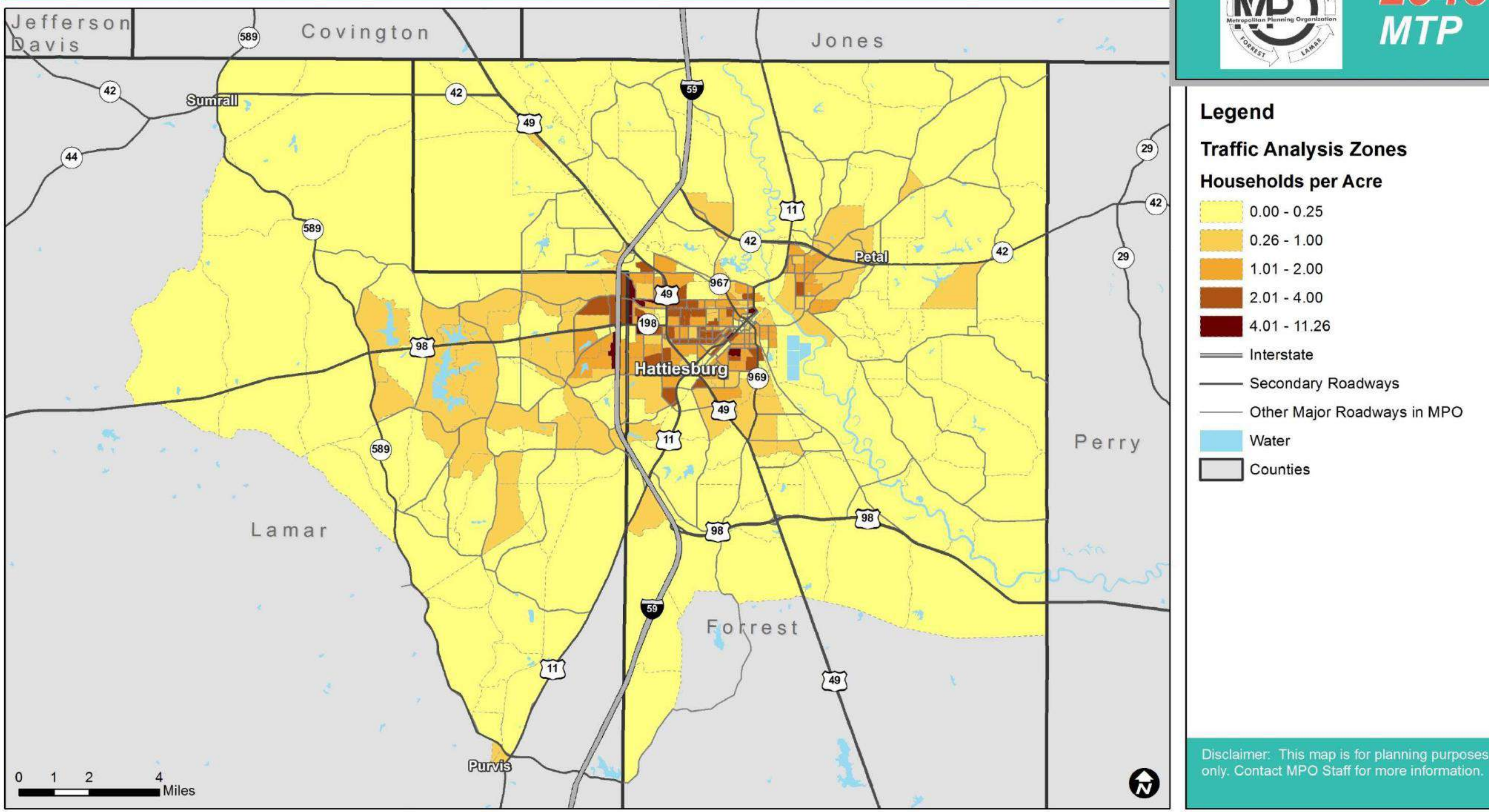


Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 7.4 HOUSEHOLD DENSITY, 2013

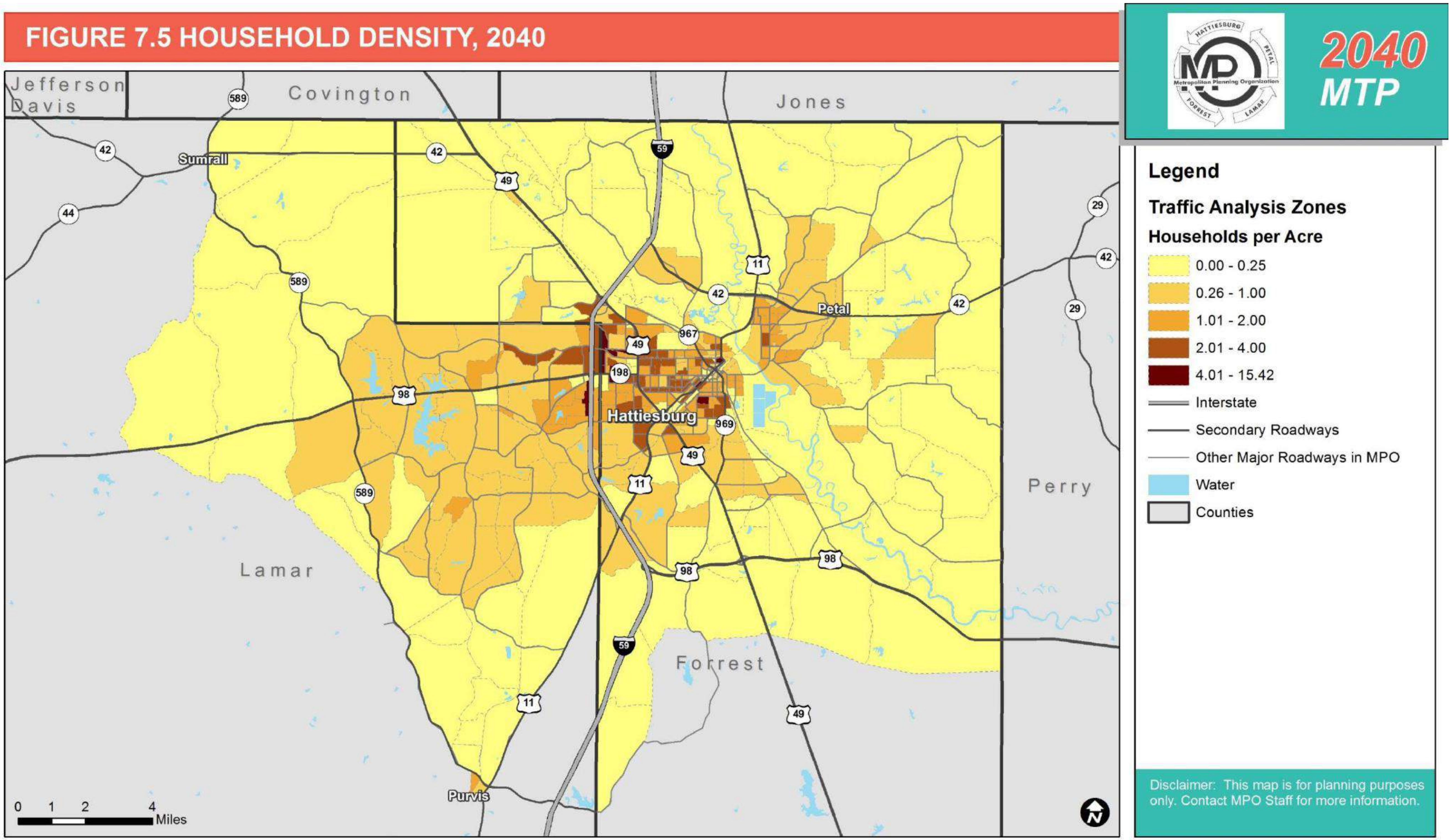
2040 MTP



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

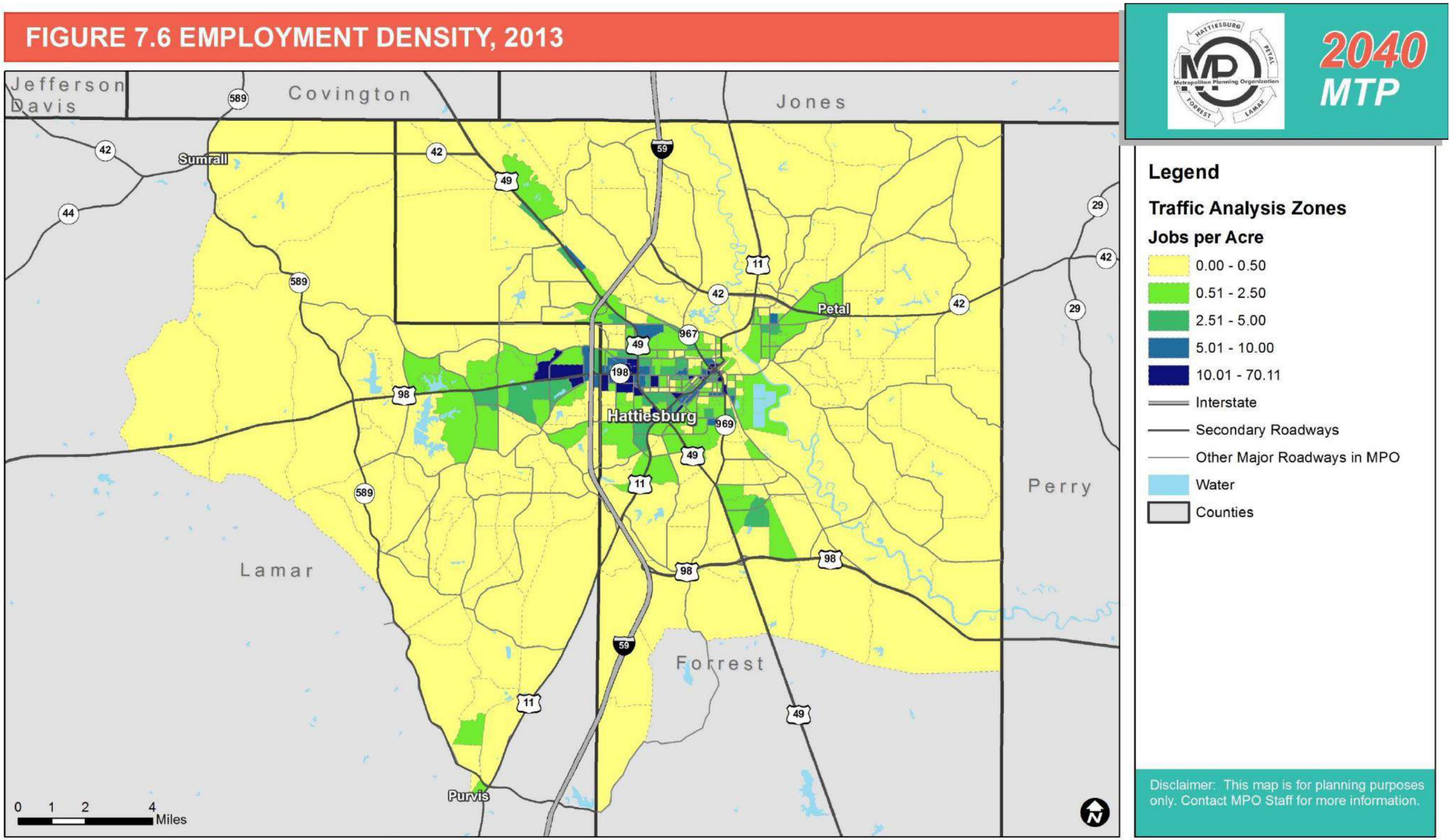
FIGURE 7.5 HOUSEHOLD DENSITY, 2040



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

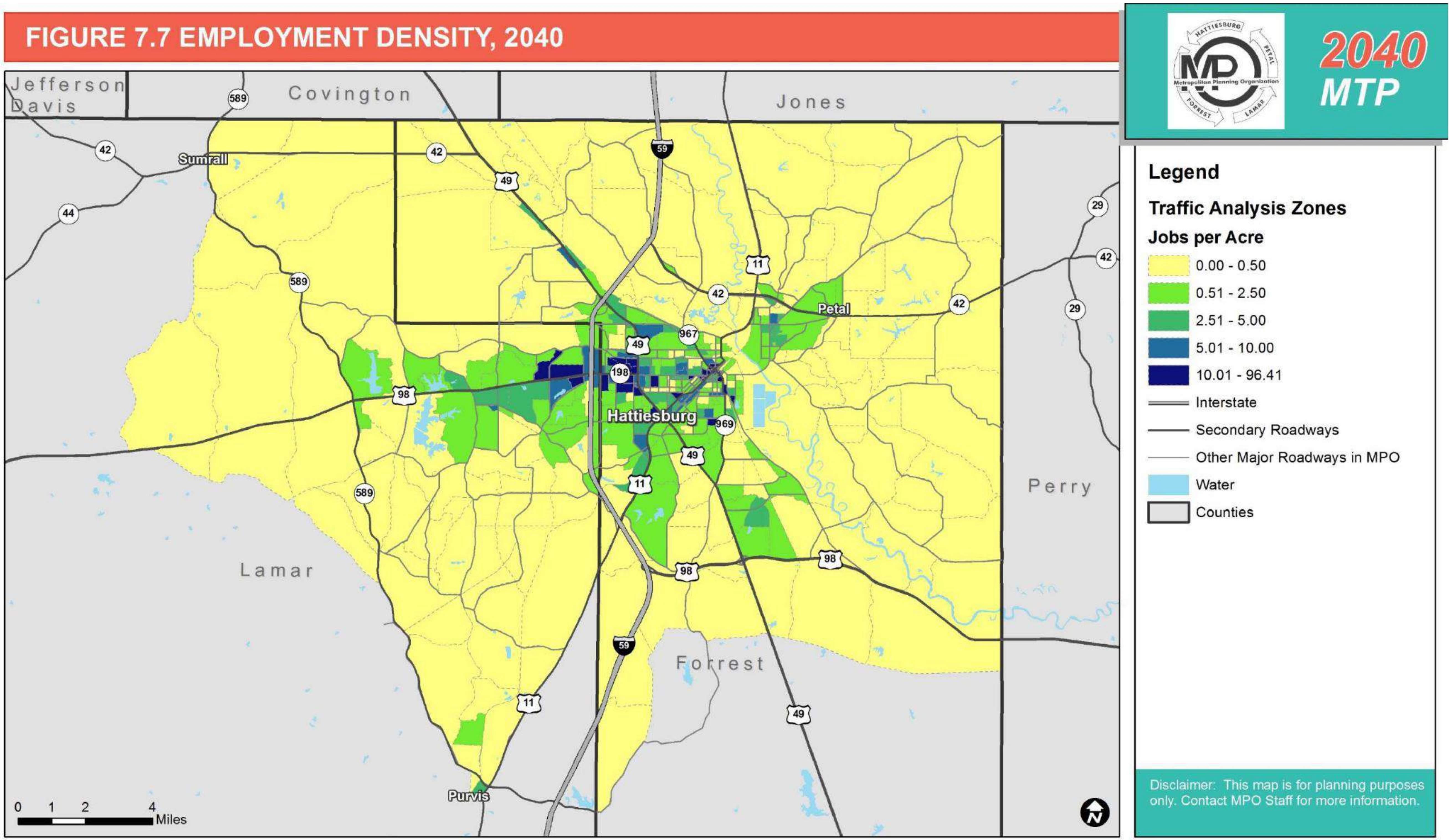
FIGURE 7.6 EMPLOYMENT DENSITY, 2013



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

FIGURE 7.7 EMPLOYMENT DENSITY, 2040

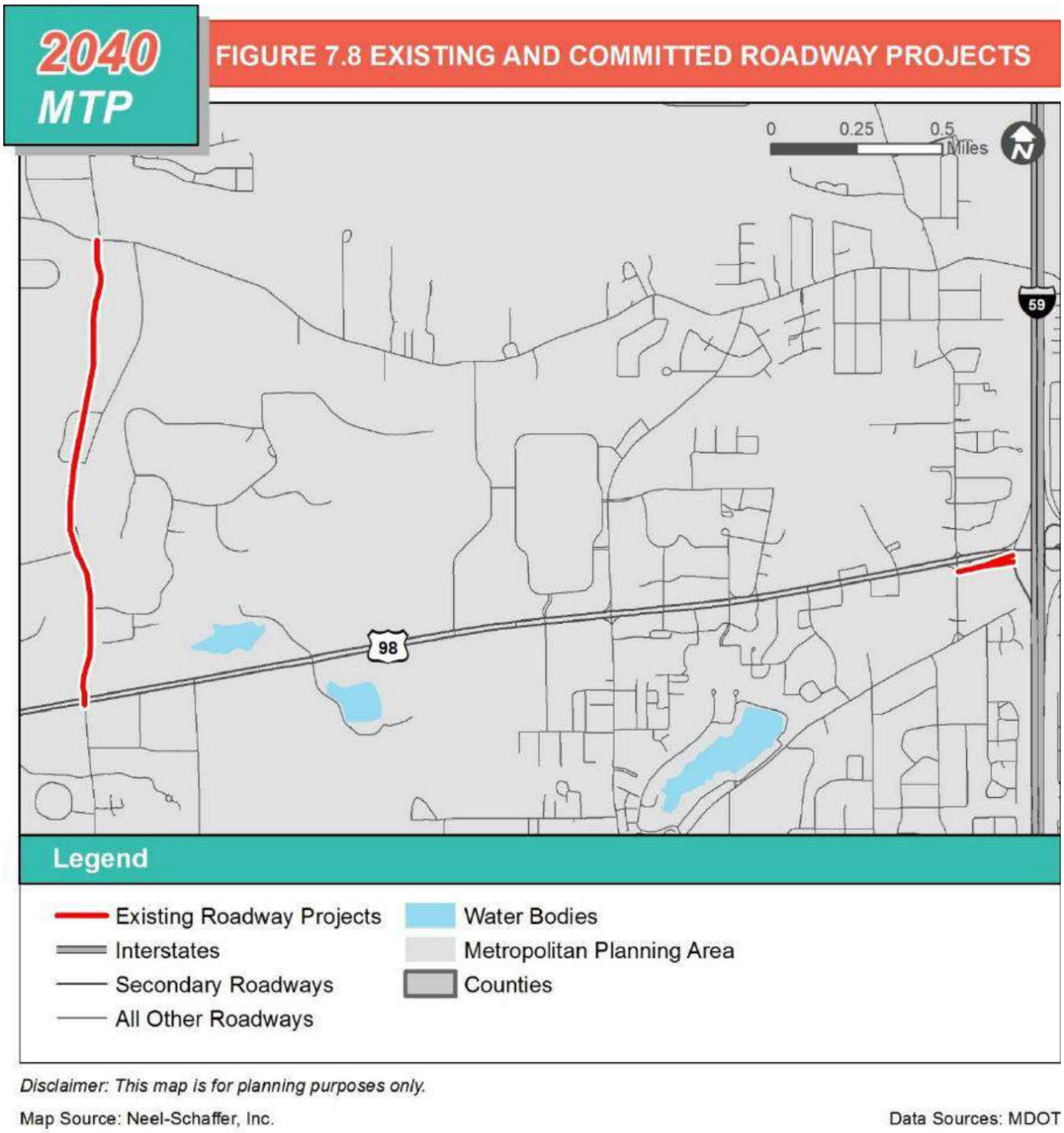


Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

7.3 Updating the Future Transportation Network

Improvements to the transportation network also affect travel demand. In addition to the socioeconomic forecasts, transportation projects that have committed funding or have been constructed since 2013 were noted. These projects were then added to the model network to create a 2040 Existing plus Committed (E+C) network. These E+C projects are depicted in Figure 7.8 and consists of the Jackson Road extension and interchange improvements at I-59 and Hardy Street.



7.4 Travel Demand Model Outputs

The primary outputs of the Travel Demand Model are vehicle trips, vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay. This information, when combined with roadway capacities and other network information, informs the needs analysis in Chapter 8: Future Transportation Need.

8.0 Future Transportation Need

This section discusses transportation issues that will need to be addressed in the future. It was developed by an analysis of existing conditions and travel demand model forecasts. However, existing plans, public involvement, and stakeholder input were also incorporated.

8.1 Roadways and Bridges

Congestion Relief

Given the population and employment growth forecasted to occur by 2040, the Hattiesburg Travel Demand Model indicates that the number of vehicle trips in the MPA will increase by nearly 30 percent, resulting in about 220,000 trips from 2013 to 2040. Most trip types grow by the same rate, but trips originating outside of the MPA are forecasted to grow slightly lower. These changes are summarized in Table 8.1.

Table 8.1 Vehicle Trips by Purpose, 2010 to 2040

Trip Purpose	2013	2040 (E+C)	Change	Percent Change
Home-Based Work	83,706	123,029	39,323	47.0%
Home-Based Other	183,361	269,441	86,080	46.9%
Non-Home Based	97,181	141,414	44,233	45.5%
Commercial Vehicle	32,995	44,777	11,782	35.7%
Truck	9,829	13,073	3,244	33.0%
External-Internal	88,296	121,467	33,171	37.6%
External-External	13,852	18,586	4,734	34.2%
Total	**509,220**	**731,787**	**222,567**	**43.7%**

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

Source: Hattiesburg Travel Demand Model, NSI

As shown in Table 8.2, if transportation projects that currently have committed funding are constructed then the centerline miles will increase by 0.6 percent because of new roadways and widening projects.

Table 8.2 also shows the forecast change in Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and hours of delay. This data indicates that both VMT and VHT will increase by about 40 and 67 percent respectively, largely due to the forecast growth and change in land use patterns. The change in hours of delay shows that without any additional projects beyond those already funded, the additional travel generated by this growth will result in a very high percent increase in delay. The minutes of delay per trip in 2040 would increase to 3.2 from 1.8 in year 2013, a 50 percent increase.

Table 8.2 Travel Demand Impact of Growth and Existing and Committed Projects, 2013 to 2040

Centerline Miles of Roadways				
Classification	2013 (Base)	2040 (E+C Projects)	Change	Percent
Interstate	22	22	0	0.0%
Principal Arterial	62	64	0	0.0%
Minor Arterial	76	76	0	0.0%
Collector	172	174	2	1.2%
Total	**332**	**334**	**2**	**0.6%**
Daily Vehicle Miles Traveled (VMT)				
Classification	2013(Base)	2040 (E+C Projects)	Change	Percent
Interstate	621,013	821,778	200,765	32.3%
Principal Arterial	1,134,731	1,503,836	369,105	32.5%
Minor Arterial	442,742	628,379	185,637	41.9%
Collector	413,955	706,645	292,690	70.7%
Total	**2,612,441**	**3,660,638**	**1,048,197**	**40.1%**
Daily Vehicle Hours Traveled (VHT)				
Classification	2013 (Base)	2040 (E+C Projects)	Change	Percent
Interstate	11,219	17,062	5,843	52.1%
Principal Arterial	30,592	50,642	20,050	65.5%
Minor Arterial	13,551	21,441	7,890	58.2%
Collector	11,813	23,204	11,391	96.4%
Total	**67,175**	**112,349**	**45,174**	**67.2%**
Daily Vehicle Hours of Delay (VHD)				
Classification	2013 (Base)	2040 (E+C Projects)	Change	Percent
Interstate	1,877	4,702	2,825	150.5%
Principal Arterial	9,269	22,581	13,312	143.6%
Minor Arterial	2,291	5,655	3,364	146.8%
Collector	1,698	5,925	4,227	248.9%
Total	**15,134**	**38,863**	**23,729**	**156.8%**

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

Source: Hattiesburg Travel Demand Model, NSI

While congestion is currently concentrated mostly near intersections in the Hattiesburg MPA, by 2040 congestion is forecast to become more widespread if only the existing and committed projects are implemented. The number of roadway segments with Volume to Capacity (V/C) ratios above 1.00 would increase from 12 in 2013 to 31 in 2040, as listed in Table 8.3 and illustrated in Figure 8.1.

It is important to note that not all segments with a high V/C ratio should be widened with additional through lanes or turning lanes. In urban settings, it may be more appropriate to consider ITS improvements like signalization improvements or reversible lanes. It also may be more appropriate to employ Transportation Demand Management (TDM) strategies and/or improve walking, biking, or transit conditions to encourage alternative means of transportation.

Table 8.3 Segments with Volume to Capacity Ratios above 1.00 in 2040 (E+C)

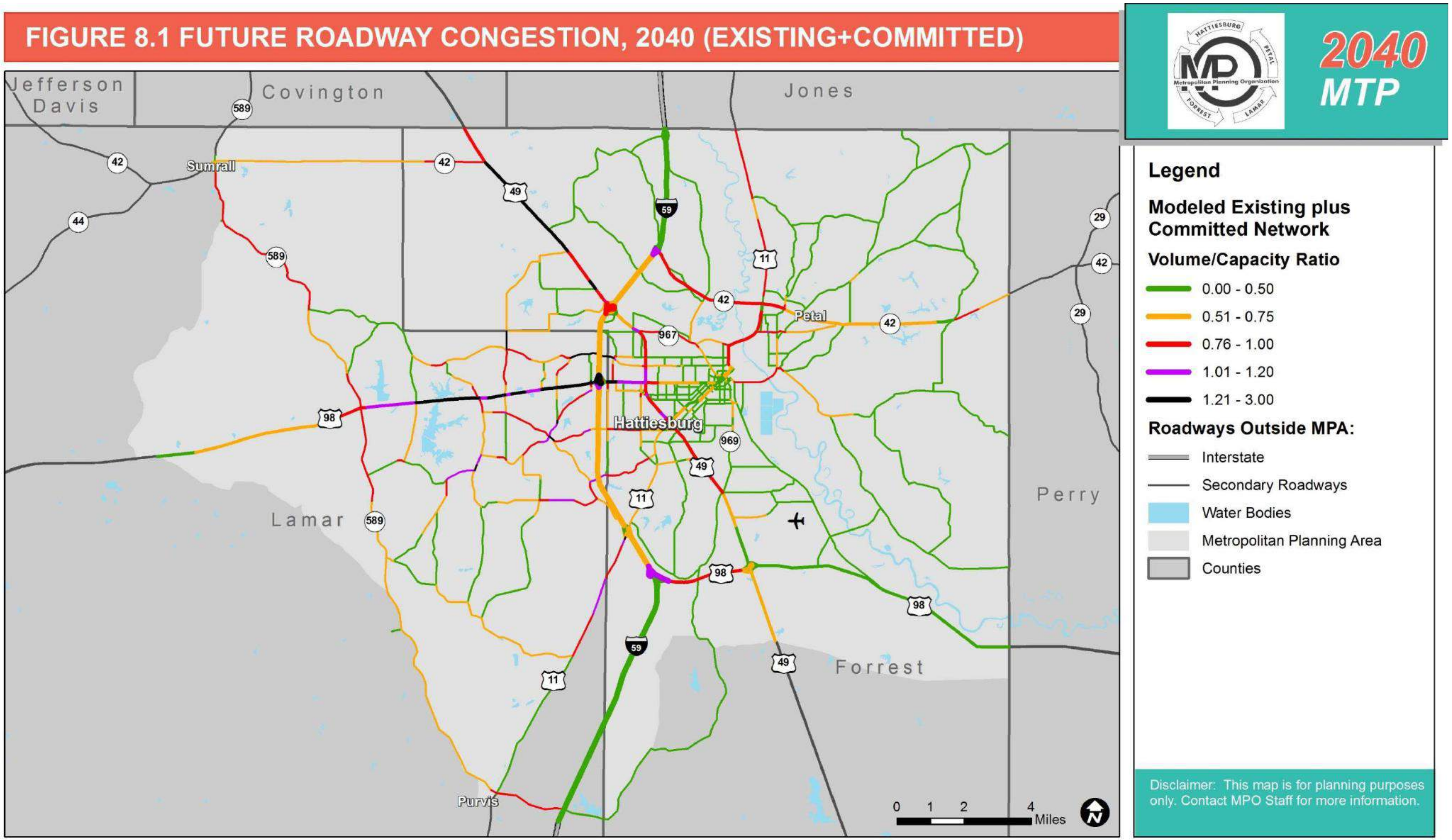
Route	Limits	Length (miles)
US 98/Hardy St	MS 589 to US 49	8.51
I-59 NB Clover On-Ramp	From US 98 EB	0.12
I-59 Collector-Distributor Road	I-59 NB Clover On-Ramp to I-59 NB On-Ramp	0.20
I-59 NB On-Ramp	I-59 Collector-Distributor Road to I-59	0.04
I-59 SB Off-Ramp	@ US 98	0.21
I-59 SB On-Ramp	@ US 98	0.16
I-59 NB Off-Ramp	I-59 to I-59 Collector-Distributor Road	0.06
I-59 SB Off-Ramp	@ MS 42	0.17
I-59 NB Off-Ramp	@ MS 42	0.17
I-59 NB On-Ramp	@ US 98 Bypass	0.60
I-59 SB Off-Ramp	@ US 98 Bypass	0.34
W 4th St	Weathersby Rd to N 37th Ave	1.42
MS 42	SB Ramps to NB Ramps on I-59	0.11
MS 42	US 49 to Rawls Springs Rd	3.63
MS 42	Blackwell Blvd to Rawls Springs Loop Rd	0.29
MS 42	Classic Dr to I-59 SB Ramps	0.07
MS 42	N George St to S George St	0.02
Oak Grove Rd	0.1 mi W of Lamar Ave to Westover Dr	0.19
US 49	N 31st Ave to Old Hwy 42	0.16

Route	Limits	Length (miles)
US 49	0.1 mi S of W 4th St to Hardy St	0.40
US 49	US 49 Frontage Rd Ramp to Mamie St	0.03
US 49	Bartur St to US 11 SB Ramps	0.17
US 11	0.16 mi S of Sullivan Kilrain Rd to I-59 SB Ramps	0.32
US 11	R D heartfield Rd to Steele Rd	0.98
Jackson Rd	J Ed Turner Dr to W 4th St	0.55
Lincoln Rd	Oak Grove Rd to Sandy Run Rd	0.19
Old Hwy 11	Old Hwy 24 to Oak Grove Rd	0.49
Old Hwy 24	Burnt Bridge Rd to Old Hwy 11	0.91
Oak Grove Rd	Friend Rd to Weathersby Rd	0.82
Richburg Rd	Carter Rd to Santmyer Rd	0.70
Richburg Rd	Sandy Run Rd to S 40th Ave	0.51

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

Source: Hattiesburg Travel Demand Model, NSI

FIGURE 8.1 FUTURE ROADWAY CONGESTION, 2040 (EXISTING+COMMITTED)



Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model

Roadway Safety Needs

Within the study area, a total of 14,248 automobile-only crashes occurred between 2011 and 2013. The majority of these crashes took place between the hours of 7 a.m. to 7 p.m., with the most crashes occurring from 12 p.m. to 6p.m.. These peak hour crashes are likely the result of intersections and/or roadways not being designed to operate efficiently when presented with large traffic volumes. Safety can likely be improved and collisions reduced by adjusting signal timing, intersection improvements and/or adding lane(s). Approximately 81 percent of crashes in the study area occurred during dry roadway surface conditions; therefore, roadway surface conditions do not play a major factor in the majority of crashes. The overwhelming majority of crashes, about 76 percent, occurred during the daylight hours. About 8 percent of crashes occurred at locations with no street lights during the nighttime hours (dark). The crashes that occurred under these conditions are likely the result of poor lighting and can be reduced by providing proper lighting at intersections.

Within the study area, there were a total of 46 fatal automobile-only crashes and 3,133 injury automobile-only crashes between 2011 and 2013. About three percent of the crashes that occurred in the study area involved alcohol, but nearly 10 percent of total fatal crashes were alcohol related. Hence, this study recommends promoting programs that aim to eliminate drunk driving.

The four highest collision types, making up nearly 86 percent of the crashes in the study area, were:

- Rear-end collisions
- Angle collisions
- Sideswipe collisions
- Run off road collisions

Recommendations for reducing these types of crashes are outlined below:

<u>Rear-End Collisions</u>

In the study area, rear-end collisions account for the largest amount of crashes. These crashes can be attributed to a number of factors. One main cause of rear-end accidents is the driver's inattentiveness. Other potential causes include large turning volumes, slippery pavement, inadequate roadway lighting, crossing pedestrians, poor visibility of a traffic signal, congestion, inadequate signal timing, and/or an unwarranted signal.

The crash data shows high concentrations of rear-end crashes along US Hwy 49 and US Hwy 98/Hardy St. The crashes occur primarily at intersections. Correlating the crash data with field conditions and observations reveal that many of these rear-end crashes may be influenced by intersection geometry and traffic operations. Rear-end crash frequency may be reduced by adjusting the yellow clearance intervals in compliance with the *Institute of Transportation Engineers (ITE)* recommended clearance interval practices. The number of crashes may further be reduced by reconfiguring the travel and turning lanes. This can be accomplished in a variety of methods including converting the two-way frontage roads to one-way frontage roads, providing exclusive right-turn lanes, providing advanced warning signs, providing indirect left-turns, or by displacing left-turn movements.

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

- Analyze turning volumes to determine if a right-turn lane or left-turn lane is warranted. Providing a turning lane separates the turning vehicles from the through vehicles, preventing through vehicles from rear ending turning vehicles. If a large right turn volume exists, increasing the corner radius for right turns is an option.
- Checking the pavement conditions. Rear-end collisions caused by slippery pavement can be reduced by lowering the speed limit with enforcement, providing overlay pavement, adequate drainage, groove pavement, or with the addition of a "Slippery When Wet" sign.
- Ensure roadway lighting is sufficient for drivers to see the roadway and surroundings.
- Determine if there is a large amount of pedestrian traffic. Pedestrians crossing the roads may impede traffic and force drivers to stop suddenly. If crossing pedestrians are an issue, options include installing or improving crosswalk devices and providing pedestrian signal indications.
- Check the visibility of the traffic signals at all approaches. In order to provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, installing 12" signal lenses, visors and back plates, or relocating/adding signal heads.
- Verify that the signal timing is adequate to serve the traffic volumes at the trouble intersections. Options include adjusting phase-change interval, providing a red-clearance interval, providing progression, and utilizing signal actuation with dilemma zone protection.
- Verify that a signal is warranted at the given intersection.

Angle Crashes

Angle collisions are the second most prevalent collision type in the study area between 2011 and 2013. They can be caused by a number of factors, including restricted sight distance, excessive speed, inadequate roadway lighting, poor visibility of a traffic signal, inadequate signal timing, inadequate advance warning signs, running a red light, and large traffic volumes.

In general, the recommendations for reducing right angle collisions include:

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

Sideswipes

Sideswipes are the third most prevalent crashes that occurred in the study area. They can be caused by a number of factors including excessive speed, inadequate roadway lighting, poor pavement markings, large traffic volumes, and driver inattentiveness.

The recommendations for reducing sideswipes include:

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

Other Collision Types

Within the study area, there are a number of other collision types that are prevalent, including left turn-angle, left turn-opposite, left turn-same, right turn-same, right turn-opposite, sideswipe-same, and sideswipe-opposite.

