2040
Long Range
Transportation Plan




March 2013

The Johnson City Metropolitan Transportation Planning Organization (MTPO)

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RESOLUTION 2013-02

RESOLUTION ADOPTING THE 2040 LONG RANGE TRANSPORTATION PLAN FOR THE JOHNSON CITY METROPOLITIAN TRANSPORTATION PLANNING ORGANIZATION

WHEREAS, the Johnson City Metropolitan Transportation Planning Organization is responsible for the transportation planning and coordination for the Johnson City Urbanized Area; and

WHEREAS, the Johnson City Metropolitan Transportation Planning Organization Executive Board has the authority to adopt plans and programs; and

WHEREAS, the development of a Long Range Transportation Plan was completed in accordance with Title 23 United States Code, Section 134, Metropolitan Transportation Planning; and

WHEREAS, various local, state, regional, and federal agencies, involved with transportation planning for the Johnson City Urbanized Area have cooperatively developed the Johnson City MTPO 2040 Long Range Transportation Plan; and

WHEREAS, the Long Rang Transportation Plan has been presented to various public groups and completed the required 30-day public review and comment period;

NOW THEREFORE, BE IT RESOLVED BY THE JOHNSON CITY METROPOLITIAN TRANSPORTATION EXECUTIVE BOARD:

THAT the Executive Board hereby adopts the Johnson City MTPO 2040 Long Range Transportation Plan.

MTPO Executive Board, Chairman — Date: 3/13/13

MTPO Executive Staff, Chairman — Date: 13 Mar 2013

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ACRONYM LIST

ADA	Americans with Disabilities Act (ADA) of 1990
ADT	Average Daily Traffic
ADHS/APD	Appalachian Development Highway System
AVL	Automated Vehicle Locator System
BLOS	Bicycle Level of Service
BRR or BR	Bridge Replacement and Rehabilitation
CAA/CAAA	Clean Air Act or Clean Air Act Amendments
CBD	Central Business District
CIP	Capital Improvement Program
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO	Carbon Monoxide
CPTHSTP	Coordinated Public Transit Human Services Transportation Plan
CSS	Context Sensitive Solutions
E+C	Existing Plus Committed
EJ	Environmental Justice
EPA/USEPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FH/PLHP	Forest Highway/Public Lands Highway Program
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas
GIS	Geographic Information System
HOV	High-Occupancy Vehicle Lanes
HPP	High Priority Projects
HUD/USHUD	United States Department of Housing and Urban Development
I	Interstate
IAC	Interagency Consultation
IM	Interstate Maintenance
IMC	Instrument Meteorological Conditions
ITS	Intelligent Transportation Systems
JCT	Johnson City Transit
JIT	Just-In-Time Delivery
LOS	Level of Service
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MTPO	Metropolitan Transportation Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NCPD	National Corridor Planning and Development
ND	National Defense
NEPA	National Environmental Policy Act
NHS	National Highway System
NOx	Nitrogen Oxide
PGA	Planned Growth Area

PLOS	Pedestrian Level of Service
PPP	Public Participation Plan
RA	Rural Area
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SP	State Construction Program
SPPR	State Primary Pavement Rehabilitation
SR	State Route
STB	Surface Transportation Board
STIP	State Transportation Improvement Program
STP	Surface Transportation Program
TAZ	Traffic Analysis Zone
TCA	Tennessee Code Annotated
TDM	Travel Demand Management
TDOS	Tennessee Department of Safety
TDOT	Tennessee Department of Transportation
TE	Transportation Enhancement
TEA-21	Transportation Equity Act of the 21st Century of 1998
TIP	Transportation Improvement Program
TN	Tennessee
TSM	Transportation System Management
UGB	Urban Growth Boundary
US	United States
US DOT	United States Department of Transportation
V/C Ratio	Volume to Capacity Ratio
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

Transportation is an integral part of everyone's life. Whether it is a trip to the grocery store or the commute to work, we all depend on some form of transportation. While planning in Johnson City dates back to the early 1900s, regional transportation planning in the area did not emerge until the 1980s. Since that time, local, state, and federal agencies have taken a collaborative approach to planning and providing transportation solutions within the Johnson City region.

As a result of the 1980 US Census, the Johnson City Metropolitan Transportation Planning Organization (MTPO) was established in 1982. The creation of the MTPO was to comply with federal requirements that urbanized areas, such as Johnson City, provide a coordinated, cooperative, and comprehensive approach to transportation planning for the region. At that time, the geographic limits of the urbanized area of Johnson City were much smaller, largely covering just the corporate limits of the City of Johnson City and a small portion of surrounding communities. Today, based on the 2010 US Census, the Johnson City urbanized area includes a much larger geographic area including portions of Washington, Carter, and Unicoi counties and the municipalities of Johnson City, Elizabethton, Jonesborough and Unicoi.

As the region develops this transportation plan, it must address three important questions. What does the future hold in store for this area relative to future growth and development? How well will the region's transportation system function? Lastly, how does the region balance these demands with the desires of existing residents and businesses when it comes to providing adequate and sound transportation choices?

The plan presented in this document provides a 27-year blueprint for transportation investments in the MTPO area through the year 2040. This plan is multimodal, meaning it addresses travel by all modes of the transportation system -- streets and highways, bikeways and walkways, public transportation, aviation, and rail. Consideration is given to population and employment trends, land development patterns, travel characteristics, current and future transportation system performance, and other planning factors. This plan was developed in coordination with the state and local agencies that are responsible for transportation, environmental protection, land use management, natural resources, and historic preservation. The recommended plan is based on a series of stated community goals, financial capability, environmental considerations, and public guidance.

The plan is organized into eight sections:

1.0 Introduction – the legal basis of the plan and planning requirements
2.0 Guiding Principles – plan goals and objectives
3.0 Planning Area and Region - current and future demographic and development conditions
4.0 Public and Stakeholder Participation – outreach, involvement, and consultation efforts during the planning effort with the public, stakeholders, and interested parties
5.0 Transportation System – current and future conditions of the transportation system
6.0 Financial Plan – current and future funding for transportation

7.0 Recommended Planned Improvements – recommended capital and operating improvements
8.0 Environmental Review – an assessment of the planned improvements on the physical and social environment

1.1 METROPOLITAN PLANNING

Federal law requires metropolitan areas (defined as urbanized areas with a population of greater than 50,000 people, based on the latest US Census) undertake a continuing, comprehensive, and cooperative transportation planning process. The Johnson City Metropolitan Transportation Planning Organization (MTPO) is the governing entity that is charged with carrying out this process for the Johnson City Urbanized Area. The planning area of the Johnson City MTPO consists of Elizabethton, Jonesborough, Johnson City, a small portion of the Town of Unicoi, and portions of Carter, Unicoi, and Washington Counties.

The Johnson City MTPO is comprised of an Executive Board, Executive Staff (agency technical staff), and MTPO staff. The Executive Board is the governing body of the MTPO and has the authority to adopt plans, programs, and policies. The Executive Board is comprised of elected officials from the following member jurisdictions:

- Mayor of Johnson City – Executive Board Chairman
- Mayor of Elizabethton – Executive Board Vice Chairman
- Mayor of Jonesborough – Member
- Mayor of the Town of Unicoi – Member
- Mayor of Carter County – Member
- Mayor of Washington County – Member
- Governor of Tennessee – Member

Additional members who have an advisory role include the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

The MTPO Executive Board has periodic meetings to discuss and vote on various policies and products. Final responsibility for transportation planning and programming is vested with the Executive Board.

The MTPO Executive Staff is comprised of a diverse group of transportation professionals, who advise the Executive Board members on all aspects of the planning process. The Executive Staff includes engineers, transportation and land use planners, from federal, state, and local agencies, as well as representatives from transit operators.

The MTPO staff is physically housed in the City of Johnson City and is responsible for all planning and administrative functions of the MTPO. The MTPO staff serve as a liaison between the MTPO Executive Board, TDOT, FHWA, FTA, local governments, and other groups and individuals interested in transportation issues within the MTPO area. The MTPO staff takes their direction from, and are accountable to the Executive Board and Executive Staff.

1.2 LEGAL REQUIREMENTS OF THE PLAN

Federal legislation provides the guiding framework that governs the transportation planning process for all metropolitan planning organizations (MPOs) including the Johnson City MTPO.

On July 6, 2012 a new federal transportation bill was signed into law, Moving Ahead for Progress in the 21st Century Act (MAP-21), replacing the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005. While the implementing regulations of MAP-21 are not yet in place, MAP-21 maintains the eight planning factors of SAFETEA-LU and provides greater emphasis in the use of performance measures and performance targets and infrastructure condition as means of creating an outcome based decision-making process.

As with SAFETEA-LU, MAP-21 requires that each MPO develop a transportation plan with at least a 20-year horizon of both long-range and short-range strategies/actions. The plan is intended to lead to the development of an integrated multimodal transportation system to facilitate the safe and efficient movement of people and goods in addressing current and future transportation demand. The MAP-21 legislation places continued emphasis on the relationships between land use, air quality, and transportation, including modes other than single-occupancy vehicles. MAP-21 also calls for a performance-based planning and programming process focused on:

- Safety
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability, and
- Reduced Project Delivery Delays.

The plan must be updated every five years to keep consistent with existing conditions, re-evaluate proposed plans, programs and projects, and validate air quality conformity analysis.

The Clean Air Act Amendments (CAAA) of 1977 and 1990 require that transportation plans, programs, and projects in non-attainment areas not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS). In late 2002, the counties within the Johnson City MTPO, joined an Early Action Compact (EAC) with the US Environmental Protection Agency (EPA) due to non-compliance with the national 8-hour ozone standards which were established in 1997 by the EPA but delayed nationally in implementation due to legal challenges which were ultimately resolved in 2002. Entering into the EAC (formally known as the Tri-Cities EAC) allowed the region to avoid being designated non-attainment as long as the area is making voluntary improvements to air quality. Currently the region is not required to undertake air quality conformity analysis of its Long Range Transportation Plan (LRTP); however, the MTPO has developed the 2040 LRTP so that conformity testing can be undertaken should the region be designated non-attainment in the future.

Other requirements of the MPO planning process include compliance with a number of existing laws, regulations, and policy directives, which are described below.

- The Americans with Disabilities Act (ADA) of 1990 mandates equal opportunity for, and prohibits discrimination against, individuals with disabilities. In particular, Title II of the ADA and Section 504 of the Rehabilitation Act of 1973 requires State, local, and regional agencies to provide transportation programs, services, and activities that are accessible to all individuals.

- Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin. Section 162a of the Federal-Aid Highway Act of 1973 to 1976 (section 324, Title 23 U.S.C.), the enabling legislation of the Federal Highway Administration (FHWA), prohibits discrimination based on sex.

- The Uniform Relocation Assistance and Real Property Acquisition Act of 1970 prohibits unfair and inequitable treatment of persons as a result of projects that are undertaken with federal financial assistance. The Civil Rights Restoration Act of 1987 clarified the intent of Title VI to include all programs and activities of federal aid recipients and contractors whether those programs and activities are federally-funded or not. Environmental Justice is a concept founded in the intent of the non-discrimination prohibitions of the federal legislation.

- The incorporation of Environmental Justice and non-discrimination principles into transportation planning and decision-making processes as well as project-specific environmental reviews as founded in Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and reaffirmed in both the United States Department of Transportation (US DOT) Order 5610.2 (a), *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and FTA Circular 4703.1 *Environmental Justice Policy Guidance for Federal Transit Administration Recipients*. These policy directives require federal agencies and grant recipients of federal funds to identify and address disproportionately high and/or adverse environmental or human health effects that any of its programs, policies, and/or activities may have on minority and low-income populations. Further, each agency and grant recipient must work to prevent the denial, reduction, or delay of benefits received by minority and low-income populations and must develop policies and strategies to ensure full and fair participation by affected populations in transportation decisions.

- Climate change has become an increasingly important policy issue. While a much debated topic, there is general scientific consensus that the earth is experiencing a warming trend and that human-induced increases in atmospheric greenhouse gases (GHGs) are a significant cause. Because transportation-related GHG emissions are a large contributor to atmospheric GHGs, MPOs, through their transportation planning and investment decisions, are called to increase their considerations and strategies to mitigate the effects of global climate change by reducing GHG emissions from transportation. US DOT also encourages MPOs to consider transportation vulnerability due to climate change and extreme weather events and options for improving resiliency of transportation facilities or systems to climate changes and/or extreme weather events.

- In 2009, the US DOT, the US Department of Housing and Urban Development (HUD), and US EPA announced a new Interagency Partnership for Sustainable Communities to improve access to affordable housing, provide more transportation options, and lower transportation costs while protecting the environment in communities nationwide. The partnership established six livability principles: provide more transportation choices; promote equitable-affordable housing; enhance economic competitiveness; support existing communities; coordinate and leverage policies and investments; and value communities and neighborhoods. MPOs are encouraged to incorporate these livability principles into their plans and programs to ensure that transportation investments support both mobility and broader community goals.

The 2040 LRTP for the Johnson City MTPO reflects compliance with the federal requirements of MAP-21, the CAAA, and the above provisions. Throughout this document, data and analysis are presented illustrating consideration and compliance with these requirements.

1.3 PLAN ADOPTION AND AMENDMENT PROCESS

Developing and updating a long range transportation plan (LRTP) takes considerable time (generally 12 to 18 months or longer) given the amount of data and information that must be considered in the plan. As part of the plan development process, opportunities are provided for public and stakeholder input, which is an important activity in determining transportation needs and priorities, and aiding in the ultimate recommendations of the plan. Appendix I provides details on the outreach and involvement processes used in the development of the 2040 LRTP and the input received.

Once a draft plan has been developed, a formal review process is required of the draft document. This review process includes an initial review by state and federal agencies of the draft plan to ensure compliance with various federal transportation planning requirements. Once this review is completed a formal public review and comment period of the draft LRTP is conducted, which is a minimum of 30-days. After the MTPO has initiated the public review process on the draft LRTP, the MTPO generally holds an advertised public meeting to review and obtain final comments from the public. At the end of the public comment period and after public comments have been addressed or considered, the MTPO endorses/adopts the LRTP and submits it to the appropriate state and federal agencies. Once compliance with federal requirements has been determined, the plan becomes an approved document.

Amendments to the LRTP can and do occur once a plan has been adopted. These amendments can occur for various reasons – changes in project schedules, unknown development changes, or changes in priorities. While the intent is to avoid such mid-cycle changes, amendments do occur. Any such amendment to the LRTP must follow the same public review process and procedures as that of adopting the plan, as per the MTPO's Public Participation Plan (PPP) (available at: www.jcmpo.org/publicplan.htm).

1.4 PLAN IMPLEMENTATION

Implementation of project recommendations from the LRTP occurs through the programming of transportation improvements on a scheduled basis which is linked to annual state and federal funding appropriations. For projects within the MTPO area that are federally or state funded or considered regionally significant, the MTPO, in consultation with the appropriate member jurisdictions, TDOT, and transit agencies, with input from the public, determines which projects are to be advanced from the LRTP into the MTPO's short-term Transportation Improvement Program (TIP).

The TIP is a planning/programming document developed and adopted by the MTPO in response to transportation goals, priorities, and needs in the MTPO area as presented in the MTPO's LRTP. The TIP updates and advances a four-year implementation program for all modes of transportation. It not only addresses major transportation improvements (e.g. constructing a new bridge or road) but it also contains small-scale transportation improvements (e.g. intersection or signalization improvements) as well as transit and other transportation investments (e.g. purchasing new transit vehicles or constructing a new sidewalk or bikeway facility). Projects that are added to the TIP for funding and implementation must be consistent with the goals, priorities, project recommendations, and strategies of the LRTP. This consistence ensures for a continuing, cooperative, and comprehensive planning process that guides development of integrated planning and decision-making by the MTPO.