In general, the recommendations for increasing the safety and reducing the number of crashes at all the study intersections include:

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

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

Develop a Safety Management System (SMS)

Traffic safety programs are relatively uniform from state to state in their approach to making the highway system safer for their users. The typical traffic safety program combines several different features from a SMS, which all states were mandated to have under ISTEA in 1991. Under ISTEA, the SMS was required to address:

- Coordinating and integrating safety features for the various modes of travel
- Identifying hazardous locations, investigating them, and establishing countermeasures to increase safety
- Early consideration for safety in all highway projects and programs
- Identifying safety needs of special user groups (handicapped, elderly, etc.)
- Routinely maintaining and upgrading the safety features on the roadways
- Marketing safety programs to encourage community involvement

The SMS mandate was later withdrawn due to the 1995 National Highway System Designation Act. However, MAP-21 Section 1203 requires that each state and MPO have a planning process that addresses the safety performance measure to "achieve a significant reduction in traffic fatalities and serious injuries on all public roads." MAP-21 also retains the SAFETEA-LU requirement that the planning process address the need to "increase the safety of the transportation system for motorized and non-motorized users." A traffic safety program involves several steps.

The typical traffic safety program includes:

- A crash record system
- Identification of hazardous locations
- Engineering studies
- Selection of countermeasures
- Prioritization of improvement projects
- Planning and implementation of improvement projects
- Evaluation of the implemented projects

The crash record system should contain data on individual crashes that occur in the area. The crash data should include the following information:

- Time,
- Date,
- Weather condition,
- Pavement condition,
- Driver, and
- Roadway.

The primary source for this data is usually police reports from local jurisdictions. In order for this record system to be useful, the data has to be processed and available on a timely basis so that it can be analyzed.

The identification of hazardous locations is based on actual crashes that have occurred, and/or the potential of an area to have a high number of crashes. The severity of these crashes must also be considered in order to prioritize the locations and develop solutions for them. Once the hazardous locations are identified, engineering studies can be conducted using the crash record system data. An analysis can use crash frequency, crash rate, Equivalent Property Damage Only (EPDO) rates, and other methods. Supplemental data from police comments and citizen complaints can also be used in the analysis process in order to find the causes of the crashes.

Once the causes of the crashes have been determined, countermeasures are proposed and then evaluated. Improvement projects are then selected based on the benefits they provide compared to the cost to implement them. Sometimes, enforcement and education may be all that is necessary in order to reduce the number of crashes. Other times, multiple projects may be needed to mitigate a particular problem area.

Once projects have been selected, they need to be prioritized based on their cost and benefits. Not all improvement projects will be able to be implemented due to funding limitations. After the projects have been selected and prioritized, an implementation plan should be developed to help ensure that resources and finances are available to complete the improvement projects in a timely manner. Implementation of projects should occur as soon as possible to avoid cost increases and prevent potential crashes that may occur without the project in place.

Projects must be evaluated to determine whether they are effective or can be used to address similar problems in the future. This is typically done in a before-and-after analysis by observing the frequency and severity of the crashes several years before the implementation of the project, and then for several years after the project has been completed. Two issues can arise in this method of analysis. First, if enforcement and/or education change from before to after conditions, it can affect the number of crashes at that location. Second, "regression to the mean", a statistical phenomenon that can make natural variation in repeated data look like real change, must be taken into account to ensure that change in crash patterns and/or frequency can be attributable to the safety projects. In order to correct these two issues, control sites should be established that are similar to the study locations, but have not had any changes made to them.

Roadway Maintenance Needs

According to 2013 data from the FHWA's Highway Performance Monitoring System, most of the pavements on major roadways in the MPA are in good or fair condition, as measured by the International Roughness Index (IRI).

Table 8.4 shows the major roadway segments in the MPA that were in poor condition in 2013 and have not been repaved.

Table 8.4 Roadway Segments in MPA with Poor Pavement Conditions

Route	From	To	Miles	Functional Class	Average Daily Traffic	IRI
US 11	Main St	E 4th St	0.60	Arterial	1,400-6,800	245
US 49	MS 42	Irby Rd	1.87	Arterial	24,000	186

Source: HPMS, 2013

Bridge Deficiencies

The existing conditions analysis revealed that there are currently 19 bridges in poor condition in the Hattiesburg MPA, two of which are on the NHS. The two bridges on the NHS in poor condition are the northbound and southbound bridges above the Bouie River on I-59.

Table 8.5 ranks the 19 bridges in poor condition in the MPA by their sufficiency ratings, regardless of location on the NHS. By addressing the needs of these bridges, the MPO can prevent/improve safety and reduce bridge-related bottlenecks. Furthermore, by addressing the bridges in poor condition on the NHS, the MPO can also improve its performance on national performance measures, which are currently proposed to only be concerned with the NHS bridges.

While some of these deficient bridges may be improved in the 2040 MTP incidental to other transportation projects, such as a roadway widening projects, the MPO and MDOT should prioritize these bridges for improvements as funding becomes available.

Table 8.5 Worst Performing Bridges in Poor Condition by Sufficiency Rating

Facility	Feature Intersecting	County	Year Built	Sufficiency Rating	Special Classification
US 11	Greene Creek	Forrest	1931	7.0	Structurally Deficient
James St	Burketts Creek	Forrest	1965	7.0	Structurally Deficient
Chappell Hill Rd	Greens Creek	Forrest	1970	12.6	Structurally Deficient
Sunrise Rd	Reese Creek	Forrest	1960	15.9	Structurally Deficient
Broad St	Gordons Creek	Forrest	1937	18.8	Structurally Deficient
Pinehills Dr	Branch Of Gordons Creek	Forrest	1975	23.3	Structurally Deficient
Byron St	Branch Of Gordons Creek	Forrest	1975	23.3	Structurally Deficient
McLeod St	Gordons Creek	Forrest	1929	25.8	Structurally Deficient
12th Ave	Gordons Creek	Forrest	1980	28.1	Structurally Deficient
Hillendale Dr	Gordons Creek	Forrest	1979	28.5	Structurally Deficient
Hardie Rd	Mill Creek	Lamar	1987	30.9	Structurally Deficient
Hillendale Dr	Gordons Creek Hillendale	Forrest	1973	33.0	Structurally Deficient
Campbell Scenic Dr	Mixon Creek	Forrest	1970	36.0	Structurally Deficient
Old Corinth Rd	Dry Prong Creek	Forrest	1997	36.5	Structurally Deficient
Lynn Ray Rd	Boggy Branch	Forrest	1979	36.6	Structurally Deficient
Cedar Rd	Lotts Creek	Forrest	1986	36.8	Structurally Deficient

Facility	Feature Intersecting	County	Year Built	Sufficiency Rating	Special Classification
Unetta St	Gordons Creek	Forrest	1960	39.9	Structurally Deficient
I-59	Bouie River	Forrest	1960	62.9	Structurally Deficient
I-59	Bouie River	Forrest	1960	62.9	Structurally Deficient

Source: National Bridge Inventory, 2013

Alternative Fuel Vehicle Infrastructure Needs

While AFVs only made up approximately seven percent of all light-duty vehicles in the U.S. in 2013, by 2040 the U.S. Energy Information Administration's *Annual Energy Outlook* anticipates that the AFV market share will grow to about 16 percent. In terms of raw numbers, the report forecasts a roughly threefold increase from approximately 15.8 million light-duty vehicles to 45.4 million light-duty vehicles.

The two biggest gainers amongst AFVs are ethanol vehicles (+16.9 million) and electric vehicles (+12.1 million), which together account for about 98 percent of the forecasted growth in light-duty AFVs through 2040. While electric vehicles are forecast to grow at a much faster rate than ethanol vehicles, accommodating the increase in both types of AFVs will require regional transportation systems to provide additional infrastructure (i.e. fuel/charging stations).

The Hattiesburg MSA currently has only one publicly accessible electric vehicle charging station. This translates to about 0.7 per 100,000 residents, which is below the 2.3 per 100,000 average for MSAs with populations less than 250,000 and significantly below the rates of the top performing small MSAs. Furthermore, there are currently no E85 stations in the MSA.

In order to ensure that the current and future infrastructure needs for these two growing types of AFVs are being met, the MPO needs to further study the regional demand for AFVs and examine the most appropriate role of the MPO in encouraging and accommodating increases in their use.

8.2 Bicycle and Pedestrian Need

High Demand Areas and Projects

The latent demand analysis in Chapter 6: The Existing Transportation System highlights many areas of high demand. In particular, the areas of greatest demand are around the University of Southern Mississippi, the Hattiesburg CBD, and the area between the Hattiesburg CBD and William Carey University.

Given the poor rating of sidewalks and crosswalks in the MPA by the public, the existing conditions and latent demand analyses in Chapter 6, and the recommendations in the MPO's Pathways Master Plan, the existing bicycle and pedestrian system does not meet the needs of the Hattiesburg MPA. While new residential subdivisions in Hattiesburg are providing sidewalks, per the city's subdivision regulations, and new roadway projects funded with state or federal funds will include bicycle and pedestrian facilities, much of the MPA transportation right-of-ways are in need of retrofitting to accommodate bicyclists and pedestrians.

The MPO's Pathways Master Plan prioritizes pedestrian improvements along major roadway corridors and in zones around schools, parks, and other major generators. It also recommends a network of on-street bikeways and shared use paths. While the 2040 MTP recognizes a high need for bicycle and pedestrian improvements, it does not identify specific bicycle and pedestrian projects. Instead, it defers to the MPO's Pathways Master Plan and local governments and institutions to identify high-need projects to worthy of pursuing federal funding.

The reason for this approach is that bicycle and pedestrian planning is much more subject to local conditions than other modes of transportation. Right-of-Way issues, facility design, and alternatives evaluation greatly impact bicycle and pedestrian project development. The MTP is not intended to analyze areas in this great of detail.

Bicycle and Pedestrian Policies

The MPO should encourage all local governments to revisit their development ordinances and consider requiring pedestrian and bicycle accommodations for new development with urban densities or in close proximity to urban areas. This will ensure that future development addresses bicycle and pedestrian needs and does not exacerbate existing system gaps and deficiencies.

For future federally funded transportation projects, bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist. In order to assess the project-specific bicycle and pedestrian needs, the surrounding context will be considered, including: land use patterns; existing, informal bicycle or pedestrian activities; any reference to bicycle or pedestrian needs in the planning process; and public, agency, or other comments requesting bicycle or pedestrian facilities. This approach is consistent with federal guidance.

Local jurisdictions may take this a step further by adopting Complete Streets policies or ordinances which require similar or more stringent actions for all locally funded transportation projects, regardless of involvement of federal funding.

8.3 Public Transit Need

Maintaining and Improving the Existing System

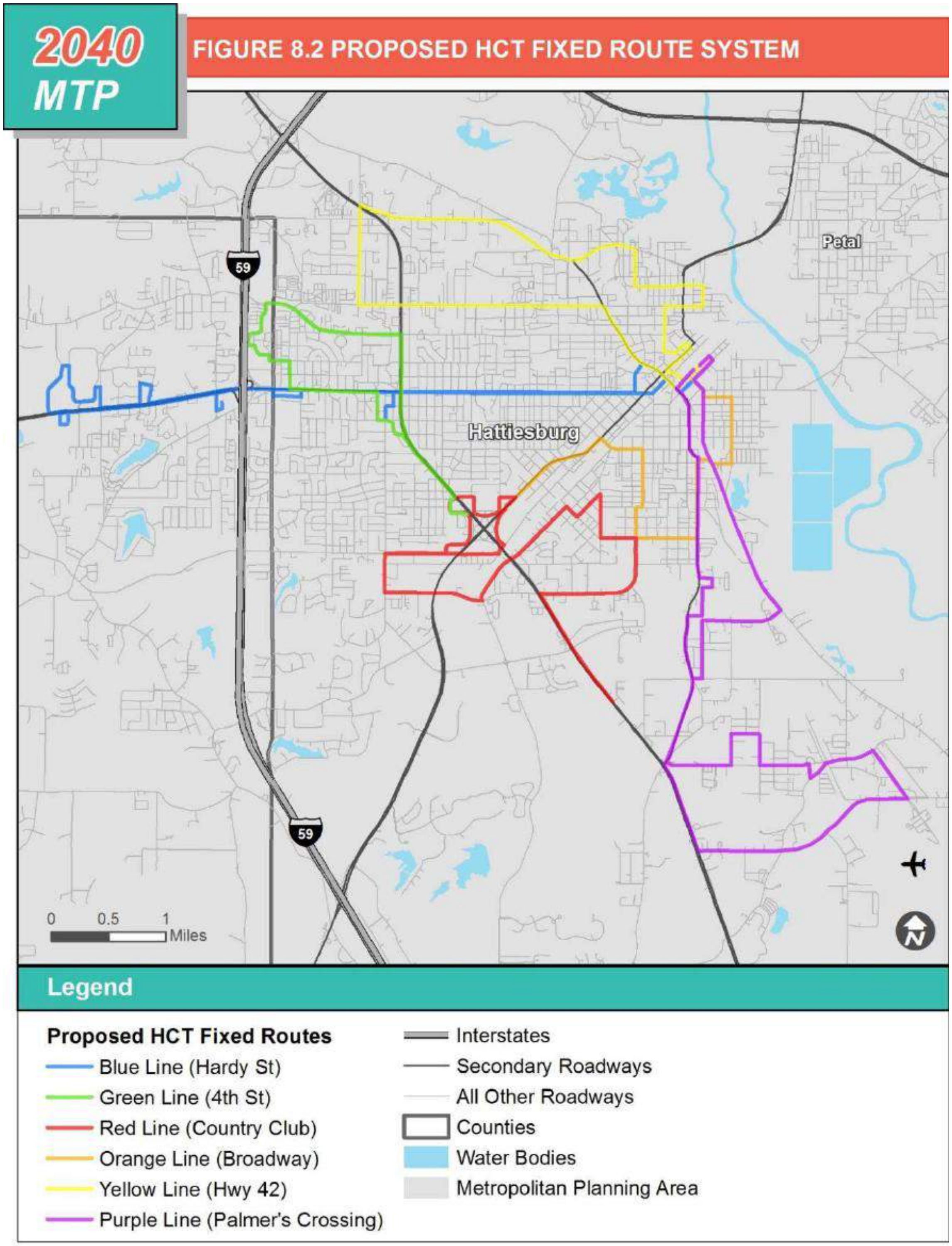
The main issue for maintaining the existing system in the future will be maintaining vehicles in good condition. Hub City Transit (HCT) will ensure its vehicles are in good condition and the MPO includes funding for the replacement and rehabilitation of vehicles in the staged improvement plan in Chapter 11: Implementation Plan.

Beyond maintaining the existing system, improving the existing level of service is the greatest and most urgent need. The existing conditions revealed that there is a lack of sidewalks near transit stops and route headways are currently very long.

The MPO should work with the HCT/city of Hattiesburg and other agencies to prioritize pedestrian improvements near transit stops, especially near major generators.

Currently, there are route modifications being proposed by the city of Hattiesburg that will make the system more efficient and increase the level of service in some areas. These modifications, illustrated in Figure 8.2, utilize the same number of buses and should be implemented before expanding the system by increasing the number of buses.

No safety or security information was reported for HCT because it uses a small systems waiver. Therefore, no assessment of safety or security needs was made for the 2040 MTP.



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: City of Hattiesburg

Increasing Transit Service

When compared to fixed route transit systems in peer urbanized areas (Chapter 6: The Existing Transportation System), HCT provides a low level of service. Out of the five selected peer areas in the South, three systems provide 2-4 times the number of annual vehicle revenue miles as HCT and have an annual ridership of 6-12 times that of HCT. While a direct comparison is limited because of differences in the built environment from place to place, the peer analysis indicates that Hattiesburg lags many of its southern peers in providing fixed route transit service.

For the Hattiesburg MPA to be economically competitive amongst its peers, the MPO must encourage HCT and other agencies to increase the current level of service for public transit. This can be done primarily by increasing route frequencies, expanding hours of operation, extending coverage to new areas, redesigning routes to be more efficient, and improving stop accommodations and ADA accessibility.

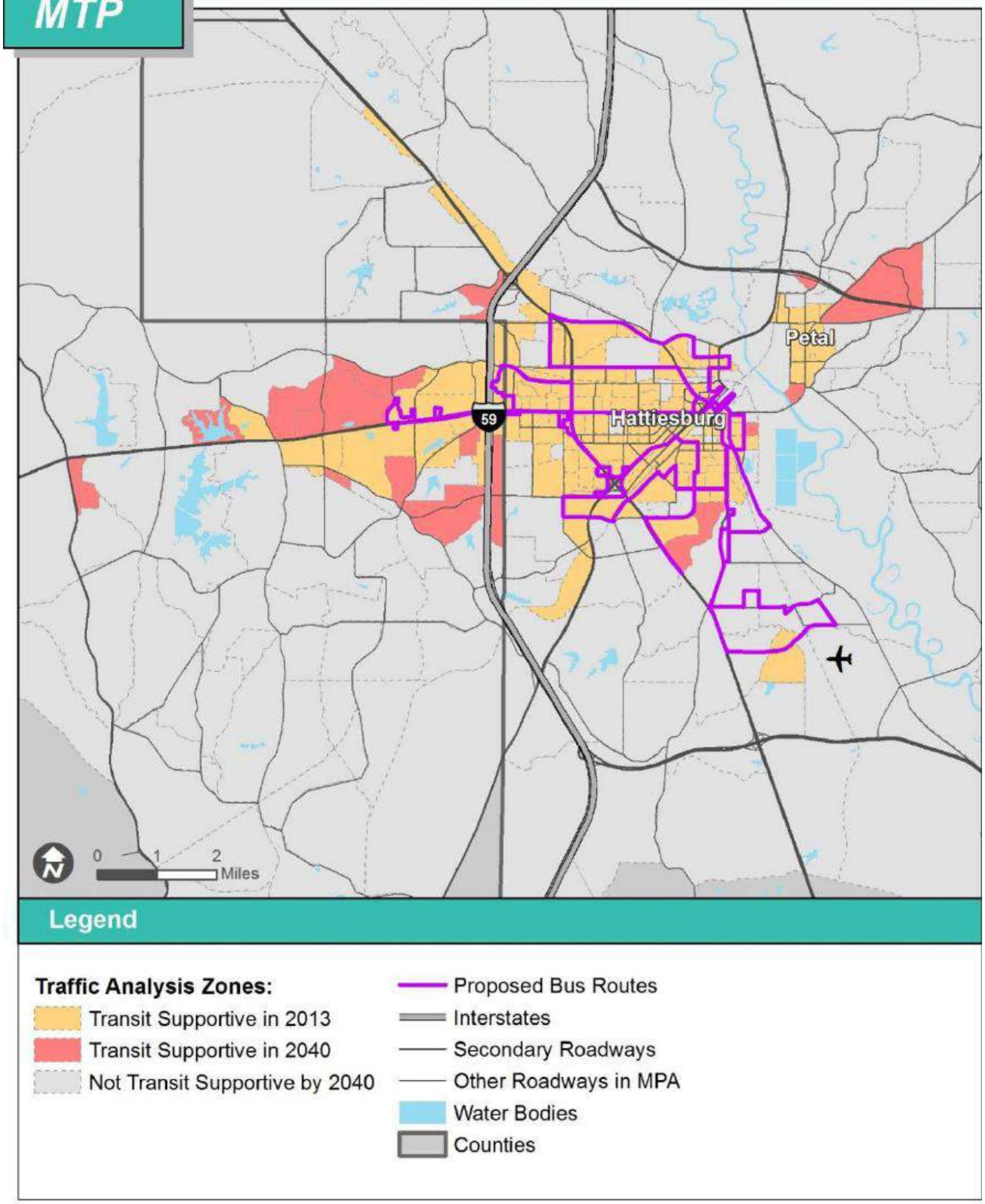
The latent demand analysis in Chapter 6: The Existing Transportation System shows there are many areas of moderate demand that are not currently served by fixed routes in the MPA, even if routes are modified as currently proposed. The main area in need of fixed route service that is not currently being served is Petal.

Beyond areas of existing demand, future growth will increase demand in some areas of the MPA. Using the socioeconomic forecast data developed for the Hattiesburg Regional Travel Demand Model, the number of Traffic Analysis Zones (TAZs) that meet or exceed two (2) households or jobs per acre in 2013 and 2040 were compared. While some areas that met this activity density threshold in 2013 are forecasted to decline at such a rate that they would not meet this threshold in 2040, the number and distribution of instances was insignificant. However, there were several areas that grew at such a rate that they exceeded this threshold by 2040 despite being below the threshold in 2013. These areas are illustrated in Figure 8.3.

The growth areas worth noting are along US 98 in Lamar County, MS 42 in Petal, and Lincoln Road in Lamar County. By 2040, depending on the development patterns, there may be moderate to high transit demand in these areas.

2040 MTP

FIGURE 8.3 TRANSIT SUPPORTIVE DENSITIES, 2013-2040



Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: Hattiesburg Regional Travel Demand Model; City of Hattiesburg

Funding for Increasing Transit Service

If transit service is to be increased to a level significantly above the current or proposed level of service, additional transit revenues will need to be identified and collected. While federal grants can be used to subsidize operating and capital costs, additional local sources of funding will be necessary to match and supplement federal funds. Simply matching federal funding will not provide enough funding to expand transit service to a level that is truly convenient and accessible.

An analysis of the operating costs of the peer systems, provided in Table 8.6, shows that all of the peer transit systems are less reliant on federal funding for operations, especially those that provide much higher levels of service. While fare revenues tend to cover a larger share of operating costs for systems that provide higher levels of service, local funds also cover a substantially higher share.

The Hattiesburg MPA will need to identify dedicated local funding source(s) in order to significantly improve transit service. Raising fares should be explored based on the peer analysis, but fare increases alone will not be enough to fund the improvements necessary to substantially improve the level of service.

Table 8.6 Sources of Operating Funds Expended by Transit System

Transit System	Vehicle Revenue Miles (Fixed Route)	Share of Operating Cost by Source				
		Federal Assistance	State Funds	Local Funds	Fare Revenues	Other Funds
HCT (Hattiesburg, MS)	175,963	66.0%	0.0%	30.1%	3.6%	0.3%
JET (Jonesboro, AR)	192,780	55.1%	35.9%	0.0%	7.4%	1.6%
CUATS (Cleveland, TN)	211,320	48.8%	18.5%	16.1%	4.3%	12.3%
RTD (Rome, GA)	454,104	45.2%	0.0%	32.4%	21.3%	1.1%
JTA (Jackson, TN)	568,940	40.6%	14.1%	24.0%	19.9%	1.4%
Monroe Transit (Monroe, LA)	776,328	28.9%	4.4%	46.3%	19.1%	1.3%

Source: National Transit Database, 2013

8.4 Freight Need

Trucking Need

Forecast Growth

Table 8.7 shows the growth in freight tonnage for trucks in the MPA counties from 2011 to 2040, as projected by Transearch/IHS Freight Finder. This data suggests that freight truck tonnage will grow slightly faster than the state of Mississippi as a whole.

Table 8.7 Change in Inbound and Outbound Truck Freight Tonnage in MPA Counties, 2011-2040

	2011	2040	Change	Percent Change
Forrest County, MS	2,072,118	3,613,502	1,541,384	74.4%
Lamar County, MS	1,123,982	2,044,895	920,913	81.9%
MPA Counties	3,196,100	5,658,397	2,462,297	77.0%
Mississippi	115,368,000	192,202,000	76,834,000	66.6%

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Table 8.8 shows, in a general sense, where freight being transported on trucks is projected to be going. By comparing this table to the same information for 2011 in Table 6.23 (Chapter 6), the following observations emerge:

- When combined, the MPA counties follow the statewide trend of out-of-state export tonnage growing more rapidly than out-of-state import tonnage. However, at the county level, the percent change in export tonnage is actually slightly lower than that of import tonnage.
- Export tonnage to other counties in Mississippi from the combined MPA counties is projected to grow twice as fast as import tonnage from other counties in Mississippi.
- The percent growth in tonnage from trips beginning and ending in Forrest County is projected to increase at a rate approximately 2.5 times that of the county's overall percent growth in tonnage.

Table 8.8 Inbound and Outbound Freight Truck Movement in the MPA by Direction by Weight, 2040

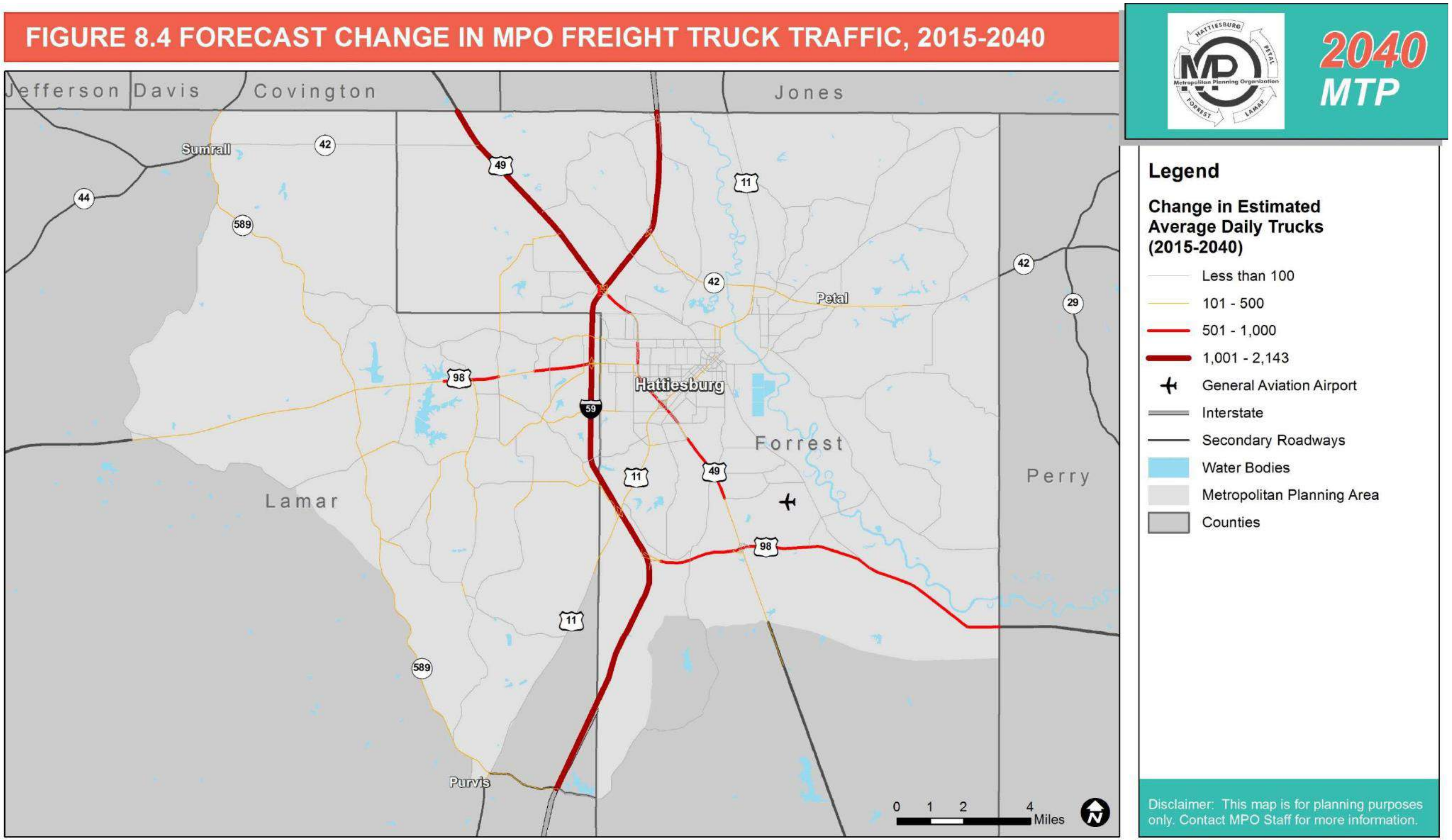
	From Outside Mississippi	To Outside Mississippi	From Other Mississippi County	To Other Mississippi County	Within County	Total
Forrest County, MS	1,074,114	890,440	445,254	1,193,494	10,201	3,613,502
Lamar County, MS	517,069	761,251	168,705	595,433	2,437	2,044,895
Combined	1,591,183	1,651,691	613,959	1,788,926	12,638	5,658,397

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Figure 8.4 illustrates where growth in freight truck traffic is anticipated to be the highest in the MPA. Figure 8.5 then shows the 2040 estimated truck volumes on roadways in the Hattiesburg MPA. Most growth is along existing major freight corridors such as I-59, US 49, and US 98 and to a lesser extent MS 589, MS 42, and US 11.

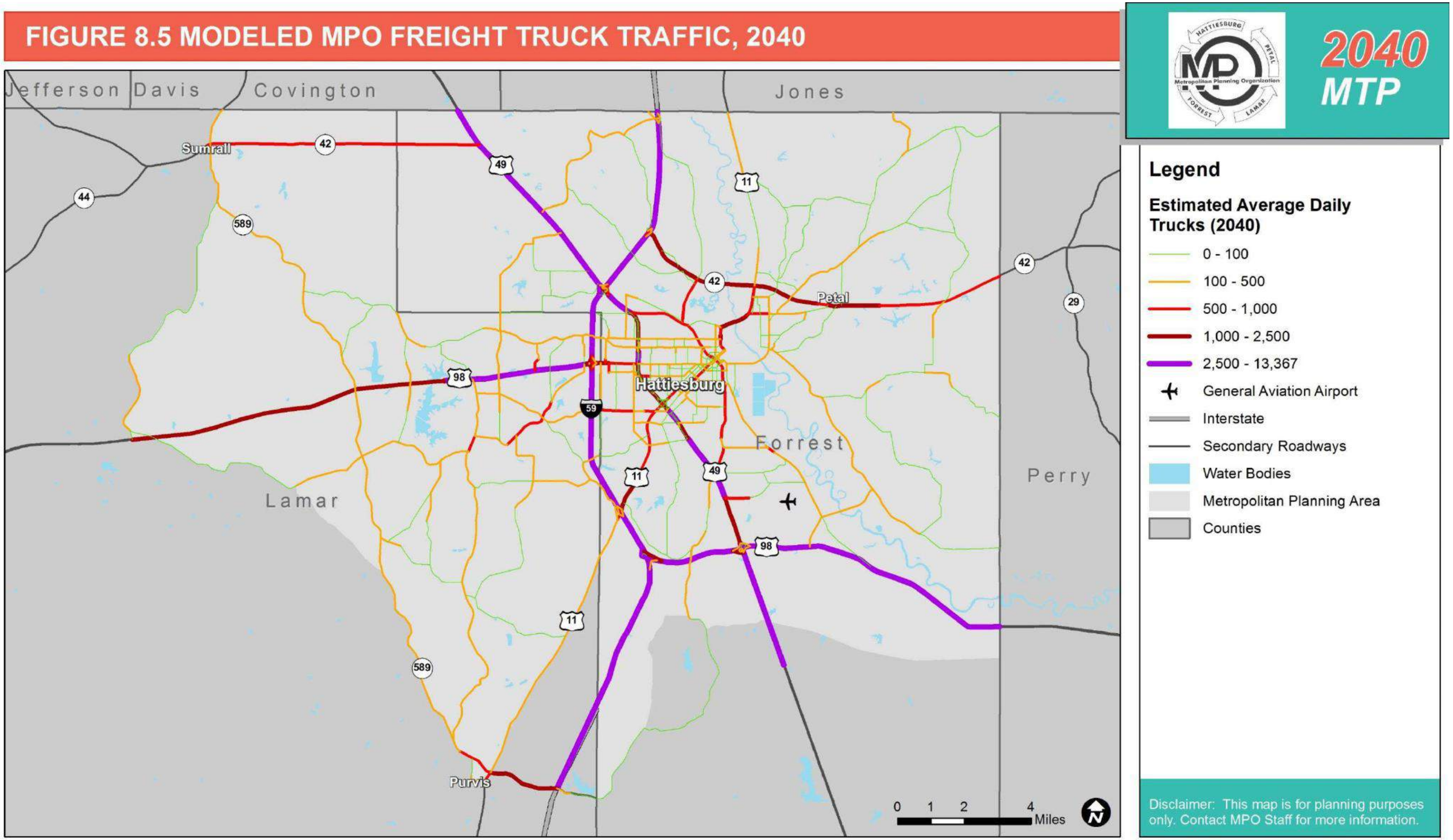
FIGURE 8.4 FORECAST CHANGE IN MPO FREIGHT TRUCK TRAFFIC, 2015-2040



Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

FIGURE 8.5 MODELED MPO FREIGHT TRUCK TRAFFIC, 2040



Map Source: Neel-Schaffer, Inc.

Data Sources: Statewide Freight Travel Demand Model; 2014 National Transportation Atlas; Census Bureau

Roadway Capacity and Reliability

One way to address travel time reliability for freight trucks is through Intelligent Transportation System (ITS) improvements. The Mississippi Statewide Freight Plan recommends leveraging the deployment of the Hattiesburg region ITS Incident Management System and TMC Operations to include expanded commercial vehicle elements. Beyond ITS improvements, traditional capacity improvements can alleviate congestion-related delay.

Table 8.9 and Figure 8.6 show the roadway segments that accommodate a large number of freight truck trips and experience some form of congestion. Either the segment experiences traffic volumes that exceed the roadway capacity (max) or it experiences significant peak period delay (peak). These segments represent the highest need for capacity/reliability improvements that would improve freight conditions.

The peak period delay was quantified by a travel time index that compares roadway speed during peak periods to roadway speed during free flow conditions. Areas that experienced at least a 10 percent decline in speed were considered to experience significant peak period delays.

Table 8.9 Major Freight Roadways with Congestion Issues

Facility	From	To	Estimated Daily Trucks (2040)	MFN	Congestion
US 49	Rawls Springs Rd	MS 42	8,100-8,300	Tier I	Max
MS 198 (Hardy St)	US 49	I-55	900-2,100	No	Peak, Max
US 98 (Hardy St)	I-55	Lakewood Dr	3,300-4,800	Tier II	Peak, Max
US 98	Lakewood Dr	Jackson Rd	2,500-3,300	Tier II	Max
US 98	Jackson Rd	Old Hwy 11	2,600-2,800	Tier II	Peak, Max
US 98	Old Hwy 11	MS 589	1,800-2,600	Tier II	Max
Oak Grove Rd	Weathersby Rd	Friend Rd	500-800	No	Max

Note: Peak congestion means that the corridor has reliability issues during AM or PM peaks. Max means that the daily volumes in 2040 exceed the capacity.

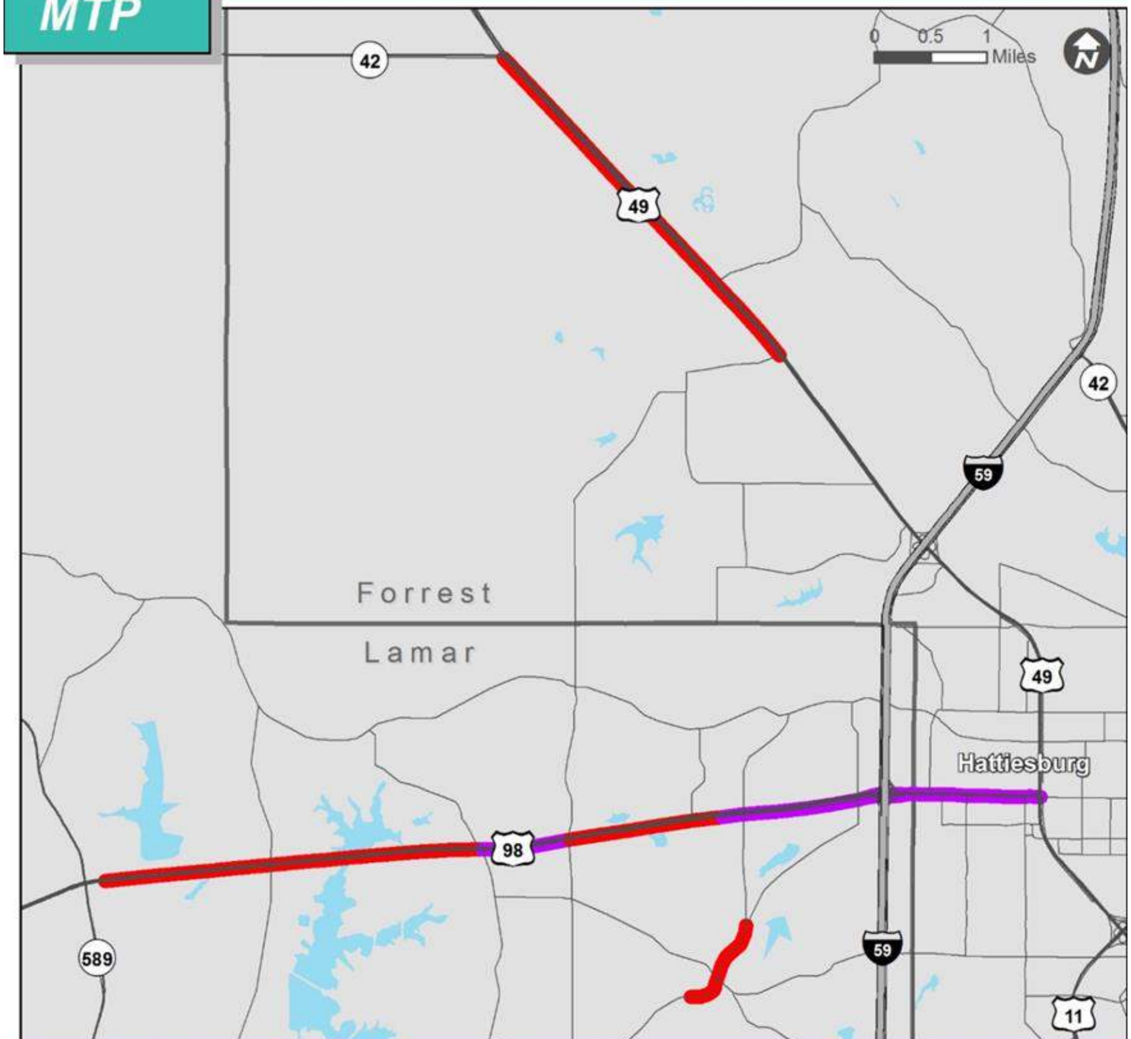
Safety

The analysis of freight truck crashes suggests the following improvements are the greatest freight truck safety needs in the Hattiesburg MPA:

- Freight truck safety improvements at US 49 @ Classic Dr.; and
- Freight truck safety improvements at US 49 @ Old Hwy 42

2040 MTP

FIGURE 8.6 FREIGHT CORRIDORS WITH CONGESTION ISSUES



Legend

Freight Corridors with Congestion Issues

- Volume Exceeds Daily Capacity in 2040
- Existing Peak Period Congestion and Volume Exceeds Daily Capacity in 2040

- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: INRIX; Hattiesburg Regional Travel Demand Model

Rail Need

Forecast Growth

Table 8.10 shows the growth in freight tonnage for rail in the MPA counties from 2011 to 2040, as projected by Transearch/IHS Freight Finder. This data suggests that rail tonnage in the MPA will grow slower than the state of Mississippi as a whole. However, at the county level, growth in rail tonnage is projected to outpace the state in Forrest County while growth is projected to be negative in Lamar County.

Table 8.10 Change in Inbound and Outbound Rail Freight Tonnage in MPA Counties, 2011-2040

	2011	2040	Change	Percent Change
Forrest County, MS	1,033,168	1,693,963	660,795	64.0%
Lamar County, MS	905,644	751,392	-154,252	-17.0%
MPA Counties	1,938,812	2,445,355	506,543	26.1%
Mississippi	24,986,000	36,286,000	11,300,000	45.2%

Note: Excludes through-traffic

Source: Transearch/IHS Freight Finder

Rail Capacity

Rail capacity and related needs can be measured in many ways. Because actual volumes and capacities are not known for all rail segments in the Hattiesburg MPA, it is not possible to forecast future capacity utilization rates and needs by segment. However, according to Mississippi's 2040 long-range transportation plan, MULTIPLAN, the following elements are typically assessed to determine physical rail capacity:

- Vertical clearances. Distance between the rail bed and the bottom of overhead structures. Modern railcars, including double-stacked containers and tri-level auto-rack cars need more space than previous generations of equipment.
- Weight limits. The gross (total) weight of a rail car plus any cargo it is carrying. Railcars continue to increase in weight, with today's standard for a four-axle car reaching 286,000 pounds.
- Number of tracks. The more tracks that exist, the greater the number of trains that can be handled on a given line. Side or passing tracks which allow trains to either overtake or pass one another in an area with only a single main line typically are not included. In industrial areas alongside busy main lines, this category includes tracks that are needed to efficiently serve customers without delaying through traffic.

- Traffic control and signaling. Signaling systems help ensure safe operations and effect permissible passenger and freight train speeds, while traffic control systems improve capacity utilization in an efficient manner. Traffic management systems can range from simple to complex, with lines experiencing higher traffic volumes benefiting from more advanced systems. These include automated technologies that help ensure operational safety (such as automatic block signals), and computerized dispatching systems that help manage the flow of trains over a route.
- Terminal and yard capacity. The number of cars that can be handled or stored at a facility. If trains cannot be built or loaded/unloaded efficiently at these locations, mainline capacity is of little value. Operational strategy and efficiency at the terminal or yard facilities can have large impacts on overall line capacity.
- Rail Line Operating Speed. The average speed that trains move on a corridor impacts capacity, and effects railroads' ability to move higher value, time-sensitive goods.

Vertical Clearance

Information on vertical clearance of railroad overpasses was not available for the Hattiesburg MPA.

Weight Limits

All of the main line railroads with information available in the MPA have been upgraded to accommodate the industry standard of 286,000 pounds (286k). However, no information is available for the Kansas City Southern main line railroad between Hattiesburg and Gulfport or any branch lines from the main lines.

Number of Tracks

The majority of the approximately 65 miles of railroad in the MPA are single track. No lines are considered double-tracked, though multiple tracks do exist near railroad yards, such as the Hattiesburg Yards, Dragon Yards, and industrial site yards.

Traffic Control and Signaling

Railroads in the Hattiesburg MPA that utilize signaling as a form of traffic control may use three different signal systems to control traffic movements on their systems. These are Manual, Automatic Block Signals (ABS), and Centralized Train Control (CTC). The capacity benefits of each signal system are summarized below:

- Manual: allows maximum speeds of 49 to 59 miles per hour;
- ABS: allows maximum speeds of up to 80 miles per hour; and
- CTC: considerable capacity improvements over ABS.

The Norfolk Southern Railway main line that also accommodates Amtrak service utilizes ABS while the Canadian National Railway main line that runs from Hattiesburg towards Perry County utilizes manual control. No information for the remaining main lines is available.

Operating Speeds

The Mississippi Statewide Freight Plan (MSFP) recommends that all Tier I main line track meet the Federal Railroad Administration (FRA) Class 4 standard of speed greater than 40 miles per hour for freight. The MSFP also recommends that all Tier II main line track meet the FRA Class 3 standard of speed greater than 25 miles per hour for freight.

Table 8.11 breaks down the railroad crossings by maximum speed according to railroad timetables. About 85 percent of all MFN Tier I rail crossings exceed operating speeds of 40 MPH.

Table 8.11 Maximum Operating Speeds of At-Grade Railroad Crossings in MPA

Rail Category	> 40 MPH		26-40 MPH		25 MPH or under		Total
	Number	Percentage	Number	Percentage	Number	Percentage	Number
MFN Tier I	38	84.4%	1	2.2%	6	13.3%	45
MFN Tier II	21	95.5%	0	0.0%	1	4.5%	22
Other – Branch Line	3	100.0%	0	0.0%	0	0.0%	3
Total	62	88.6%	1	1.4%	7	10.0%	70

Source: Federal Railroad Administration

By mapping the location of main line railroad crossings with slow speeds, we can better understand the concentration of these areas. Figure 8.7 illustrates all Tier I main line crossings that do not meet the MSFP performance standard of higher than 40 miles per hour and all other main line crossings with operating speeds of 25 miles per hour or less.

Many of the Mississippi Freight Network (MFN) Tier I rail crossings with lowest operating speeds are in urban areas where there may not be a desirable alternative. Consultation with rail companies, representatives of the local government, and the surrounding residents and businesses should occur if improvements to these areas are desired.

Terminal and Yard Capacity

Information on terminal and yard capacities were not available at this time for the Hattiesburg MPA.

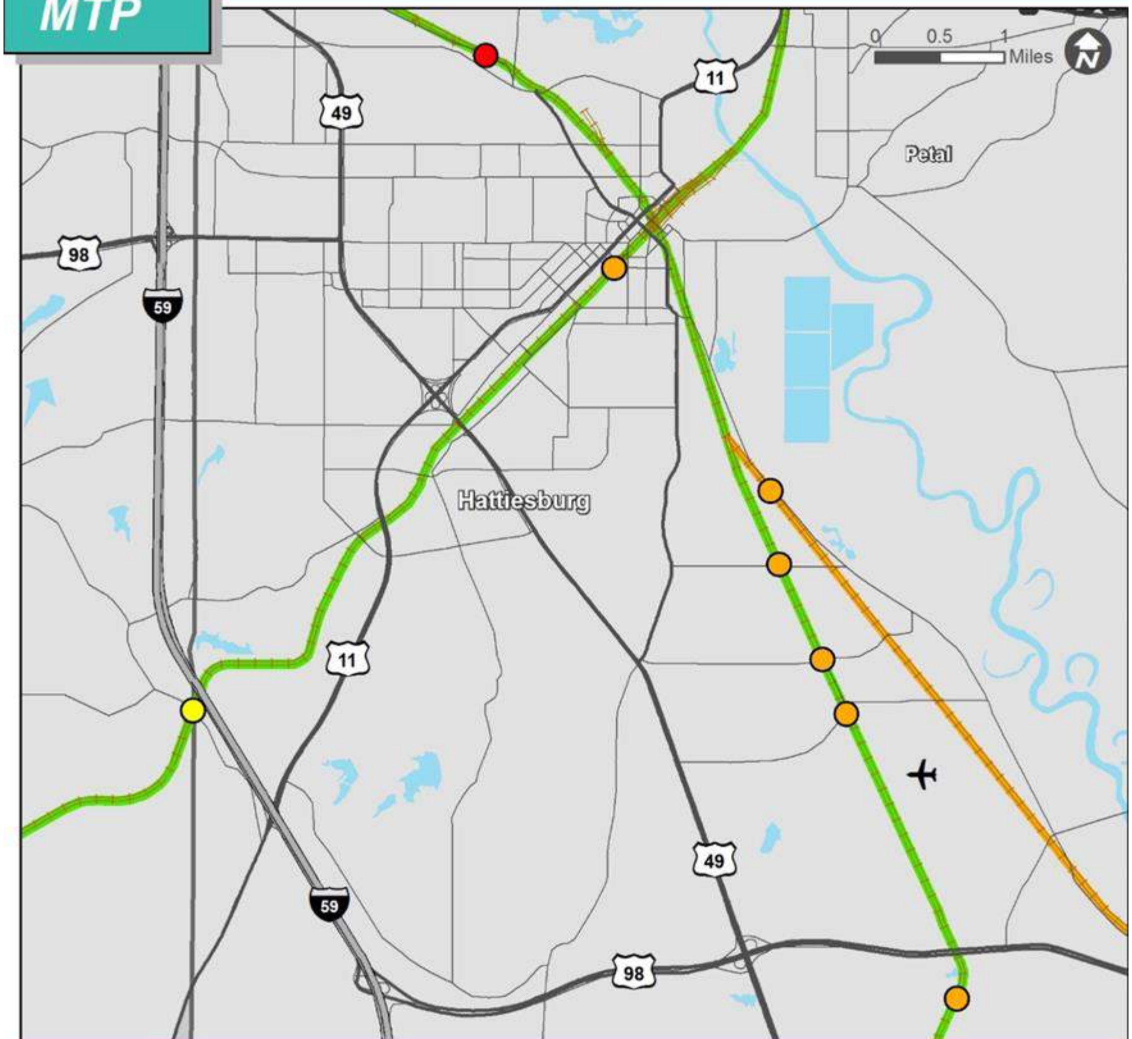
<u>Safety</u>

The analysis of railroad incidents suggests the following improvements are the greatest rail safety needs in the Hattiesburg MPA:

- Active warning device(s) at Canadian National Railway intersection with Mobile St. in Hattiesburg; and
- Active warning device(s) at Canadian National Railway intersection with Tatum Rd. in Hattiesburg

2040 MTP

FIGURE 8.7 LOW SPEED MAIN LINE RAILROAD CROSSINGS



Legend

Main Line, At-Grade Railroad Crossings

Maximum Speed

- 10
- 25
- 40
- Tier I Rail Corridor (MS Freight Network)
- Tier II Rail Corridor (MS Freight Network)
- Railroads
- Interstates
- Secondary Roadways
- Other Roadways in MPA
- Water Bodies
- Metropolitan Planning Area
- Counties

Disclaimer: This map is for planning purposes only.

Map Source: Neel-Schaffer, Inc.

Data Sources: 2014 National Transportation Atlas; FRA

9.0 Forecasting Future Available Funding

MTPs are required to be fiscally constrained. In order to be fiscally constrained, the costs of programmed projects must not exceed the amount of funding that is reasonably expected to be available. This chapter provides an analysis of anticipated funding available for transportation projects and programs in the MPA.

9.1 Roadway Funding

Potential Federal Funding Sources

MAP-21 authorized the Federal Surface Transportation Programs for highways, highway safety, and transit for the two-year period 2013-2014 and has been extended by continuing resolution by the United States Congress since then. MAP-21 builds on the firm foundation of the three previous landmark bills that brought surface transportation into the 21st century – the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Transportation Equity Act for the 21st Century (TEA 21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act – Legacy for Users (SAFETEA-LU).

MAP-21 provides total funding of $105 billion nationally for the original two-year period, the current apportionment for 2015 is $37.8 billion. This legislation includes several categories of funding, under which many of the projects in the financially constrained plan will be eligible for federal funding assistance. These categories are:

National Highway System (NHS)

This category covers all Interstate routes and a large percentage of urban principal arterials. The federal/state funding ratio for arterial routes is 80/20. The interstate system, although a part of NHS, will retain its separate identity and will receive separate funding at a 90/10 ratio. The U.S. Congress passed the NHS bill in 1996.

Surface Transportation Program (STP)

The STP is a block grant funding program with subcategories for states and urban areas.

These funds can be used for any road, including NHS, which is not functionally classified as a local road or rural minor collector. The state portion can be used on roads within an urbanized area and the urban portion can only be used on roads within an urbanized area. The funding ratio is 80/20.

Bridge Replacement and Rehabilitation Program (FBR)

These funds can be used to replace or repair any bridge on a public road. The federal/state funding ratio is 80/20.

Congestion Mitigation and Air Quality (CMAQ)

Urban areas which do not meet ambient air quality standards are designated as nonattainment areas by the U.S. Environmental Protection Agency (USEPA). These funds are apportioned to those urban areas for use on projects that contribute to the reduction of mobile source air pollution through reducing vehicle miles traveled, fuel consumption, or other identifiable factors. Starting in FY 2013 all CMAQ projects will require a 20 pecent local match, with the exception of carpool & vanpool projects, which will remain 100 percent federal.

The Hattiesburg MPO currently does not qualify for CMAQ funds because it is in attainment of air quality standards. However, should that change in the future, the MPO would become eligible for CMAQ funding.

Potential Local Funding Sources

Any costs not covered by federal and state programs will be the responsibility of the local governmental jurisdictions. Local funding can come from a variety of sources including property taxes, sales taxes, user fees, special assessments, and impact fees.

Each of these potential sources is important and warrants further discussion.

Property Taxes

Property taxation has historically been the primary source of revenue for local governments in the United States. Property taxes account for more than 80 percent of all local tax revenues. Property is not subject to federal government taxation, and state governments have, in recent years, shown an increasing willingness to leave this important source of funding to local governments.

General Sales Taxes

The general sales and use tax is also an important revenue source for local governments. The most commonly known form of the general sales tax is the retail sales tax. The retail sales tax is imposed on a wide range of commodities. The rate is usually a uniform percentage of the selling price.

User Fees

User fees are fees collected from those who utilize a service or facility. The fees are collected to pay for the cost of a facility, finance the cost of operations, and/or generate revenue for other uses. User fees are commonly charged for public parks, water and sewer services, transit systems, and solid waste facilities. The theory behind the user fee is that those who directly benefit from these public services pay for the costs.

Special Assessments

Special assessment is a method of generating funds for public improvements, whereby the cost of a public improvement is collected from those who directly benefit from the improvement. In many instances, new streets are financed by special assessment. The owners of property located adjacent to the new streets are assessed a portion of the cost of the new streets, based on the amount of frontage they own along the new streets.

Special assessments have also been used to generate funds for general improvements within special districts, such as central business districts. In some cases, these assessments are paid over a period of time, rather than as a lump sum payment.

Impact Fees

Development impact fees have been generally well received in other states and municipalities in the United States. New developments create increased traffic volumes on the streets around them. Development impact fees are a way of attempting to place a portion of the burden of funding improvements on developers who are creating or adding to the need for improvements.

Bond Issues

Property tax and sales tax funds can be used on a pay-as-you-go basis, or the revenues from them can be used to pay off general obligation or revenue bonds. These bonds are issued by local governments upon approval of the voting public.

2040 MTP Funding Forecast

Assuming that future funding for transportation improvements will be consistent with the level of expenditure indicated by recent historical data, an average of $15.6 million per year in 2013 dollars is forecasted to be available in state and federal funds for transportation improvements in the MPA, using both MPO designated funding and MDOT funds. By factoring in a one percent annual inflation rate, the total amount forecast to be available through 2040 is $453 million. The annual amounts are aggregated to the three time periods of the MTP resulting in the following levels of state and federal funding to be available for each stage.

- Stage 1 (2016-2020) - $81,827,281
- Stage 2 (2021-2030) - $176,389,519
- Stage 3 (2031-2040) - $194,843,766

9.2 Public Transit Funding

Potential Federal Funding Sources

There are many federal funding sources for public transit. Most of these sources are programs funded by the Federal Transit Administration (FTA) or Federal Highway Administration (FHWA) and administered by MDOT. The following federal funding programs are formula-based or discretionary grants funded by the federal government that are available for transit providers in the Hattiesburg MPA to utilize.

<u>Metropolitan Transportation Planning (Section 5303)</u>

This formula-based funding program provides funding and procedural requirements for multimodal transportation planning in metropolitan areas that are cooperative, continuous, and comprehensive, resulting in long-range plans and short-range programs of transportation investment priorities. Federal share is 80 percent with a required 20 percent local match. Funding is only available to Metropolitan Planning Organizations.

<u>Urbanized Area Formula Grants (Section 5307)</u>

This formula-based funding program provides funds for capital and operating assistance for transit operations in urbanized areas with populations greater than 50,000 and for transportation-related planning. Funds can be used for planning, engineering, design and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention and security equipment and construction of maintenance and passenger facilities; computer hardware/software; and operating assistance in urbanized areas under 200,000 in population or with 100 or fewer fixed-route buses operating in peak hours. Activities eligible under the former Job Access and Reverse Commute (JARC) program, which provided services to low-income individuals to access jobs, are now eligible under the Urbanized Area Formula program. Federal share is 80 percent for capital projects, 50 percent for operating assistance, and 80 percent for ADA non-fixed route paratransit service.

Rural Area Formula Grants (Section 5311)

This formula-based funding program provides administration, capital, planning, and operating assistance to support public transportation in rural areas, defined as areas with fewer than 50,000 residents. Activities eligible under the former JARC program, which provided services to low-income individuals to access jobs, are now eligible under the Rural Area Formula program. In addition, the formula now includes the number of low-income individuals as a factor. Funds may be used for planning, capital purchases, administration, planning and operating expenses, and requires a local match. Eligible recipients include local public bodies, non-profit organizations and state agencies. Federal share is 80 percent for capital projects, 50 percent for operating assistance, and 80 percent for ADA non-fixed route paratransit service, using up to 10 percent of a recipient's apportionment. This program is administered by MDOT and includes the follow sub-programs:

- Intercity Bus Program
  - This program meets a federal requirement for assistance to bus operators in providing connecting services between non-urbanized areas and larger regional or national bus routes.
  - At least 15 percent of annual apportionment is used to develop and support intercity bus transportation.
- Rural Transit Assistance Program (RTAP)
  - RTAP funds are used by the Public Transit Division to provide training, and technical assistance, support research or demonstration projects, and enable contractors to promote transit as a mobility alternative.
- Other set asides are for public transportation on Indian Reservations and Appalachian Development Public Transportation Program.

Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310)

Grants are made by the MDOT to private non-profit organizations (and certain public bodies) to increase the mobility of seniors and persons with disabilities. The former New Freedom program (Section 5317) is folded into this program. The New Freedom program provided grants for services for individuals with disabilities that went above and beyond the requirements of the Americans with Disabilities Act (ADA). Activities eligible under New Freedom are now eligible under the Enhanced Mobility of Seniors and Individuals with Disabilities program. Eligible capital costs include buses, vans, radios, computers, engines, and transmissions. Using these funds for operating expenses requires a 50 percent local match while using these funds for capital expenses (including acquisition of public transportation services) requires a 20 percent local match. At least 55 percent of program funds must be spent on the types of capital projects eligible under the former section 5317. The remaining 45 percent may be used for new freedom related program requirements. Projects must be included in a coordinated human service transportation plan.

Bus and Bus Facilities Formula Grants (Section 5339)

This program provides funds to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. Eligible recipients under this section are designated recipients that operate fixed- route bus service or that allocates funding to fixed route bus operators. A designated recipient that receives a grant under this section may allocate amounts of the grant to sub-recipients that are public agencies or private non-profit organizations engaged in public transportation. This is a capital grant program which requires 20 percent local match.

Other FTA Grant Programs

The FTA has several other funding sources for special programs. These include: Public Transportation Emergency Relief Program (Section 5324), Research, Development, Demonstration, and Deployment Projects (Section 5312), Technical Assistance and Standards Development (Section 5314), Transit-Oriented Development Planning, and Fixed Guideway Capital Investment Grants (“New Starts”) (Section 5309).

Surface Transportation Program (STP)

The STP provides funding that may be used by states and localities for a wide range of projects to preserve and improve the conditions and performance of surface transportation, including highway, transit, intercity bus, bicycle and pedestrian projects. Local match requirement varies.

Transportation Alternatives Program (TAP)

This is funded by a 2 percent set-aside from the Highway Account of the federal Highway Trust Fund. Eligible projects are broadly defined but are mostly focused on bicycle and pedestrian projects. The program is administered by MDOT and a 20 percent local match is required.

National Highway Performance Program (NHPP)

The NHPP provides support for the condition and performance of the NHS, for the construction of new facilities on the NHS, and to ensure that investments of federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS. This is a new program under MAP-21.

NHPP funds may only be used for the construction of a public transportation project that supports progress toward the achievement of national performance goals for improving infrastructure condition, safety, mobility, or freight movement on the NHS and which is eligible for assistance under chapter 53 of title 49, if: the project is in the same corridor as, and in proximity to, a fully access-controlled NHS route; the construction is more cost-effective (as determined by a benefit-cost analysis) than a NHS improvement; and the project will reduce delays or produce travel time savings on the NHS, as well as improve regional traffic flow. Local match requirement varies.

Potential Local Funding Sources

Local funding sources include all of the same potential sources as local roadways revenue, outlined previously. Fare revenue, a user fee, is an important but relatively small local funding source.

2040 MTP Funding Forecast

The only federal funding source forecasted is Section 5307 funding since the city of Hattiesburg is allocating funding for this program based on the population of the Hattiesburg Urbanized Area. Other funding programs, such as Section 5339, Section 5311, and Section 5310, are not entirely related to urbanized areas and are allocated to the state, which sub-allocates to urban and rural areas, depending on the program. Local/state matches are based on matching these federal funding sources.

The following assumptions are utilized:

- The base year (2016) revenue is $993,740, based on the 2015 allocation specified in the MPO's 2015-2019 Transportation Improvement Program (TIP).
- Revenue is inflated 0 percent annually from 2016 to 2020. This is consistent with the 2015-2019 TIP, where a conservative approach was utilized that assumed revenues would remain stagnant in the short-term. After 2020, revenue is inflated 2.5 percent annually in order to account for long-term inflation.
- The utilization of "carry over" funding, the result of not obligating all federal allocation, will continue for Section 5307 funding.
- Any local costs above and beyond those required to match federal funds are assumed to grow in proportion to the increase in revenues and to continue to be paid by local sources. Therefore, they are not discussed further in this section.

Based on these assumptions, the following levels of state and federal funding for public transit in the MPO can be expected to be available through 2040:

- Stage 1 (2016-2020) - $6,311,981
- Stage 2 (2021-2030) - $12,543,152
- Stage 3 (2031-2040) - $15,619,284

9.3 Bicycle and Pedestrian Funding

For future federally funded transportation projects, bicycling and pedestrian facilities will be incorporated into all transportation projects unless exceptional circumstances exist. In order to assess the project-specific bicycle and pedestrian needs, the surrounding context will be considered, including: land use patterns; existing, informal bicycle or pedestrian activities; any reference to bicycle or pedestrian needs in the planning process; and public, agency, or other comments requesting bicycle or pedestrian facilities. This approach is consistent with federal and state guidance.

Beyond these incidental bicycle and pedestrian projects there is still a need to forecast federal funding available for independent, or stand-alone, bicycle and pedestrian projects.

Potential Federal Funding Sources

While many of the major federal roadway and public transit funding sources described in previous sections of this chapter are flexible enough to fund construction of bicycle and pedestrian facilities, the MTP will forecast available independent bicycle and pedestrian funding based on TAP funding since it is the federal funding source most explicitly intended for bicycle and pedestrian projects.

Potential Local Funding Sources

Local funding sources include all of the same potential sources as local roadways revenue, outlined previously.

2040 MTP Funding Forecast

TAP funding for the MPO was forecast based on the following assumptions:

- Only 50 percent of a state's TAP apportionment (after deducting the set-aside for the Recreational Trails Program (RTP), if applicable) is sub-allocated to urban and rural areas based on their relative share of the total state population.
- The MPO will receive an amount of funding from the 50 percent dedicated for sub-allocation throughout the state that is proportionate to its urbanized area's current share (2.7 percent) of the state population in 2010. In 2014, that amounted to $125,132.
- TAP revenue will increase one percent annually.

Using the assumptions above, the amount of TAP funding reasonably expected to available for bicycle and pedestrian projects in the MPO through 2040 is as follows:

- Stage 1 (2016-2020) - $652,067
- Stage 2 (2021-2030) - $1,405,616
- Stage 3 (2031-2040) - $1,552,674

10.0 Project Development and Prioritization

This chapter summarizes how transportation projects were developed and evaluated in the 2040 MTP.

10.1 Project Development

Project Identification

Projects were identified in the following ways:

- Roadway capacity projects were identified from the public visioning exercise, MTP subcommittee, stakeholder input, and previous plans.
- Roadway Maintenance and Operations projects were identified through an analysis of existing conditions and consultation with local transportation providers.
- Public Transit projects and programs were identified from the 2015-2019 STIP under the assumption that public transit will continue to operate at similar levels in the future. There was no anticipated change in the level of service for the MTP.
- The primary means of collecting input from the public and stakeholders regarding freight projects was through the public meeting that kicked off the project and from the project's MindMixer website. Projects from the MPO's 2035 Metropolitan Transportation Plan were also considered. The only independent freight project identified was an eastern railroad bypass of Hattiesburg, illustrated in Figure 2.3. However, this project was not evaluated in the MTP due to its preliminary nature.

Project Cost Estimates

Roadway Project Cost Estimates

Cost estimates for some projects were available from the MDOT or local public agencies. However, for most, it was necessary to develop new estimates. This effort began with cost estimates obtained from historic project costs from the MDOT and local public agencies. Where such construction estimates were not available, the study team prepared order-of-magnitude cost estimates in 2015 dollars based on projects in the historic funding database. The typical construction cost estimates for various types of improvements are shown in Table 10.1.

No cost estimates were made for maintenance projects such as bridge and pavement projects.

Table 10.1 Hattiesburg Urbanized Area MTP 2040 Typical Project Cost by Improvement Type (2015 Dollars)

Improvement Type	Avg. Cost	Unit
New Interstate	$16,650,000	Mile
Interstate Widening	$ 9,500,000	Mile
Interstate Rehab	$ 2,000,000	Mile
New 4 Lane Arterial	$ 9,400,000	Mile
New 2 Lane Arterial	$ 5,200,000	Mile
Arterial Widening	$ 3,500,000	Mile
Center Turn Lane	$ 2,650,000	Mile
Reconstruction	$ 2,000,000	Mile
Overlay	$ 700,000	Mile
ITS	$ 800,000	Mile
New Bridge	$ 3,300,000	Each
Bridge Replacement	$ 2,000,000	Each
RR Crossing	$ 200,000	Each
Intersection Improvement	$ 850,000	Each
Interchange Improvement	$ 5,750,000	Each
New Interchange	$23,000,000	Each
Underpass	$10,500,000	Each
Railroad Overpass	$ 6,250,000	Each
Roundabout	$ 1,000,000	Each

Source: MDOT Historic Project Lettings 1991-2014, NSI 2015

Public Transit Project Cost Estimates

The annual cost of operating public transit in the MPO was taken from current levels of expenditures for Hub City Transit in the MPO's 2015-2019 TIP. It is assumed that any local costs above and beyond those required to match federal funds in the TIP will grow in proportion to the increase in revenues and will continue to be paid by local sources.

As previously mentioned, no new capacity projects were identified for transit.

In order to forecast transit operating costs through 2040, the following assumptions are utilized:

- The cycle of acquiring new support vehicles will continue at the level in the 2015-2019 TIP, averaging $17,500 per year.
- The cycle of acquiring new ADA vehicle equipment will continue at the level in the 2015-2019 TIP, averaging $21,875 per year.
- Replacement of existing fleet/rolling stock and/or addition to the existing fleet are assumed to be covered by continuing the "Capital Equipment ADA Rolling Stock" funding levels in the 2015-2019 TIP, averaging $250,000 per year.
- Projects costs will remain flat through 2020, consistent with the TIP. After 2020, project costs are inflated 2.0 percent annually.

10.2 Roadway Project Prioritization

In order to maximize limited funding, roadway capacity projects were prioritized. The relatively few ITS projects and high-priority Maintenance and Operations (MO) projects identified in Chapter 8: Future Transportation Need will be funded through the federal programs highlighted in Chapter 9: Forecasting Future Available Funding. There was no need to prioritize these projects.

Table 10.2 shows the criteria and weights that were utilized to prioritize identified roadway capacity projects. Table 10.3 then shows how these criteria were measured. The results of this prioritization exercise are show in Table 10.4 and illustrated in Figure 10.1.