The MTPO also maintains an annual work program (referred to as the Unified Planning Work Program or UPWP) which outlines the planning activities in the region to be undertaken by the MTPO during the fiscal year. Planning activities of the MTPO are influenced by the goals and priorities of the LRTP and frame a large portion of the MTPO's work program activities. Examples of these activities, which support implementation of the MTPO's LRTP, include undertaking subarea and sub-regional studies that allow for the MTPO to better understand transportation needs in the region, maintaining avenues and opportunities for public and stakeholder input on projects and decisions by the MTPO, and updating planning data and tools for future analysis of transportation needs in the region. Additionally, the MTPO is actively involved in monitoring and coordinating projects from the LRTP into the TIP. Through this continuous planning process the MTPO plays an active role in implementing the recommendations of the LRTP and supporting an integrated planning process within the MTPO area.

2.0 GUIDING PRINCIPLES

This section describes a set of stated goals and objectives that have been developed to guide the 2040 LRTP. During 2012, the MTPO Executive Board and Executive Staff, with the assistance of public input, established a series of guiding principles. These principles are aligned with national transportation policies to serve in the development of the 2040 MTPO LRTP. From each goal, a set of objectives intended to move the region closer to the stated guiding principles has been established.

2.1 NATIONAL EMPHASIS

Moving Ahead for Progress in the 21st Century Act (MAP-21), which was signed into law in July 2012, is the current national transportation legislation providing the guiding principles behind transportation decision-making throughout the United States in metropolitan areas.

MAP-21 reaffirms the requirement that the metropolitan areas carryout a transportation planning process that considers 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 the accessibility and mobility options available to people and for 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.
8. Emphasize the preservation of the existing transportation system.

In addition to these eight Planning Factors, MAP-21 sets a new direction in transportation planning and programming calling for a performance-based approach to transportation decision-making, focused on:

- **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.

These factors and national goals provide the foundation for which locally desired regional outcomes are established. Table 2-1 and Table 2-2 illustrate how the 2040 LRTP goals, which are further described in the following section and throughout the LRTP address each of the planning factors and national goals.

2.2 REGIONAL GOALS

The following goals and objectives have been established with full consideration of the above MAP-21 Planning Factors and National Goals. The 2040 LRTP goals are intended to guide future transportation decisions in the region. For each of the following goals, a corresponding set of objectives has been established to help the region move closer to the intended goal.

Goals

Goal 1 - Reduce Traffic Congestion along Major Routes of the MTPO Area

- Reduce travel delays between major areas of attractions in the MTPO study area
- Seek cost-effective management solutions and new technologies as a means of addressing congestion, reducing transportation delay, and improving system operations
- Increase transit and other transportation demand management opportunities
- Enhance the flow of raw materials and manufactured products

Goal 2 - Promote Economic Growth and Livability by Enhancing the Transportation System for the MTPO Area

- Maintain what we have – take a “state of good repair” approach to our community’s transportation assets
- Remove obstacles to economic growth through improved transportation facilities and the integration and connectivity of the transportation system, across and between modes, for people and freight thus allowing for the continued expansion of the business community
- Promote alternative forms of transportation (such as walking, biking, and transit) where possible
- Seek improvement options and strategies which minimize adverse impacts to historical, social, cultural, and natural environments and promote reductions in transportation-related GHG emissions

Goal 3 - Enhance Regional Access to and from the MTPO Area

- Maintain and improve access to regional areas outside of the MTPO study area
- Support transportation investments and policies that work to create jobs and improve access to people, places, and goods while embracing access management and corridor management strategies that preserve the long-term functionality of a roadway's capacity and safety
- Strategically target transportation investments to areas supportive and conducive to growth and redevelopment initiatives

Goal 4 - Improve Safety and Security throughout the Transportation System of the MTPO Area

- Encourage partnerships with other transportation and non-transportation agencies to enhance transportation safety and security
- Reduce secondary traffic accidents
- Establish initiatives (projects and programs) to improve the safety and security of vulnerable roadway users (e.g. pedestrians, cyclists, transit riders, and the young and old)

Table 2-1
LRTP Goals Addressing MAP-21 Planning Factors

2040 Plan Goal	MAP-21 Planning Factor							
	1	2	3	4	5	6	7	8
	Support economic vitality	Increase safety	Increase security	Increase accessibility and mobility	Protect and enhance the environment	Enhance the integration & connectivity	Promote efficient system management & operation	System preservation
Goal 1 - Reduce Traffic Congestion along Major Routes of the MTPO Area	X			X			X	X
Goal 2 - Promote Economic Growth and Livability by Enhancing the Transportation System for the MTPO Area	X				X	X	X	
Goal 3 - Enhance Regional Access to and from the MTPO Area	X	X		X	X	X	X	X
Goal 4 - Improve Safety and Security throughout the Transportation System of the MTPO Area		X	X	X				

Table 2-2
LRTP Goals Addressing MAP-21 National Goals

2040 Plan Goal	MAP-21 National Goals						
	Safety	Infrastructure Condition	Congestion Reduction	System Reliability	Freight Movement & Economic Vitality	Environmental Sustainability	Reduced Project Delivery Delays
Goal 1 - Reduce Traffic Congestion along Major Routes of the MTPO Area			X	X	X		
Goal 2 - Promote Economic Growth and Livability by Enhancing the Transportation System for the MTPO Area		X		X	X	X	X
Goal 3 - Enhance Regional Access to and from the MTPO Area	X	X		X	X	X	
Goal 4 - Improve Safety and Security throughout the Transportation System of the MTPO Area	X		X				

Performance Measures

As previously stated, MAP-21 sets a new direction in transportation planning and programming calling for a performance-based approach to transportation decision-making. MAP-21 sets a schedule for US DOT, state DOTs, and MPOs develop performance measures and standards to carry out a performance-based transportation planning and programming approach. At present final implementing regulations are not in place for MAP-21, nor are the parameters relative to specific performance measures. To ensure a high level of consistency between implementing regulations and the ultimate selected performance measures, the MTPO is not proposing measures for the 2040 LRTP but will rather amend the LRTP once performance measures have been established by US DOT, TDOT, and the MTPO, in consultation with JCT.

2.3 PROJECT ASSESSMENT

Each transportation recommendation considered for inclusion in the 2040 LRTP was evaluated by comparing the project's need with the stated goals and objectives of the Plan. Specific project assessment criteria included level of congestion, access and connectivity, economic growth, safety and security, freight movement, and plan consistency. Appendix III provides additional details on the criteria and results of the assessment that aided in the ultimate selection of the recommended transportation improvements, which are presented in Section 7.0. The resulting score for each project is an indication of the transportation projects consistency with the MTPO's stated goals. The higher the score, the more consistent the project is with the region's desires for transportation investments. The lower the score, the less consistent the project is with the region's desires for transportation investments, indicating that the project does not fully meet or achieve all the stated goals and objectives of the MTPO. The project assessment process allows for a foundation of project understanding and data that is available to the MTPO as it considers projects for funding in the MTPO's TIP (as described in Section 1.4).

3.0 PLANNING AREA AND REGION

The Johnson City region is situated near the borders of northeastern Tennessee and northwestern North Carolina in an area commonly referred to as the Tri-Cities region. The Johnson City MTPO planning area is one of three urbanized areas (UZAs) in the Tri-Cities region (Bristol and Kingsport are the other two areas). The Johnson City MTPO planning area comprises approximately 398 square miles incorporating portions of Washington, Carter, and Unicoi counties and the municipalities of Johnson City, Elizabethton, Jonesborough and Unicoi. Figure 3-1 illustrates the UZA and metropolitan planning area (MPA) of the Johnson City MTPO.

Since 1982, when the Johnson City area was first designated by the federal government as a UZA, the region has experienced steady population and employment growth and has seen a shift in its employment base from largely manufacturing to one of service and retail. Another change in the region has been an increase in the percent of persons over the age of 65, a trend that is occurring nationally as more Americans are living longer. In the 1970s, less than 10 percent of the population within the MTPO was over 65 years of age. Today, nearly 16 percent of the population is over the age of 65, and that trend is projected to increase to nearly 20 percent by the year 2040. While some retirees are moving to the area, according to US Census data, the projected increases in this population group are largely associated with the aging of older residents.

What is an Urbanized Area (UZA)?
An Urbanized Area is a statistical geographic entity designated by the US Census Bureau, consisting of a central core and adjacent densely settled territory that together contain at least 50,000 people, generally with an overall population density of at least 1,000 people per square mile. Within the transportation planning community an Urbanized Area is typically referred to as a UZA.

What is a Metropolitan Planning Area (MPA)?
A Metropolitan Planning Area is defined in the Code of Federal Regulations (23 CFR 450.104) as the geographic area in which the metropolitan transportation planning process must be carried out. The MPA boundary, at a minimum, is to cover a UZA and the contiguous geographic areas likely to become urbanized within the twenty year forecast period covered by the transportation plan.

This section describes the community structure of the MTPO area in terms of population and employment trends and forecasts, the region's natural and cultural environment, and current and future land use activities. Included in the discussion are the plans and policies that guide growth and development within the region. State and local agencies assisted in determining the latest available estimates and assumptions for land-use, population, travel, employment, congestion, and economic activity, which were utilized in the development of this plan.

3.1 DEMOGRAPHICS

This sub-section discusses the population, age, housing, and employment characteristics of the MTPO area. Historical data is presented as is future year projections. For purposes of this plan, the base year is 2010 and future year projections are to the year 2040.

3.1.1 Population Trends and Forecasts

The total population of the Johnson City urbanized area in 2000 was 102,456. In 2010, the urbanized area grew to 120,415 people with the largest amount of growth occurring in Washington County. By 2040, the MTPO's planning area, which was recently expanded to account for expansion of the region's urbanized area, is projected to have 196,731 persons, which is a 25 percent increase over the 2010 population count for the same geographic area. Table 3-1 depicts recent population trends and projections for the MTPO area. Figure 3-2 illustrates the projected absolute increase in population for the MTPO area from 2010 to 2040.

Figure 3-1
Johnson City MTPO Planning Area Map

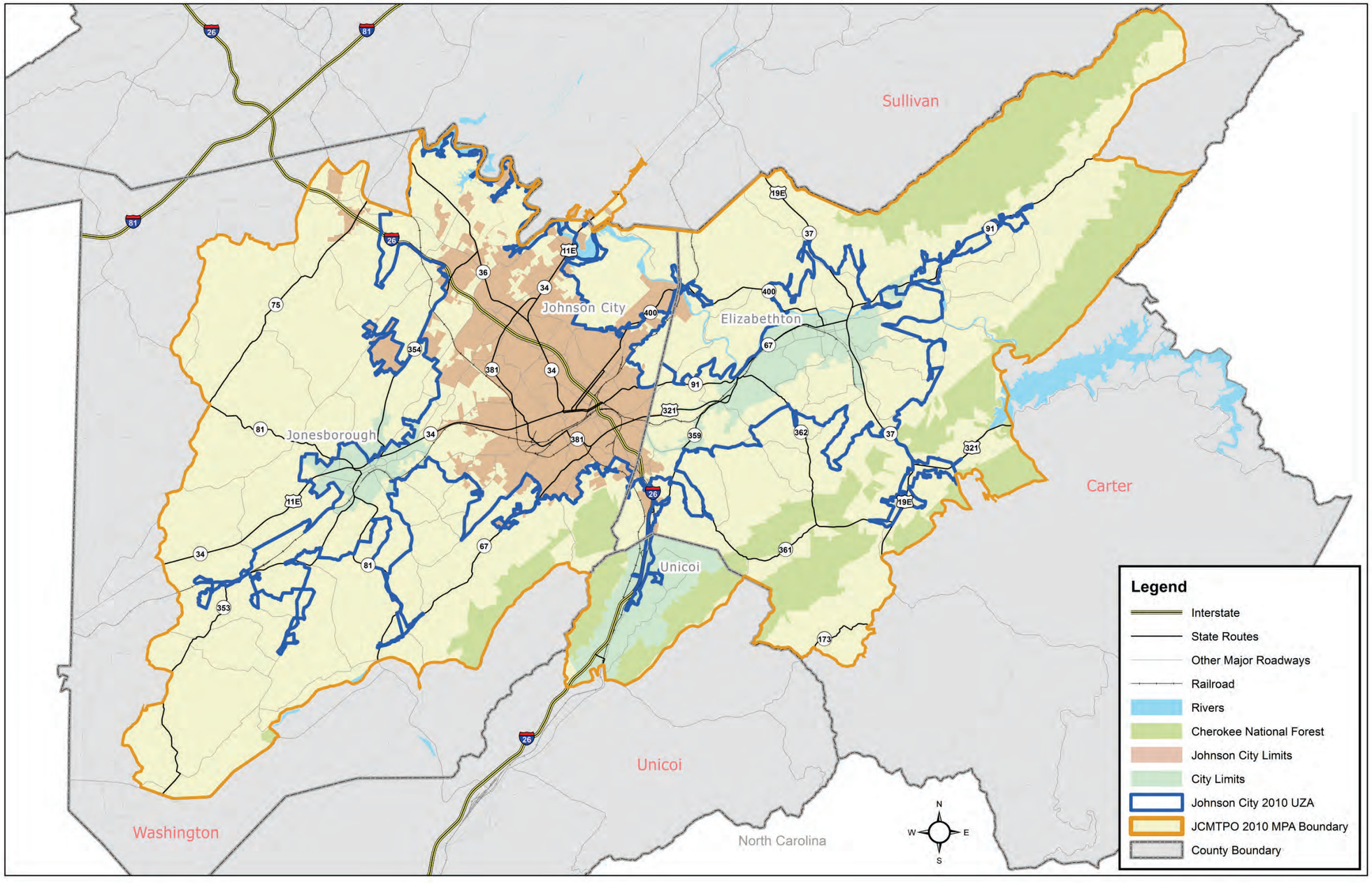


Figure 3-2
Population Change (2010-2040) Map

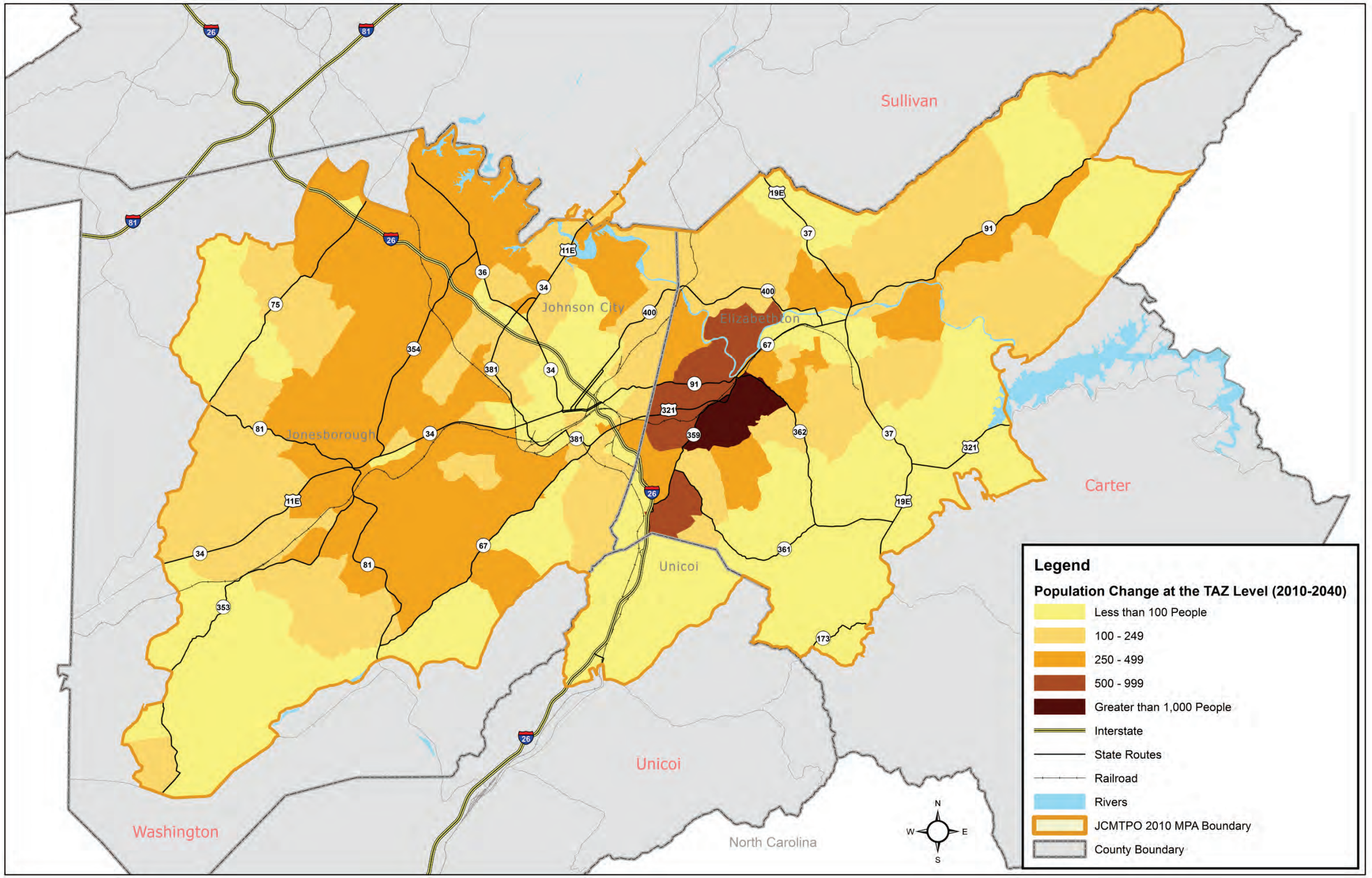


Table 3-1
Total Population (2000-2040)

	2000	2010	2040	% Change (2000-2010)	Absolute Change (2010-2040)	% Change (2010-2040)
Johnson City Urbanized Area*	**102,456**	**120,415**	**196,731**	**18%**	**76,316**	**63%**
Johnson City MTPO MPA**	**143,819**	**157,823**	**196,731**	**10%**	**38,908**	**25%**
Washington County	107,198	122,979	150,611	15%	27,632	22%
Carter County	56,742	57,424	71,340	1%	13,916	24%
Unicoi County	17,667	18,313	19,394	4%	1,081	6%
3 County Population	**181,607**	**198,716**	**241,345**	**9%**	**42,629**	**21%**
MTPO% of 3 County Population	**79%**	**79%**	**82%**			

Sources: US Census, Woods & Poole Economics, Inc.
* Population figures for 2040 are for the MTPO's newly established 2010 MPA boundary
** Population figures for 2000 & 2010 are for the MTPO's newly established 2010 MPA boundary for comparison purposes

The current MTPO planning boundary is intended to reflect the area of the region which is likely to be urbanized in the next 20 years. The population density in 2010 for the MTPO area was 397 persons per square mile. Assuming the MTPO planning boundary remained the same as it is today – the population density of the MTPO area would increase to 494 persons per square mile by 2040. Table 3-2 and Figure 3-3 illustrate the number of persons per square mile (or density level) within the MTPO area.

Table 3-2
MTPO Area Population Density (2000-2040)

	2000	2010	2040
Total Population	143,819	157,823	196,731
Land Area (sq. miles)*	398	398	398
Population per Sq. Mile	361	397	494

Sources: US Census, Woods & Poole Economics, Inc.
* For comparison purposes only, Land Area for all three time periods (2000, 2010, and 2040) are based on the MTPO's newly established 2010 MPA boundary

3.1.2 Age Trends and Forecasts

Another trend in the MTPO area that has continued to increase over time and is projected to continue to increase is the number of persons aged 65 and older. In 1970, all three counties in the MTPO region had less than 11 percent persons aged 65 and older. Today that number is between 14 and 19 percent and by 2040 over 20 percent of the region's population will be aged 65 and older with Unicoi County having 28 percent of their population 65 and older. Table 3-3 depicts these changing age demographics within the MTPO area, a trend that is consistent with state and national trends of an aging US population.

Table 3-3
MTPO Area Population Aged 65 and Over Trends (1970-2040)

	1970	2000	2010	2040	Percent Change (1970-2000)	Percent Change (2010-2040)
Washington County, TN	10%	14%	15%	21%	95%	66%
Carter County, TN	10%	15%	16%	23%	105%	78%
Unicoi County, TN	11%	18%	19%	28%	88%	53%

Source: Woods & Poole Economics, Inc.

Figure 3-3
Population Density (2010-2040) Map

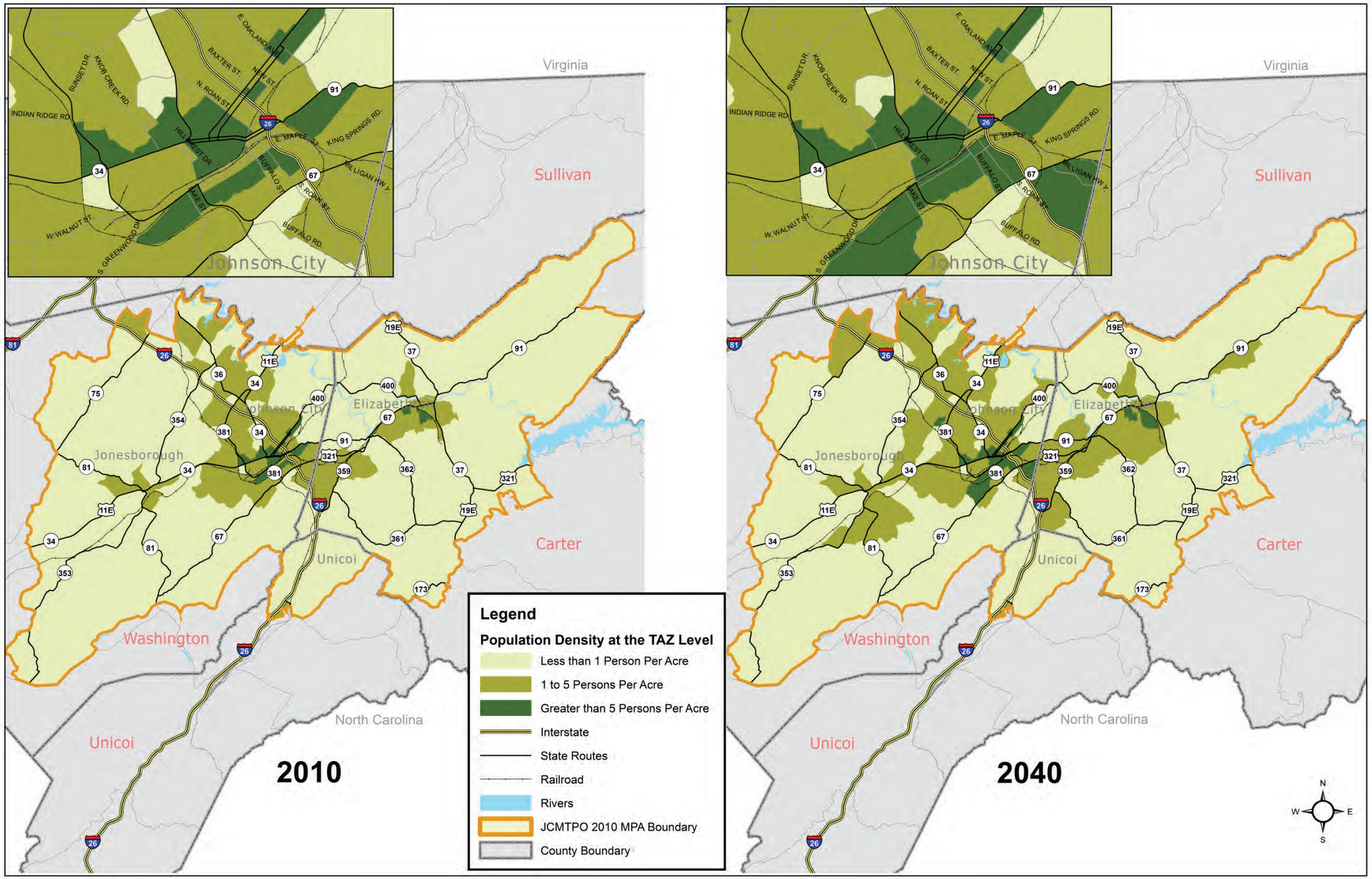
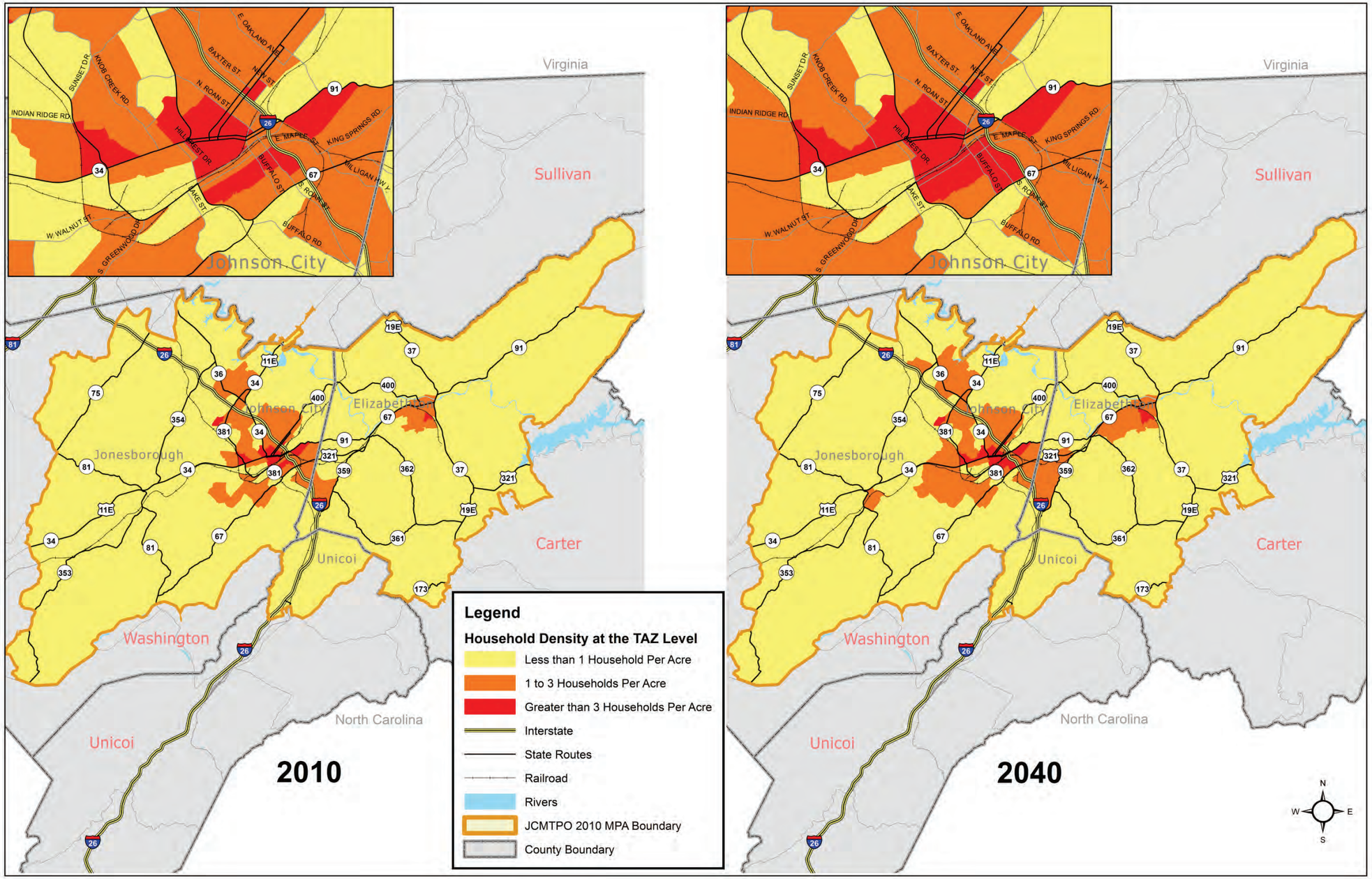


Figure 3-4
Household Density (2010-2040) Map



Providing transportation options within the region will require higher levels of investments in transit services, walking, and biking over time in meeting the needs of this growing population group. Equally important will be housing placement in relation to other uses (e.g. grocery, stores, medical, recreation, etc.) to reduce transportation costs and provide mobility independence.

3.1.3 Household Trends and Forecasts

The increase of households within the MTPO area is projected to mirror the rate of increase in population over the 27-year planning horizon.

In 2010, the number of households within the MTPO area was 73,892. By 2040, the number of households is projected to grow to 92,395. Table 3-4 and Figure 3-4 illustrate the number of households and density level of households within the MTPO area. As illustrated in the household density map, while outward growth is projected, density levels are expected to increase from current concentration areas. Higher residential density makes walking, biking, and transit transportation a more viable option compared to serving a region with low-density or geographically segregated development patterns which discourage or prohibit shorter trips.