Table 10.2 Roadway Capacity Project Prioritization Criteria

Criteria	Rationale	Maximum Points
Travel Delay Reduction Benefits	Make most efficient use of limited funding by selecting projects that reduce overall network delay experienced by the users.	40
Safety	Unsafe areas should receive priority over other areas.	15
Connectivity/Continuity	Connectivity benefits exceed quantifiable model outputs, especially as it relates to the provision of alternative routes and street connectivity for bicyclists and pedestrians.	10
Intermodal/Multimodal Benefits	Encourage projects that benefit both the movement of people and goods and/or have the potential to improve bicycle and pedestrian conditions.	10
Plan Consistency	Encourage projects that have been vetted through locally-adopted plans, existing studies or plans such as Congestion Management Process (CMP).	10
Potential Impact to Community or Natural Resources	Avoid negative and costly environmental impacts.	10
Potential Impact to Minority and Low-Income Population	Environmental Justice.	5

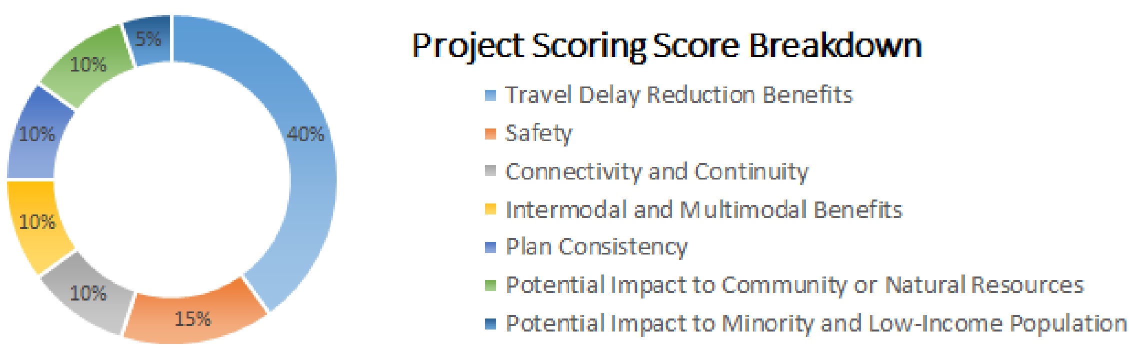


Table 10.3 Roadway Capacity Project Prioritization Criteria Measures

Criterion	Rationale	Measure	Scoring Scale (Points Possible)				
			0	5	10	15	40
Travel Delay Reduction Benefits	Make most efficient use of limited funding by selecting projects that reduce overall network delay experienced by the users.	Vehicle hours of delay.	Points awarded in increments of 4 based upon the effectiveness of a project in reducing overall roadway network delay.				
Safety	Unsafe areas should receive priority over other areas.	Qualitative assessment based on crash data, bridge conditions, and engineering judgement.	No safety benefits	Minimal safety benefits	Moderate safety benefits	Considerable safety benefits	
Connectivity and Continuity	Connectivity benefits exceed quantifiable model outputs, especially as it relates to the provision of alternative routes and street connectivity for bicyclists and pedestrians.	For new roadways/extensions: arterials intersected per mile (Principal arterials count as 2). For roadway widenings: Number of connections or intersections with existing widened facilities.	No arterial intersections/ does not connect or intersect with roadway with higher number of lanes	< 2 intersections per mile/ connects or intersects 1 roadway with higher number of lanes	2+ intersections per mile/connects or intersects 2+ roadways with higher number of lanes		
Intermodal and Multimodal Benefits	Encourage projects that benefit both the movement of people and goods and/or have the potential to improve bicycle and pedestrian conditions.	Type of roadway and estimated truck traffic. For new roadways, assume similar truck traffic as similar or parallel facility.	Not a major freight route/freeway with no bike or pedestrian access	>= 500 estimated average daily trucks	More than 1,000 estimated average daily trucks or part of MDOT primary freight corridor		
Plan Consistency	Encourage projects that have been vetted in locally-adopted plans or existing studies or plans.	In previous locally-adopted plan or in preliminary study.	Not in previous plans	In previous MTP.	In local plan or preliminary study		
Potential Impact to Community or Natural Resources	Avoid negative and costly environmental impacts.	Proximity to community or natural resources like historic sites, recreational areas, churches, cemeteries, preserves, etc.	Scaled 1-10, depending on nearby resources				
Potential Impact to Minority and Low-Income Population	Avoid disproportionately high and adverse impacts to Environmental Justice groups.	Percentage of population in Environmental Justice group along project route.	Above planning area average	Below planning area average			

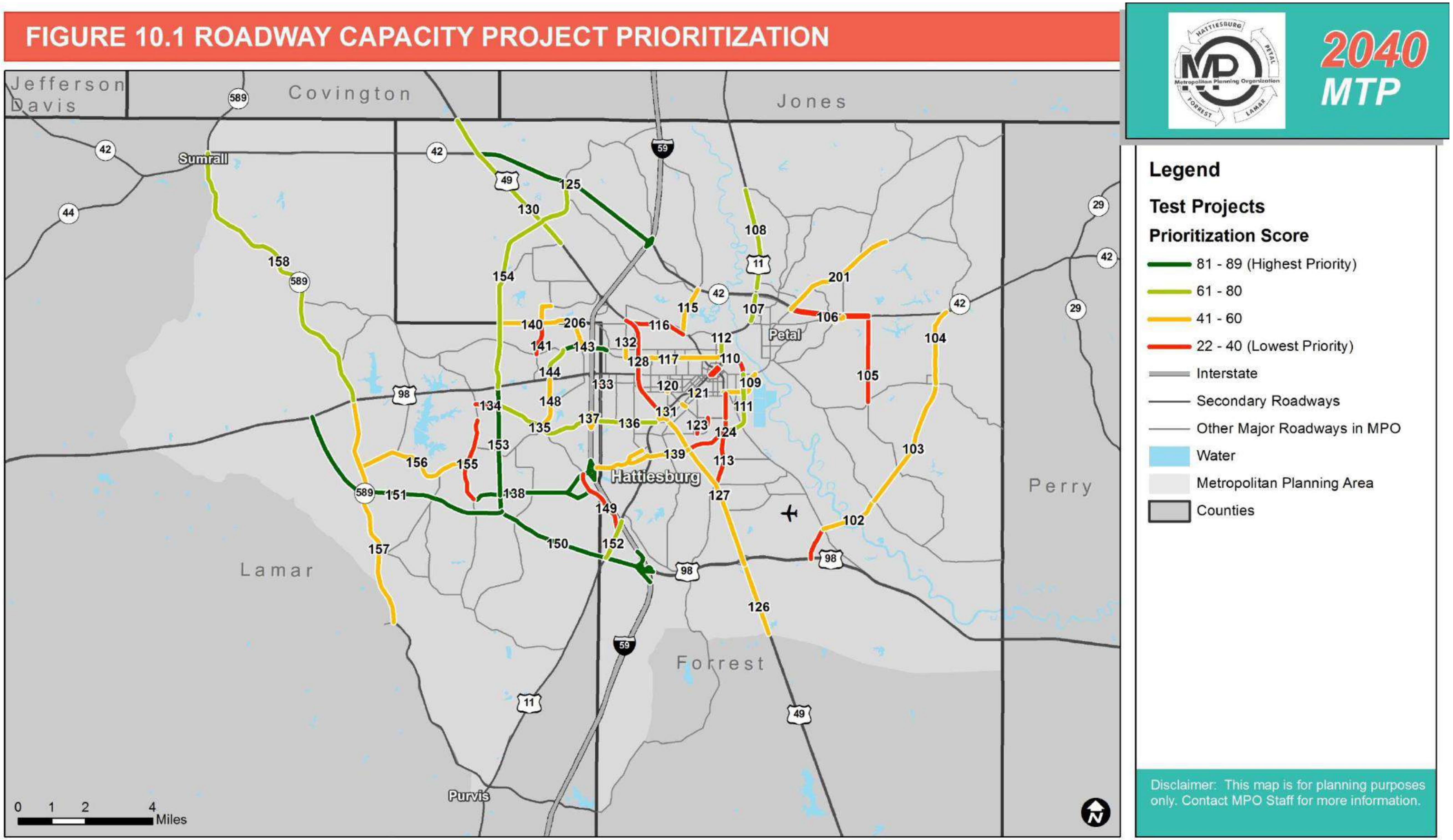
Table 10.4 Roadway Capacity Project Prioritization Results

Project ID	Route	Limits	Improvement	Miles	Cost (2015 Dollars)	Delay Reduction Points	Safety Points	Connectivity and Continuity Points	Intermodal and Multimodal Points	Plan Consistency Points	Env't Points	EJ Points	Total Points	Rank
138	Richburg Rd	Old US 11 to I-59	Widen to 4 Lanes, New 4 Lane Roadway, New Interchange	4.05	$40,550,000	40	10	10	5	10	9	5	89	1
153	Western Bypass Phase I	Richburg Rd to US 98	Widen to 4 Lanes, New 4 Lane Roadway	3.20	$18,870,000	36	10	5	10	10	8	5	84	2
150	US 98 Bypass Extension Phase I	Richburg Rd to I-59	New 4 Lane Roadway and Interchange	4.85	$45,590,000	40	10	5	5	10	9	5	84	3
125	MS 42 Realignment	US 49 to Eatonville Rd	New 4 Lane Roadway, Widen to 4 Lanes, Interchange Modifications	5.80	$54,520,000	40	15	5	5	10	7	0	82	4
151	US 98 Bypass Extension Phase II	US 98 to US 98 Bypass Extension Phase I	New 4 Lane Roadway	7.05	$66,270,000	40	10	5	5	10	7	5	82	5
143	W 4th St	Weathersby Rd to N 38th Ave	Widen to 4 Lanes	1.35	$4,725,000	36	10	5	10	10	10	0	81	6
136	Lincoln Rd	S 40th Ave to Broadway Dr.	Widen to 4 Lanes	1.65	$5,775,000	28	10	10	10	10	7	5	80	7
154	Western Bypass Phase II	US 98 to re-aligned MS 42	Widen to 4 Lanes, New 4 Lane Roadway	5.50	$32,820,000	36	10	5	10	10	8	0	79	8
130	US 49	Rawls Springs Loop Rd to North Study Area Boundary	Widen to 6 Lanes	4.75	$16,625,000	36	5	5	10	10	7	5	78	9
108	US 11	Chapel Hill Rd to Leeville Rd	Widen to 4 Lanes	2.55	$8,925,000	28	10	5	10	10	9	5	77	10
135	Lincoln Rd	Sandy Run Rd/Hegwood Rd to I-59	Widen to 4 lanes	2.80	$9,800,000	32	10	5	10	10	9	0	76	11
107	US 11	W Central Ave to Evelyn Gandy Pkwy	Widen to 4 Lanes	0.50	$1,750,000	32	10	10	10	0	10	0	72	12
152	US 11	1.1 miles south of I-59 to I-59	Widen to 4 Lanes	1.20	$4,200,000	24	5	5	10	10	10	5	69	13
144	Weathersby Rd	Methodist Blvd to W 4th St	Widen to 4 Lanes	0.70	$2,450,000	20	10	5	10	10	10	0	65	14
158	MS 589	US 98 to MS 42	Widen to 4 Lanes	9.50	$33,250,000	32	5	5	10	0	6	5	63	15
111	CBD Bypass Phase II	E Hardy St to Edwards St	New 4 Lane Roadway	2.05	$19,270,000	28	10	5	10	0	9	0	62	16
112	Bouie St	E 4th St to Old MS 42/US 11	Widen to 4 Lanes	0.55	$1,925,000	32	5	5	10	0	9	0	61	17
109	Hall Ave Extension	James St to E Hardy St	New 2 Lane Roadway	1.30	$6,760,000	24	5	10	10	0	9	0	58	18
157	MS 589	Luther Lee Rd to US 98	Widen to 4 Lanes	5.65	$19,775,000	24	5	5	10	0	9	5	58	19
103	Sims Rd Extension	Old River Rd to Indian Springs Rd	New 4 Lane Roadway	4.00	$37,600,000	24	10	5	5	0	9	5	58	20
115	Glendale Ave	Old MS 42 to Evelyn Gandy Pkwy (MS 42)	Widen to 4 Lanes	1.45	$5,075,000	20	5	5	10	10	7	0	57	21
120	S 17th Ave	Adeline St to Mamie St	New 2 Lane Roadway	0.15	$780,000	8	10	10	10	0	10	5	53	22

Project ID	Route	Limits	Improvement	Miles	Cost (2015 Dollars)	Delay Reduction Points	Safety Points	Connectivity and Continuity Points	Intermodal and Multimodal Points	Plan Consistency Points	Env't Points	EJ Points	Total Points	Rank
137	I-59	@ Lincoln Rd	New Interchange	--	$23,000,000	8	15	10	0	10	10	0	53	23
131	US 49	@ Broadway Dr	Reconstruct Interchange	--	$5,750,000	12	10	0	10	10	10	0	52	24
104	Sunrise Rd	Indian Springs Rd to MS 42	Widen to 4 Lanes, Realign Intersections	2.05	$7,875,000	20	5	5	5	0	9	5	49	25
127	US 49	US 98 Bypass to Broadway Dr	Widen to 6 Lanes	5.35	$18,725,000	28	5	0	10	0	6	0	49	26
140	J Ed Turner Dr/Classic Dr	Jackson Rd to N Beverly Hills Rd	Widen to 4 Lanes	2.00	$7,000,000	16	5	5	10	0	7	5	48	27
203	Springfield Rd Extension	Corinth Rd to Evelyn Gandy Pkwy	New 2 Lane Roadway	0.35	$1,820,000	12	5	10	5	0	10	5	47	28
122	Timothy Ln Extension	W Pine St to Eastside Ave	New 2 Lane Roadway	0.15	$780,000	4	10	10	10	0	10	0	44	29
148	Oak Grove Rd/Weathersby Rd	Lincoln Rd to US 98	Widen to 4 Lanes	1.55	$5,425,000	4	5	5	10	10	10	0	44	30
102	Sims Rd	James St/Old US 49 to Old River Rd	Widen to 4 Lanes	1.80	$6,300,000	20	5	0	5	0	9	5	44	31
117	W 4th St	US 49 to Bouie St	Widen to 4 Lanes	2.45	$8,575,000	4	10	5	10	10	5	0	44	32
201	Old Richton Rd	Evelyn Gandy Pkwy to Herrington Rd	Widen to 4 Lanes	3.50	$12,250,000	16	5	5	5	0	8	5	44	33
121	Broadway Dr Extension	W Pine St to Hall Ave	New 2 Lane Roadway	0.25	$1,300,000	4	10	10	10	0	9	0	43	34
139	Richburg Rd	I-59 to US 49	Widen to 4 Lanes, New 4 Lane Roadway	2.90	$9,785,000	4	10	10	10	0	9	0	43	35
156	Old Hwy 24	MS 589 to Old US 11	Add Center Turn Lane	3.70	$11,655,000	4	5	0	10	10	8	5	42	36
126	US 49	South Study Area Boundary to US 98 Bypass	Upgrade to Expressway	2.20	$20,900,000	12	10	0	10	0	10	0	42	37
132	N 31st Ave Extension	W 4th St to W 7th St	New 2 Lane Roadway	0.25	$1,300,000	4	10	10	10	0	7	0	41	38
206	J Ed Turner Dr Extension	Classic Dr. to W 4th St	New 2 Lane Roadway	0.40	$2,080,000	8	5	10	10	0	8	0	41	39
114	Edwards St	Tuscan Ave to James St	Widen to 4 Lanes	0.70	$2,450,000	16	5	0	10	0	9	0	40	40
155	Old US 11	Richburg Rd to 6th Section Rd	Add Center Turn Lane	2.65	$8,347,500	4	10	0	10	0	10	5	39	41
116	Old MS 42	US 49 to Glendale Ave	Widen to 4 Lanes	1.65	$5,775,000	4	10	5	10	0	9	0	38	42
149	Sullivan-Kilran Rd/ Richburg Rd	US 11 to Richburg Rd	Add Center Turn Lane	2.15	$6,772,500	12	5	0	5	0	10	5	37	43
110	CBD Bypass Phase I	Bouie St/Gordon St to E Hardy St	New 4 Lane Roadway	0.95	$8,930,000	4	10	10	5	0	8	0	37	44
124	WSF Tatum Blvd Extension	US 49 to Edwards St	New 4 Lane Roadway	1.25	$11,750,000	4	5	10	10	0	8	0	37	45
101	Ralston Rd	US 98 Bypass to James St/Old US 49	Add Center Turn Lane	1.00	$3,150,000	16	5	0	5	0	10	0	36	46
113	Edwards St	US 49 to Tuscan Ave	Add Center Turn Lane	2.05	$6,457,500	8	10	0	10	0	7	0	35	47
133	W Arlington Loop Extension	S 40th Ave to S 37th Ave	New 2 Lane Roadway	0.25	$1,300,000	4	5	10	5	0	10	0	34	48

Project ID	Route	Limits	Improvement	Miles	Cost (2015 Dollars)	Delay Reduction Points	Safety Points	Connectivity and Continuity Points	Intermodal and Multimodal Points	Plan Consistency Points	Env't Points	EJ Points	Total Points	Rank
145	I-59	@ W 4th St	New Interchange	--	$15,000,000	4	10	10	0	0	10	0	34	49
134	Lincoln Rd	Old US 11 to Sandy Run Rd/Hegwood Rd	Add Center Turn Lane	0.70	$2,205,000	4	5	0	10	0	9	5	33	50
141	Classic Dr. Extension	W 4th St to J Ed Turner Rd	New 2 Lane Roadway	0.95	$4,940,000	4	5	10	5	0	9	0	33	51
105	Batson Rd Extension	Sunrise Rd to MS 42	New 2 Lane Roadway	2.55	$13,260,000	4	5	5	5	0	9	5	33	52
106	Evelyn Gandy Pkwy (MS 42)	Old Richton Rd to Herrington Rd	Add New Service Roads	2.30	$23,920,000	4	5	0	10	0	8	5	32	53
118	Pine St/Front St	Hardy St to Market St	Convert to Two Way	0.65	$1,000,000	4	0	10	10	0	6	0	30	54
128	US 49	Broadway Dr. to N 31st Ave	Widen to 6 Lanes	3.00	$10,500,000	4	5	5	10	0	6	0	30	55
123	Martin Luther King Ave Extension/ Penton St	Bowling St to Helveston Rd	New 2 Lane Roadway, Restrict Through Access	0.25	$1,300,000	4	0	0	10	0	8	0	22	56

FIGURE 10.1 ROADWAY CAPACITY PROJECT PRIORITIZATION



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.

11.0 Implementation Plan

11.1 Fiscally-Constrained Staged Improvement Program

The 2040 MTP's staged improvement program is a fiscally-constrained list of transportation projects that collectively represents the Hattiesburg MPA's planned future transportation improvements. Projects included in the MTP's staged improvement plan become eligible for federal and/or state funding assistance through programs such as the NHS and Surface Transportation Program (STP). These programs are funded under the current transportation bill, MAP-21.

In developing this plan, the approach has been to identify transportation needs, and to consider alternative ways of meeting those needs. In many cases, additional studies may be required in order to determine the most effective and feasible improvement alternative. Suggested improvements identified in the staged improvement program are meant to convey the type of improvement that would make the most sense based on currently available information.

This approach acknowledges the inability to avoid all future traffic congestion simply by building as much roadway capacity as the anticipated demand for travel would seem to require. It also recognizes the reality of induced demand, that is, additional roadway capacity inevitably generates additional traffic. One principle which has guided the development of this plan has been the idea that alternative travel options should be made available wherever possible. Possibilities include new or improved parallel routes, or modal choices that serve the same origins and destinations. In the case where there is a projected need for additional roadway capacity, the preferred response may not be a wider facility, but enhanced operational efficiency. Improvements can be achieved using Transportation System Management (TSM), Travel Demand Management (TDM), or Intelligent Transportation System (ITS) strategies and access management techniques that serve to optimize the performance of a facility.

Project Staging Phases and Applying Fiscal Constraint

The staged improvement program is a long-range plan for transportation improvements in the Hattiesburg MPA, covering a 25-year period from 2016 to 2040. Recommended improvements are distributed among three stages:

- Stage I covers the short-term period from 2016 through 2020;
- Stage II corresponds to the intermediate period from 2021 through 2030; and
- Stage III is the long-range period from 2031 through 2040.

The assignment of a given project to a particular stage was largely determined by the prioritization of projects discussed in Chapter 10, estimated funding available for each stage of the plan, project cost, and other mobility-related considerations (such as safety, emergency evacuation, access to developable areas, etc.).

Table 11.1 summarizes the total costs of the roadway capacity projects selected to be funded in the 2040 MTP as well as all forecast state and federal revenues, with local match funding, anticipated to be available for implementing transportation projects through 2040. The anticipated state and federal roadway capacity funding, with local match funding, for the plan period (2016–2040) was calculated to be $453 million. The estimated total cost of improvements as identified in the staged improvement program is $455 million, which is within acceptable programming limits of available funding. Therefore, the roadway capacity projects in the 2040 MTP are fiscally-constrained.

Table 11.1 Fiscal Constraint for Roadway Capacity Projects

	Stage I 2016 - 2020	Stage II 2021 - 2030	Stage III 2031 - 2040	Total 2016 - 2040
Estimated Funding Availability	$81,827,281	$176,389,519	$194,843,766	$453,060,566
Estimated Fiscally-Constrained MTP Project Costs	$80,771,652	$175,999,612	$198,189,644	$454,960,908
			Vision Needs	$596,767,471
			Total Needs Plan	$1,051,728,379

Note: Annual Inflation Factors – 2.0% on Project Cost, 1.0% on Funding Availability

Table 11.3 summarizes all forecast transit-related costs through 2040 and all federal revenues anticipated to be available for transit-related projects through 2040. The anticipated state and federal transit funding for the plan period (2016–2040) was calculated to be $32 million. The estimated total cost of transit projects as identified in the staged improvement program is $31 million, which is within acceptable programming limits of available funding. Therefore, the transit projects in the 2040 MTP are fiscally-constrained.

Table 11.2 Fiscal Constraint for Public Transit Operations

	Stage I 2016 - 2020	Stage II 2021 - 2030	Stage III 2031 - 2040	Total 2016 - 2040
Estimated Transit Projects Cost (federal share)	$5,184,395	$11,583,991	$14,120,821	$30,889,207
Estimated Federal Funding Available	$6,311,981	$12,543,152	$15,619,284	$32,331,348

Note: Federal funding only includes Section 5307. Total 2016-2040 federal funding available does not equal sum of all stages because unobligated balance remaining in each year is added to the annual amount available.

Stage I (2016-2020) Projects

Stage I is planned for improvements in the years 2016 to 2020. A list of projects is shown in Table11.3. These planned improvements - are projected to cost **$88.7 million** and will be funded with local, state, and federal funds. Project improvements consist of intersection improvements, roadway widenings, roadway preservation, enhancements, and safety projects.

Table 11.3 2040 MTP Staged Improvement Program - Stage I (2016-2020)

ID	Mode	Route	Location	Project Description	Project Cost ($)
143	Roadway	W 4th St	Weathersby Rd to N 38th Ave	Widen to 4 Lanes	$5,018
136	Roadway	Lincoln Rd	S 40th Ave to Broadway Dr.	Widen to 4 Lanes	$6,131
108	Roadway	US 11	Chapel Hill Rd to Leeville Rd.	Widen to 4 Lanes	$9,478
107	Roadway	US 11	W Central Ave to Evelyn Gandy Pkwy	Widen to 4 Lanes	$1,859
119	Roadway	Hardy St	US 49 to 21st Ave	ITS Improvements	$297
129	Roadway	US 49	I-59 to Rawls Springs Loop Rd.	ITS Improvements	$1,997
146	Roadway	Hardy St	King Rd/Old US 11 to I-59	ITS Improvements	$2,931
204	Roadway	Hardy St	N 21st Ave to W Pine St	ITS Improvements	$1,487
205	Roadway	Hardy St	I-59 to US 49	ITS Improvements	$1,317
Line Item	Roadway	Various	Various	Enhancement	$3,461
Line Item	Roadway	Various	Various	Safety	$3,323
Line Item	Roadway	Various	Various	FBR	$6,431
Line Item	Roadway	Various	Various	Overlay	$28,412
Line Item	Roadway	Various	Various	Maintenance	$895
Line Item	Roadway	Various	Various	Reconstruction	$7,734
Line Item	Transit	--	--	HCT Operations	$3,754
Line Item	Transit	--	--	HCT Preventative Maintenance	$2,188
Line Item	Transit	--	--	Passenger Amenities	$313
Line Item	Transit	--	--	Transit Enhancements Bus Shelters	$188
Line Item	Transit	--	--	HCT Capital Equipment ADA Rolling Stock	$1,250
Line Item	Transit	--	--	HCT Support Vehicles	$88
Line Item	Transit	--	--	ADA Vehicle Equipment	$109
Total Stage I					**$88,661**

Stage II (2021-2030) Projects

Stage II is planned for improvements in the years 2021 to 2030. A list of projects is shown in Table -11.4. These planned improvements are projected to cost **$193.7 million** and represent improvements consisting of roadway widening, new roadway construction, roadway preservation, enhancements, and safety projects.

Table 11.4 2040 MTP Staged Improvement Program - Stage II (2021-2030)

ID	Mode	Route	Location	Project Description	Project Cost ($)
153	Roadway	Western Bypass Phase I	Richburg Rd to US 98	Widen to 4 Lanes, New 4 Lane Roadway	$23,267
152	Roadway	US 11	I-59 south for 1.2 miles	Widen to 4 Lanes	$5,179
144	Roadway	Weathersby Rd	Methodist Blvd to W 4th St	Widen to 4 Lanes	$3,021
112	Roadway	Bouie St	E 4th St to Old MS 42/US 11	Widen to 4 Lanes	$2,374
109	Roadway	Hall Ave Extension	James St to E Hardy St	New 2 Lane Roadway	$8,335
115	Roadway	Glendale Ave	Old MS 42 to Evelyn Gandy Pkwy	Widen to 4 Lanes	$6,257
120	Roadway	S 17th Ave	Adeline St to Mamie St	New 2 Lane Roadway	$962
122	Roadway	Timothy Ln Ext	W Pine St to Eastside Ave	New 2 Lane Roadway	$962
Line Item	Roadway	Various	Various	Enhancement	$7,462
Line Item	Roadway	Various	Various	Safety	$24,471
Line Item	Roadway	Various	Various	FBR	$13,864
Line Item	Roadway	Various	Various	Overlay	$61,247
Line Item	Roadway	Various	Various	Maintenance	$1,929
Line Item	Roadway	Various	Various	Reconstruction	$16,672
Line Item	Transit	--	--	HCT Operations	$8,385
Line Item	Transit	--	--	HCT Preventative Maintenance	$4,886
Line Item	Transit	--	--	Passenger Amenities	$698
Line Item	Transit	--	--	Transit Enhancements Bus Shelters	$419
Line Item	Transit	--	--	HCT Capital Equipment ADA Rolling Stock	$2,792

ID	Mode	Route	Location	Project Description	Project Cost ($)
Line Item	Transit	--	--	HCT Support Vehicles	$198
Line Item	Transit	--	--	ADA Vehicle Equipment	$246
Total Stage II					**$193,735**

Stage III (2031-2040) Projects

Stage III is planned for improvements in the years 2031 to 2040. A list of projects is shown in Table -11.5. These planned improvements - are projected to cost **$220 million** and represent improvements consisting of roadway widening, new roadway construction, roadway preservation, enhancements, and safety projects.

Table 11.5 2040 MTP Staged Improvement Program - Stage III (2031-2040)

ID	Mode	Route	Location	Project Description	Project Cost ($)
135	Roadway	Lincoln Rd	Sandy Run Rd/Hegwood Rd to I-59	Widen to 4 lanes	$14,729
104	Roadway	Sunrise Rd	Indian Springs Rd to MS 42	Widen to 4 Lanes, Realignment	$11,837
140	Roadway	J Ed Turner Dr/ Classic Dr	Jackson Rd to N Beverly Hills Rd	Widen to 4 Lanes	$10,522
203	Roadway	Springfield Rd Ext	Corinth Rd to Evelyn Gandy Pkwy	New 2 Lane Roadway	$2,736
148	Roadway	Oak Grove Rd/ Weathersby Rd	Lincoln Rd to US 98	Widen to 4 Lanes	$8,154
102	Roadway	Sims Rd	James St/Old US 49 to Old River Rd	Widen to 4 Lanes	9,469
121	Roadway	Broadway Dr Ext	W Pine St to Hall Ave	New 2 Lane Roadway	$1,954
Line Item	Roadway	Various	Various	Enhancement	$8,242
Line Item	Roadway	Various	Various	Safety	$27,031
Line Item	Roadway	Various	Various	FBR	$15,314
Line Item	Roadway	Various	Various	Overlay	$67,655
Line Item	Roadway	Various	Various	Maintenance	$2,131
Line Item	Roadway	Various	Various	Reconstruction	$18,416

ID	Mode	Route	Location	Project Description	Project Cost ($)
Line Item	Transit	--	--	HCT Operations	$10,221
Line Item	Transit	--	--	HCT Preventative Maintenance	$5,956
Line Item	Transit	--	--	Passenger Amenities	$851
Line Item	Transit	--	--	Transit Enhancements Bus Shelters	$511
Line Item	Transit	--	--	HCT Capital Equipment ADA Rolling Stock	$3,404
Line Item	Transit	--	--	HCT Support Vehicles	$242
Line Item	Transit	--	--	ADA Vehicle Equipment	$300
Total Stage III					**$220,030**

Effectiveness of Fiscally-Constrained Projects

Table 11.6 shows the travel impacts of implementing the capacity projects in the fiscally-constrained project lists versus a "no-build" scenario where only existing and committed projects are modeled. Figure 11.1 provides an illustration of these projects.

While daily vehicle miles traveled and daily vehicle hours traveled only decrease slightly, the daily hours of delay decrease by about 13 percent by implementing the projects recommended in the 2040 MTP.

Table 11.6 Travel Impacts of Fiscally-Constrained 2040 MTP Roadway Capacity Projects

Measure	2040 Existing and Committed	2040 Fiscally Constrained MTP	Difference	Percent Difference
Daily Vehicle Miles Traveled	4,379,518	4,358,210	-21,308	-0.5%
Daily Vehicle Hours Traveled	136,868	131,386	-5,482	-4.0%
Daily Hours of Delay	41,275	35,925	-5,350	-13.0%

Source: Hattiesburg Travel Demand Model, NSI

Note: Values in this table include all facilities modeled and do not match the values in other tables regarding VMT, VHT, and VHD.

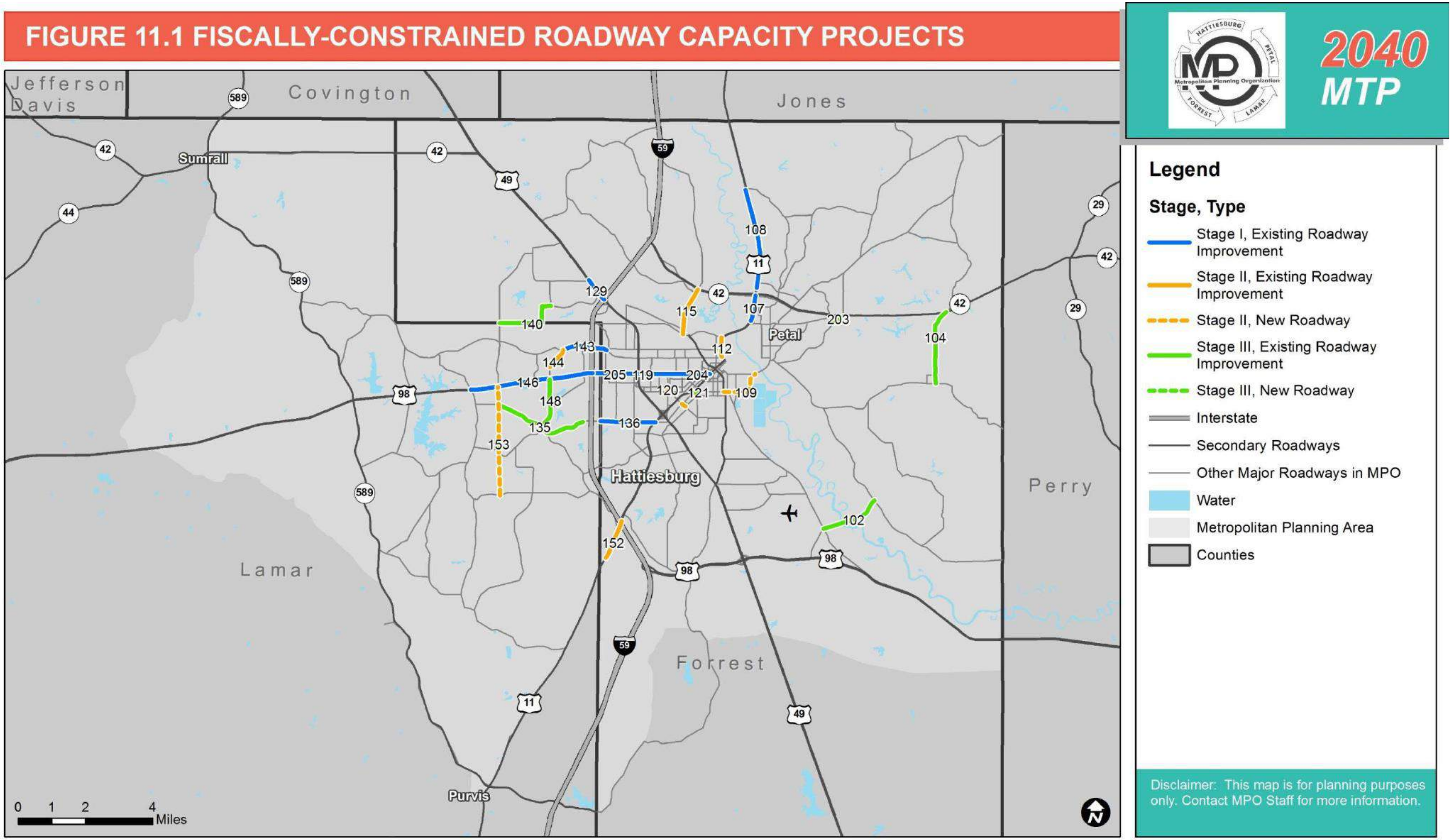
Table 11.7 Travel Impacts of Fiscally Constrained 2040 MTP Projects by Roadway Functional Class

Centerline Miles of Roadways				
Classification	**2040 (E+C Projects)**	**2040 MTP**	**Difference**	**Percent**
Interstate	22	22	0	0.0%
Principal Arterial	64	66	4	6.5%
Minor Arterial	76	77	1	1.3%
Collector	174	176	2	1.1%
Total	**334**	**341**	**7**	**2.1%**
Daily Vehicle Miles Traveled (VMT)				
Classification	**2040 (E+C Projects)**	**2040 MTP**	**Difference**	**Percent**
Interstate	821,778	796,686	-25,092	-3.1%
Principal Arterial	1,503,836	1,479,718	-24,118	-1.6%
Minor Arterial	628,379	656,785	28,406	4.5%
Collector	706,645	728,356	21,711	3.1%
Total	**3,660,638**	**3,661,546**	**908**	**0.0%**
Daily Vehicle Hours Traveled (VHT)				
Classification	**2040 (E+C Projects)**	**2040 MTP**	**Difference**	**Percent**
Interstate	17,062	15,694	-1,368	-8.0%
Principal Arterial	50,642	47,617	-3,025	-6.0%
Minor Arterial	21,441	21,667	226	1.1%
Collector	23,204	23,044	-160	-0.7%
Total	**112,349**	**108,022**	**-4,327**	**-3.9%**
Daily Vehicle Hours of Delay				
Classification	**2040 (E+C Projects)**	**2040 MTP**	**Difference**	**Percent**
Interstate	4,702	3,694	-1,008	-21.4%
Principal Arterial	22,581	20,032	-2,549	-11.3%
Minor Arterial	5,655	5,089	-566	-10.0%
Collector	5,925	5,234	-691	-11.7%
Total	**38,863**	**34,049**	**-4,814**	**-12.4%**

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

Source: Hattiesburg Travel Demand Model, NSI

FIGURE 11.1 FISCALLY-CONSTRAINED ROADWAY CAPACITY PROJECTS



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.

11.2 Visionary (Unfunded) Roadway Projects

The previous section addressed Stage I, II, and III's transportation improvements with identified funding sources; however, many other transportation improvements are desired to further improve travel conditions. These unfunded transportation improvements are included in a Visionary Needs list to keep a record of future needs. .

Unfunded transportation improvements are not necessarily less important or effective; they just cannot be accommodated within the financially constrained budget. Delayed funding for a transportation improvement project may be the result of the project's size, cost, design complexity, acquisition difficulties, jurisdictional concerns, and/or environmental concerns. A project may be delayed because its efficiency is minimized until other projects are completed or it does not alleviate existing transportation deficiencies that will only be exacerbated over time.