Table 3-4
MTPO Area Household Density (2010-2040)

	2010	2040	Percent Change (2010-2040)
Total Households	73,892	92,395	25%
Land Area (Sq. miles)	398	398	-
Households per Sq. Mile	186	232	25%

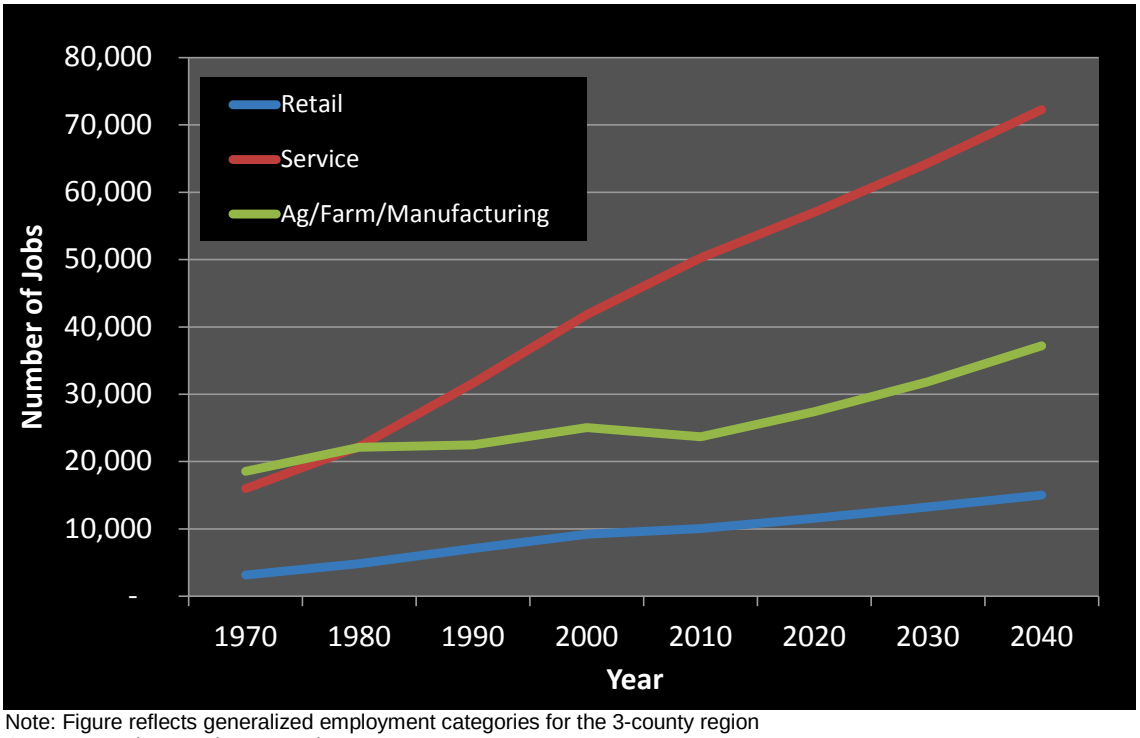
Sources: U.S. Census, Woods & Poole Economics, Inc.

3.1.4 Employment Trends and Forecasts

Employment conditions within the MTPO area, much like in many communities in the Southeast, have seen dramatic changes over the last several decades relative to the number of jobs and types of jobs, which make up the local economy.

Figure 3-5 illustrates the change in the number of jobs, and types of jobs from 1970 to 2040 for the counties of Carter, Unicoi and Washington. In the 1970s and 1980s, the employment of the three-county region and the MTPO area was largely dominated by manufacturing jobs. Since that time, the region, much like the rest of the country, has seen a leveling off of manufacturing employment. While manufacturing is no longer the leading employment sector in the region, the MTPO area and the region have continued to see positive employment growth in retail and service, specifically medical employment.

Figure 3-5
Employment Trends (1970-2040) – By Sector



Note: Figure reflects generalized employment categories for the 3-county region
Source: Woods & Poole Economics, Inc.

Today, service sector employment (which consists of professional, technical, health, education, government, and finance) accounts for 60 percent of the jobs within the MTPO area while manufacturing has remained somewhat constant. Over the next 27 years, employment in the three-county region is projected to reach 124,505 (adding 40,475 new jobs to the three-county region). Of this growth, the MTPO area is projected to receive 36,783 new jobs (accounting for 91 percent of the three-county region's 27 year employment growth).

Table 3-5 and Figure 3-6 illustrate employment trends and forecasts within the MTPO area (and three-county region) including projected employment concentrations.

Table 3-5
MTPO Area Total Employment (2010-2040)

Johnson City MTPO Area						
MTPO Counties	**2010 Jobs**	**Percent of 3 County Region's 2010 Jobs**	**2040 Jobs**	**Percent of 3 County Region's 2040 Jobs**	**Absolute Change (2010-2040)**	**Percent Change (2010-2040)**
Carter County	11,856	95%	20,741	96%	8,885	75%
Unicoi County	156	3%	244	4%	88	56%
Washington County	64,485	98%	92,295	96%	27,810	43%
MTPO Area Total	**76,497**	**91%**	**113,280**	**91%**	**36,783**	**48%**
Three County Region						
MTPO Counties	**2010 Jobs**	**Percent of 3 County Region's 2010 Jobs**	**2040 Jobs**	**Percent of 3 County Region's 2040 Jobs**	**Absolute Change (2010-2040)**	**Percent Change (2010-2040)**
Carter County	12,446	15%	21,548	17%	9,102	73%
Unicoi County	5,692	7%	6,944	6%	1,252	22%
Washington County	65,892	78%	96,013	77%	30,121	46%
Three County Total	**84,030**	**100%**	**124,505**	**100%**	**40,475**	**48%**

Sources: U.S. Census, Woods & Poole Economics, Inc.

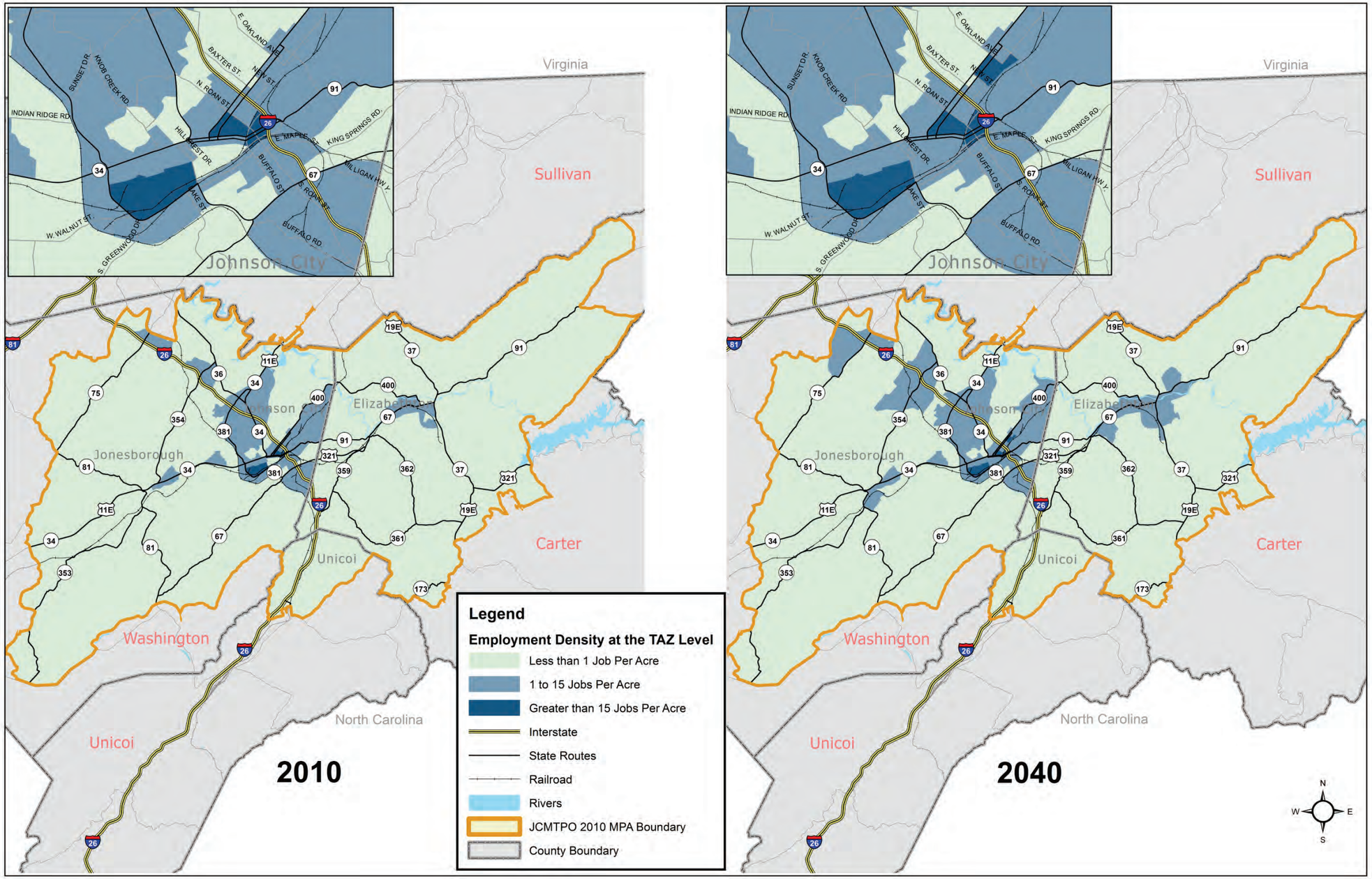
Table 3-6 identifies the ten largest non-government employers (in terms of number of employees) within the MTPO area. These ten employers account for nearly 20 percent of all jobs (or 15,150 jobs) within the MTPO area.

Table 3-6
10 Largest Private Employers

Employer	Type of Industry	Number of Employees
Mountain States Health Alliance	Health	3,500
East Tennessee State University	Education	2,500
Citi Commerce Solution	Financial	2,000
James H. Quillen VA Center	Health	1,600
Advance Call Center Technologies	Telemarketing	1,500
Frontier Health	Health	1,200
American Water Heater Co	Manufacturing	1,100
AT&T Mobility	Telecommunications	650
Fairfield Marketing	Telemarketing	550
TPI Corporation	Manufacturing	550

Sources: Tennessee Department of Economic and Community Development, InfoGroup

Figure 3-6
Employment Density (2010-2040) Map



With a projected 48 percent increase in employment over the 27-year planning horizon, job opportunities within the MTPO area appear to be strong. As previously mentioned, job growth in the region has seen a shift from largely manufacturing to a more service related economy. Changes in employment type from shift work to one that is consumer dependent will result in changing travel patterns over time. An example of this type of travel behavior change can be seen on corridors such as North State of Franklin Road (SR 381) with high amounts of commercial development and traffic volumes during mid-day that are reaching the traditional AM and PM commuting traffic volumes.

3.2 NATURAL & CULTURAL ENVIRONMENT AND LAND DEVELOPMENT PATTERNS

This sub-section describes the MTPO area's natural and cultural environmental features, current and future land use activities, and plans and policies that guide growth and development activities.

3.2.1 Natural Environment

The natural environment often dictates the pattern of land use and development in a community as well as influences the type and location of its transportation infrastructure. Climate, air and water quality, topography and geology, and watersheds and tributaries are significant natural factors that affect growth and development and are important to understand and consider in the development of a community's transportation system. The following is a listing of these factors and their impact on the region's transportation system:

Climate

The climate of the MTPO region can be characterized as continental and warm-to-temperate. Winters are short and cool with the average temperature being about 30 degrees Fahrenheit. The summer season is warm with an approximate average temperature of 77 degrees Fahrenheit. The mean annual rainfall, which is fairly well distributed throughout the year, averages approximately 43.8 inches. Severe storms are rare, and winters are generally mild and clear.

Climate change has become an increasingly important policy issue. While a much debated topic, there is general scientific consensus that the earth is experiencing a warming trend and that human-induced increases in atmospheric greenhouse gases (GHGs) are a significant cause. The combustion of fossil fuels is by far the biggest source of GHG emissions. In the United States, transportation is the largest source of GHG emissions, after electricity generation. Transportation accounts for 27 percent of United States greenhouse gas emissions based on recent data.

Scientists refer to what has been happening in the earth's atmosphere over the past century as the "enhanced greenhouse effect." By pumping man-made greenhouse gases into the atmosphere, humans are altering the process by which naturally occurring greenhouse gases trap the sun's heat before it can be released back into space. Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30 percent, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15 percent. These increases have enhanced the heat-trapping capability of the earth's atmosphere which has led to a decrease in the polar ice caps and an increase in sea levels. Such trends are a particular threat to coastal communities in the US and around the world due to their

vulnerability to flooding and increased tropical storm activity. Changes in climate (or climate change effects) vary by location and include higher temperatures, longer and/or more frequent heat waves, sea level rise, changes in seasonal precipitation, and the intensity of rain events. The US has already experienced some changes in climate, particularly higher average temperatures, but for some factors, such as extreme weather events, it is less clear if changes experienced recently can be attributed to climate change, normal weather variability, or some combination of the two.

The changing climate poses serious challenges to the transportation community, given the community's need to watch over transportation systems and infrastructure designed to last decades or longer. Transportation functions tied to construction, operations, maintenance, and planning should be grounded in an understanding of the environment expected to support transportation facilities. Decisions therefore need to be informed by an understanding of potential future changes in climate. Since the highway system is engineered to withstand the historically expected range of weather stressors, small changes in average climate are not expected to cause significant impacts. However, because future climate change is projected to transcend the bounds of historic experience, it is likely to expose vulnerabilities. Impacts could include abrupt and unanticipated disruptions to the system (such as a road washing out), or more gradual disruption (such as an increased need for road maintenance). The MTPO continues to work with its member jurisdictions and other agencies to understand these effects and to develop appropriate adaptation measures to reduce harm or risk associated with the impacts of climate change and extreme weather events on the region’s transportation system.

In addition to planning for climate change effects and developing adaptation measures there is also a need to develop strategies to help reduce GHG emissions from the transportation sector. Section 8.0 of this Plan describes these strategies and what actions the MTPO can undertake to contribute to reductions in GHG emissions.

Air Quality

The US Environmental Protection Agency (EPA) sets national standards for pollutants such as volatile organic compounds (VOCs) and nitrogen oxides (NOx), which are precursors of ozone formation. The EPA designates areas that exceed the set pollutant levels as "non-attainment.” The MAP-21 legislation places continued emphasis on the relationships between land use, air quality, and transportation, including modes other than single-occupancy automobiles. The Clean Air Act Amendments (CAAA) of 1977 and 1990 require that transportation plans, programs, and projects in non-attainment areas not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS). In the 1970s, EPA established a 1-hour ozone standard. Originally set at 0.08 parts per million (ppm) in 1971, the 1-hour ozone standard was revised in 1979 to 0.12 ppm. In July 1997, EPA replaced the 1-hour standard with an 8-hour standard of 0.08 parts per million. The 8-hour standard was delayed nationally in implementation due to legal challenges which were ultimately resolved in 2002.

In late 2002, the counties within the Johnson City MTPO joined an Early Action Compact (EAC) with the EPA due to non-compliance with the national 8-hour ozone standards. Entering into the EAC allowed the region to avoid being designated non-attainment as long as the area is making voluntary improvements to air quality. In April 2012, EPA issued final area designations for the 2008 ozone standards and the Johnson City

MTPO area was not classified as nonattainment (meaning the region is in compliance with national air quality standards). While the region is not required to undertake air quality conformity analysis of its LRTP, the MTPO has developed the 2040 LRTP so that conformity testing can be undertaken should the region be designated non-attainment in the future. Projects in the LRTP have been coded in the MTPO's travel demand model by horizon year, consistent with air quality conformity horizon year thresholds, and projects have been identified as exempt and non-exempt based on current air quality conformity requirements.

Topography and Geology

Topography is defined as the general configuration of the earth's surface, including its slope, geological characteristics, and other natural features. Topography in this region of Tennessee is among the most varied in the United States. The MTPO region located in the Ridge-and-Valley Appalachians, which is a physiographic province of the larger Appalachian Mountains (e.g. Cumberland Plateau) extending from southeastern New York through northwestern New Jersey, westward into Pennsylvania and southward into Maryland, West Virginia, Virginia, Tennessee, North Carolina, Georgia, and Alabama.

These mountains are characterized by long, even ridges, with long, continuous valleys in between. From a great enough altitude, they almost look like corduroy, except that the widths of the valleys are somewhat variable and ridges sometimes meet in a vee. The ridge and valley system presents an important obstacle to east-west land travel even with today's technology. Elevations within the MTPO area range from 1,400 feet along the Watauga River to 4,280 feet on Holston Mountain. Slopes in the region range from below 5 percent to nearly 50 percent. In areas greater than 20 percent slope, limitations to development are severe.

Karst terrain makes up a large part of the northeastern Tennessee landscape and is very problematic in locating, designing, and constructing highways. Karst topography is the name given to an area underlain by rocks such as limestone and is characterized by caves, sinkholes, and depressions. Figure 3-7 illustrates the regional context of karst development areas within the MTPO region.

Watersheds and Tributaries

As a result of the mountainous region, the drainage patterns in the Johnson City area are well developed. There are three watersheds that cover the MTPO area (the South Fork Holston River Watershed, the Watauga River Watershed, and the Nolichucky River Watershed) all of which are part of the Tennessee River Basin which is the largest tributary of the Ohio River system. In the 1800s, these waterways were used for transportation and commerce; however, today, in the MTPO area, none are navigable for freight transportation.

Within the MTPO area, the South Fork Holston River drains into the northern portion of Washington County which flows from Southwestern Virginia into East Tennessee. The Watauga River flows generally north and then west into Carter County where it forms the northern limits of Elizabethton, where the Watauga then receives the Doe River. A considerable portion of the boundary line between Washington County and Sullivan County is formed by the Watauga River. The Nolichucky River is a major stream draining the Blue Ridge Mountains of Western North Carolina and East Tennessee, as the river flows into the MTPO area through Unicoi and Washington counties toward Greeneville,

Tennessee. Figure 3-8 illustrates the floodplains of these rivers and tributaries in the MTPO area.

While these rivers, creeks and branches carry off most of the drainage, flooding in the MTPO area is common on the banks of the Watauga and Doe Rivers in Carter County and along the Brush Creek and King Creek basins in Washington County due to prolonged rainfall or backwater flooding. Based on data from the National Climatic Data Center, in the last 20 years there have been over 30 major flood events in the MTPO area resulting in millions of dollars in damage. The City of Johnson City's Downtown area experiences flooding yearly. According to reports, flooding in downtown Johnson City is caused by overflow from Brush Creek and King Creek. Flow from these creeks enters the downtown area when the Brush Creek and King Creek culverts are overtopped. In late summer of 2012 Johnson City experienced an extreme flashflood and localized flooding that affected the downtown section of Johnson City and resulted in six of JCT's demand response vehicles being damaged. To mitigate future flooding impacts on flood prone areas in Johnson City, the City is funding a major, locally funded, mitigation project. When Johnson City was developed, it was built over two streams, thus constricting the natural overflow of the streams and concentrating flooding in certain areas of downtown. Johnson City is in the process of acquiring property and removing these structures to allow natural overflow to occur in a newly added green space.

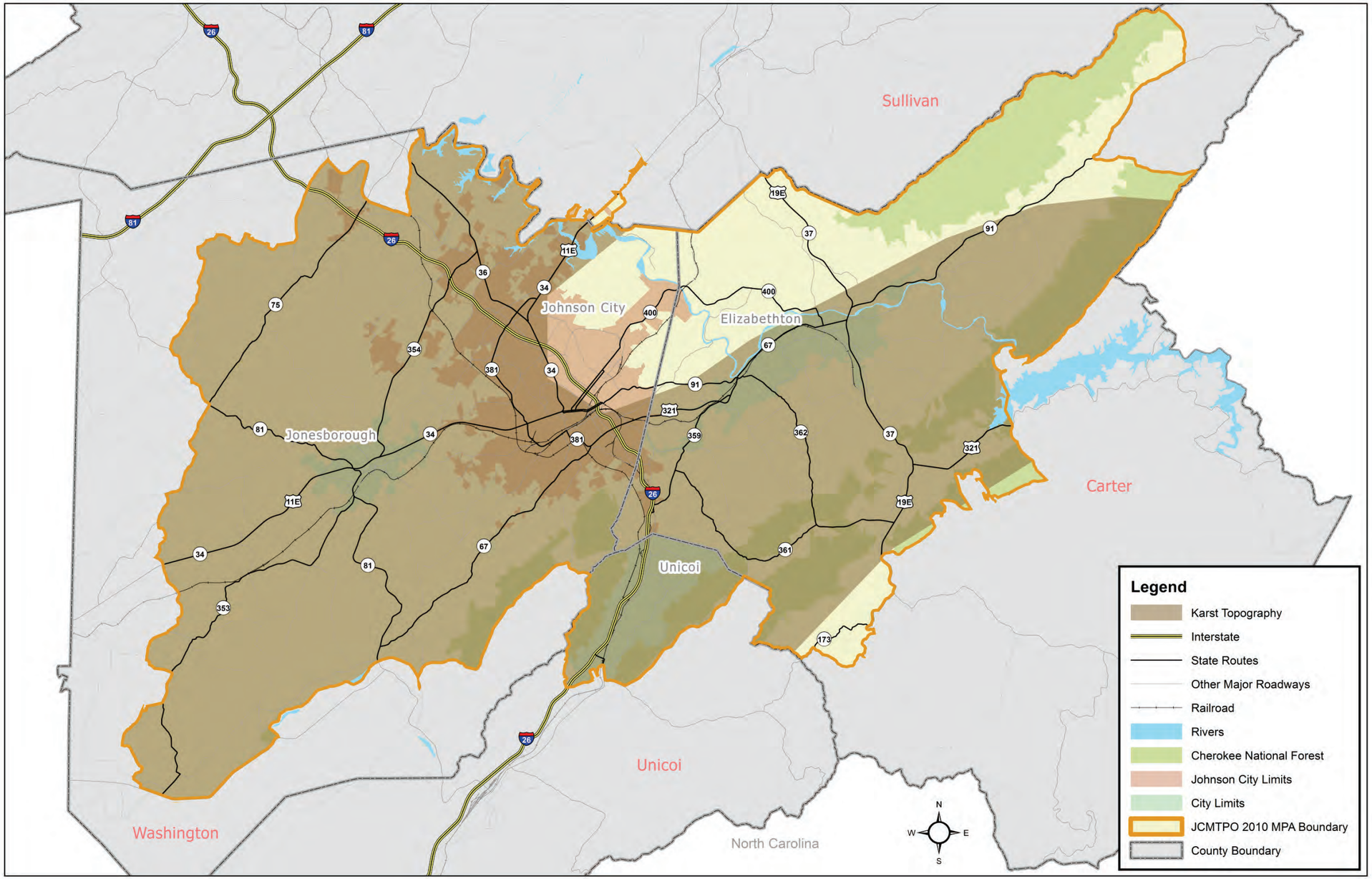
As the region develops and implements needed transportation improvements, it is important that transportation investments avoid or minimize impacts to these important watersheds and avoid flood prone areas.

3.2.2 Historic and Cultural Environment

In addition to the natural environment, there is a cultural and historic environment in the Johnson City MTPO area with a long and rich history. The fascinating history of the area includes Cherokee Indians, early colonial pioneers, Revolutionary war heroes, Civil War battles, and beneficial government planning. This area of east Tennessee had been of strategic value since the railroad served as a vital link between the upper Confederacy of Virginia and the States of the lower south. The area is rich in history ranging as far back as the 1673. Historic districts, homes, inns, churches, cemeteries, and living museums can be found within the MTPO planning area. Figure 3-9 depicts the locations of these historic resources within the MTPO planning area.

Numerous laws and regulations call for preservation and/or enhancement of cultural resources through various local, state, and federal agencies. Historic preservation has become a major factor in the community and economic development of towns and cities throughout Tennessee. Historic preservation is now incorporated in many city and county planning efforts. As the Johnson City area grows and needed transportation facilities are planned, it is important that these improvements avoid and/or minimize impacts to these cultural resources. The MTPO through the development of the 2040 LRTP and as part of the MTPO's planning process is committed to developing transportation improvements and solutions that exhibit context sensitive design and preserve/enhance environmental, scenic, aesthetic, historic, and natural resource values of these areas.

Figure 3-7
Potential Karst Development Map



Note: Shaded areas depict locations with high potential for karst development.

Figure 3-8
Floodplain Map

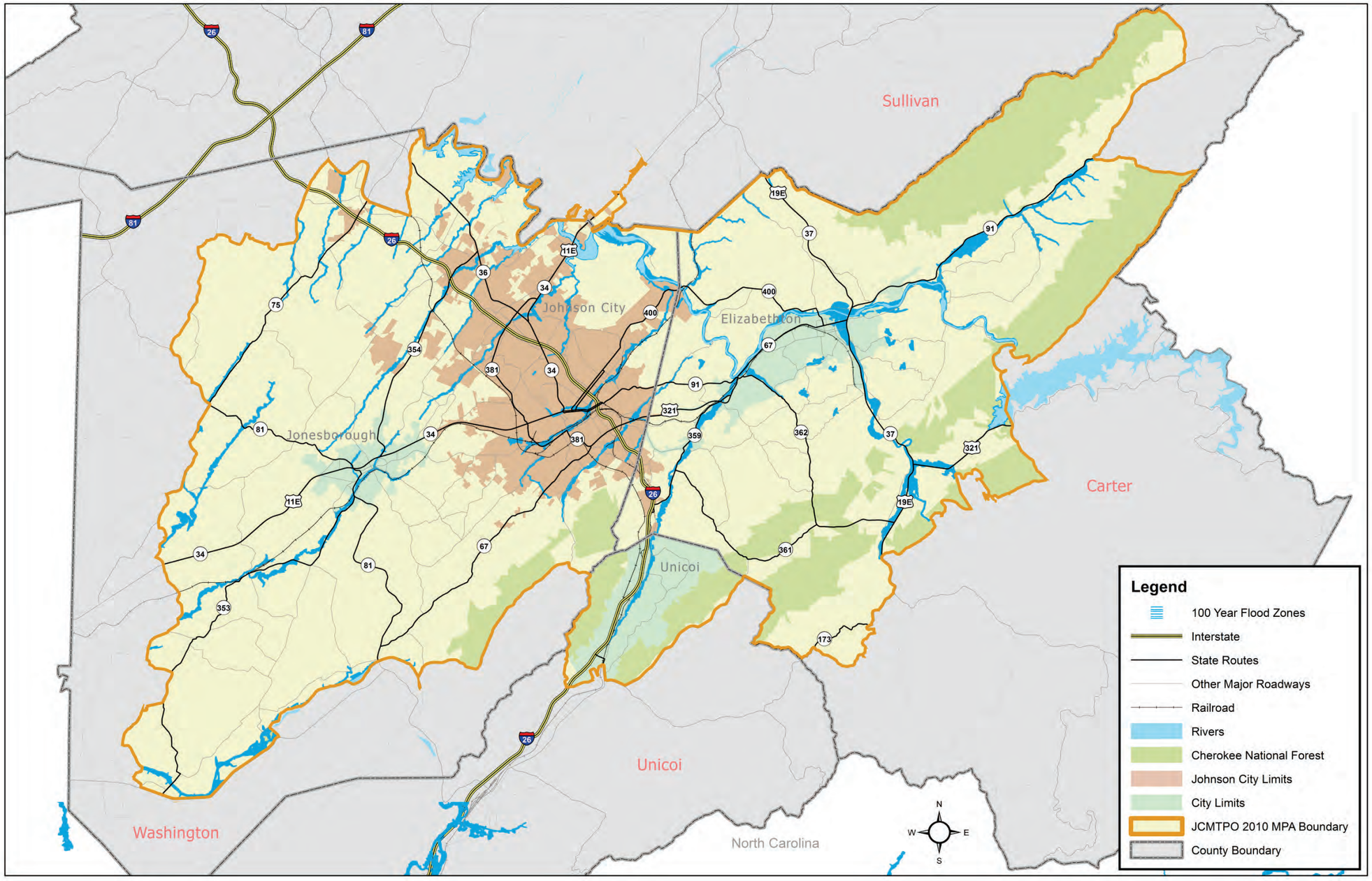
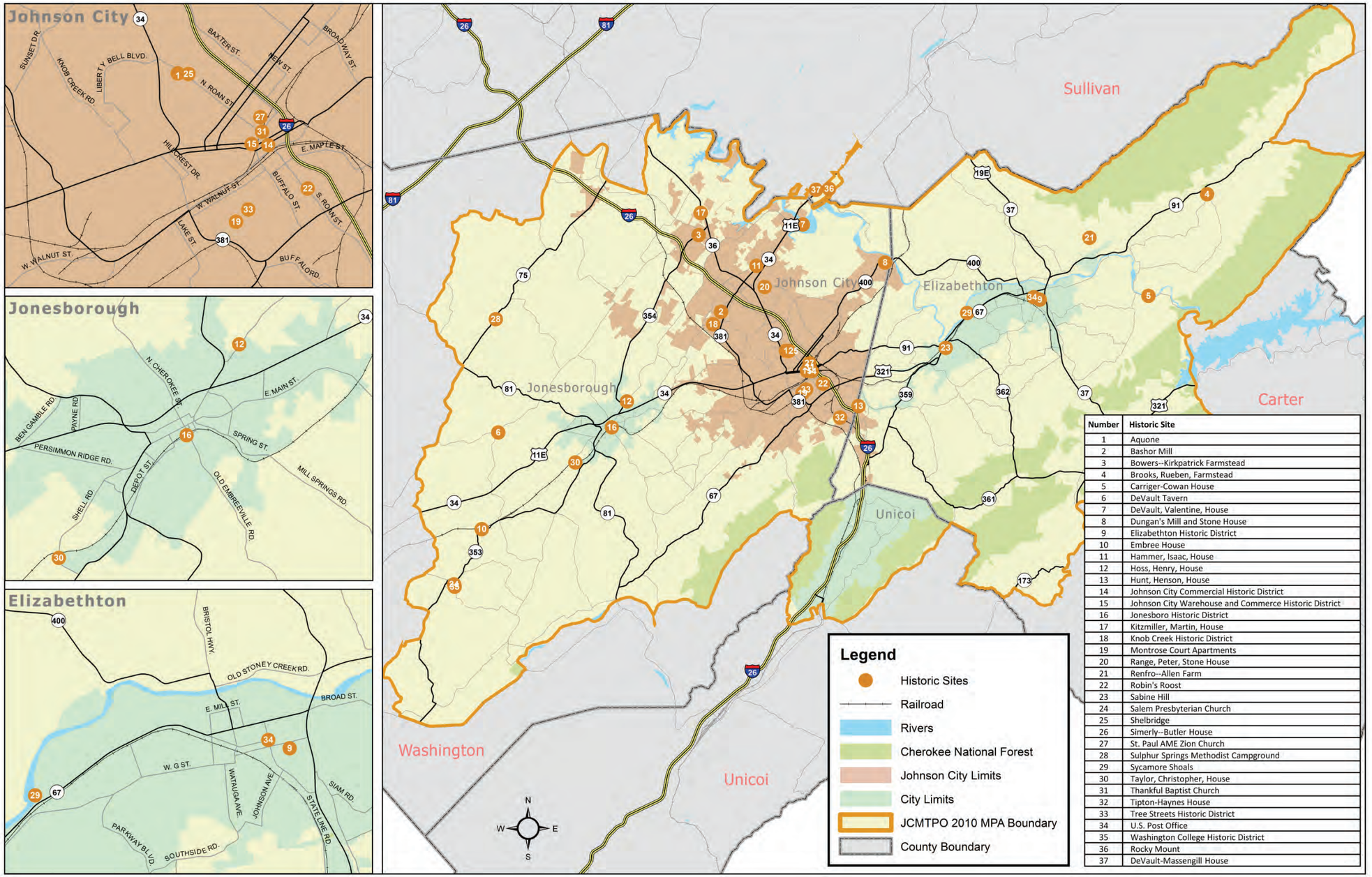


Figure 3-9
Historic Districts Map



Number	Historic Site
1	Aquone
2	Bashor Mill
3	Bowers--Kirkpatrick Farmstead
4	Brooks, Rueben, Farmstead
5	Carriger-Cowan House
6	DeVault Tavern
7	DeVault, Valentine, House
8	Dungan's Mill and Stone House
9	Elizabethton Historic District
10	Embree House
11	Hammer, Isaac, House
12	Hoss, Henry, House
13	Hunt, Henson, House
14	Johnson City Commercial Historic District
15	Johnson City Warehouse and Commerce Historic District
16	Jonesboro Historic District
17	Kitzmiller, Martin, House
18	Knob Creek Historic District
19	Montrose Court Apartments
20	Range, Peter, Stone House
21	Renfro--Allen Farm
22	Robin's Roost
23	Sabine Hill
24	Salem Presbyterian Church
25	Shelbridge
26	Simerly--Butler House
27	St. Paul AME Zion Church
28	Sulphur Springs Methodist Campground
29	Sycamore Shoals
30	Taylor, Christopher, House
31	Thankful Baptist Church
32	Tipton-Haynes House
33	Tree Streets Historic District
34	U.S. Post Office
35	Washington College Historic District
36	Rocky Mount
37	DeVault-Massengill House

3.2.3 Land Use

Understanding land use and development activity is an important element when planning for transportation infrastructure and services. How a region grows or intends to grow has a direct impact on the type and level of investments a community must make to its transportation system.