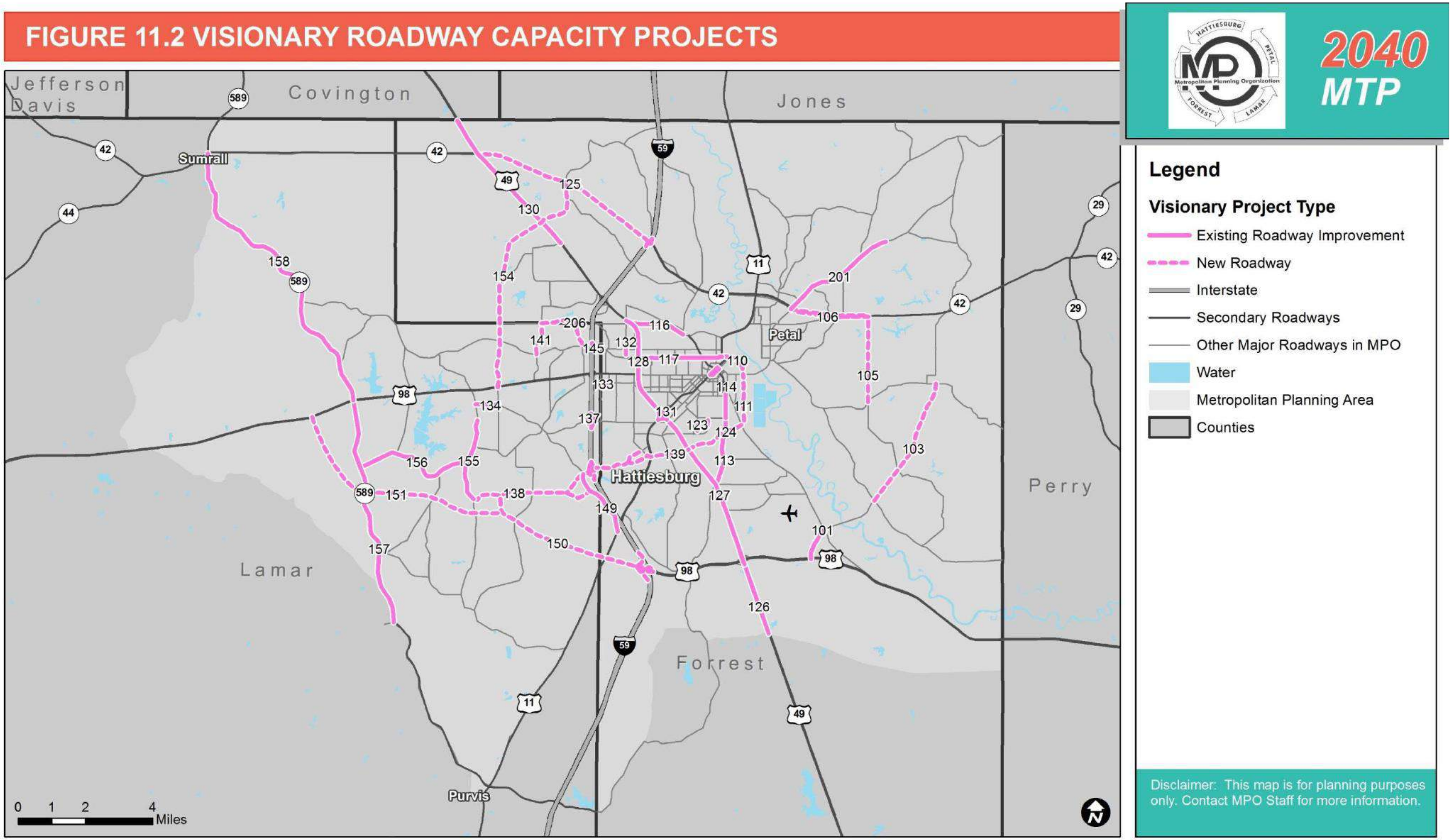
The estimated cost, in 2015 dollars, to implement the unfunded projects is $596.8 million. The Visionary Needs list is shown in Table 11.8 and projects are illustrated in Figure 11.2.

Table 11.8 2040 MTP Visionary Needs List

ID	Route	Location	Improvement	Miles	Project Cost (2015 $,000)
138	Richburg Rd	Old US 11 to I-59	Widen to 4 Lanes, New 4 Lane Roadway, New Interchange	4.05	$40,550
150	US 98 Bypass Extension Phase I	Richburg Rd to I-59	New 4 Lane Roadway and Interchange	4.85	$45,590
125	MS 42 Realignment	US 49 to Eatonville Rd	New 4 Lane Roadway, Widen to 4 Lanes, Interchange Modifications	5.80	$54,520
151	US 98 Bypass Extension Phase II	US 98 to US 98 Bypass Extension Phase I	New 4 Lane Roadway	7.05	$66,270
154	Western Bypass Phase II	US 98 to re-aligned MS 42	Widen to 4 Lanes, New 4 Lane Roadway	7.20	$32,820
130	US 49	Rawls Springs Loop Rd to North Study Area Boundary	Widen to 6 Lanes	4.75	$16,625
158	MS 589	US 98 to MS 42	Widen to 4 Lanes	9.50	$33,250
111	CBD Bypass Phase II	E Hardy St to Edwards St	New 4 Lane Roadway	2.05	$19,270
157	MS 589	Luther Lee Rd to US 98	Widen to 4 Lanes	5.65	$19,775
103	Sims Rd Extension	Old River Rd to Indian Springs Rd	New 4 Lane Roadway	4.00	$37,600
137	I-59	@ Lincoln Rd	New Interchange	--	$23,000
131	US 49	@ Broadway Dr	Reconstruct Interchange	--	$5,750
127	US 49	US 98 Bypass to Broadway Dr	Widen to 6 Lanes	5.35	$18,725

ID	Route	Location	Improvement	Miles	Project Cost (2015 $,000)
117	W 4th St	US 49 to Bouie St	Widen to 4 Lanes	2.45	$8,575
201	Old Richton Rd	Evelyn Gandy Pkwy to Herrington Rd	Widen to 4 Lanes	3.50	$12,250
139	Richburg Rd	I-59 to US 49	Widen to 4 Lanes, New 4 Lane Roadway	2.90	$9,785
156	Old Hwy 24	MS 589 to Old US 11	Add Center Turn Lane	3.70	$9,805
126	US 49	South Study Area Boundary to US 98 Bypass	Upgrade to Expressway	2.20	$20,900
132	N 31st Ave Extension	W 4th St to W 7th St	New 2 Lane Roadway	0.25	$1,300
206	J Ed Turner Dr Extension	Classic Dr to W 4th St	New 2 Lane Roadway	0.40	$2,080
114	Edwards St	Tuscan Ave to James St	Widen to 4 Lanes	0.70	$2,450
155	Old US 11	Richburg Rd to 6th Section Rd	Add Center Turn Lane	2.65	$2,329
116	Old MS 42	US 49 to Glendale Ave	Widen to 4 Lanes	1.65	$5,775
149	Sullivan-Kilran Rd/ Richburg Rd	US 11 to Richburg Rd	Add Center Turn Lane	2.15	$5,697
110	CBD Bypass Phase I	Bouie St/Gordon St to E Hardy St	New 4 Lane Roadway	0.95	$8,930
124	WSF Tatum Blvd Extension	US 49 to Edwards St	New 4 Lane Roadway	1.25	$11,750
101	Ralston Rd	US 98 Bypass to James St/Old US 49	Add Center Turn Lane	1.00	$2,650
113	Edwards St	US 49 to Tuscan Ave	Add Center Turn Lane	2.05	$5,433
133	W Arlington Loop Extension	S 40th Ave to S 37th Ave	New 2 Lane Roadway	0.25	$1,300
145	I-59	@ W 4th St	New Interchange	--	$15,000
134	Lincoln Rd	Old US 11 to Sandy Run Rd/Hegwood Rd	Add Center Turn Lane	0.70	$1,855
141	Classic Dr Extension	W 4th St to J Ed Turner Rd	New 2 Lane Roadway	0.95	$4,940
105	Batson Rd Extension	Sunrise Rd to MS 42	New 2 Lane Roadway	2.55	$13,260
106	Evelyn Gandy Pkwy (MS 42)	Old Richton Rd to Herrington Rd	Add New Service Roads	2.30	$23,920
118	Pine St/Front St	Hardy St to Market St	Convert to Two Way	0.65	$1,000
128	US 49	Broadway Dr to N 31st Ave	Widen to 6 Lanes	3.00	$10,500
123	Martin Luther King Ave Extension/ Penton St	Bowling St to Helveston Rd	New 2 Lane Roadway, Restrict Through Access	0.25	$1,539
Total Vision					**$596,768**

FIGURE 11.2 VISIONARY ROADWAY CAPACITY PROJECTS



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.

11.3 Strategies to Improve Public Transit Conditions

Based on existing conditions and future needs, this section presents recommendations for future transit planning efforts. The timeframes for recommendations in this section of the report are based on the direction of the FHWA and FTA. These timeframes include:

- Short-Term Strategies (Years 1-5)
- Medium and Long-Term Strategies (Years 6-25)

Table 11.9 Public Transit Actions to Address Transit Needs

Strategies	Time Frame	Description
Implement Proposed HCT Fixed Route Modifications	Short	Fixed Route modifications have been proposed which improve access to the system and increase frequencies.
Install bike racks on all HCT buses	Short	Bicycle racks on buses extend the reach of transit.
Work with Southern Mississippi Transit (SMT) group to develop Coordinated Human Services Transportation Plan	Short	This will identify opportunities for coordination between different public transit providers and make federal funding available for these projects.
Improve existing HCT stop accessibility and amenities	Short	There are many existing bus stops with poor sidewalk coverage nearby. Most stops are currently unaccommodating to pedestrians and bicyclists.
Improve HCT rider information	Short	Improve rider marketing materials. Add mobile app tracking of buses. Provide route information at stops.
Improve HCT transit revenues	Short	Consider alternative additional funding sources such as public-private partnerships, Tax Increment Financing, advertisements, student fees at colleges and universities, etc.
Implement regional Transportation Demand Management (TDM) Program	Short	Focus on vanpooling, ridesharing, and partnering with major employers to provide employee incentives.
Expand HCT hours of operation	Medium	Expand hours of operation later into evenings and on weekends so more jobs are accessible by transit.
Explore extending transit service to Petal	Medium	Petal is the largest area without transit service that has moderate demand. A fixed or deviated-fixed route should be explored that connects the Walmart area in Petal to the Hattiesburg Train Depot, with stops in high demand areas along the way. Contracted service could be an interim step or alternative to a regional transit authority.
Study formation of regional transit authority	Long	One transit system in the region with a dedicated funding source. Demand-response service providing access in rural areas.

11.4 Strategies to Improve Bicycle and Pedestrian Conditions

In order to address the need for improved bicycle and pedestrian conditions in the Hattiesburg MPA, a Pathways Master Plan (2015) was adopted by the MPO. Implementation of the plan's most important strategies and short-term actions, reproduced in Table 11.10, will put the MPO on track to become bicycle and pedestrian friendly.

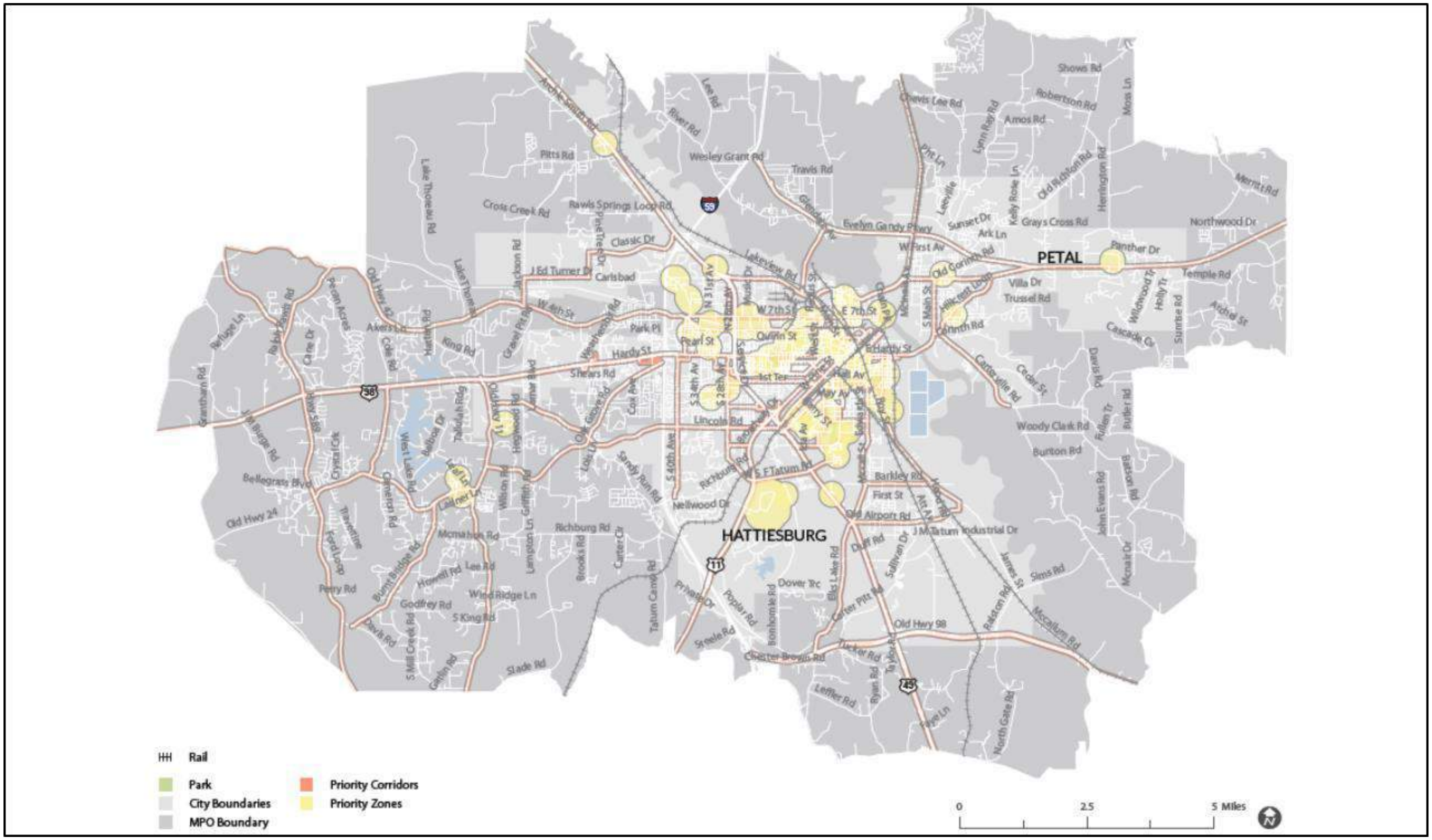
In the long-term, the MPO should focus on improving pedestrian conditions in the pedestrian corridors and zones illustrated in Figure 11.3 and on implementing the bicycle facilities plan, as illustrated in Figure 11.4. The Transportation Alternatives Program (TAP) funding discussed in Chapter 9: Financial Analysis is a good source for incrementally addressing these needs. Approximately, $3.6 million in TAP funding is forecast for the MPO from 2016 to 2040.

Table 11.10 Bicycle and Pedestrian Actions

Task	Details	Phase
Policy Action Steps		
Coordinate Development Plans	During the development review process, City and County staff should reference this plan. If a new development requires changing the public right-of-way, the changes should be used to support walking and biking improvements identified in this Plan. The site design should also be supportive of walking and biking access on the property.	Ongoing
Form a Bicycle and Pedestrian Advisory Committee	Form the Bicycle and Pedestrian Advisory Committee and confirm the goals of the BPAC to include the implementation of this plan.	Short-Term (2015)
Seek Multiple Funding Sources and Facility Development Options	To implement this plan, funding from a variety of funding sources will need to be leveraged. Working with MPO and other partners, the BPAC should identify public and private funding sources and pursue these resources on an ongoing basis.	Short-Term/Ongoing (2015 onward)
Program Action Steps		
Designate Staff	Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. Designated staff should include City and County staff.	Short-Term (2015)
Become designated as a Bicycle-Friendly Community (BFC)	The development and implementation of this plan is an essential first step toward becoming a designated BFC. With ongoing efforts and the short- term work program recommended here, MPO jurisdictions should be in a position to apply for and receive recognition within a few years.	Short-Term (2015) City of Hattiesburg Mid-Term/Long-Term (2017 onward) City of Petal, Forrest and Lamar County
Become designated as a Walk-Friendly	The development and implementation of this plan is an essential first step toward becoming a designated WFC. With ongoing efforts and the short- term work program recommended here, MPO jurisdictions	Short-Term (2015) City of Hattiesburg Mid-Term/Long-Term

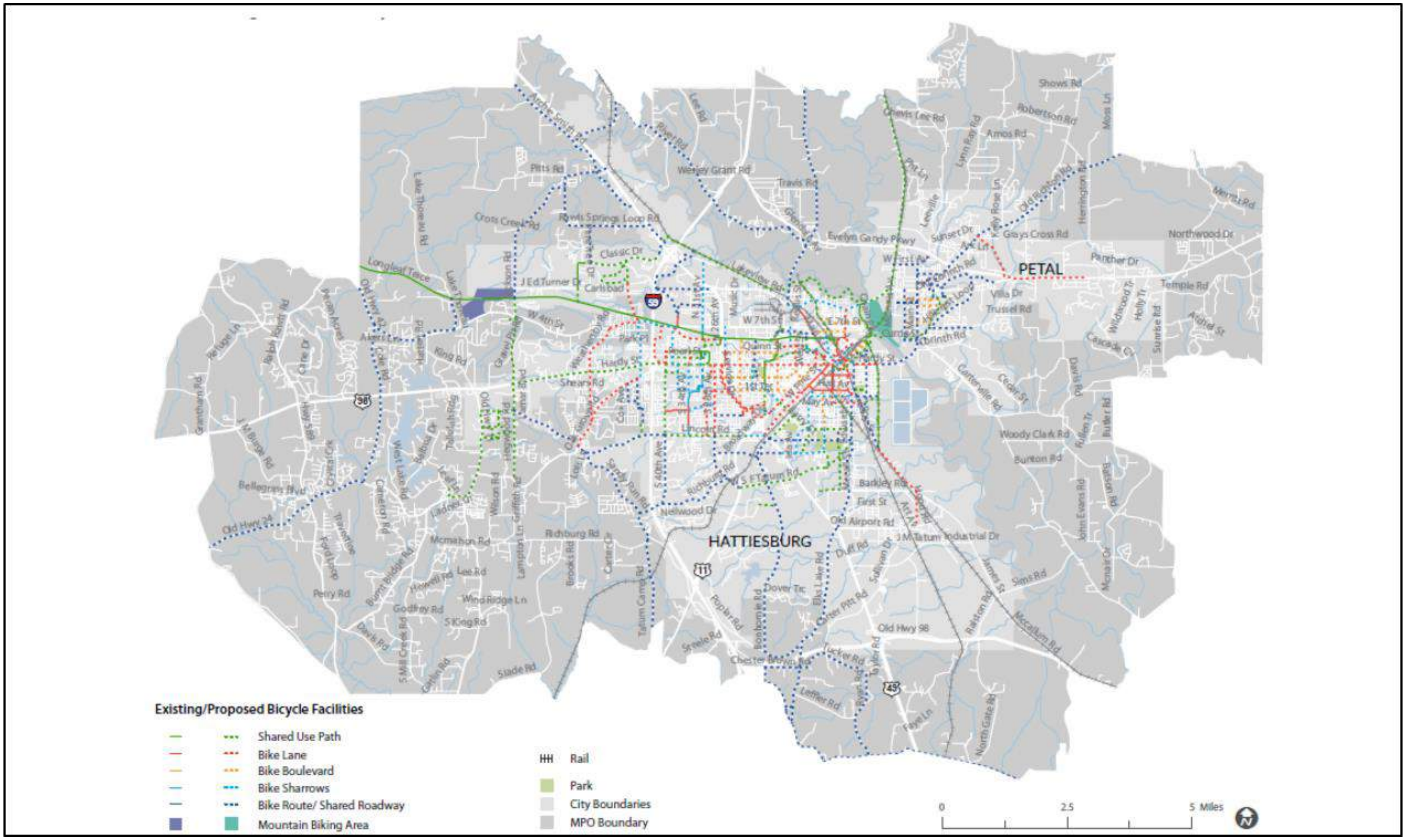
Task	Details	Phase
Community (WFC)	should be in a position to apply for and receive recognition within a few years.	(2017 onward) City of Petal, Forrest and Lamar County
Communication and Outreach	The BPAC should establish a communication campaign to celebrate successes as facilities are developed and otherwise raise awareness of the overall pedestrian and bicycle network and its benefits. A key first task of this group is to design and launch a one-stop website. Set up the one-stop website to provide information to residents and tourists on walking and biking in the community. To begin, the website can include the maps included in this plan.	Short-Term (2015)
Establish Evaluation and Reporting Program	The MPO and the BPAC should brainstorm specific benchmarks to track through a monitoring program and honor the completion of projects with public events and media coverage.	Mid-Term/Ongoing (2016 onward)
Begin annual Meeting with Key Project Partners	Key project partners (see org. chart on page 68) should meet on an annual basis to evaluate the implementation of this Plan. Meetings could also occasionally include on-site tours of priority project corridors.	Short-Term/Ongoing (2015 onward)
Improve Existing Programs and Launch New Programs	These groups should coordinate to improve existing bicycle and pedestrian programs and to launch new programs, such as those described in Recommendations chapter.	Short-Term/Ongoing (2015 onward)
Provide Enforcement and Education Training for Public Safety Officials	Provide police and fire officers with training through free online resources available from the National Highway Traffic Safety Administration, and through webinars available through the Association of Pedestrian and Bicycle Professionals. Provide officers with an informational handout to be used during bicycle and pedestrian-related citations and warnings. Coordinate regular in-person training workshops for officers to learn bicycle and pedestrian laws and enforcement strategies.	Short-Term/Ongoing (2015/2016 onward)
Infrastructure Action Steps		
Identify Funding	To allow continued development of the overall walkway and bikeway system, capital funds for pedestrian and bicycle facility construction should be set aside every year. Local and Federal funds should be programmed for facility construction. Funding for an ongoing maintenance program should also be included in the Cities and County's operating budgets.	Short-Term/Ongoing (2015 onward)
Complete Short-Term Priority Projects	The Recommendations chapter identifies projects for implementation. Aim to complete at least two of these projects by the end of 2017.	Mid-Term (2017)

Figure 11.3 Priority Pedestrian Corridors and Zones



Source: Hattiesburg-Petal-Forrest-Lamar MPO Pathways Master Plan, 2015

Figure 11.4 On-Street Bikeways and Shared-Use Paths



Source: Hattiesburg-Petal-Forrest-Lamar MPO Pathways Master Plan, 2015

11.5 Strategies to Improve Freight Conditions

Deploy Regional Intelligent Transportation Systems (ITS) Incident Management System

Several ITS projects are included in the 2040 MTP fiscally-constrained projects. All of these projects are on major freight corridors. In addition to the delay reduction benefits of these ITS improvements; the MPO will leverage the deployment of the Hattiesburg Region ITS Incident Management System and TMC Operations to include expanded commercial vehicle elements. This is a recommendation -from the Mississippi Statewide Freight Plan (2015).

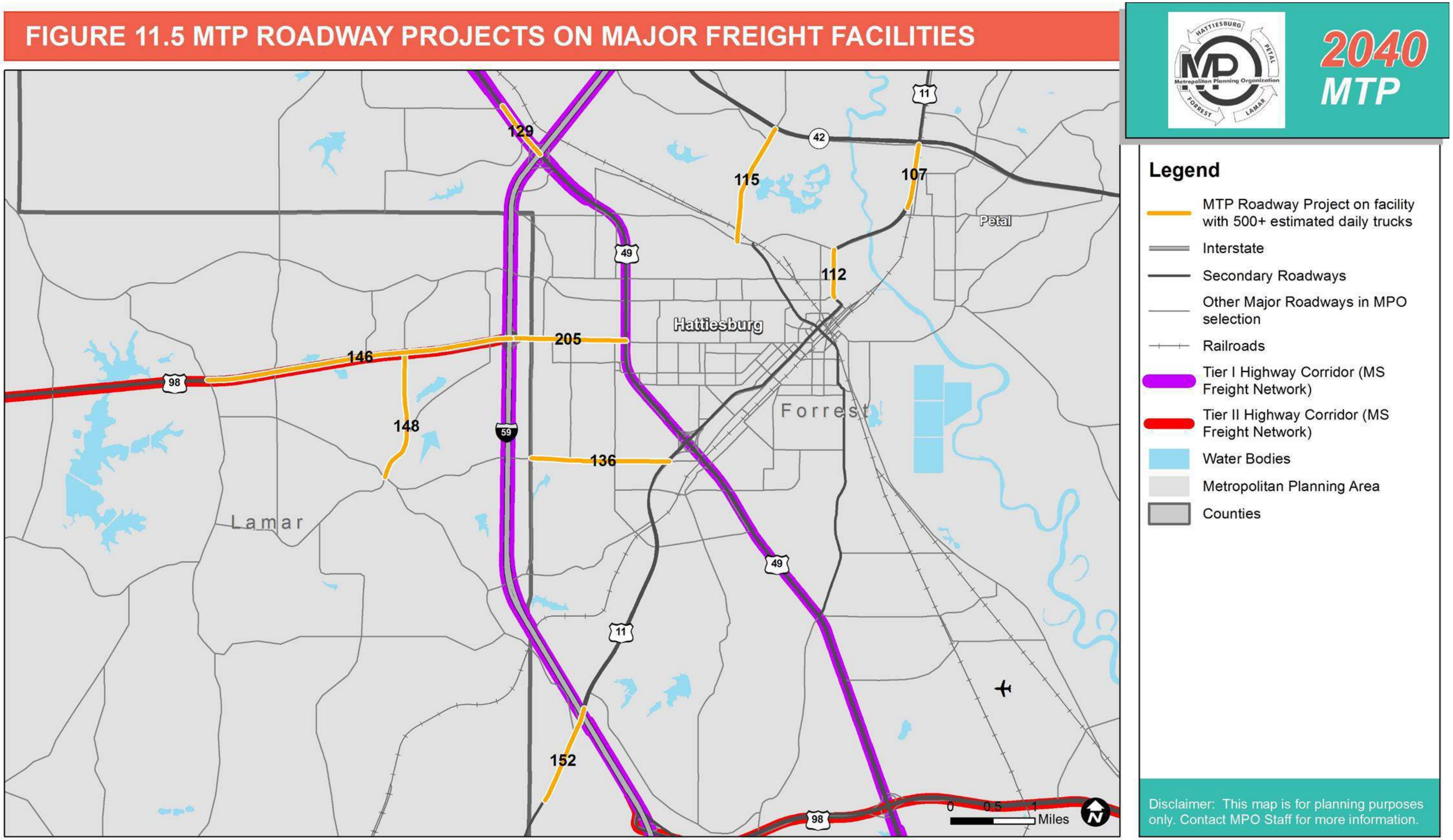
Implement MTP Roadway Projects

Table 11.11 shows roadway projects funded in the 2040 MTP that are along major freight corridors or roadway segments with 500 or more estimated daily trucks and are also illustrated in Figure 11.5.

These projects address two of the three areas of concern for freight truck congestion: US 98/Hardy Street, and Oak Grove Road. They also address an area of concern for freight truck safety: US 49 from I-59 to Classic Drive. By implementing these projects, both passenger and commercial traffic should experience reductions in delay and safety incidents.

Table 11.11 2040 MTP Roadway Projects with Freight Benefits

ID	Route	Location	Improvement	Stage
107	US 11	W Central Ave to Evelyn Gandy Pkwy	Widen to 4 lanes	Stage I
136	Lincoln Rd	S 40th Ave to Broadway Dr	Widen to 4 lanes	Stage I
205	Hardy St	I-59 to US 49	ITS Improvements	Stage I
129	US 49	I-59 to Rawls Springs Loop Rd	ITS Improvements	Stage I
146	Hardy St	King Rd/Old US 11 to I -59	ITS Improvements	Stage I
112	Bouie St	E 4th St to Old MS 42/US 11	Widen to 4 lanes	Stage II
115	Glendale Ave	Old MS 42 to Evelyn Gandy Pkwy	Widen to 4 lanes	Stage II
152	US 11	I-59 south for 1.2 miles	Widen to 4 lanes	Stage II
148	Oak Grove Rd/ Weathersby Rd	Lincoln Rd to US 98	Widen to 4 lanes	Stage III



Map Source: Neel-Schaffer, Inc.

Data Sources: Neel-Schaffer, Inc.; MDOT

11.6 Strategies to Improve Air Quality

According to the FHWA, transportation strategies to mitigate the impacts of air pollution emissions from automobiles can be organized into four major groups:

1. **Improve system and operational efficiencies** by optimizing the design, construction, operation, and use of transportation networks. The strategies range from anti-idling ordinances to traffic management to congestion pricing. The objective of this group of strategies is to reduce the energy use and emissions associated with a given unit of passenger or freight travel (e.g., person-miles, vehicle-miles, or ton-miles of travel).
2. **Reduce travel activity** by reducing growth in vehicle-miles traveled. The objective of this group of strategies is to influence travelers' activity patterns, thereby reducing total travel, shifting travel to more efficient modes, increasing vehicle occupancy, or otherwise taking actions that reduce energy use and emissions associated with personal travel.
3. **Introduce low-carbon fuels.** Petroleum-based fuels account for 97 percent of U.S. transportation energy use. The objective of this group of strategies is to develop and introduce alternative fuels that have lower carbon content and generate fewer transportation emissions. These alternative fuels include ethanol, biodiesel, natural gas, liquefied petroleum gas, synthetic fuels, hydrogen, and electricity.
4. **Increase fuel efficiency** by advancing and bringing to market advanced engine and transmission designs, lighter-weight materials, improved aerodynamics, and reduced rolling resistance. The objective of this group of strategies is to use less fuel and generate fewer emissions.

Table 11.12 below outlines actions the MPO can take to begin addressing the negative impacts of vehicle emissions on air quality and public health.

Table 11.12 Actions to Reduce Transportation-Related Air Pollution Emissions

Strategy	Action Category	Description
Implement the Hattiesburg Regional ITS Deployment Plan and update as necessary.	Improve system and operational efficiencies	This will improve the operational efficiency of the existing transportation system, reducing the higher level of vehicle emissions occurring at low speeds or while idling.
Encourage local governments to adopt land use regulations that encourage building urban, suburban and rural communities with housing and transportation choices near jobs, shops and schools.	Reduce travel activity	Increasing the walkability of the MPO will reduce the need for trips to be made by driving an automobile. It can also be more energy efficient overall.
Implement transit and bicycle/pedestrian strategies outlined previously to reduce automobile trips.	Reduce travel activity	Many of these actions will make walking, biking, and transit more attractive, thereby potentially reducing demand for travel by automobile.

Strategy	Action Category	Description
Work with MDOT to explore creating a Clean Cities coalition for Mississippi.	Introduce low-carbon fuels; Increase fuel efficiency	At the local level, coalitions leverage resources to create networks of local stakeholders and provide technical assistance to fleets implementing alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies.
Perform studies to identify best programmatic, policy, and infrastructure strategies to reduce regional transportation-related air pollution emissions.	All	These studies should focus on improving system and operational efficiencies (e.g. idle reduction strategies and traffic management), reducing travel activity (e.g. Transportation Demand Management [TDM]), and increasing the utilization of alternative fuel vehicles (e.g. ethanol, biodiesel, natural gas, propane, synthetic fuels, hydrogen, and electricity).

Appendix A: Public Participation Record

- Initial Public Notice of MTP Update and MindMixer website
    - MindMixer press release from MDOT – January 12, 2015

- 2040 MTP Kick-off Meeting
    - Legal Advertisement (Public Notice)
    - Environmental Justice (EJ) Outreach Summary Letters
    - Kick-off Meeting Summary and Public Input

- Draft Plan Public Input Period
    - Legal Advertisement (Public Notice) for Review of Draft Plan
    - MDOT Press Release – October 16, 2015
    - MPO Press Release – October 28, 2015
    - MDOT Stakeholder notice of public meetings
    - MDOT Stakeholder notice of draft plan availability for review
    - MindMixer notice of plan available for comment
    - Meeting Location Change Notification
    - Flyers posted at public locations
    - WDAM article – October 30, 2015
    - Sign In sheets
    - Comments received during public comment period

MDOT news (website) and released statewide 1/12/15

New Website Allows Citizens to Voice their Community's Critical Transportation Needs for Statewide Long-Range Transportation Plan

JACKSON, MISS--- The Mississippi Department of Transportation (MDOT) and the Gulf Coast, Hattiesburg and Jackson Metropolitan Planning Organizations (MPOs) are pleased to announce the launch of mississippitransportationplan.mindmixer.com. The site provides citizens with a new way to connect and communicate their thoughts with transportation decision makers and other citizens about Mississippi's long-range transportation plan known as MULTIPLAN 2040.

Sometimes it is difficult for citizens to take time away from family and work to attend face-to-face public meetings. This new website allows online input from those who might not have the opportunity to attend a meeting. The goal of the site is to increase opportunities for the public's voice to be heard. Feedback gathered through this site will be vital to the planning of future infrastructure throughout the state of Mississippi.

The partnership with MDOT and the MPOs in the planning process will help ensure that urban and rural transportation needs are addressed in a comprehensive manner statewide. Additionally, MDOT and each MPO will still host face-to-face meetings in locations across the state. Meetings are set to begin in February and will occur until June; exact dates and locations will follow.

The site gives contributors a chance to share new ideas, support existing concepts and provide feedback on a variety of transportation topics online anytime, anywhere. The topics are designed to generate critical thinking about ideas that would have a positive impact on future infrastructure over the next 25 years. Participants are encouraged to share photos, use maps to help pinpoint locations and have conversations with other citizens from across the state.

The site is accessible through mobile devices and is available in over 50 languages for easy access to join the conversation.

Online discussions will host topics including:

- What do you want our transportation system to look like in 25 years?
- If you could change one thing about our existing transportation system, what would it be?

The site will measure and track participation on the most compelling topics. The resulting data provides invaluable insights for this and future planning processes. For more information on how you can join the conversation, please visit mississippitransportationplan.mindmixer.com.

CUTLINE: The Mississippi Department of Transportation (MDOT) and the Gulf Coast, Hattiesburg and Jackson Metropolitan Planning Organizations (MPOs) are pleased to announce the launch of mississippitransportationplan.mindmixer.com...

WMT	72.27	90.97	86.19	+.48	+0.6	+0.4	+17.3	18	2.2
WFC	44.17	55.95	53.45	+.64	+1.2	-2.5	+19.5	13	2.6
WY	27.48	37.04	35.57	+.33	+0.9	-0.9	+21.4	27	3.3

$63.17 after the country's largest chain of car dealerships reported income that beat Wall Street's estimates.

civil service protection.

"I think he (Fisher) will be very sensitive about personnel," Clarke said.

Fisher said he would like to see the salary for correctional officers and probation officers increased. He said the avarage pay is $22,000 a year for a correctional officer and $27,000 for a probation officer.