The Tri-Cities region has a long history of planning dating back to early 1900s with the creation of a General Plan for the City of Johnson City in 1927 by the renowned city planner and landscape architect John Nolen who is also credited with creating the General Plan for the City of Kingsport in 1919. Nolen's accomplishments as a city planner are quite impressive. He was the head landscape architect for not only Johnson City and the City of Kingsport, but other successful American cities like Madison, Wisconsin; Roanoke, Virginia; San Diego, California; New London, Connecticut; and Savannah, Georgia. Nolen integrated ideas such as roundabouts, which were common around his home in Massachusetts. Areas for commerce and industry were set up and strategically outlined among the residential areas. The school system was set up based on a model developed at Columbia University.

Today, much of Johnson City's urban core continues to embrace this design while outlying portions of the region are more typical of post-World War II development, suburban in nature and highly auto oriented. Despite this development trend, the region has attempted to direct growth into areas that are most suitable for development and to a degree contiguous to existing corporate limits as a means of cost effectively providing city services. Additionally, the region has successfully maintained a large portion of its planning area as rural in character and with a large portion of the planning area being the Cherokee National Forest, development has been limited to areas of the region more suitable for development. Figure 3-10 illustrates the current land use within the MTPO area.

The largest share of land in the MTPO area (29 percent) is classified as agricultural, which includes large rural residential tracks of land that are intended to remain rural in nature, farm and forest lands. The second largest classification of lands (26 percent) is public lands (e.g. city, county, state, and federal). The vast majority of this classification is the Cherokee National Forest. Other significant land uses in this category include James H. Quillen VA Medical Center and the East Tennessee State University Campus both located off SR 381 (West State of Franklin Road). The third largest classification of lands is residential, accounting for 25 percent of the land area in the MTPO region.

Other existing land uses within the MTPO planning area include commercial activity, which is largely clustered in the downtown areas of Johnson City, Elizabethton, and Jonesborough and along major corridors such as SR 34 (North Roan Street/West Market Street), SR 381 (North State of Franklin Road), and SR 67 (Elk Street). And industrial uses that are located east of downtown Johnson City (off of SR 400), along SR 91 in Carter County – east of downtown Elizabethton, and other areas of the region including SR 75 (Bobby Hicks Highway) near I-26.

3.2.4 Growth Boundaries

Public Chapter 1101 (T.C.A. § 6-58-106) requires Tennessee's counties and their municipal governments to develop countywide growth plans. Public Chapter 1101

signaled a substantial change in the way growth planning, annexation, and incorporation could be accomplished by counties and municipalities within Tennessee. Public Chapter 1101 requires local officials within each of the 93 non-metropolitan counties to work together to shape growth policy through the development of 20-year growth plans.

Each plan must identify three distinct areas: an "urban growth boundary," a "planned growth area" and a "rural area." The "urban growth boundary" (UGB) territory contains the corporate limits of a municipality and the adjoining territory where growth is expected. The "planned growth area" (PGA) includes sections outside current municipalities and UGBs where growth is expected. The "rural area" (RA) includes land that is to be preserved for agriculture, recreation, forest, wildlife and uses other than high-density commercial or residential development.

Figure 3-11 provides the approved Growth Boundary Map within the MTPO region. Of the MTPO's planning area, approximately 51 percent is contained within a UGB. As illustrated on the map, areas outside the UGB contain some PGAs but for the most part are intended to remain rural areas, to be preserved for agriculture, recreation, forest, wildlife, or uses other than high-density commercial or residential development.

3.2.5 Land Suitability

To further understand growth and development patterns and opportunities within the MTPO area an assessment of land coverage data from the United States Geological Survey (USGS) was undertaken. The National Land Cover Database provides a rich understanding of land cover allowing for an assessment of developed lands, suitable lands, and less suitable lands. Figure 3-12 illustrates within the MTPO area that are more conducive to development and areas within the region which are limiting and/or restricted given physical land characteristics. This data along with other variables, such as existing and future land use policies and urban growth boundary plans were used to develop future year population and employment allocations within the region.

Figure 3-10
Current Land Use Map

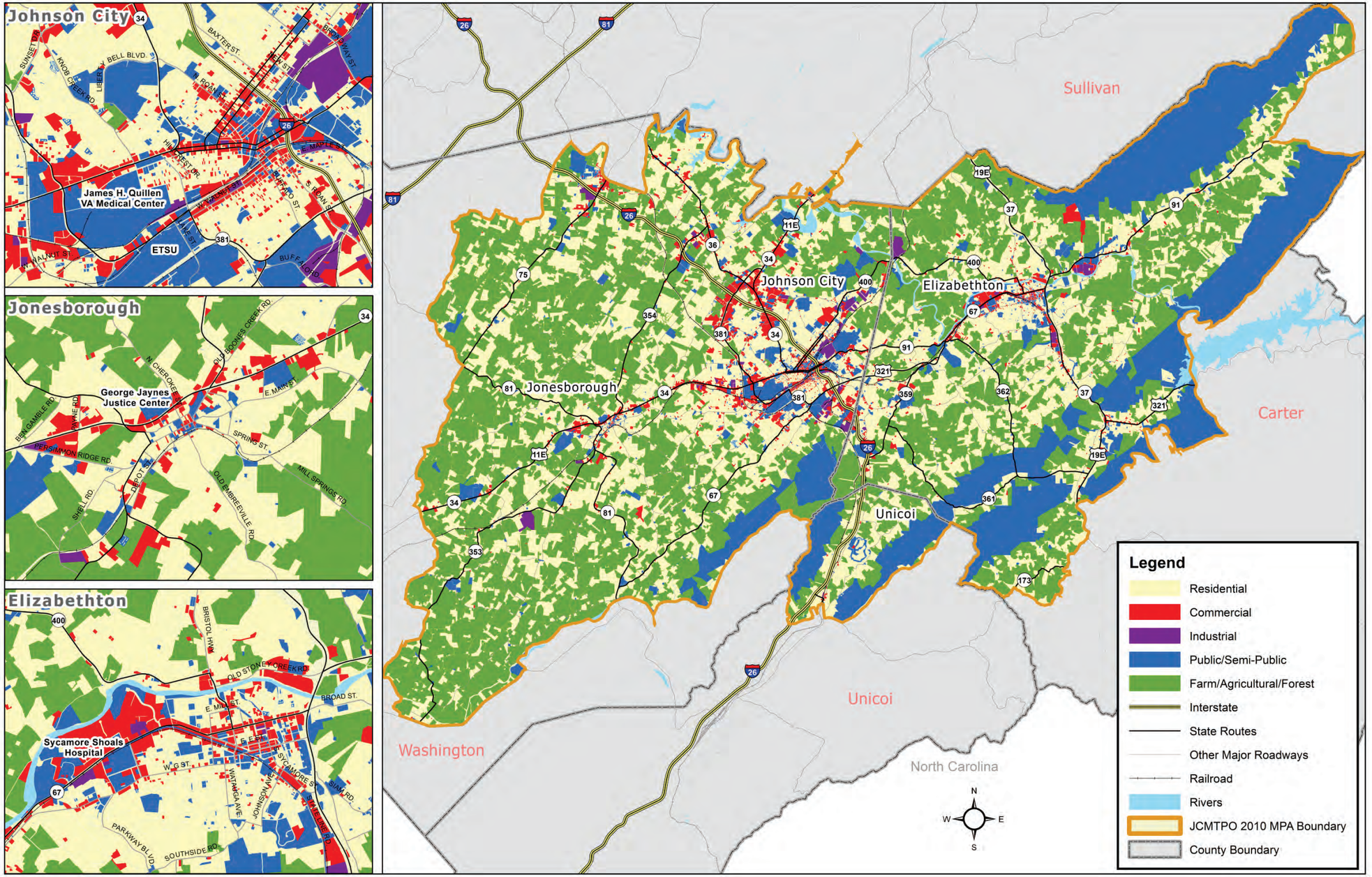


Figure 3-11
Johnson City Region Growth Boundary Map

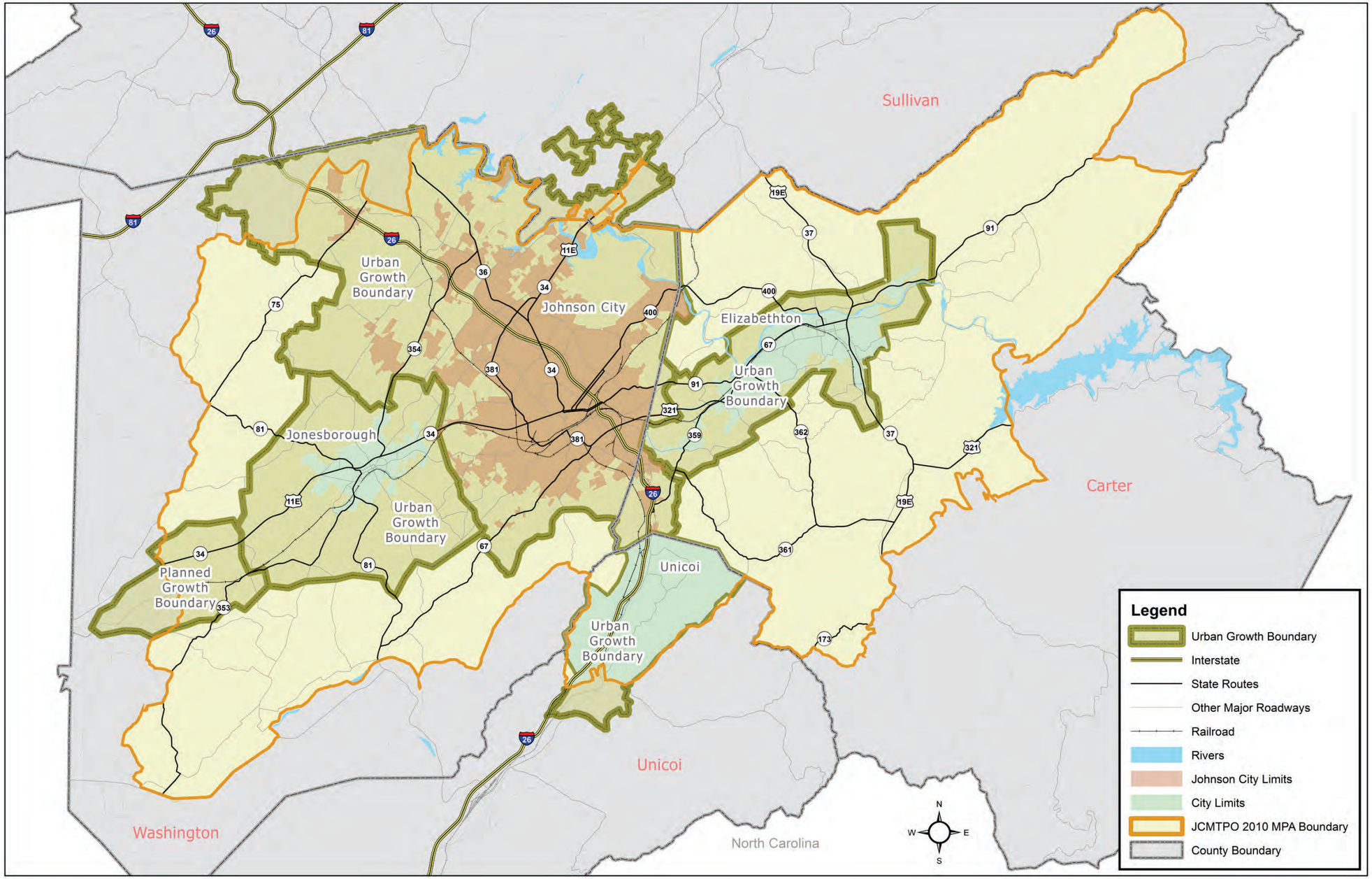
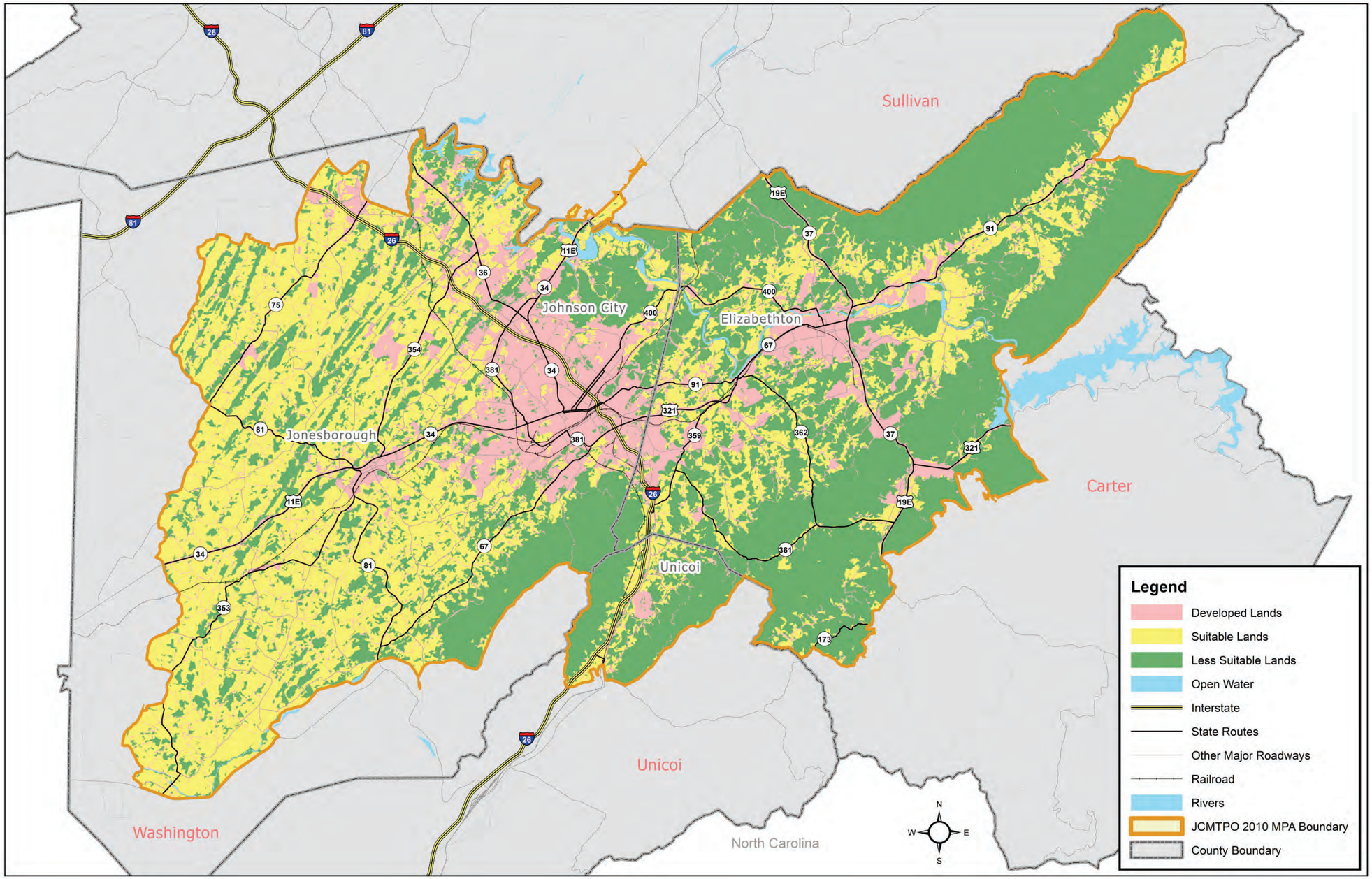


Figure 3-12
MTPO Land Pattern Suitability Map



3.2.6 Plans, Programs, and Policies

In addition to land use and growth boundary plans, there are a number of other local, state, and regional plans, programs, and policies that dictate growth and development within a community. In developing the 2040 LRTP, the following plans, programs, and policies were reviewed and incorporated into the analysis and recommendations of the 2040 LRTP. These documents were used in establishing future year development allocations (e.g. the allocation of future year population and employment) and are reflected in the growth trends for the region over the 27-year plan horizon.