A key goal is retention of correctional and probation officers, Fisher said, and better pay might help.

Fisher said he plans to increase annual training requirements, including firearm proficiency for correctional and probation officers.

Contact Jimmie E. Gates at jgates@jackson.gannett.com or (601) 961-7212. Follow @jgatesnews on Twitter.

Dining

Continued from Page 9A

Luby's is famous for its made-from-scratch, homestyle meals that are available "at a great value in a friendly cafeteria style environment," she said. "Luby's is about real food, real ingredients and home-cooked dishes made every day with fresh, unprocessed ingredients by dedicated team members."

The Original Burger, Bacon Cheddar Burger, and the Buffalo Burger are the top three customer favorites on Fuddruckers' menu, she said.

Fried fish, fried chicken, and blackened tilapia are the top three customer favorites at Luby's, she said.

According to its website, "Luby's operates restaurants under the brands Luby's Cafeteria, Fuddruckers and Cheeseburger in Paradise and provides food service management through its Luby's Culinary Contract Services business segment.

"In addition to the 73 company-operated Fuddruckers locations, Luby's is the franchisor for 111 Fuddruckers franchise locations across the United States (including Puerto Rico), Canada, Mexico, Italy, the Dominican Republic, Panama and Chile," according to the website.

Nell Luter Floyd is a shopping enthusiast. Contact her at nellfloyd@bellsouth.net

JCL 2/4

Jackson Clarion Ledger

42, Hattiesburg, MS. 601-544-8181.

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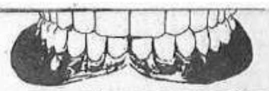

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Mississippi Long-Range Transportation Plan
Open Forum Public Meetings

MDOT — 2040 MULTIPLAN

The Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization (MPO) and the Mississippi Department of Transportation (MDOT) invite you to attend open forum public meetings across the state for development of the 2040 Long Range Transportation plan, MULTIPLAN. Join the conversation during the planning process for Mississippi's long-range transportation development. Planning efforts incorporate key needs identified by citizens who attend these meetings. The development and implementation of a regional multimodal transportation system addresses connectivity between public transportation, non-motorized transportation, rail, commercial motor vehicle, waterway, aviation facilities and other initiatives. If you are not able to attend the public meeting, you may still take part in online discussions at "mississippitransportationplan.mindmixer.com." Individuals who require auxiliary aids or require alternative languages and want to participate in the meeting should call 601-359-7685 at least five days prior to the meeting date.

HATTIESBURG:

Wednesday, February 18, 4 – 6 p.m.
Breland Community Center (Lamar County), 79 Jackson Road

Thursday, February 19, 4 – 6 p.m.
Historic Train Depot (Forrest County), 308 Newman Street

Staff members will be present at each meeting to discuss the planning process and receive input on the MULTIPLAN.

H Burg Impact 2/9

8A • WEDNESDAY, FEBRUARY 4, 2015 • HATTIESBURGAMERICAN.COM • HATTIESBURG AMERICAN

FROM THE FRONT

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PROGRAMS FOR YOUNG READERS

Mississippi Long-Range Transportation Plan
Open Forum Public Meetings

The Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization (MPO) and the Mississippi Department of Transportation (MDOT) invite you to attend open forum public meetings across the state for development of the 2040 Long Range Transportation plan, MULTIPLAN. Join the conversation during the planning process for Mississippi's long-range transportation development. Planning efforts incorporate key needs identified by citizens who attend these meetings. The development and implementation of a regional multimodal transportation system addresses connectivity between public transportation, non-motorized transportation, rail, commercial motor vehicle, waterway, aviation facilities and other initiatives. If you are not able to attend the public meeting, you may still take part in online discussions at "mississippitransportationplan.mindmixer.com." Individuals who require auxiliary aids or require alternative languages and want to participate in the meeting should call 601-359-7685 at least five days prior to the meeting date.

HATTIESBURG:

Wednesday, February 18, 4 – 6 p.m.
Rawls Community Center (Lamar County), 71 Jackson Road

Thursday, February 19, 4 – 6 p.m.
Historic Train Depot (Forrest County), 308 Newman Street

Staff members will be present at each meeting to discuss the planning process and receive input on the MULTIPLAN.

Hattiesburg 2/4

106 S. President St.
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Fax: (601) 960-0420

SOL
Engineering Services, LLC
Engineers & Project Managers

1100 Poydras St.
Suite 2130
New Orleans, LA 70163
Phone: (504) 522-4575
Fax: (504) 522-4576

March 10, 2015

Rebecca Boone
Neel-Schaffer, Inc.
125 S. Congress Street, Suite 1100
Jackson, MS 39201

RE: Feedback on Environmental Justice (EJ) and Underserved Groups Outreach
MDOT's Long Range Transportation Plan Project – 4022-029

Dear Rebecca:

Over the past week, SOL Engineering Services, LLC (SOL) was tasked with reaching out via various means of communication to personally communicate to Environmental Justice (EJ) and underserved groups. During the past week, SOL personnel reached out mainly to personal contacts as well as additional organizations that may or may not have been personally contacted during the previous outreach attempts. SOL made several phone calls, sent several emails and during this communication, also requested that contacted individuals share this information via their social media pages if possible. Additionally, contacted individuals were informed of the purpose of the project as well as the importance of having community leaders and citizens provide their input in the development of our future transportation system as well as times and locations of the scheduled meetings.

While surveying social media sights after making phone call requests to post the information on their respective pages, the following was observed on pages where the information was posted:

Facebook Observations	
Contact/Organization	**Number of Page Members or Affiliates**
Word and Worship Church*	582
City of Byram Unofficial Facebook Page	1,131
City of Indianola Unofficial Facebook Page	140
WHLH 95.5 Hallelujah FM personnel (Nikki Dulaney, Michael Davis, and Lance Fuller)	unknown
JSUNAA Byram-Terry Chapter Facebook Page**	800+
Personal Friends	4500+ (collectively)

*Members also shared it on their personal pages.
**This post also tagged approximately 7 other individuals to share on their personal pages. Those numbers, where possible, are included in the personal friends FB numbers.

"Shaping Communities through Engineering Innovations"

Ms. Rebecca Boone
March 10, 2015
Page 2

Since we had not previously called any county human resource agencies during our additional outreach efforts, we called all agencies in or near the Clarksdale, Tupelo, and Jackson areas. Finally, utilizing the American Public Transportation Association webpage, we also contacted all transportation agencies in or near the aforementioned areas to inform them about the upcoming meetings in their respective areas.

All who were reached via telephone were very receptive to the information, and about 90% of them said they would either attend or send a representative. There were a few who had previous engagements, and therefore, wouldn't be able to attend. They were informed about the mindmixer website and the opportunity to view the LRTP information online and still have the opportunity to provide feedback. Overall, the organizations and individuals were very appreciative of the information, and expressed an interest in participating in the project planning process.

The groups and personal contacts who were contacted expressed very sincere appreciation for their invitation to be involved. Overall, the outreach process proved to be very successful based on the feedback received via telephone calls and the observed number of people/groups who shared the information on their social media pages.

Warmest Regards,

Falicia L. Edwards, PhD, REM
Project Manager

"Shaping Communities through Engineering Innovations"

Public Meeting Summary
Hattiesburg MPO

Meeting Format

The Mississippi Department of Transportation (MDOT) Planning Division and the Hattiesburg MPO staff held two public meetings on February 18 and 19, 2015. The first meeting was held in Lamar County at the Breland Community Center located at 79 Jackson Rd., Hattiesburg and had 34 citizens in attendance. The Forrest County meeting was held at the Hattiesburg Historic Train Depot located at 308 Newman St., Hattiesburg and had 23 participants. Transportation planners guided participants through the planning process and provided an opportunity for them to complete activities designed to gather input for use in the development of a draft plan.

Attendees were invited to watch a brief video explaining the planning process for Mississippi's Unified Long-Range Transportation Infrastructure Plan known as MULTIPLAN 2040. The video provided educational information and explained how stakeholders and the public could become engaged in the transportation planning process.

MDOT provided a short video at each public meeting and on line to provide citizens with information about the transportation planning process.

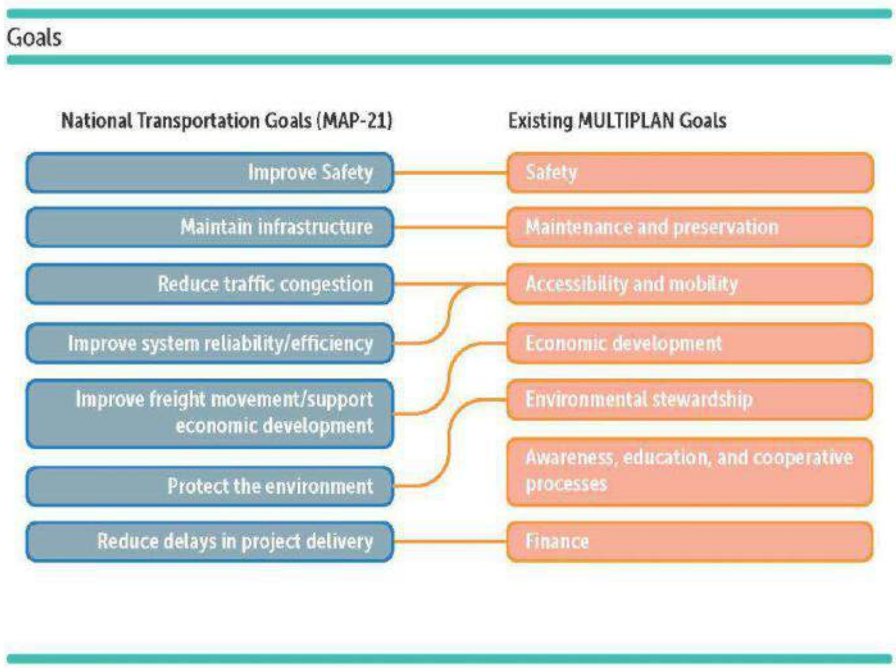
Visitors reviewed statewide transportation goals, the funding process, safety data, highway mobility information, and bridge and highway preservation statistics (see Figures 1-5). MPO-specific data on transportation safety, model roadway network, the study area, and goals were also available (see Figures 6-9). Members of the consulting team, MDOT and the MPO were available to answer questions and provide supplemental information from past, and in some cases, existing initiatives.

The planning team offered three activities designed to encourage input from the public. The activities included the following:

- Transportation improvement needs: participants reviewed maps depicting state maintained highways, multi-modal facilities and the MPO area then asked to make written comments identifying transportation needs or issues (see Figure 10);
- Rate our transportation system: participants rated the condition of various transportation categories (see Figure 11); and
- Transportation budget priority: participants used a form to expressed how they felt our state's transportation dollars should be spent (see Figure 12).

Statewide Display Boards

Figure 1 - Statewide Goals



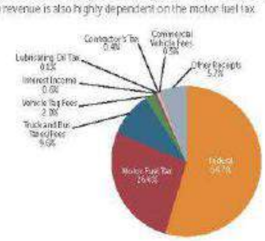
Mississippi's transportation goals are developed with input from the public to support national transportation goals. The graphic above represents Mississippi's existing statewide goals and demonstrates how they support national goals. Public meeting participants were encouraged to review the existing goals and provide feedback that will aid in the development of Mississippi's draft Unified Long-Range Transportation Infrastructure Plan.

Public Meeting Summary
Hattiesburg MPO

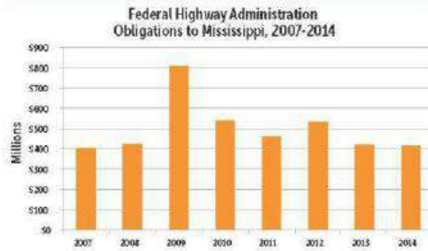
Figure 2 - Transportation Funding

How is transportation funded in Mississippi?

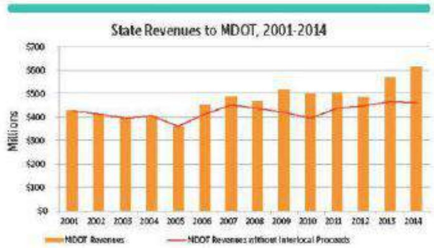
The majority of the federal funding is from the Federal Motor Fuel Tax. The state's transportation revenue is also highly dependent on the motor fuel tax.



Federal funding has been on the decline.



Non-bond state transportation revenues are relatively flat.



Revenues are not keeping pace with needs.

Needs Estimates for Highways and Bridges

$2.58 Billion	5-Year funding gap for pavement
$5.29 Billion	2015 to 2040 funding needs and roadway capacity
$2.53 Billion	Replacement cost of deficient state maintained bridges

Understanding how transportation is funded and that current needs outweigh revenues is key to helping the public and stakeholders provide meaningful input in planning our future transportation process. The charts above represent statewide funding challenges and were provided during public meetings.

3

Public Meeting Summary
Hattiesburg MPO

Figure 3 - Safety

Safety

Mission of the Mississippi Strategic Highway Safety Plan (SHSP):
Save lives and reduce injuries by using partnerships to coordinate and integrate education, enforcement, engineering, and emergency response initiatives.

Vision of the Mississippi SHSP: *Advancing the safety of Mississippi's roadways Towards Zero Deaths*

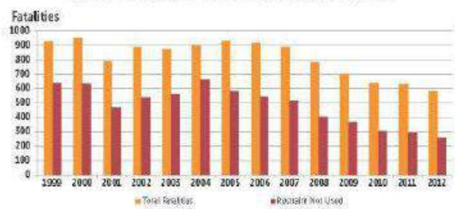
Mississippi's "Critical Emphasis Areas," or top priorities, for highway safety improvement:

- Increasing seat belt usage
- Reducing impaired driving
- Reducing the number of unlicensed drivers on our roadways
- Preventing or reducing the severity of roadway departure crashes
- Preventing or reducing the severity of intersection-related crashes

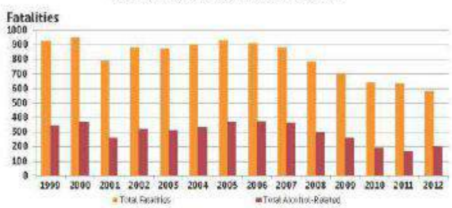
Fatalities and Fatality Rate per 100 Million Vehicle Miles Traveled by Year

*2012 had the lowest fatalities per 100 million VMT ever recorded in Mississippi

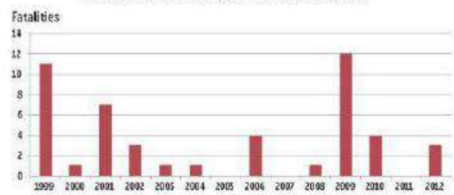
Fatalities and Fatalities Where Restraint was Not Used



Fatalities vs Alcohol-Related Fatalities



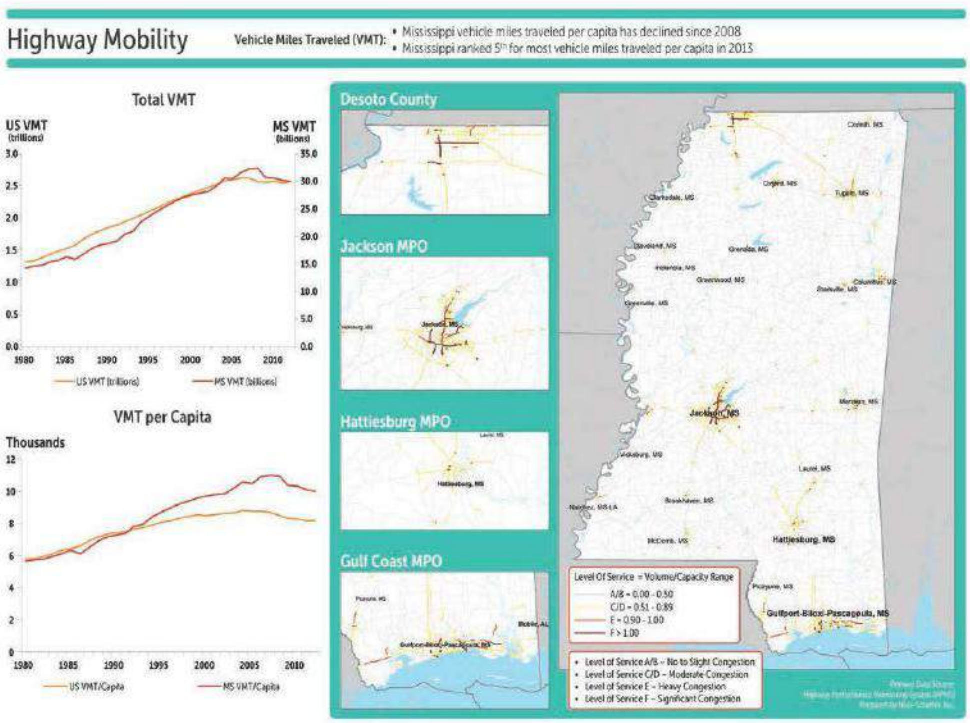
Fatalities in Construction/Maintenance Zones



The mission of the Mississippi Strategic Highway Safety Plan (SHSP) is to save lives and reduce injuries by using partnerships to coordinate and integrate education, enforcement, and emergency response initiatives. This display board, which was presented during public meetings, help participants understand needs on the state maintained system and to provide meaningful input during the transportation planning process.

Public Meeting Summary
Hattiesburg MPO

Figure 4 - Highway Mobility



Vehicle Miles Traveled (VMT) per capita in Mississippi has declined since 2008. The state was also ranked 5th for the most VMT per capita in 2013. The public was provided the opportunity to review the maps and charts above during public meetings to inform them of our state's highway mobility levels.

5

Figure 5 - Bridge and Highway Preservation

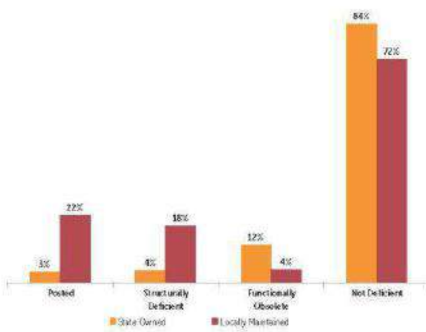
Bridge and Highway Preservation

Bridge Conditions

Posted
- Unable to carry legal weight limits

Structurally Deficient
- Does not imply bridge is unsafe
- Bridge requires additional repair to remain in service

Functionally Obsolete
- Does not imply bridge is unsafe
- Bridge does not meet current design standards



Highway Conditions

Highway Performance – Pavement Roughness:

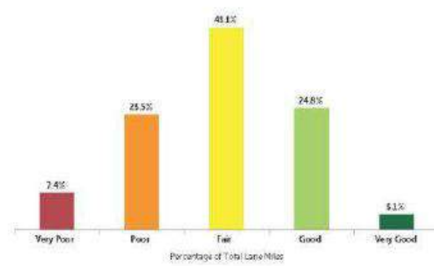
Very Good
- New or almost new pavement, will not require improvement for some time

Good
- In satisfactory condition, free of significant defects, preserve pavement

Fair
- Some defects or deficiencies, minor rehabilitation needed

Poor
- Advanced deterioration, needs structural repair in the near future to preserve usability

Very Poor
- Needs replacement or reconstruction to restore serviceability

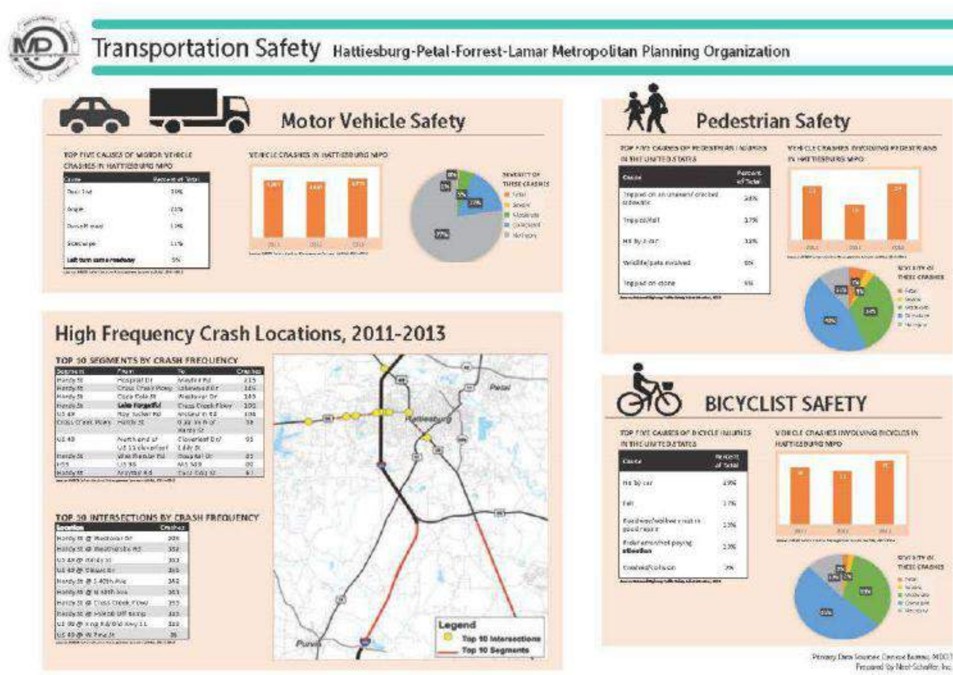


Maintaining the bridges, highways and other transportation facilities currently in place is one of our statewide goals. The chart above was provided during public meetings to give the public an idea of how our highways and bridges rank today.

Public Meeting Summary
Hattiesburg MPO

Hattiesburg MPO Display Boards

Figure 6 - Transportation Safety

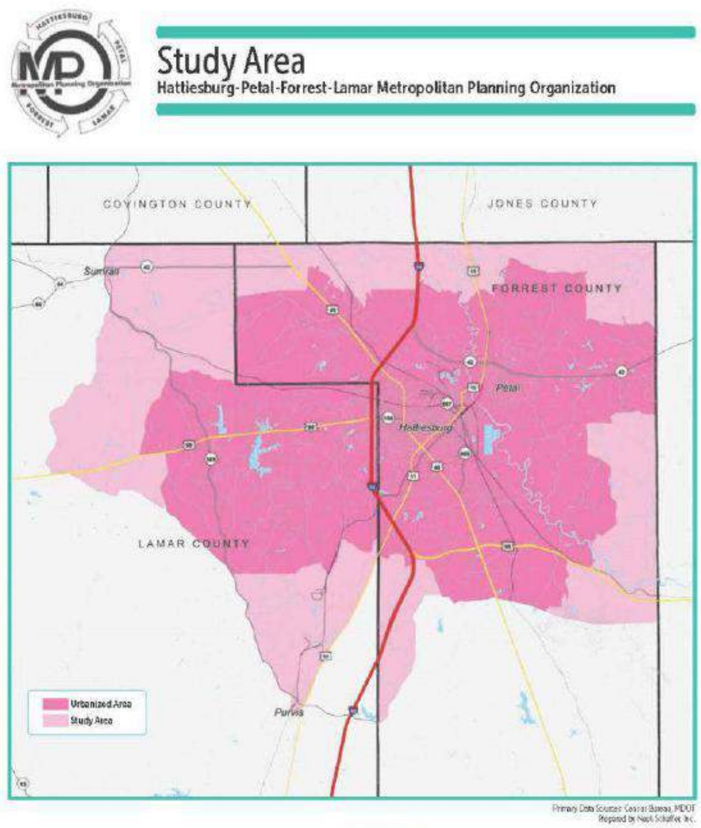


Safety is everyone's priority. The Hattiesburg MPO provided the above safety statistics during its February 2015 public meeting.

7

Public Meeting Summary
Hattiesburg MPO

Figure 7 - Study Area



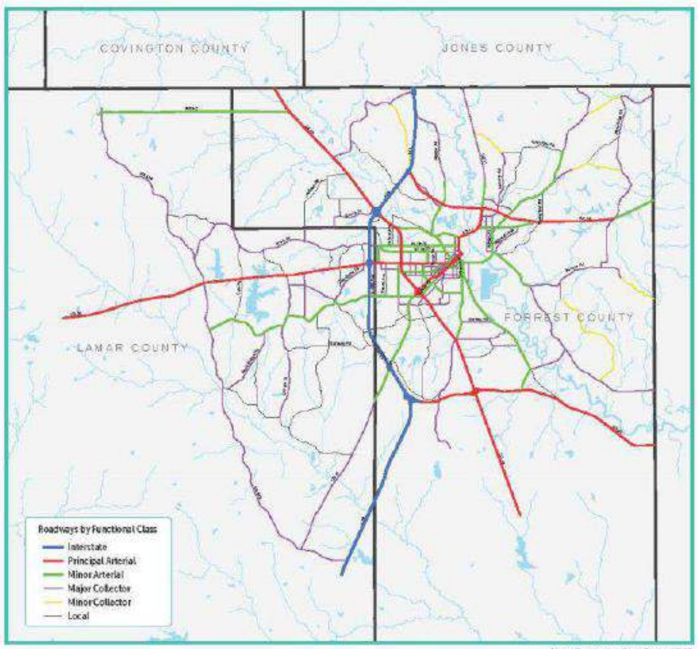
The map above was made available at the Hattiesburg MPO public meeting and provided a visual of the long-range transportation study area.

8

Public Meeting Summary
Hattiesburg MPO

Figure 8 - Model Roadway Network

Model Roadway Network
Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization



Primary Data Sources: Census Bureau, MDOT
Prepared by Neel-Schaffer, Inc.

Roadways within the Hattiesburg Urbanized area are depicted here by functional class. This map was made available during the February 2015 public meeting and helped participants visualize the different types of roadways and streets with the area.

9

Public Meeting Summary
Hattiesburg MPO

Figure 9 - Goals

Goals

Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization

- Affordable, convenient, and reliable access to destinations by multiple modes of transportation
- A connected regional economy accessible to national and global markets
- A well-maintained and efficient transportation system
- A safe, secure, and resilient transportation system
- A transportation system that creates a sense of place and improves public health
- A transportation system that distributes benefits and burdens in an equitable manner
- A transportation system that minimizes detrimental impacts to the natural and historic environment and practices environmental stewardship
- A meaningful public involvement process that influences transportation decision-making
- A fiscally-constrained 25-year transportation improvement program that addresses existing and future needs while maximizing projected revenues

Transportation goals developed by the Hattiesburg MPO were made available during the public meeting.

Public Meeting Summary
Hattiesburg MPO

Transportation Improvement Needs

Participants were given markers to note areas on a statewide map indicating where improvements are needed (see Figure 10). The following comments were noted:

- Regional loop around Hattiesburg with connections near Prentiss, Columbia, Wiggins, New Augusta, and Laurel
- Connector roads from Hwy 98 West to I-59 and I-59 to Hwy 49
- Better access to improve safety noted on Hwy 49

11

Public Meeting Summary
Hattiesburg MPO

Figure 10 - Transportation Improvement Map

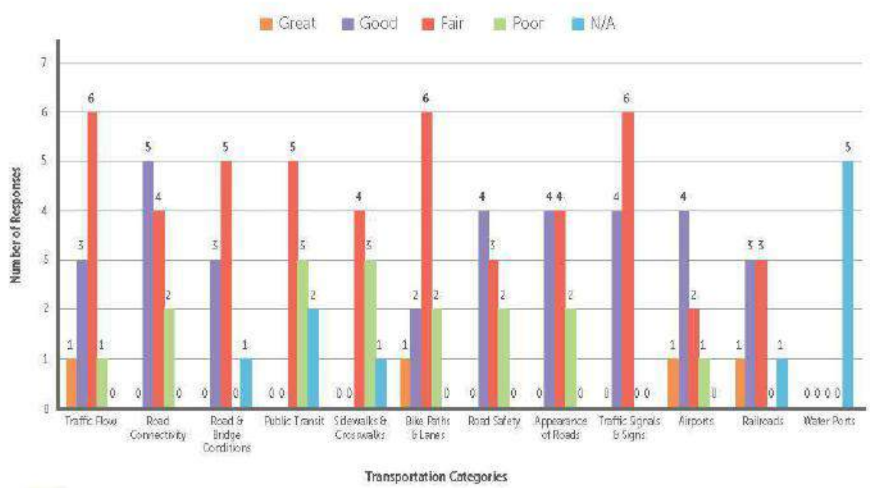
12

Public Meeting Summary
Hattiesburg MPO

Rate our Transportation System

Meeting participants rated 12 transportation categories as great, good, fair, poor or not applicable by placing a sticker on a graph (see Figure 11). A majority of the categories received a fair rating. Below are the overall results of this opinion poll.

Rate Our Transportation System–Hattiesburg MPO
February 18-19, 2015



13

Public Meeting Summary
Hattiesburg MPO

Figure 11 - Rate our Transportation System

Rate Our Transportation System

Place a sticker in the box that best describes your satisfaction in each category of Mississippi's transportation system.

Transportation Category	Great	Good	Fair	Poor	N/A
Traffic Flow					
Road Connectivity					
Road and Bridge Conditions					
Public Transit					
Sidewalks and Crosswalks					
Bike Paths and Lanes					
Road Safety					
Appearance of Roads					
Traffic Signals and Road Signs					
Airports					
Railroads					
Water Ports					

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Public Meeting Summary
Hattiesburg MPO

Transportation Budget Priorities

This activity allowed participants to spend $100 over ten transportation categories. A total of 14 surveys were collected. Maintain roads received the highest priority (38 percent) while improve streetscape/appearance of roadways, add lanes to existing highways and/or add new roads, and promote economic development through transportation projects received the lowest priority (4 percent). Below is a pie chart that reflects the percentage of funds allocated by category followed by a copy of the survey questions (Figure 12).

Transportation Budget Priorities–Hattiesburg MPO
February 18-19, 2015

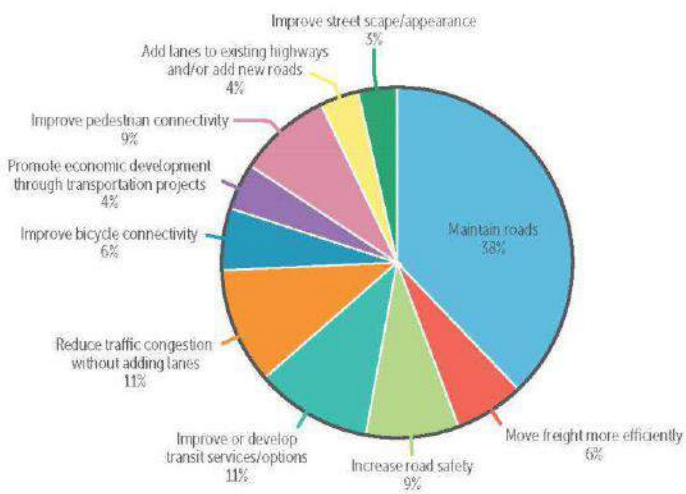

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Figure 12 - Transportation Budget Priorities Worksheet

Transportation Budget Priorities

Imagine you need to complete $1,000 worth of transportation projects, but you only have $100 available to spend. What would your priorities be?

You may spend all of your money in one category or spread it around. Either way, your thoughts count. Let your voice be heard!

Please enter your zip code here...

Transportation Projects	Use multiples of $10
Maintain roadways (bridges, repave, signage, striping)	
Move freight more efficiently (highways, ports, railroads, air, waterways)	
Increase roadway safety (traffic calming, new road designs)	
Improve or develop transit services/options (new and expanded routes, rapid transit, multi-use activity hubs, local revitalization)	
Reduce traffic congestion without adding lanes (intersection improvements)	
Improve bicycle connectivity (multi-use pathways, designated bike lanes)	
Promote economic development through transportation projects	
Improve pedestrian connectivity (crosswalks, pedestrian signals, sidewalks)	
Add lanes to existing highways and/or add new roads	
Improve streetscape/appearance (plants/trees, lighting, art, road pavers)	
List other improvement ideas here:	
Should equal no more or less than $100	$100

CMPDD
Central Mississippi Planning and Development District
Gulf Regional Planning Commission

mississippitransportationplan.mindmixer.com planning@mdot.ms.gov

Legal Advertisement (Public Notice) for Review of Draft Plan
will go here once received from publishing agency.

Public Affairs › News Releases: Review Mississippi's Draft Long-Range Transportation Plans

Public Affairs Division

Title	Review Mississippi's Draft Long-Range Transportation Plans
Cutline	Meeting dates, times and locations are provided below and are available online at mississippitransportationplan.mindmixer.com.
Area	Statewide
Event Date & Time	10/30/2015 12:00:00 AM
Category	Upcoming Events
Body	

JACKSON, MISS.— The Mississippi Department of Transportation (MDOT) and the Jackson, Hattiesburg-Petal-Forrest-Lamar (HPFL), and Gulf Coast Metropolitan Planning Organizations (MPOs) are holding joint, open-house public meetings to hear your thoughts about our state's draft long-range transportation plans.

Meeting dates, times and locations are provided below and are available online at **mississippitransportationplan.mindmixer.com**. Individuals who would like to participate online may do so beginning Friday, Oct. 30. Copies of the draft statewide plan as well as the MPOs' draft plans can be seen and comments made there. Questions? Call 601-359-7685 or email planning@mdot.ms.gov.

Date/Time Location Plan(s) Available for Review:

***Oct. 20, 4-6 p.m. at Jackson MPO CMPDD District Office**
1170 Lakeland Drive in Jackson, MS
Plan available for review: Jackson MPO Plan

***Oct. 21, 4-6 p.m. at Madison Co. Admin. Building, 1st Floor**
125 W North Street in Canton, MS
Plan available for review: Jackson MPO Plan

***Oct. 22, 4-6 p.m. at Rankin Co. Courthouse Annex Board Room**
211 East Government Street, Brandon, MS
Plan available for review: Jackson MPO Plan

***Nov. 4, 4-6 p.m. at Jackson MPO CMPDD District Office**
1170 Lakeland Drive, Jackson, MS
Plan available for review: Statewide Plan

***Nov. 5, 4-6 p.m. at Hattiesburg Historic Train Depot**
308 Newman Street, Hattiesburg, MS
Plans available for review: Statewide Plan and HPFL MPO Plan

***Nov. 10, 4-6 p.m. at Breland Community Center**
79 Jackson Road, Hattiesburg, MS
Plans available for review: Statewide Plan and HPFL MPO Plan

***Nov. 11, 4-6 p.m. at Historic Train Depot**
326 Blues Alley, Clarksdale, MS
Plan available for review: Statewide Plan

***Nov. 12, 11 a.m. - noon at Jackson MPO CMPDD District Office**
1170 Lakeland Drive, Jackson, MS
Plan available for review: Jackson MPO Plan

***Nov. 12, 4-6 p.m. at MDOT District Office**
1909 Gloster Street, Tupelo, MS
Plan available for review: Statewide Plan

***Nov. 17, 4-6 p.m. at Pascagoula Senior Center**
1912 Live Oak Avenue, Pascagoula, MS
Plans available for review: Statewide Plan and Gulf Coast MPO Plan

***Nov. 18, 4-6 p.m. Edgewater Mall (near Dillards)**
2600 Beach Boulevard, Biloxi, MS
Plans available for review: Statewide Plan and Gulf Coast MPO Plan

***Nov. 19, 4-6 p.m. at Bay St. Louis Community Hall**
301 Blaize Avenue, Bay St. Louis, MS
Plans available for review: Statewide Plan and Gulf Coast MPO Plan

Mississippi's Unified Long-Range Transportation Infrastructure Plan or MULTIPLAN 2040 is the strategy for meeting mobility needs over the next 25 years. By reviewing and commenting on the draft plans, input will be considered before the drafts are finalized.