Local Plans, Programs, and Policies

City and county governments have direct jurisdiction over land use and growth decisions within their communities. The following are other planning items that were reviewed and considered in the development of the 2040 LRTP:

Town of Jonesborough, TN

- Jonesborough Economic Development and Transportation Study (2008)
- Zoning Ordinance – Town of Jonesborough (2006)

City of Johnson City, TN

- Johnson City Comprehensive Plan 2020 (2004)
- Subdivision Regulations – Johnson City (2010)
- Zoning Regulations – Johnson City (2012)

Washington County, TN

- Subdivision Regulations – Washington County (2010)
- Zoning Regulations – Washington County (2011)

City of Elizabethton, TN

- Elizabethton Land Use and Transportation Study (2011)
- Zoning Regulations – City of Elizabethton (2008)

Carter County, TN

- Zoning Map – Carter County (2011)

Unicoi County, TN

- Unicoi County Land Use and Transportation Plan (2008)

Town of Unicoi, TN

- Zoning Ordinance – Town of Unicoi (2010)

Town of Erwin, TN

- Erwin Land Use and Transportation Policy Plan (2001)

State & Regional Plans, Programs, Policies

State and regional plans, programs, and policies can also and do also influence growth and development activities locally, regionally, and statewide. The following national, state, and regional initiatives were reviewed:

US Department of Agriculture Forest Service Southern Region

- Cherokee National Forest Revised Land and Resource Management Plan (2004)

Appalachian Regional Commission (TN/VA)

- Moving Appalachia Forward Appalachian Regional Commission Strategic Plan 2011–2016 (2010)

Tennessee Department of Economic and Community Development (TN)

- Northeast Tennessee Regional Strategic Plan (2011)

3.3 SUMMARY

Development of the 2040 LRTP is based on the existing and future land use policies and plans, as described within this document. Plans, policies, and anticipated growth areas within the region were considered in the development of the future population and employment forecasts for the MTPO region. As part of this effort, close coordination with local and regional planning agencies within the Johnson City region was undertaken to best match anticipated development activities within the MTPO area in the coming years.

As previously described, the MTPO area has seen and is projected to see positive population and employment growth over the next 27 years. Population and housing growth is planned to occur largely within the designated UGB with both infill and outward residential expansion. Areas outside the UGB will see some residential growth but at a much lower level. As for projected employment growth, a large number of these jobs are planned to occur in and around the same geographic areas of current employment activity. In addition to these locations, future employment concentrations are planned along the I-26 corridor throughout Washington County at the interchanges of SR 75 (Bobby Hicks Highway), SR 354 (Boones Creek Road), and SR 381 (State of Franklin Road). Other employment growth areas include the SR 67 corridor (Elk Avenue) and along SR 91 in Elizabethton.

This projected increase in population and employment will not only require the need for additional roadway capacity (both in terms of new roads and improvements to existing roads) but will also create greater demand for public transportation services and walking and biking opportunities, which may not currently exist in certain areas of the region. An equally important challenge during the 27-year planning horizon is how to encourage development and growth that balances the need for expansion with the need for preservation.

4.0 PUBLIC & STAKEHOLDER PARTICIPATION

Public and stakeholder input are critical components of the MTPO planning process and are required by federal law. The public and stakeholder involvement process of the 2040 LRTP consisted of a variety of communication and outreach means. The primary means of engagement largely consisted of presentations to civic and community organizations, public and stakeholder involvement, the use of an online survey, and internet and social media outreach. The following depict the various means of each in this process:

4.1 COMMUNITY AND CIVIC PRESENTATIONS

A number presentations were made throughout the region to various community and civic organizations on the development of the 2040 LRTP. In addition to information being shared on the update of the plan, participants at these meetings were encouraged to share their thoughts and opinions on transportation needs in the region via the MTPO's online survey.

The following lists meetings the MTPO presented at on the development of the 2040 LRTP:

- 2011 Economic Summit - Millennium Centre in Johnson City – November 1, 2011
- Carter County Tomorrow (Joint Economic & Community Development Board) – February 27, 2012
- Northside Roundtable Meeting (Johnson City Businessmen) – March 3, 2012
- Professional Development Meeting for Engineers and Planners hosted by Tysinger and Hampton - May 9, 2012
- 2012 Economic Summit - Millennium Centre in Johnson City – October 30, 2012
- Washington County Local Emergency Planning Committee Meeting – February 7, 2013

4.2 PUBLIC AND COMMUNITY MEETINGS

In addition to events listed above, the MTPO also engaged the public and community in a number of venues throughout the region during the development of the 2040 LRTP. The following highlights public and community outreach meetings and events held during the development of the 2040 LRTP:

- Washington County/Johnson City Area Planning Meeting - May 1, 2012
- Carter County/Elizabethton Area Planning Meeting - May 1, 2012
- Blue Plumb Festival (public information tent) – June 1-2, 2012
- Historic Covered Bridge Festival (public information tent) – June 8-10, 2012
- MTPO Public Meeting #1 2040 LRTP Needs – July 10, 2012
- First Tennessee Transportation Coalition Meeting – July 26, 2012
- Johnson City Semi-Annual Neighborhood Assoc. Meeting – November 27, 2012
- Johnson City/Washington County Branch National Association for the Advancement of Colored People (NAACP) Monthly Meeting – January 21, 2013
- MTPO Public Meeting #2 on Draft 2040 LRTP – March 1, 2013

Appendix I contains copies of the meeting notices, sign-in sheets, and other meeting materials from these meetings.

4.3 ONLINE PUBLIC SURVEY

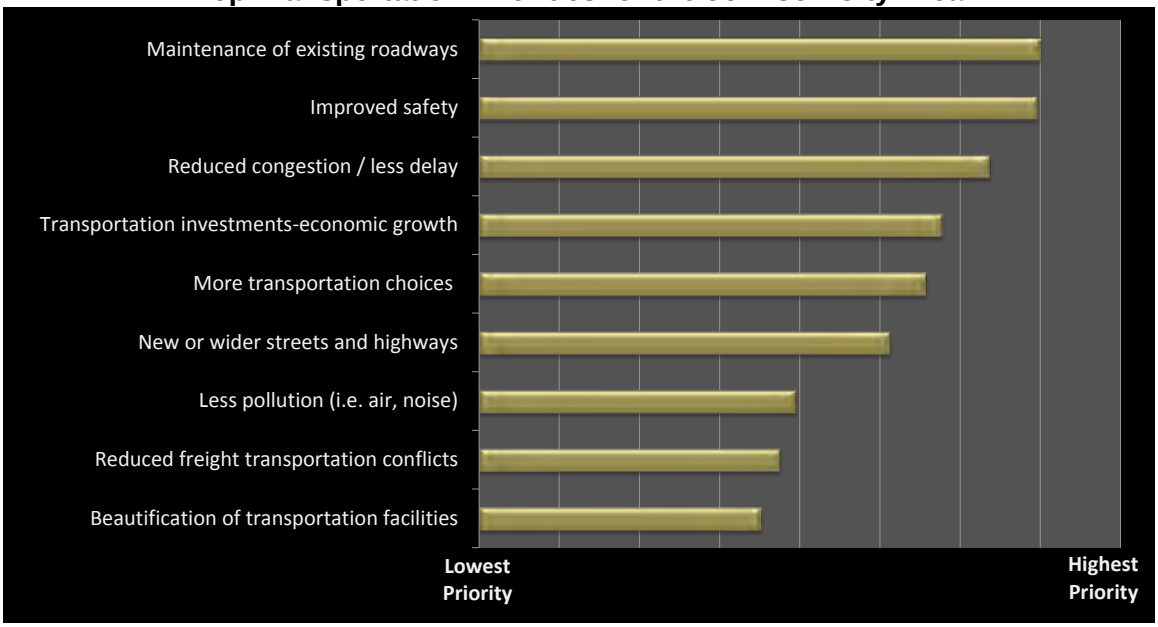
In developing the 2040 LRTP, an online survey was created in order to afford individuals an additional opportunity to share their thoughts and opinions on transportation needs within the region.

A total of 182 individuals participated in the online survey. From the online survey, the MTPO was able to gather specific public input that lead to plan recommendations. The following highlights key findings of the online survey:

Top Overall Transportation Priorities

Key findings from the survey revealed strong support for increased maintenance of existing facilities followed by a desire for improved roadway safety. Third in priority was reduced congestion and delay. Figure 4-1 illustrates the top transportation priorities in the region identified by survey participants.

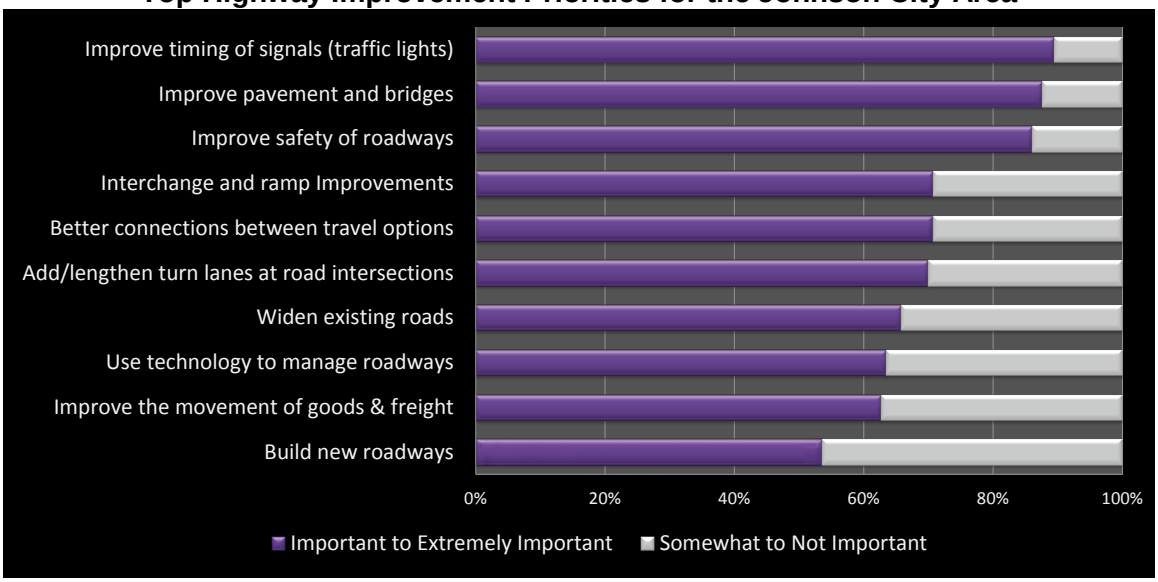
Figure 4-1
Top Transportation Priorities for the Johnson City Area



Top Highway Improvement Priorities

When asked specifically about highway improvements, respondents ranked improved signal timing and roadway pavement and bridges as most important. Figure 4-2 illustrates the top highway priorities in the region identified by survey participants.

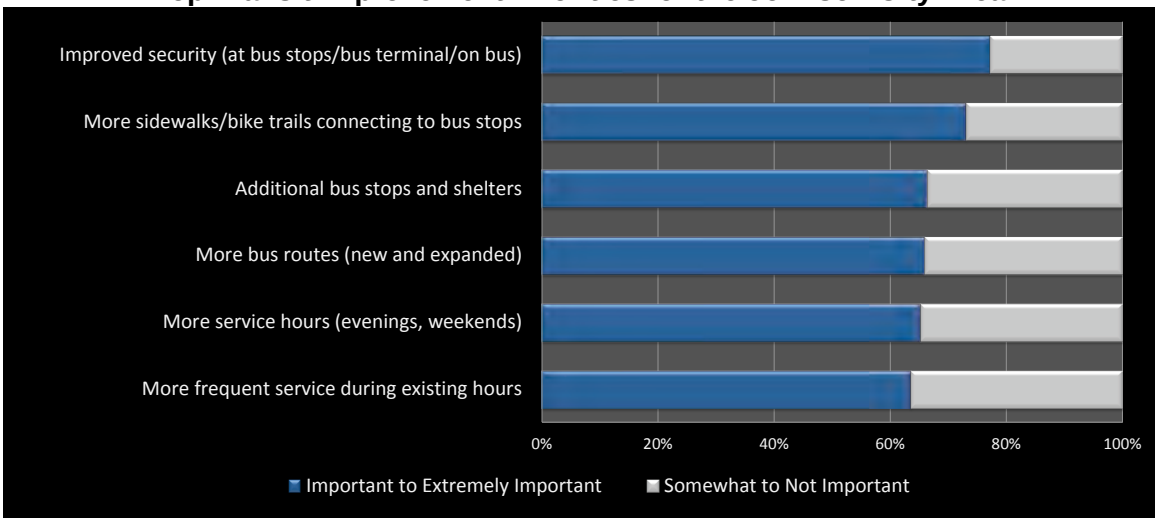
Figure 4-2
Top Highway Improvement Priorities for the Johnson City Area



Top Transit Improvement Priorities

When asked specifically about transit improvements, respondents ranked improved security and connections to bus stops as most important. Figure 4-3 illustrates the top transit improvement priorities in the region identified by survey participants.