MULTIPLAN's goal is to look at the big picture and answer questions such as "How can we make the best use of limited funding to provide a transportation system that meets current and expected needs?" It provides a framework for developing and putting into place our strategic and financial plans.

MDOT and the MPOs are teaming up to make better use of limited funds and to ensure that all transportation planning is well coordinated. While MDOT is responsible for the statewide transportation system, the MPOs have planning responsibilities for each of their respective urbanized areas.
Earlier this year, MDOT and the MPOs asked "What do you think our transportation system should look like in the year 2040?" and "How would you spend limited transportation dollars?"

Comments were received from individuals, agencies, corporations and groups from all across the state. Planners considered this input, along with technical data, to develop the draft transportation plans being offered for review today.

Technical data reviewed included information such as the following:

- The current population and its projected growth
- Where people are traveling to work and school
- Where future development is likely to occur that could increase traffic demands
- The existing conditions and capacity of our transportation system and how it would be impacted by growth
- Information determined from previous studies

Together, we are planning for the best possible transportation system to safely meet your needs, strengthen our economy, and provide the mobility you deserve. Individuals who require auxiliary aids or require alternative languages and want to participate in the meeting should call 601-359-7685 at least five days prior to the meeting date.

###

Attachments

News Release

Contact: Matt Williams
Phone: 601.545.6259
Email: mpo@hattiesburgms.com

Draft Long-Range Transportation Plans Ready for Review

HATTIESBURG, MS; Wednesday, Oct. 28, 2015-------The Hattiesburg-Petal-Forrest-Lamar Metropolitan Planning Organization (MPO) and the Mississippi Department of Transportation (MDOT) are holding **joint, open-house public meetings to hear your thoughts about our state's draft long-range transportation plans.**

Meeting dates, times and locations are provided below:

Date/Time	Location	Plan(s) Available for Review
Nov. 5 4- 6 p.m.	Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg	Statewide Plan and HPFL MPO Plan
Nov. 10 4- 6 p.m.	Breland Community Center 79 Jackson Road, Hattiesburg	Statewide Plan and HPFL MPO Plan

Individuals who would like to review and make comments about the plans online may do so beginning Friday, Oct. 30, at mississippitransportationplan.mindmixer.com. By participating in the review process, your comments will be carefully considered before the plans are finalized.

The MPO and MDOT are teaming up to make better use of limited funds and to ensure that all transportation planning is well coordinated. While MDOT is responsible for the statewide transportation system, the state's MPOs have planning responsibilities for each of their respective urbanized areas.

Mississippi's Unified Long-Range Transportation Infrastructure Plan or MULTIPLAN 2040 is our strategy for meeting mobility needs over the next 25 years.

MULTIPLAN's goal is to look at the big picture and answer questions such as "How can we make the best use of limited funding to provide a transportation system that meets needs?" It provides a framework for developing and putting into place our strategic and financial plans.

Individuals who require auxiliary aids or require alternative languages and want to participate in a meeting should call 601.545.6259 at least five days prior to the meeting date.

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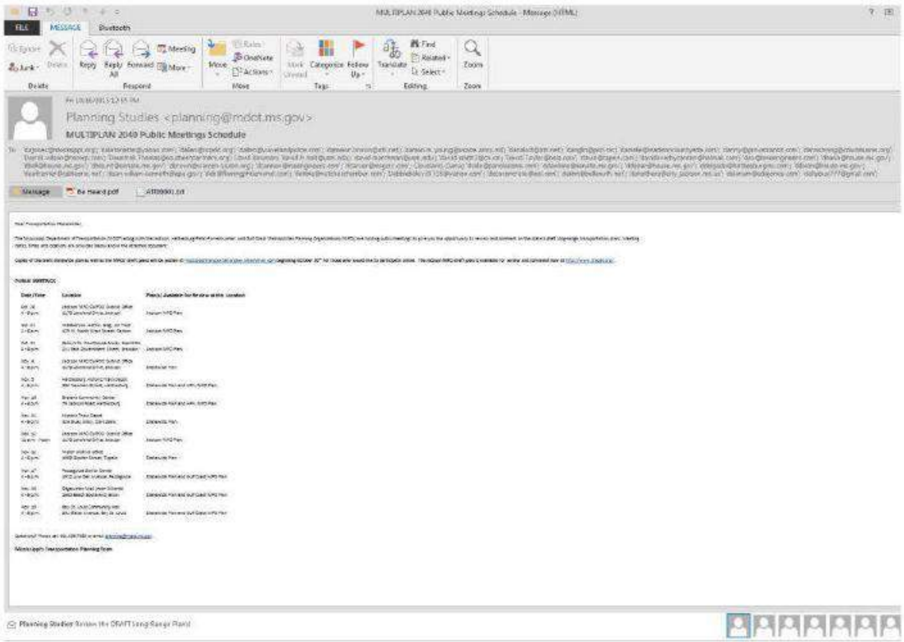


Copy of email blast sent to Stakeholder list inviting them to public meetings.

10/16/15

From: Planning Studies
To: "pdkey@bellsouth.net"; "pdowell@camsys.com"; "pelahat@bellsouth.net"; "penney.stokes@dmh.state.ms.us"; "pepper@msroadbuilders.com"; "peter@msleveeboard.com"; "pfisher@clintonms.org"; "pgandy@senate.ms.gov"; "pgary@cmicsp.org"; "pgunn@house.ms.gov"; "phdministries7@aol.com"; "phil.hardwick@msstate.edu"; "Phillip.Sanderson@mmns.state.ms.us"; "phillip.seal@sabic-ip.com"; "phillip@carpenterproperties.com"; "phunt@mississippi.org"; "pickettmarvin@aol.com"; "Pierce.Moore@governor.ms.gov"; "pikecd@cableone.net"; "pjwylie@southernco.com"; "pkclark123@gmail.com"; "pkennedy@smpdd.com"; "pking@bgccm.org"; "platture@comcast.net"; "plee@senate.ms.gov"; "plglong@hotmail.com"; "plieb@mdah.state.ms.us"; "PMADDOX@MSDH.STATE.MS.US"; "pmoran@senate.ms.gov"; "pmroadpro@bellsouth.net"; "pnelson@house.ms.gov"; "porlatinos@yahoo.com"; "pragati.srivastava@memphistn.gov"; "prairieopportunity@yahoo.com"; "pratallan@netscape.net"; "pres@wmcarey.edu"; "president@lambra.org"; "prussell@icedf.org"; "pslaughter@yoursccaa.com"; "psudduth@ncpdd.org"; "psullivan@house.ms.gov"; "psumrall@mississippi.edu"; "ptisdale@biloxi.ms.us"; "publicworks@madisonthecity.com"; "pwalley@ihl.state.ms.us"; "pwatson@house.ms.gov"; "pwillis@house.ms.gov"; "qci@qualitycustomerinteractions.com"; "quitmanema@att.net"; "ra3@rac.com"; Jansen, Randy; "randallgeorge@bellsouth.net"; "randy.stewart@tunicagov.com"; "rasvp@oxfordms.net"; "ravila@stepscoalition.org"; "ray_aycock@fws.gov"; "Raymond@sd-w.com"; "rbarlow@copiahcountyms.gov"; "RBell@GWRR.com"; "rbell@msfa.state.ms.us"; "rbennett@house.ms.gov"; "rbgcontr@msn.com"; "rbobkoskie@swmmhc.org"; "rbost@olemiss.edu"; "rboxx@mississippi.org"; "rboyd@house.ms.gov"; "rbrantley@trpdd.com"; Burt, Robby; "rchra@bellsouth.net"; "rcook@hmcompany.com"; "rcovington@mississippi.org"; "rcrawford@earthcon.com"; "rdavis@cityofpascagoula.com"; "rdc506@yahoo.com"; "rdickson@house.ms.gov"; "rdombrowski@gulfport-ms.gov"; "rdrane@copiahcountyms.gov"; "rduren@ibcconstruction.net"; "rdzanie@gmail.com"; "reascountrylane@att.net"; Rebecca Boone; "rebelservices@yahoo.com"; "reed.harrington@cn.ca"; "rejones@umc.edu"; "rellis@diberville.ms.us"; "relmore@edgellc.us"; "renata.lana@noaa.gov"; "renee@gulfcoast.org"; "rererussell@yahoo.com"; "retailms@bellsouth.net"; "rfbahm@gmail.com"; "rferguson@mississippi.org"; "rferguson@pickeringfirm.com"; "rflowers@gulfport-ms.gov"; "rforster@olemiss.edu"; "rgacfs@aysia.com"; "rginn@dps.ms.gov"; "rgordon@ndpdd.com"; "rgoza@monroecoms.com"; "rgraham@co.hinds.ms.us"
Subject: Review the DRAFT Long-Range Plans!
Date: Monday, November 02, 2015 2:22:14 PM
Attachments: image001.png
Tell Us What You Think.pdf
ATT00001.txt

Stakeholder:

Drafts of Mississippi's 2040 statewide and urban long-range transportation plans are ready for your review and comment at http://mississippitransportationplan.mindmixer.com/. Using technical data and your input, we have developed strategies for meeting future transportation needs for the next 25 years.

If you prefer, follow the links below to make comments directly to the participating Metropolitan Planning Organizations and the Mississippi Department of Transportation.

Mississippi's Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN):
www.gomdot.com/multiplan2040

Jackson Metropolitan Transportation Plan:
www.cmpdd.org

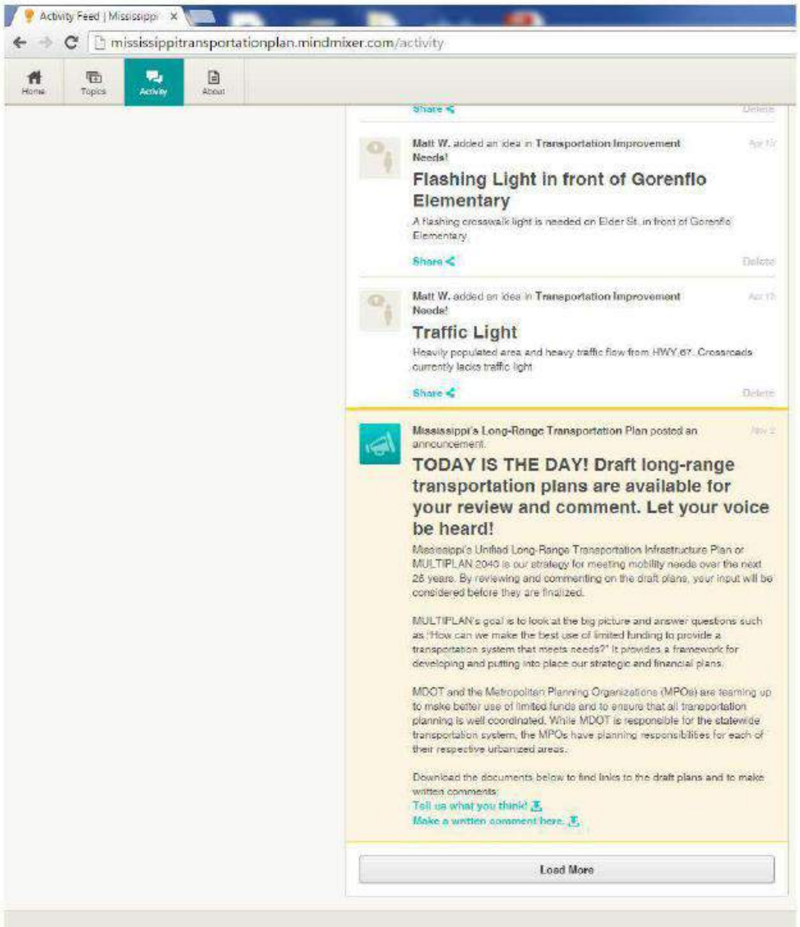
Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan:
www.Hattiesburgms.com/government/departments/federal-programs/metropolitan-planning-organization/

Gulf Coast Metropolitan Transportation Plan:
www.grpc.com/mpo-plans/mtp/

Help us get the message out! Post or share the attached flier with your co-workers, friends, relative and others. Together we can plan for the best possible use of limited transportation funds.

Questions? Please call 601.359.7685 or email planning@mdot.ms.gov.

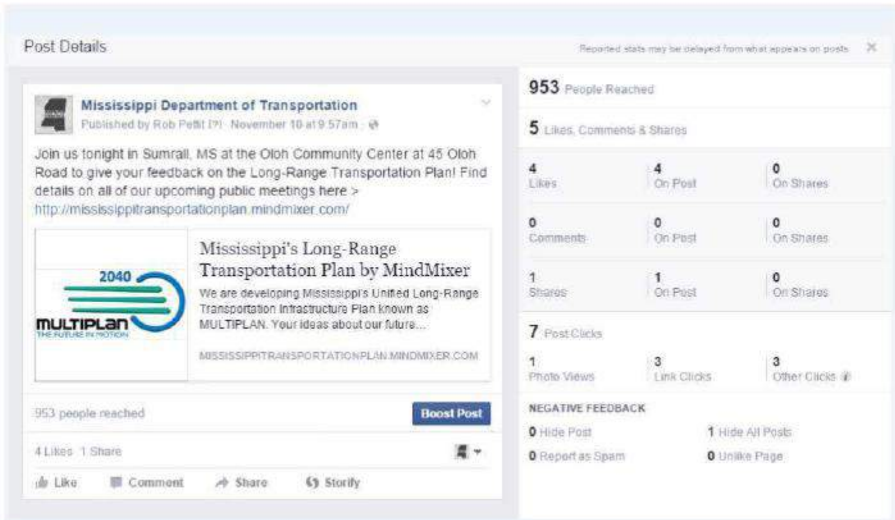
Mississippi Transportation Planning Team



Notification of draft plan availability on MindMixer Nov. 2, 2015

Hattiesburg Public Meeting notice

Nov. 10, 2015



Notification of new venue for Lamar County public meeting Nov. 10, 2015

2040 MULTIPLAN THE FUTURE IN MOTION

Mississippi 2040 Long-Range Transportation Plans

Let Us Hear From YOU!

We hope you will take time to review Mississippi's statewide draft transportation plan and plans developed for our urbanized areas. Let us know what you expect from your transportation system! Public meeting locations are listed below.

If you prefer, draft plans can be reviewed on line at mississippitransportationplan.mindmixer.com beginning Friday, October 30.

Date/Time	Location	Plan(s) Available for Review
Oct. 20 4- 6 p.m.	Jackson MPO CMPDD District Office 1170 Lakeland Drive, Jackson	Jackson MPO Plan
Oct. 21 4- 6 p.m.	Madison Co. Admin. Bldg, 1st Floor 125 W. North Street., Canton	Jackson MPO Plan
Oct. 22 4- 6 p.m.	Rankin Co. Courthouse Annex Board Rm 211 East Government Street, Brandon	Jackson MPO Plan
Nov. 4 4- 6 p.m.	Jackson MPO CMPDD District Office 1170 Lakeland Drive, Jackson	Statewide Plan
Nov. 5 4- 6 p.m.	Hattiesburg Historic Train Depot 308 Newman Street, Hattiesburg	Statewide Plan and HPFL MPO Plan
Nov. 10 4- 6 p.m.	Breland Community Center 79 Jackson Road, Hattiesburg	Statewide Plan and HPFL MPO Plan
Nov. 11 4- 6 p.m.	Historic Train Depot 326 Blues Alley, Clarksdale	Statewide Plan
Nov. 12 11 a.m.- noon	Jackson MPO CMPDD District Office 1170 Lakeland Drive, Jackson	Jackson MPO Plan
Nov. 12 4- 6 p.m.	MDOT District Office 1909 Gloster Street, Tupelo	Statewide Plan
Nov. 17 4- 6 p.m.	Pascagoula Senior Center 1912 Live Oak Avenue, Pascagoula	Statewide Plan and Gulf Coast MPO Plan
Nov. 18 4- 6 p.m.	Edgewater Mall (near Dillards) 2600 Beach Boulevard, Biloxi	Statewide Plan and Gulf Coast MPO Plan
Nov. 19 4- 6 p.m.	Bay St. Louis Community Hall 301 Blaize Avenue, Bay St. Louis	Statewide Plan and Gulf Coast MPO Plan

MDOT Mississippi Department of Transportation

CMPDD Central Mississippi Planning and Development District

Mississippi Gulf Coast Metropolitan Planning Organization
Gulf Regional Planning Commission

News article generated by news release

Round 2, Oct. 30, 2015

Hattiesburg seeks citizen input for long-range transportation plan

Posted: Oct 30, 2015 2:46 PM CDT
Updated: Oct 30, 2015 2:46 PM CDT

By Charles Herrington, Reporter

HATTIESBURG, MS (WDAM) - Hattiesburg city officials are asking the public to help complete a long-range transportation plan for the area.

On Thursday Nov. 5, the city and the Mississippi Department of Transportation will host a public meeting to discuss a plan, being developed by the Metropolitan Planning Organization.

That group includes the cities of Hattiesburg and Petal, along with Forrest and Lamar County.

The plan will include ways to improve the use of roads, sidewalks and bridges.

The meeting will take place from 4-6 p.m. in the Community Room of the Hattiesburg Train Depot.

City leaders said the the plan is about three-quarters complete. When it is fully developed, it will be submitted to the Mississippi Department of Transportation.

LOCAL

Mississippi ranks high in most charitable state study

World's largest post office does more business

Social Security seminar

USM Assistant Professor, Students Receive Love of Learning Awards

Hattiesburg council wants answers, change to new flood rating

MULTIPLAN and HPFL Public Meeting Sign In Sheet

Hattiesburg Historic Train Depot | 308 Newman Street, Hattiesburg, MS | Thursday, November 5, 2015 | 4 p.m. to 6 p.m.

MULTIPLAN 2040 THE FUTURE IN MOTION

Name	Affiliation	Email	Telephone
Tim Torrey	SOL ENGINEERING	ttorrey@solengrs.com	601·961·1415
Edward Jones	SOL Engineering	ejones@solengrs.com	601·961·1415
Donna Lum	NS	donna.lum@neel-schaffer.com	601-948-3071
Trung Trinh	MDOT	ttrinh@mdot.ms.gov	601-359-7685
Lindsey Netherland	MDOT	lnetherland@mdot.ms.gov	601-359-7685
LP LedeT	Neel-Schaffer	louis.ledeT@neel-schaffer.com	337-232-6111
Robert Walker	"	robert.walker@neel-schaffer.com	601-948-3071
Taylor Marcantel	"	taylor.marcantel@neel-schaffer.com	337-232-6111
Jacquline McClain	Hattiesburg MPO	jmcclain@hattiesburgms.com	601-545-6381
Amy Ricedorf	Pine Belt Mental Health	amy.ricedorf@pbmhr.org	601-545-3668
Matt Williams	MPO Hattiesburg	mpo@hattiesburgms.com	601-545-6259
Chris Bowen	Forrest Co.	chris@co.forrest.ms.us.	601-545-6091
Robert McHaney	CS	rmchaney@camsys.com	512-691-8510

MDOT | CMPDD Central Mississippi Planning and Development District | Hattiesburg-Petal-Forrest-Lamar MPO | Mississippi Gulf Coast Metropolitan Planning Organization

mississippitransportationplan.mindmixer.com planning@mdot.ms.gov

MULTIPLAN and HPFL Public Meeting Sign In Sheet

Hattiesburg Historic Train Depot | 308 Newman Street, Hattiesburg, MS | Thursday, November 5, 2015 | 4 p.m. to 6 p.m.

2040 MULTIPLAN THE FUTURE IN MOTION

Name	Affiliation	Email	Telephone
DANIEL JAYROE	AREA DEV. PARTNERSHIP	D.JAYROE@THEADP.COM	601.408.4557
ALBERT WHITE	MDOT - DISTRICT 7	alwhite@mdot.ms.gov	601-291-5301
W.L. Sanders	City of Hattiesburg	wsanders@hattiesburgms.com	601-606-8522
Chad Miller	USM	Chad.r.miller@usm.edu	601 266-6666
Lamar Rutland	City Hattiesburg	lrutland@hattiesburgms.com	601-545-4590
PHIL ORTON	LAMAR RESIDENT	ORCOLLC@HOTMAIL.COM	228-671-9032
LARRY BARNES	City of Hattiesburg	LBARNES@HattiesburgMS.COM	601-674-1594
Andrew George	City of Hattiesburg	ageorge@hattiesburgms.com	601-319-0719
LaKeyla White	City of Hattiesburg	lwhite@hattiesburgms.com	601-545-4570
Derrick Ware	The Ware Group	thewaregroupllc@gmail.com	601 307.6110
Carrie Acey	CRS	carrieacey@yahoo.com	601.606.0945

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MULTIPLAN and HPFL MPO Public Meeting Sign In Sheet

Oloh Community Center | 45 Oloh Road, Sumrall, MS | Tuesday, November 10, 2015 | 4 p.m. to 6 p.m.

2040 MULTIPLAN THE FUTURE IN MOTION

Name	Affiliation or Residency	Email	Telephone
Timothy Torrey	SOL Engineering	ttorrey@solengrs.com	601.961.1415
Edward Jones	SOL Engineering	ejones@solengrs.com	601-961-1915
Jacqueline McClain	Hattiesburg MPO	jmcclain@hattiesburgms.com	601-545-6395
Trung Trinh	MDOT	ttrinh@mdot.ms.gov	601-359-7685
Lindsey Netherland	MDOT Planning	lnetherland@mdot.ms.gov	601-359-7685
Robert McHaney	CS	rmchaney@camsys.com	512-691-8510
Greg Wilkinson	MDOT- District 7	gwilkinson@mdot.ms.gov	601-249-5216
Rebecca Boone	NSI	rebecca.boone@neel-schaffer.com	601-948-3071
Shannon Campbell	USM	Shannon.campbell@usm.edu	601-517-0933
Hema Gopalan	COH	hgopalan@hattiesburgms.com	601-545-6222
Sammy Holcomb	MDOT	sholcomb@mdot.ms.gov	601-359-7685
Matt Williams	MPO	mpo@Hattiesburgms.com	601-545-6259
Alan Tyson	Resident	Tyson-Alan@Hotmail.com	863-4660438

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mississippitransportationplan.mindmixer.com planning@mdot.ms.gov

MULTIPLAN and HPFL MPO Public Meeting Sign In Sheet

Oloh Community Center | 45 Oloh Road, Sumrall, MS | Tuesday, November 10, 2015 | 4 p.m. to 6 p.m.

2040 MULTIPLAN THE FUTURE IN MOTION

Name	Affiliation or Residency	Email	Telephone
Lee Hutchins	Lamar County Resident	Hutch3Lee@Gmail.com	
Phil Orton	Resident	ORCOLLC@HOTMAIL.COM	228-671-9032
Joseph Yawn	MPO		

MDOT CMPDD Central Mississippi Planning and Development District Mississippi Gulf Coast Metropolitan Planning Organization

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2040 MULTIPLAN THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

We want to hear from you! Use the space below (and back if needed) to make comments about our draft long-range transportation plans. Please use a different form for each plan.

My comments are about (please check one):

- [ ] Mississippi's Statewide Long-Range Transportation Plan
- [x] Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

ELECTRIC VEHICLES (EV)
CO2 BUILDUP IN THE ATMOSPHERE, DEPLETION OF FOSSIL FUELS, INEVITABLE RETURN TO HIGHER FUEL COSTS, STEADY GROWTH OF EV'S AND SIGNIFICANT INCENTIVES FROM THE FEDERAL GOVT. AND OTHER STATES ALL POINT TO THE NEED TO RECOGNIZE AND SUPPORT THIS RAPIDLY EVOLVING SEGMENT OF TRANSPORTATION. I REQUEST AND RECOMMEND THAT EV CHARGING STATIONS BE INCLUDED IN MS REST STOPS ON INTERSTATE HIGHWAYS AND IN SIGNIFICANT PUBLIC AREAS, INCLUDING CONVENTION CENTERS AND THAT THE PROGRAM START IN 2016

PROJECT 154
I OPPOSE THIS PROJECT. MAJOR FUNDING, LAND ACQUISITIONS, DISRUPTION OF LIVES OF RESIDENTS ALONG JACKSON ROAD HAVE BEEN ON-GOING FOR SEVERAL YEARS. ALSO, THE ADDING OF SIGNIFICANTLY MORE TRAFFIC ON TO HWY 98 SEEMS UNREASONABLE. ADDITIONALLY, MAJOR GROWTH IS OCCURING WESTERLY.

Your Name (optional):
PHILIP ORTON

Contact Information (optional):
ORCOLLC@HOTMAIL.COM
228-671-9032

MDOT MISSISSIPPI DEPARTMENT OF TRANSPORTATION

2040
MULTIPLAN
THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

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- [ ] Mississippi's Statewide Long-Range Transportation Plan
- [x] Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

Please Include charging stations for electric vehicles in the Plan as soon as possible. The rest of the country is ahead of us in this area and I would buy one if Ms. supported them better. Our environment would be much cleaner if we did this.

Your Name (optional):
Alan Tyson

Contact Information (optional):
TYSON-ALAN@HOTMAIL.COM
863-465-0638

MDOT
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

HATTIESBURG PETAL FORREST LAMAR
MPO Metropolitan Planning Organization

MULTIPLAN 2040
THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

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Concerns have arose regarding Hattiesburg public transit/bus system, specifically in terms of lack of monthly pass options, as well as not running past 6pm nor on weekends.

Your Name (optional):

Contact Information (optional):

MDOT
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

HATTIESBURG PETAL FORREST LAMAR
MPO Metropolitan Planning Organization

MULTIPLAN 2040
THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

- [x] Mississippi's Statewide Long-Range Transportation Plan
- [x] Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

With the big push to encourage citizens to make choices that will more positively impact the environment, part of the overall plan should include infrastructure that will support alternatives like electric cars. Without charging stations the range one can drive is very limited. I would like to see more charging stations included in any Long Range planning.

Kim Osterman

OSTERMANSTER@GMAIL.COM

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

Hattiesburg Petal Forrest Lamar
MPO
Metropolitan Planning Organization

2040 MULTIPLAN
THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

- [x] Mississippi's Statewide Long-Range Transportation Plan
- [x] Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

WE NEED MORE EV CHRGING STATIONS IN MISSISSIPPI TO MAKE THE USE OF ELECTRIC VEHICLES A VIABLE ALTERNATIVE.

WALT OSTERMAN

WALT.OSTERMAN@GMAIL.COM

2040 MULTIPLAN THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

We want to hear from you! Use the space below (and back if needed) to make comments about our draft long-range transportation plans. Please use a different form for each plan.

My comments are about (please check one):

[x] Mississippi's Statewide Long-Range Transportation Plan

[x] Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

As a family of four who owns a purely Electric Vehicle, I fully support the development of infrastructure for EVs in Mississippi. EVs provide an extremely economical means of transportation as well as numerous benefits to the environment. Our family has found owning an EV to be a purely enjoyable experience. There are very few cons to owning such a vehicle and numerous pros. The pros include: extremely low "fuel" cost. Electricity rates rates range from 10-15 cents/kwh in MS and the EV that I own averages an efficiency level of about 4.5-5 miles/kwh. This is about one quarter the cost of operating a gasoline vehicle. EVs do not require petroleum products to lubricate the engine or the transmission. Essentially the only maintenance required for an EV involves the tires and brake pads.

The cons of owning an EV are essentially isolated to those of range. In MS there are very few charging stations available to the public. Other states have developed EV charging infrastructures that are far more advanced than MS'. I would like to ask that MDOT and the state of MS as a whole provide some support for this fast growing and promising mode of transportation by beginning to develop a charging infrastructure that will alleviate much of the range concerns.

Your Name (optional):

Russell Etheridge

Contact Information (optional):

601-472-5023 (russnc22@gmail.com)

MDOT MISSISSIPPI DEPARTMENT OF TRANSPORTATION

2040 MULTIPLAN THE FUTURE IN MOTION

JOINT PUBLIC MEETING
Hattiesburg-Petal-Forrest-Lamar MPO and
Mississippi Department of Transportation
Forrest County
11/5/15

We want to hear from you! Use the space below (and back if needed) to make comments about our draft long-range transportation plans. Please use a different form for each plan.

My comments are about (please check one):

☒ Mississippi's Statewide Long-Range Transportation Plan

☒ Hattiesburg-Petal-Forrest-Lamar Metropolitan Transportation Plan

① a Type of Public Transportation between Hattiesburg-Petal-Forrest-Lamar and Camp Shelby, to the Gulf Coast, at the present time a Limo service can do it, about $100 one-Way.
The Hub City bus needs to be continued Many people relay on and use this service.

② Electric cars should be used by all drivers. no oil, no gas, no emissions, also no noise.
more buyers would be willing to spend the extra money for all electric if they could extend the range. Having more charging stations in our state would enable longer trips.
We are proud owners of an all electric car.
Doing our part to save the enviroment.

Your Name (optional):
LINDA ORTON

Contact Information (optional):
LJORTON@GMAIL.COM

MDOT MISSISSIPPI DEPARTMENT OF TRANSPORTATION

Hattiesburg Petal Forrest Lamar MPO Metropolitan Planning Organization

Hattiesburg-Petal-Forest-Lamar MPO
Mississippi Department of Transportation
Lamar County Presentation – November 10, 2015
OLAH Community Center – Sumrall MS

My comments relate primarily to the "local" 2040 Metropolitan Transportation Plan but some could also apply to the statewide long range transportation plan. These comments are being provided after reviewing the lengthy Transporation Plan and not the November 10 presentations..

(1) The local MTP discusses in excruciating detail our future infrastructure needs associated with roadways, bridges, public transportation, sidewalks and bike paths.

One area that I feel needs to be included in the Plan are potential infrastructure needs associated with electric vehicles. These vehicles eliminate their need for fossil fuels and provide for reduced emissions. Electric vehicles are cutting edge with ever improving technology. Current models are capable of a 100 mile range prior to needing a recharge. Since late 2010, Nissan has sold over 165,000 electric cars called the Leaf. It is anticipated that 100,000 units will be sold in the near future. There are also other electric car brands on the market and the government is encouraging their purchase by offering a $7500 credit on income tax filings. While public charging stations are currently limited, an increase in these units would encourage greater use such as downtown parking in government owned parking facilities or Mississippi Welcoming stations.. I certainly am not qualified to identify the charging station infrastructure needs and costs, but think brighter minds than mine should investigate these needs.

(2) The study has also priortirized road projects and listed a great number of "visionary projects" A real list of "needs" and "like to haves".

Of some concern to me is the visionary project #154 priced at almost $32 million dollars. Can this project be moved from "visionary" to a "priority" without the residents along the proposed roadway being notified? If the residents of Lamar county do not wish this project to come to fruition can it be forced upon us by the Hattiesburg-Petal-Forrest-Lamar MPO or MDOT?

(3) Will the local MTP be modified if the proposed $339 billion federal transportation bill is signed into law ?

Lee Roy Hutchins---

hutch3lee@gmail.com

mindmixer PROJECT REPORTS Idea Report 1

Topic Name: There's still time!

Idea Title: Add Electric Vehicle(EV) Infrastructure Development to Plan

Idea Detail: CO2 buildup in the atmosphere, depletion of fossil fuels, inevitable return to higher fuel costs, steady growth of EV vehicles and significant incentives from the Federal Govt. and other states all point to the need to recognize and support this rapidly evolving segment of transportation. I request and recommend that EV charging stations be included in MS rest stations on interstate highways and in significant public areas, including Convention Centers and that the program start in 2016

Idea Author: Phil O

Number of Stars 9

Number of Comments 4

Comment 1: Thank you for your input. Your original statement and those who have made comments have been received. | By Donna L

Comment 2: We absolutely need to incorporate more zero-emissions vehicles into our transportation planning as well as the infrastructure to support them. I'd consider buying an electric vehicle if I could charge it at work, at the grocery store, and while traveling throughout the state. And not just in the big cities, either. All communities need charging stations in convenient locations, where cars are going to be parked long enough to get a charge. | By Meg H

Comment 3: I agree with the above proposal. Having charging capabilities at MS rest stations, public areas and convention centers is an excellent idea. Also providing RV parks and hotels with incentives to set up EV charging stations is another good solution to expanding the EV infrastructure. | By Ravi K

Comment 4: I fully support the comments to add more charging stations in Mississippi and the Hattiesburg area. MS is way behind in this area and needs to do some catching up. I would buy one if we drive them beyond the local community. | By Alan T

Idea Title: I think planning for our future is very important.

Idea Detail: Transportation is the backbone of our economic engine here in MS. Thank you for planning for our future.

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mindmixer PROJECT REPORTS Idea Report 2

Idea Author: Donna L

Number of Stars 3

Number of Comments 2

Comment 1: Thank you Phil! | By Donna L

Comment 2: I agree, the planning team did a great job!! | By Phil O

Idea Title: Western Beltway Project #154

Idea Detail: Jackson road residents have endured about 7 years of uncertainty, land acquisitions, road building and millions of dollars have been spent improving this road. The Project has just recently been completed and traffic has increased significantly. To now propose widening to 4 lanes and putting more traffic on an already congested Hwy 98 seems unreasonable and prompts the question of 'why do all this work then re-do it immediately afterward'? Additionally, the new growth in this area appears to be moving westward. Lets move the beltway out ahead of the new growth to the west of Jackson Road.

Idea Author: Phil O

Number of Stars 1

Number of Comments 1

Comment 1: Thank you Phil. Your comment has been received. | By Donna L

Idea Title: My idea is this. I attended the Nov 10 Presentation

Idea Detail: Took the time to attend the Nov 10 presentation in Sumerall. Took the time to review the local plan and write up a review which I turned in at the meeting. Can not find where my thoughts were included in any analysis. Makes me think government doesn't want anything to interfere with what they have already designed. Don't ask for input if you don't plan on using them. Lee Roy Hutchins........Hattiesburg MS

Idea Author: Lee H

Number of Comments 1

Comment 1: Hello Mr. Hutchins, thank you for taking the time to engage in the long-range

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transportation planning process. You will be glad to know that the comment period has not yet ended and planners are still in the process of receiving and reviewing all comments. Comments will be accepted until Dec. 14. | By Donna L

Idea Title: Light rail for Coast

Idea Detail: Obviously, my original write-up did not register. (I got an e-mail and there are 3 ideas, none of which is mine. It asks me to go back. This is it. I am not re-writing stuff over and over because you have picked a lousy vendor or do not update your stuff.) A light rail along either or both 90 or the rail right of way (you will have to purchase rail right of way), or alternating, would give a great commuting method for people to go to Ingalls, the REAL Port (Pascagoula) or the tourist stores and restaurants of Bay St. Louis. Tourists would love it if it had a view. Ozone is about to be a much bigger problem here as the standards are changing. Don't need all these cars with one person in them. Use the $ from HUD for the Fantasy Port, what's left that CH2MHill hasn't stolen.

Idea Author: Julia O

Number of Comments 1

Comment 1: Hi Julia, I am so sorry you have had trouble with this venue. Please know your comment has been heard and sent to the Gulf Regional Planning Commission. | By Donna L

Appendix B: Travel Demand Model Documentation

This section includes a description of the procedures used in developing travel estimates, the relationship between planning data and trip making, and the calibration and testing of the models used in this study.

B.1 Model Overview

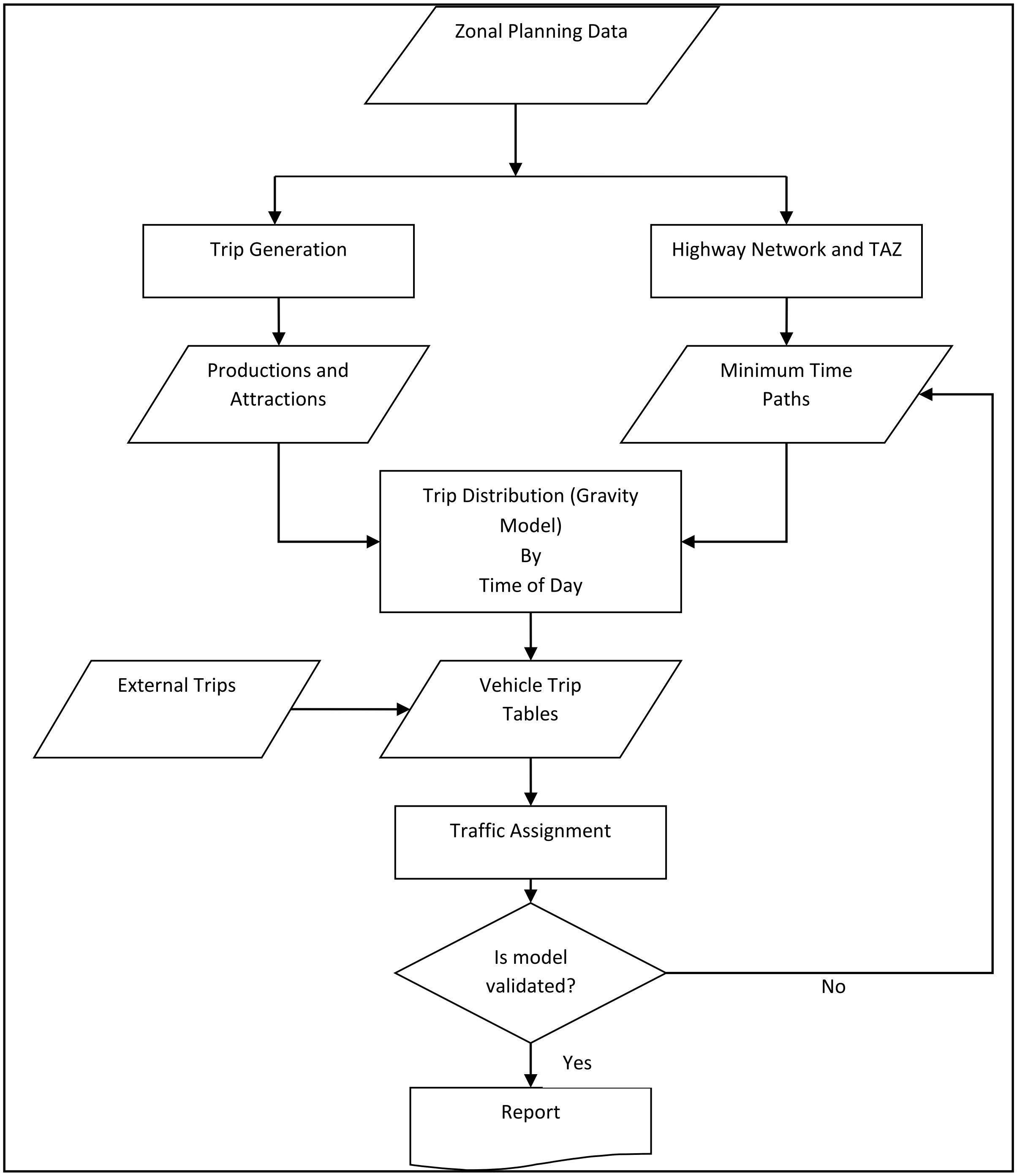
The HPFL MPO Travel Demand Model is based upon the conventional trip-based four-step modeling approach.

Broadly, the main model components fall within the following four categories:

- *Trip Generation* - The process of estimating trip productions and attractions at each TAZ.
- *Trip Distribution* - The process of linking trip productions to trip attractions for each TAZ pair.
- *Modal Choice* - The process of estimating the number of trips using a particular mode for each TAZ pair. Because of the low frequency of transit trips, pedestrian, and bicycle trips in the modeling area, this step was not performed.
- *Trip Assignment* - The process of assigning auto and truck trips onto specific highway facilities in the region.

The general relationships between the different model steps and their inputs and outputs are presented in a schematic drawing in Figure B.1. When calibrating a model, the process contains several review and adjustment loops, which are not shown for the sake of clarity.

Figure B.1: Modeling Process



B.2 Trip Generation

This section describes the procedures used to determine the number of trips that begin or end in a given traffic zone. The identification of the other end of the trips occurs in the trip distribution models to be discussed in the next section.

The model considers the following trip purposes:

Internal Trip Purposes

- Home-Based Work (HBW)
- Home-Based Other (HBO)
- Non Home-Based (NHB)
- Commercial Vehicle (CMVEH)
- Truck Trips (TRK)

External Trip Purposes

- External-Internal Auto Trips (EIAUTO)
- External-Internal Truck Trips (EITRK)
- External-External (Through) Auto Trips (EEAUTO)
- External-External (Through) Truck Trips (EETRK)

Internal Travel Model

For home-based trips, the productions refer to the home end, and the attractions refer to the non-home end of the trip. For non-home based, commercial vehicle, and truck trips, productions and attractions refer to the origin and destination respectively.

The model uses cross-classification trip production models for the home-based and non-home based trip purposes; that is, trip rates that vary by household type are applied at the zonal level. For the commercial vehicle trip purposes, the model applies a linear regression equation that relates zonal employment and households to trip productions and attractions. The trip attraction models are linear regression equations that relate zonal employment, households, and student enrollment to trip attractions. Productions and attractions are balanced at the study area level for all trip purposes by holding trip productions constant.

HBW, HBO, and NHB trip models were developed by using the procedures described in the NCHRP Report 365 for an urban area between 50,000 and 199,999 total population. These trip models were refined as needed during the calibration process. Commercial Vehicle and Truck trip models were derived using the Quick Response Freight Manual, September 1996. Commercial Vehicle trips represent four-tire commercial vehicles, including delivery and service vehicles. Truck trips represent single-unit with six or more tires and multi-unit with three-plus axle combination trucks. Final trip generation models are shown in Table B.1, Table B.2, Table B.3, Table B.4 and Table B.5.

Table B.1 Home-Based Work Trip Productions

Number of Vehicles per Household	HHS1	HHS2	HHS3	HHS4	HHS5P
HH_VEH0	0.6020	1.2226	1.6278	2.0237	2.2043
HH_VEH1	0.9262	1.7065	2.0237	2.5296	2.6963
HH_VEH2	0.9262	2.0631	2.3316	2.9256	3.2868
HH_VEH3P	0.9262	2.1395	2.6176	3.3215	3.5426

Source: NCHRP 365; NSI, 2015

Table B.2 Home-Based Other Trip Productions

Number of Vehicles per Household	HHS1	HHS2	HHS3	HHS4	HHS5P
HH_VEH0	1.2336	2.2774	3.6410	4.6884	6.1012
HH_VEH1	1.8978	3.1789	4.5267	5.8604	7.4631
HH_VEH2	1.8978	3.8431	5.2155	6.7777	9.0973
HH_VEH3P	1.8978	3.9855	5.8552	7.6950	9.8055

Source: NCHRP 365; NSI, 2015

Table B.3 Non-Home Based Trip Productions

Number of Vehicles per Household	HHS1	HHS2	HHS3	HHS4	HHS5P
HH_VEH0	0.7325	1.2483	2.0046	2.2928	2.5485
HH_VEH1	1.1269	1.7424	2.4922	2.8660	3.1174
HH_VEH2	1.1269	2.1064	2.8714	3.3146	3.8000
HH_VEH3P	1.1269	2.1845	3.2236	3.7632	4.0959

Source: NCHRP 365; NSI, 2015

Table B.4 Commercial Vehicle and Truck Trip Productions

Vehicle Type	OCCDU	RET_EMP	RET_EMP2	OS_EMP	OTH_EMP	AMC_EMP	MTCUW_EMP
CMVEH	0.1506	0.5328	0.5328	0.2622	0.2622	0.6660	0.5628
TRK	0.0719	0.1670	0.1670	0.0404	0.0404	0.2431	0.1817

Source: Quick Response Freight Manual, 1996; NSI, 2015

Table B.5 Trip Attraction Equations by Trip Purpose

Trip Purpose	OCCDU	RET_EMP	RET_EMP2	OS_EMP	OTH_EMP	AMC_EMP	MTCUW_EMP	SCHATT
HBWA	0.0000	1.2044	1.2044	1.2044	1.2044	1.2044	1.2044	0.0000
HBOA	1.0006	2.2236	10.0062	1.8901	0.5559	0.5559	0.5559	0.7416
NHBA	0.4488	1.2567	3.6803	1.0772	0.4488	0.4488	0.4488	0.2478
CMVEHA	0.1506	0.5328	0.5328	0.2622	0.2622	0.6660	0.5628	0.0000
TRKA	0.0720	0.1670	0.1670	0.0400	0.0400	0.2430	0.1820	0.0000

Source: NCHRP 365; NSI, 2015

A special generator is a land use with unusually low or high trip generation characteristics. For the HPFL MPO model there were no locations that were identified as special generators.

Application of the trip generation models to the base-year planning data yielded estimates of trip productions and attractions by travel purpose for each traffic analysis zone. These were then balanced to ensure that every trip generated by the model has both a beginning and an end. Table B.6 lists the daily person trips by trip purpose.

Table B.6 Daily Study Area Trips by Trip Purpose

Trip Purpose	Trips	Trip Type
HBW	83,706	Person Trips
HBO	183,361	Person Trips
NHB	97,181	Person Trips
CMVEH	32,995	Vehicle Trips
TRK	9,829	Vehicle Trips
Total	**407,072**	

Source: NSI, 2015

External Travel Model

External travel consists of two types of trips: external-internal (EI) trips and external-external (EE) trips. EI trips have one end of the trip inside the study area, and the other outside. EE trips pass through the study area having no origin or destination within the study area.

In order to EE trip tables data provided through AirSage on the travel patterns in the metropolitan area and the methodology described in NCHRP 716 were used to create an initial EE matrix that was then run through the Fratar procedure to obtain trips crossing the study area boundary. The EI trip tables were developed using the AirSage data and regression analysis.

External-External (EE) Trips

Table B.7, Table B.8 and Table B.9 list the balanced EE trips used in the model.

Table B.7 Expanded 24-Hour EE Trip Table for All Vehicles

TAZ	601	602	603	604	605	606	607	608	609	610	611	612	Total
601	0.0	0.0	61.6	80.9	721.9	417.0	36.0	11.7	1,352.3	9.4	18.5	1,169.0	**3,878.4**
602	0.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**9.0**
603	61.6	9.0	0.0	0.0	0.0	0.4	0.0	0.0	3.1	0.0	0.4	103.7	**178.2**
604	80.9	0.0	0.0	0.0	3.2	1.7	0.1	0.0	22.6	0.0	0.6	1,337.2	**1,446.4**
605	721.9	0.0	0.0	3.2	0.0	0.0	0.0	0.0	11.1	0.0	0.0	1,214.0	**1,950.3**
606	417.0	0.0	0.4	1.7	0.0	0.0	0.0	0.0	0.6	0.3	0.0	189.8	**609.8**
607	36.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	15.2	**51.6**
608	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	0.0	0.0	0.0	**31.3**
609	1,352.3	0.0	3.1	22.6	11.1	0.6	0.2	19.5	0.0	2.8	0.0	83.0	**1,495.3**
610	9.4	0.0	0.0	0.0	0.0	0.3	0.1	0.0	2.8	0.0	0.0	0.0	**12.5**
611	18.5	0.0	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	**48.4**
612	1,169.0	0.0	103.7	1,337.2	1,214.0	189.8	15.2	0.0	83.0	0.0	28.9	0.0	**4,140.8**
Total	**3,878.4**	**9.0**	**178.2**	**1,446.4**	**1,950.3**	**609.8**	**51.6**	**31.3**	**1,495.3**	**12.5**	**48.4**	**4,140.8**	**13,852.0**

Source: MDOT, 2013; NSI, 2015

Table B.8 Expanded 24-Hour EE Auto Trip Table

TAZ	601	602	603	604	605	606	607	608	609	610	611	612	Total
601	0.0	0.0	43.6	11.7	448.7	258.9	30.5	7.2	1,220.0	8.0	13.8	788.2	**2,830.6**
602	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**7.9**
603	43.6	7.9	0.0	0.0	0.0	0.4	0.0	0.0	3.1	0.0	0.4	101.5	**156.8**
604	11.7	0.0	0.0	0.0	2.3	1.2	0.1	0.0	21.1	0.0	0.5	1,019.0	**1,056.0**
605	448.7	0.0	0.0	2.3	0.0	0.0	0.0	0.0	11.1	0.0	0.0	1,176.3	**1,638.4**
606	258.9	0.0	0.4	1.2	0.0	0.0	0.0	0.0	0.6	0.3	0.0	183.8	**445.3**
607	30.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	15.1	**46.0**
608	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.4	0.0	0.0	0.0	**26.6**
609	1,220.0	0.0	3.1	21.1	11.1	0.6	0.2	19.4	0.0	2.8	0.0	82.6	**1,360.9**
610	8.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	2.8	0.0	0.0	0.0	**11.1**
611	13.8	0.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.4	**43.1**
612	788.2	0.0	101.5	1,019.0	1,176.3	183.8	15.1	0.0	82.6	0.0	28.4	0.0	**3,394.9**
Total	**2,830.6**	**7.9**	**156.8**	**1,056.0**	**1,638.4**	**445.3**	**46.0**	**26.6**	**1,360.9**	**11.1**	**43.1**	**3,394.9**	**11,017.5**

Source: MDOT, 2013; NSI, 2015

Table B.9 Expanded 24-Hour EE Truck Trip Table

TAZ	601	602	603	604	605	606	607	608	609	610	611	612	Total
601	0.0	0.0	18.1	69.2	273.2	158.1	5.5	4.5	132.3	1.4	4.7	380.8	**1,047.7**
602	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.1**
603	18.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	**21.4**
604	69.2	0.0	0.0	0.0	0.9	0.5	0.0	0.0	1.5	0.0	0.1	318.2	**390.4**
605	273.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	37.7	**311.9**
606	158.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	**164.5**
607	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	**5.7**
608	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	**4.7**
609	132.3	0.0	0.0	1.5	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.5	**134.5**
610	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.4**
611	4.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	**5.3**
612	380.8	0.0	2.2	318.2	37.7	5.9	0.1	0.0	0.5	0.0	0.5	0.0	**746.0**
Total	**1,047.7**	**1.1**	**21.4**	**390.4**	**311.9**	**164.5**	**5.7**	**4.7**	**134.5**	**1.4**	**5.3**	**746.0**	**2,834.4**

Source: MDOT, 2013; NSI, 2015

External-Internal (EI) Trips

The EI attraction equations used in this model were derived by regression analysis using the data provided by AirSage and knowledge of the area's travel patterns. In addition, external-internal trips were also separated into auto and truck trips based on the vehicle classification counts at external stations.

The following EI attraction equations were used in the travel demand model for EIAUTO and EITRK trips.

EIAUTO Attractions = 0.9120 * (OCCDU) + 1.5340 * (RET_EMP + RET_EMP2) +

0.2754 * (AMC_EMP + MTCUW_EMP + OS_EMP + OTH_EMP)

EITRK Attractions = 0.1160 * (RET_EMP + RET_EMP2) + 0.0930 * (AMC_EMP + MTCUW_EMP)

Table B.10 Daily Study Area External Vehicle Trips by Type

Trip Purpose	Trips
EI AUTO	71,172
EI TRUCK	17,124
EE AUTO	11,018
EE TRUCK	2,834
Total	**102,148**

B.3 Trip Distribution

The next step in travel demand modeling is the trip distribution process. This function determines the destinations of trips produced in the trip generation model, and conversely, where the attracted trips originated. Many models are available for this process. The one used for this effort was the doubly constrained gravity model.

This model employs two relationships, the first of which is indirect:

> The shorter the travel time to the destination zone, the greater the number of trips will be distributed to it from the origin zone.

The second relationship is a direct one:

> The more attractions there are in a destination zone, the more trips will be distributed to it from the origin zone.

The generalized equation for this model is:

$$T_{ij} = \frac{(P_i)(A_j)(F_{ij})}{\sum_{j=1}^{n}(A_j)(F_{ij})}$$

Where: T_{ij} =Trips distributed between zones i and j

P_i = Trips produced at zone i

A_j =Trips attracted to zone j

F_{ij} =Relative distribution rate (friction factors or impedance function) reflecting impedance between zone i and zone j

n = Total number of zones in study area

In a model of this type, friction factors determine the effect that spatial separation has on trip distribution between zones. These factors measure the probability of trip making at one-minute increments of travel time. The gamma function was used to derive the friction factors. Calibration of a gamma impedance function involves estimating the three parameters of the gamma function; a, b, and c, as shown in the following equation:

$$f(t_{ij}) = a * t_{ij}^{-b} * e^{-c(t_{ij})}$$

Where: t_{ij} = Travel time between zones i and j

a,b,c = Parameters of the gamma function

e =2.71828183… (Base of the natural logarithm)

The a,b,c parameter values used for each trip purpose are shown in Table B.11.

Table B.11 Gamma Function Parameter Values by Trip Purpose

Trip Purpose	a	b	c
HBO	5,757,246.6014	1.2469	0.1743
HBW	186.9551	-3.5137	0.3270
NHB	2,188,886.4252	1.0691	0.1704
CMVEH	1.0000	0.0000	0.0800
EIAUTO	5.8171	-2.1712	0.1281
EITRK	1.0000	0.0000	0.0307
TRK	1.0000	0.0000	0.1000

Source: NSI, 2015; Quick Response Freight Manual, 1996

The initial outcome of the Trip Distribution step was a daily production-attraction (P-A) matrix. It is necessary to convert this production-attraction matrix to an origin-destination (O-D) matrix to use in the Trip Assignment step. TransCAD's "P-A to O-D" procedure with diurnal distribution of trips by purpose was used to create the final 24-hour O-D matrix.

Diurnal distribution is the process of allocating daily trips (by purpose and mode) into the time periods used for highway assignment. The allocation is achieved via use of time of day or diurnal factors. A time of day factor gives the proportion of total trips (by purpose) that are in-motion during a certain period of the day. These factors are typically developed separately for the production to attraction direction of travel (P-to-A), and the attraction to production direction of travel (A-to-P). This consideration is necessary to ensure that the trips loaded to the networks are in origin-destination format, and not in the production-attraction format used in all previous modeling steps.

The peak and off-peak person trip tables split into four periods in preparation for highway assignment. This time of day split is based on diurnal factors derived from various sources and are shown in Table B.12. The four assignment time periods are:

- AM Peak Period: 6:00 AM to 9:00 AM
- Mid-Day: 9:00 AM to 3:00 PM
- PM Peak Period: 3:00 PM to 6:00 PM
- Night: 6:00 PM to 6:00 AM

Table B.12 Diurnal Factors Used in Model Development

TIME_PERIOD	ACTUAL_HOUR	HOUR	DEP_HBW	RET_HBW	DEP_HBO	RET_HBO	DEP_NHB	RET_NHB	DEP_CMVEH	RET_CMVEH	DEP_TRK	RET_TRK	DEP_EI_AUTO	RET_EI_AUTO	DEP_EI_TRK	RET_EI_TRK	DEP_EE_AUTO	RET_EE_AUTO	DEP_EE_TRK	RET_EE_TRK
AM PEAK	6	0	10.30	0.25	1.26	0.02	1.35	1.35	3.50	3.50	2.50	2.50	2.82	3.71	2.36	3.80	2.82	3.71	2.36	3.80
AM PEAK	7	1	12.53	0.62	3.24	0.05	2.68	2.68	3.30	3.30	3.65	3.65	3.31	3.56	2.71	3.13	3.31	3.56	2.71	3.13
AM PEAK	8	2	5.30	0.31	3.13	0.09	2.36	2.36	3.20	3.20	3.60	3.60	3.10	2.87	3.01	3.06	3.10	2.87	3.01	3.06
MID-DAY	9	3	2.57	0.29	4.32	1.37	3.81	3.81	2.60	2.60	3.90	3.90	2.78	2.77	3.44	3.10	2.78	2.77	3.44	3.10
MID-DAY	10	4	1.30	0.42	3.63	1.73	3.52	3.52	2.85	2.85	3.50	3.50	2.56	2.59	3.27	3.19	2.56	2.59	3.27	3.19
MID-DAY	11	5	2.08	1.41	3.39	3.07	8.07	8.07	2.70	2.70	3.75	3.75	2.42	2.55	2.95	3.22	2.42	2.55	2.95	3.22
MID-DAY	12	6	1.62	2.16	2.44	2.95	7.40	7.40	2.75	2.75	3.40	3.40	2.59	2.82	2.82	3.18	2.59	2.82	2.82	3.18
MID-DAY	13	7	1.54	1.74	2.72	2.77	5.05	5.05	2.90	2.90	3.55	3.55	2.46	2.81	3.05	3.29	2.46	2.81	3.05	3.29
MID-DAY	14	8	1.33	2.26	2.71	5.13	4.26	4.26	3.20	3.20	3.85	3.85	2.79	2.85	3.33	3.24	2.79	2.85	3.33	3.24
PM PEAK	15	9	1.36	7.95	1.72	3.43	2.50	2.50	3.90	3.90	3.80	3.80	3.20	3.30	3.65	3.21	3.20	3.30	3.65	3.21
PM PEAK	16	10	1.21	11.38	2.33	2.99	2.57	2.57	4.35	4.35	3.30	3.30	4.30	3.92	3.91	2.77	4.30	3.92	3.91	2.77
PM PEAK	17	11	0.75	10.67	3.28	3.41	1.87	1.87	3.55	3.55	2.55	2.55	5.24	3.75	3.83	2.56	5.24	3.75	3.83	2.56
NIGHT	0	12	0.00	0.51	0.00	0.79	0.14	0.14	0.35	0.35	0.35	0.35	0.38	0.21	0.45	0.34	0.38	0.21	0.45	0.34
NIGHT	1	13	0.00	0.43	0.00	0.31	0.09	0.09	0.20	0.20	0.30	0.30	0.28	0.22	0.37	0.30	0.28	0.22	0.37	0.30
NIGHT	2	14	0.00	0.29	0.00	0.03	0.05	0.05	0.20	0.20	0.30	0.30	0.31	0.21	0.50	0.33	0.31	0.21	0.50	0.33
NIGHT	3	15	0.32	0.36	0.00	0.13	0.00	0.00	0.20	0.20	0.25	0.25	0.49	0.35	0.72	0.57	0.49	0.35	0.72	0.57
NIGHT	4	16	1.56	0.20	0.21	0.00	0.46	0.46	0.30	0.30	0.55	0.55	0.85	1.14	0.86	1.16	0.85	1.14	0.86	1.16
NIGHT	5	17	4.73	0.17	0.79	0.00	1.09	1.09	1.00	1.00	1.50	1.50	1.60	2.64	1.54	3.18	1.60	2.64	1.54	3.18
NIGHT	18	18	0.38	3.05	6.87	5.74	1.14	1.14	2.90	2.90	1.75	1.75	3.17	2.68	2.75	2.11	3.17	2.68	2.75	2.11
NIGHT	19	19	0.22	1.06	4.52	4.54	0.59	0.59	1.65	1.65	1.20	1.20	1.78	1.75	1.58	1.45	1.78	1.75	1.58	1.45
NIGHT	20	20	0.31	1.47	1.87	4.62	0.55	0.55	1.45	1.45	0.80	0.80	1.27	1.25	0.91	1.06	1.27	1.25	0.91	1.06
NIGHT	21	21	0.24	1.61	1.01	3.80	0.23	0.23	1.30	1.30	0.65	0.65	1.08	0.98	0.86	0.78	1.08	0.98	0.86	0.78
NIGHT	22	22	0.29	0.98	0.44	2.18	0.14	0.14	1.00	1.00	0.50	0.50	0.75	0.67	0.73	0.56	0.75	0.67	0.73	0.56
NIGHT	23	23	0.07	0.42	0.12	0.85	0.09	0.09	0.65	0.65	0.50	0.50	0.48	0.39	0.39	0.41	0.48	0.39	0.39	0.41

Source: NSI, 2015

B.4 Trip Assignment

Traffic assignment models are used to estimate the traffic flows on a network. The main input to these models is a matrix of flows that indicate the volume of traffic between origin-destination (O-D) pairs. The other inputs to these models are network topology, link characteristics, and link performance functions. The trips between each O-D pair are loaded onto the network based on the travel time or impedance of the alternative paths that could carry this traffic.

TransCAD's Multi-Modal Multi-Class Assignment (MMA), with User Equilibrium (UE) as assignment type, and the Bureau of Public Roads (BPR) Volume-Delay function was used for HPFL MPO model. The MMA model is a generalized cost assignment that lets you assign trips by individual modes or user classes to the network simultaneously. Each mode or class can have different network exclusions, congestion impacts (passenger car equivalent values), values of time, and toll costs.

B.5 Model Validation

The purpose of model validation is to make the adjustments necessary to replicate base-year traffic conditions as closely as possible. In practice, this means making link assignment volumes approximate traffic estimates, based on actual counts, within acceptable limits of deviation. Generally speaking, the lower the volume, the greater the relative deviation that is acceptable. Conversely, the greater the amount of traffic, the greater the degree of accuracy required. This is because the ultimate purpose of the model is to determine whether additional vehicular capacity will be needed on any given roadway at a designated future date. Where existing volumes are low, the model assignment may deviate from actual conditions by 40 or 50 percent without affecting the projected need for additional capacity. On the other hand, in the case of a heavily traveled interstate route, a deviation of 20 percent may be significant (i.e., alter the projection of required capacity). The validation process is intended to ensure that the model is performing within the limits that define acceptable ranges of deviation from observed "real-world" values.

Validation of the HPFL MPO Travel Demand Model proceeded from consideration of its area wide performance to the relative distribution of traffic by roadway functional classification and ADT range. In the final stage of the validation process, the accuracy of the model with respect to specific routes and roadway groups was analyzed. At each level, an appropriate degree of accuracy was defined in terms of the maximum tolerable deviation from base-year vehicular volumes (i.e., estimated annual average daily traffic) and Root Mean Square Error (RMSE).

RMSE was chosen because when comparing model flows versus counts, sometimes a straight aggregate sum by link group can be misleading. The sum of all traffic counts for a particular link group may be close to the sum of the corresponding traffic flows, but individual link flows may still be very different than their corresponding link count. However, the RMSE statistic does not convey information about the magnitude of the error relative to that of the counts. Therefore the Percent Root Mean Square Error (Percent RMSE or % RMSE) is often computed. This measure expresses the RMSE as a percentage of the average count value. The Percent RMSE is defined as below:

$$\%RMSE = \frac{\sqrt{\sum_j (Model_j - Count_j)^2 / (Numberofcounts)}}{\left(\sum_j Count_j \middle/ Numberofcounts\right)} * 100$$

Overall, the cumulative model volume for all network links associated with MDOT traffic count locations (2,078,260 vehicles) differed from total model estimated ADT (2,001,047 vehicles) by -3.7 percent compared to an allowable error limit of five percent.

Validation results by ADT group and functional class are shown in Table B.13 and Table B.14 respectively.

Table B.13 Validation of Base-Year Model by ADT Group

ADT Range	Total Count[1]	Total Model Volume[2]	% Dev Limit[3]	% Dev	% RMSE Limit[4]	% RMSE
ADT < 1,000	25,860	28,568	+/- 200.0	10.5	115.8	101.0
1,000<= ADT < 2,500	122,400	120,060	+/- 100.0	-1.9	115.8	45.8
2,500<= ADT < 5,000	170,000	161,609	+/- 50.0	-4.9	115.8	28.8
5,000<= ADT < 10,000	472,000	435,711	+/- 25.0	-7.7	43.1	24.8
10,000<= ADT < 20,000	521,000	526,055	+/- 20.0	1.0	28.3	22.0
20,000<= ADT < 40,000	563,000	540,608	+/- 15.0	-4.0	25.4	12.0
ADT >= 40,000	204,000	188,437	+/- 15.0	-7.6	30.3	8.9
Total	**2,078,260**	**2,001,047**	**+/- 5.0**	**-3.7**	**40.0**	**25.5**

Source: Minimum Travel Demand Model Calibration and Validation Guidelines for State of Tennessee; NSI, 2015

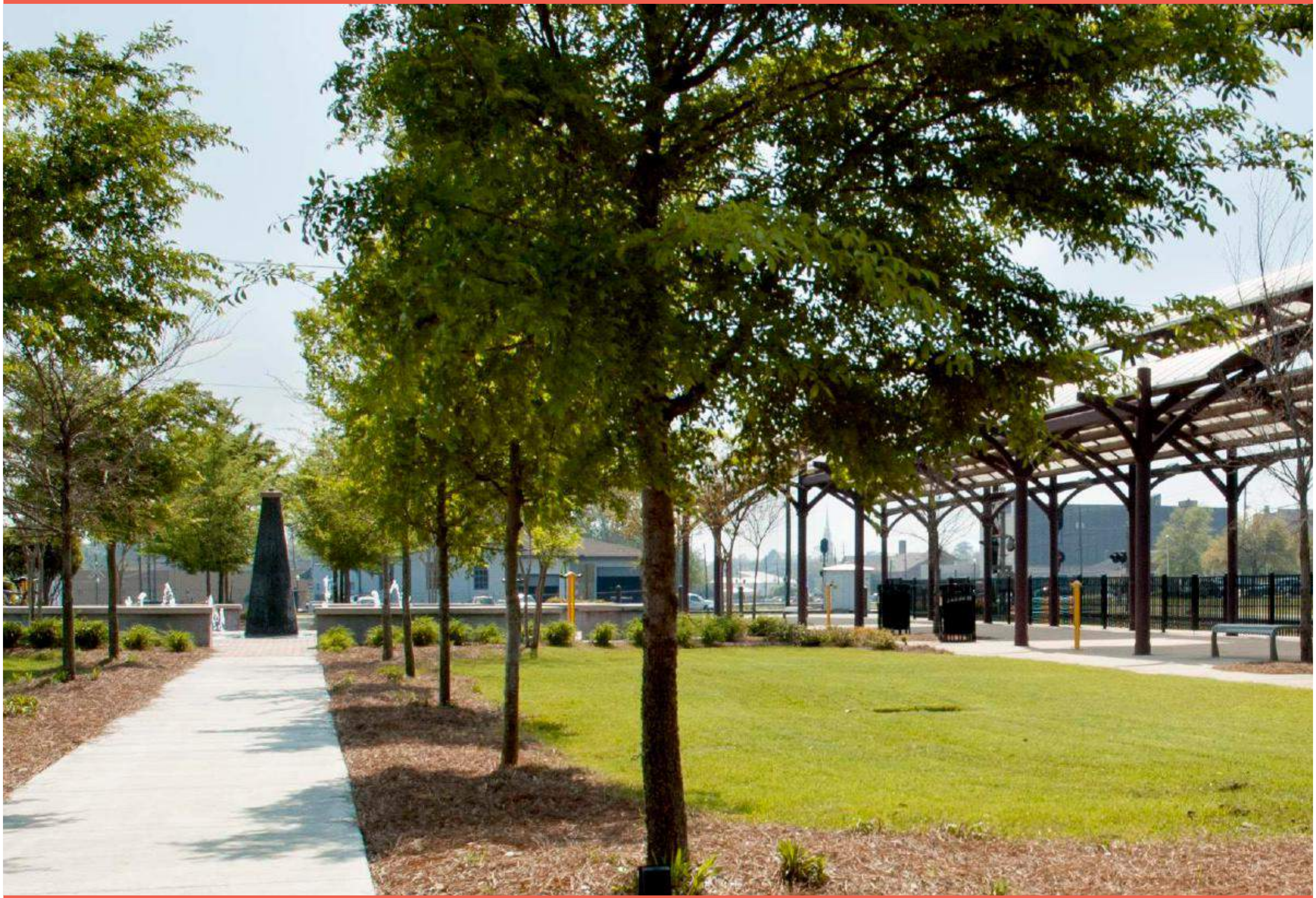
Table B.14 Validation of Base-Year Model by Roadway Functional Class

Functional Class	Total Count[1]	Total Model Volume[2]	% Dev Limit[3]	% Dev
INTERSTATES	232,000	229,546	+/- 7.0	-1.1
PRINCIPAL ARTERIALS	885,000	881,878	+/- 25.0	-0.4
MINOR ARTERIALS	506,000	469,123	+/- 10.0	-7.3
COLLECTORS/LOCAL	317,580	273,077	+/- 15.0	-14.0
Total	2,078,260	2,001,047	+/- 25.0	-3.7

Source: Minimum Travel Demand Model Calibration and Validation Guidelines for State of Tennessee; NSI, 2015

(1) Total Count represents the sum of average daily traffic estimates for all MDOT count locations (area wide), all count locations on principal arterials, all locations on minor arterials, all on major/minor collectors.
(2) Total Model Volume is the sum of model-generated traffic volumes for all network links associated with MDOT count locations (area wide), all links associated with count locations on principal arterials, all links associated with locations on minor arterials, and all links associated with count locations on collectors.
(3) % Dev Limit is the maximum acceptable plus/minus percentage deviation from estimated base-year (2013) average daily traffic (ADT) based on counts conducted by MDOT.
(4) % RMSE Limit is the maximum acceptable magnitude of the error relative to that of the counts conducted by MDOT.

The validation effort concluded that the HPFL MPO study area travel demand forecasting model performs well within the established limits of acceptable deviation from base-year estimated volumes.



Part of the Mississippi Unified Long-Range Transportation Infrastructure Plan (MULTIPLAN), sponsored by the Mississippi Department of Transportation

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