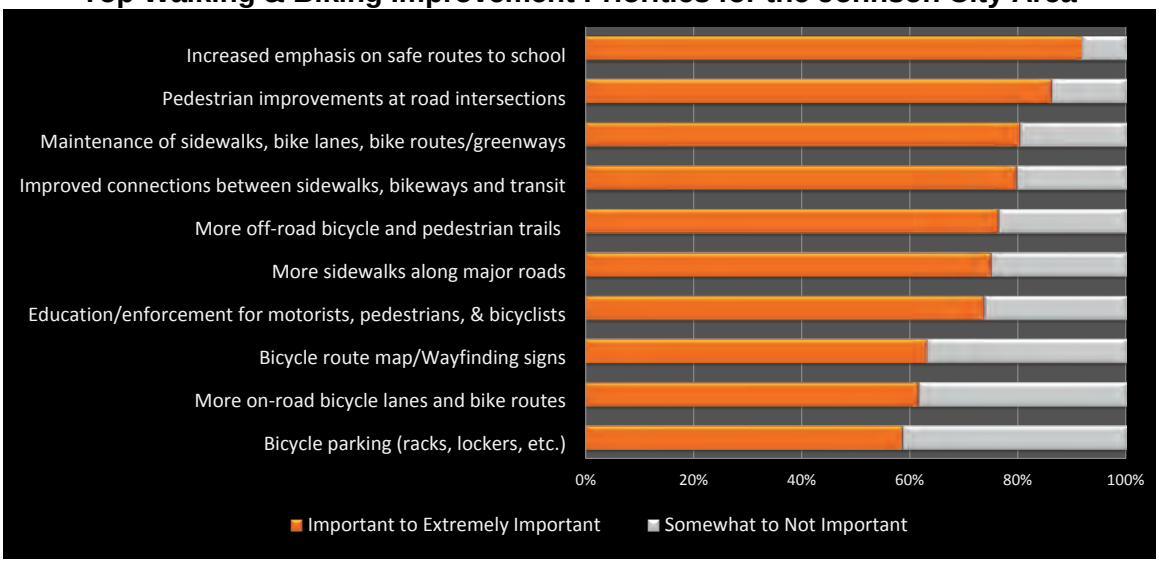
Figure 4-3
Top Transit Improvement Priorities for the Johnson City Area



Top Walking & Biking Improvement Priorities

When asked specifically about walking and biking improvements, respondents ranked increased emphasis on safe routes to schools and improvements at roadway intersections as most important. Figure 4-4 illustrates the top walking and biking improvement priorities in the region identified by survey participants.

Figure 4-4
Top Walking & Biking Improvement Priorities for the Johnson City Area



Appendix I contains a summary of the results from the online survey.

4.4 STAKEHOLDER MEETINGS & EVENTS

Consultation with stakeholders within the MTPO region including local and regional planning agencies, transit operators, and various state and federal agencies, as defined in the MTPO's Public Participation Plan (PPP) were also conducted in the development of the 2040 LRTP.

Specific meetings held with stakeholders occurred on the following dates:

- September 8, 2011 (Project Kick-Off Meeting)
- May 1, 2012 (Land Use/Growth Allocation Meetings)
- May 1, 2012 (Public Transit Needs Meeting)
- June 6, 2012 (Development of Goals & Objectives Meeting)
- July 10, 2012 (Public Transit Priorities Meeting)
- July 10, 2012 (Regional Stakeholders Meeting)

General items discussed with these stakeholders included:

- Planning Assumptions including Growth and Development (e.g. land use, transportation, population, employment, revenues and funding, etc.)
- Plans, Programs, Projects, and Policies
- Regional Goals and Objectives

Appendix I contains copies of the agendas, sign-in sheets, and other meeting materials from these stakeholder meetings. In addition to these formal meetings, numerous other means of communication were held with various stakeholders (e.g. TDOT, etc.) throughout the process. A final step in the consultation process included sending a special invitation letter to stakeholders defined within the MTPO's PPP soliciting

comments on the MTPO's proposed draft 2040 LRTP. Documentation of this consultation is also provided in Appendix I.

4.5 MTPO BOARD PRESENTATIONS

Presentations were made to the MTPO Board throughout the development of the 2040 LRTP. Project status updates and presentations on the development of the 2040 LRTP were made to the MTPO Board at the following public meetings:

- September 8, 2011
- November 3, 2011
- June 6, 2012
- August 15, 2012
- March 13, 2013

Appendix I contains documentation of these meetings and information presented.

4.6 MEDIA OUTREACH

Local news media (print and live) were approached to help disseminate information about the project and the upcoming meetings. Additionally, the use of the internet and other social media were also used to increase awareness on the development of the 2040 LRTP. The following lists the variety of methods employed by the MTPO in development of the 2040 LRTP:

- Johnson City MTPO Twitter – 97 Followers
- October 18, 2011 "Tweeted" the Update on LRTP is underway and to visit the MTPO website for additional information
- Online Survey for LRTP Update available from the MTPO website main page http://www.jcmpo.org or by direct link http://www.surveymonkey.com
- May 2, 2012 "Tweeted" July 9, 2012 for Public Meeting and online survey for LRTP
- E-mailed various individuals regarding the LRTP update and online survey
- Letters mailed out to consultation list in the MTPO Public Participation Plan stating the MTPO is in the process of updating LRTP and their input is needed

Appendix I contains documentation of these outreach efforts.

4.7 DISPOSITION OF COMMENTS

A wide range of public comments were provided as part of the development of the LRTP. Comments received were given careful consideration during the development of the 2040 LRTP.

Table 4-1 lists the general issues identified by the public and includes a disposition of how these categories of issues are addressed in the LRTP.

Table 4-1
Disposition of Public Comments

Issues Raised	Disposition of Issues/Concerns (See)
Maintenance of Existing Roadways	
	Goal 2 (pg 2-2); Intelligent Transportation Systems (pg 5-40 thru 5-42); Financial Plan (pg 6-1 thru pg 6-20)
Improved Safety	
	Goal 4 (pg 2-3); Transportation Safety (pg 5-43 thru 5-50); Intelligent Transportation Systems (pg 5-40 thru 5-42); Recommended Planned Improvements (pg 7-1 thru pg 7-10)
Address Congestion - Improve Timing of Signals	
	Goal 1 (pg 2-2);Intelligent Transportation Systems (pg 5-40 thru 5-42); Recommended Planned Improvements (pg 7-1 thru pg 7-10)
Pedestrian Safety - Increase Safe Routes to Schools	
	Goal 4 (pg 2-3); Transportation Safety (pg 5-43 thru 5-50); Recommended Planned Improvements (pg 7-1 thru pg 7-10)
Increased Transit Services - More Routes and Service	
	Goal 1 and Goal 2 (pg 2-2); Public Transportation (pg 5-14 and pg 5-23); Intelligent Transportation Systems (pg 5-40 thru 5-42); Financial Plan (pg 6-13 thru pg 6-20); Recommended Planned Improvements (pg 7-1 thru pg 7-10)

5.0 TRANSPORTATION SYSTEM

This section of the plan provides an assessment of the existing and future transportation system conditions within the MTPO planning area. As part of this assessment, future transportation system needs are discussed. Additionally, specific attention is paid to freight transportation within the Johnson City MTPO area.

5.1 EXISTING AND FUTURE TRANSPORTATION SYSTEM CONDITIONS

The Johnson City MTPO area transportation system includes various elements - streets and highways, public transportation, walkways and bikeways, airports, and railroads. All of these transportation elements comprise the transportation system within the MTPO area and provide for the movement of people and goods.

The following subsections describe each component of the transportation system relative to existing and future conditions.

5.1.1 Streets and Highways

The roadway network in the Johnson City MTPO area consists of several classifications of roadways. The majority of roadways within the MTPO area, as with most metropolitan areas, are classified as local roads. Local roads include those roadways that are typically low-volume roadways that provide direct frontage to residential developments. There are over 1,000 miles of local roads within the MTPO area.

Figure 5-1 illustrates the roadway functional classification for the MTPO area, including collector roadways and higher classifications. Table 5-1 summarizes the total miles of these classified roadways by functional classification.

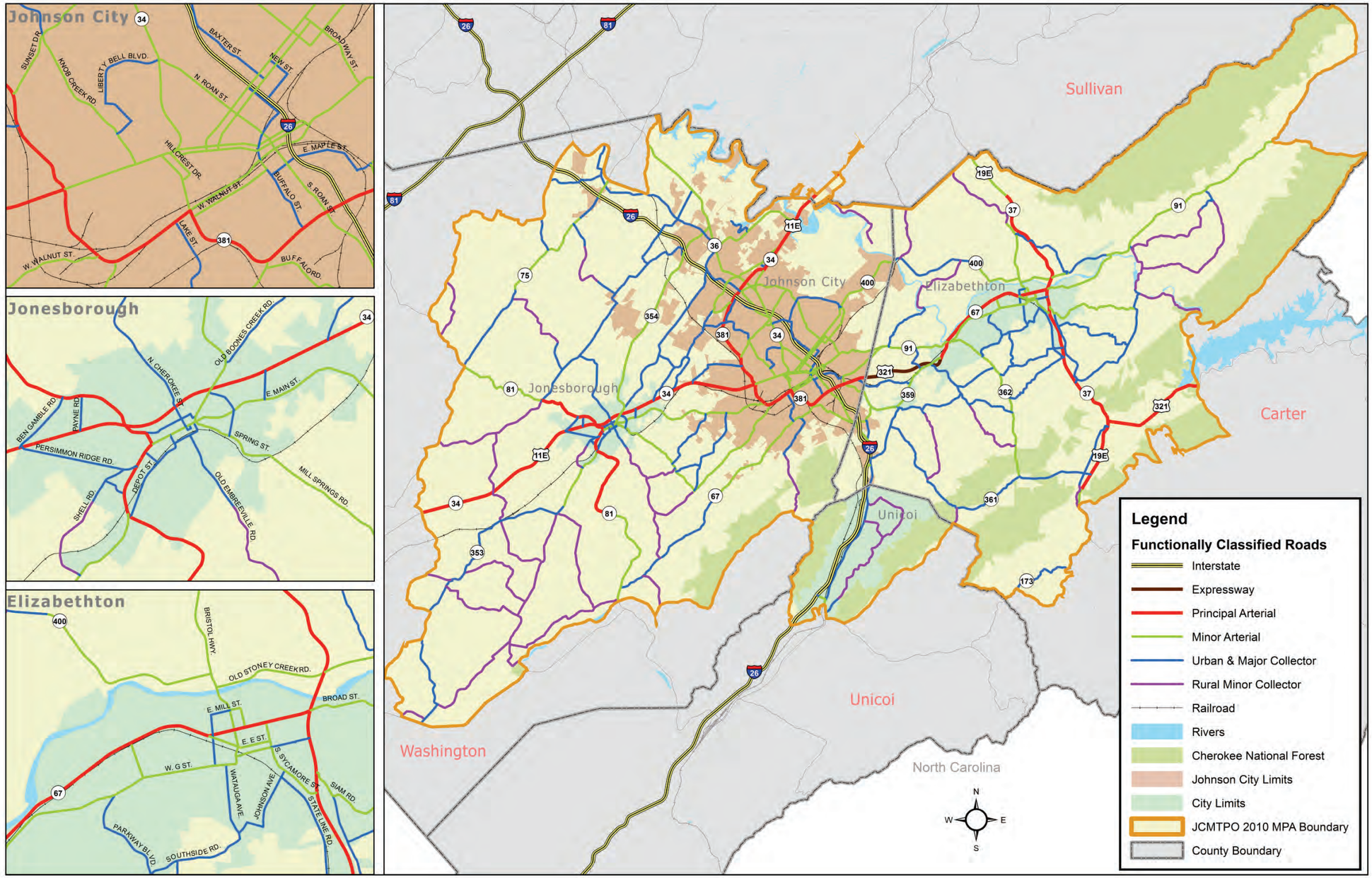
Table 5-1
Existing Miles of Classified Roadways (2010)

Roadway Functional Classification	Total Miles
Interstate & Expressway	51
Principal Arterial	78
Minor Arterial	195
Collector	486
Total Miles	**810**

Source: Johnson City MTPO Regional Model, 2012

Interstates and expressways are full-access controlled roadways that carry the majority of through-traffic volumes entering and exiting an urban area. Expressways, to a degree, also facilitate major cross-town uninterrupted travel movements in urban areas. In the Johnson City MTPO area there are two roadways classified as interstate, I-26 and I-81. Both of these corridors account for the largest amount of through-travel within the region. These corridors are important corridors of commerce providing commuters, shippers, and travelers access to and from the region as well as throughout the US. New Elizabethton Highway (SR 67/US 321) is an expressway that is access controlled between I-26 and Milligan Highway (SR 359) providing about a four mile stretch of uninterrupted traffic flow between Johnson City and Elizabethton.

Figure 5-1
Roadway Functional Classification Map



Principal arterials are roadways that serve major activity centers, such as downtown Johnson City or highly developed residential and commercial areas. Principal arterials generally carry high traffic volumes and accommodate the longest trip length desires of the region. Principal arterials also carry high traffic volumes into and out of the urban area. Examples of principal arterial roadways in the MTPO area include West Market Street (US 11E), State of Franklin Road (SR 381), and Bristol Highway (US 11E).

Minor arterials interconnect with principal arterials and collectors and typically provide more frequent access to commercial developments than principal arterials allow. Minor arterials typically do not accommodate traffic volumes as high as those experienced on principal arterials. In the MTPO area, examples of minor arterials include Roan Street (US 11E), Boones Creek Road (SR 354), and Bobby Hicks Highway (SR 75).

Collector roadways provide both land access and circulation within residential neighborhoods and commercial or industrial areas. Collectors typically function to connect neighborhoods and local roads with the arterial roadway network. Collector roadways generally carry lower traffic volumes and accommodate shorter trip lengths than arterials.

5.1.1.1 Existing Conditions

Roadway travel within the MTPO area is greatest along major roadways such as I-26, State of Franklin Road (SR 381), US 231/ SR 67 in Elizabethton and Carter County, and West Market Street (US 11E/ SR 34). Figure 5-2 illustrates the Average Daily Traffic (ADT) volumes of roadways in the MTPO area with ADT counts over 10,000 vehicles per day over the past three decades (1990, 2000, and 2010). As depicted on the map, traffic (volumes) are greatest along I-26, Bristol Highway (US 11E/SR 34), State of Franklin Road (SR 381), West Market Street (US 11E/ SR 34), and US 231/ SR 67.

5.1.1.2 Future Conditions

The MTPO region has made considerable progress since 2008 in advancing needed transportation improvements. In total, 32 transportation roadway projects have been completed, are under construction, or are in the development process with construction scheduled by 2015 (committed projects). Table 5-2 and Figure 5-3 illustrate the projects that have been completed since the last plan and those projects that are considered committed projects.

A common practice in looking at long-term transportation demands is to assess future transportation needs based on impacts to the transportation system if no more improvements were made beyond current roadway facilities and those projects that are currently committed to be improved. In undertaking this assessment, committed improvements are added to the existing transportation network of the MTPO's travel demand model - which is termed an existing plus committed (E+C) network. The E+C network provides the "base roadway network" and allows for the assessment of travel impact, today and in the future, under a "no additional transportation improvement scenario". For planning purposes, committed projects on the E+C network are those projects that are currently funded in the MTPO's *Fiscal Year 2011-2014 TIP*. For committed projects on the E+C network that are not fully funded through the construction phase, these projects are also included in Table 7-1 of the 2040 LRTP to account for remaining project funding obligations and to demonstrate fiscal constraint of the MTPO's 2040 LRTP.

Figure 5-2
Roadways with ADT Counts Over 10,000 in 1990, 2000, & 2010 Map

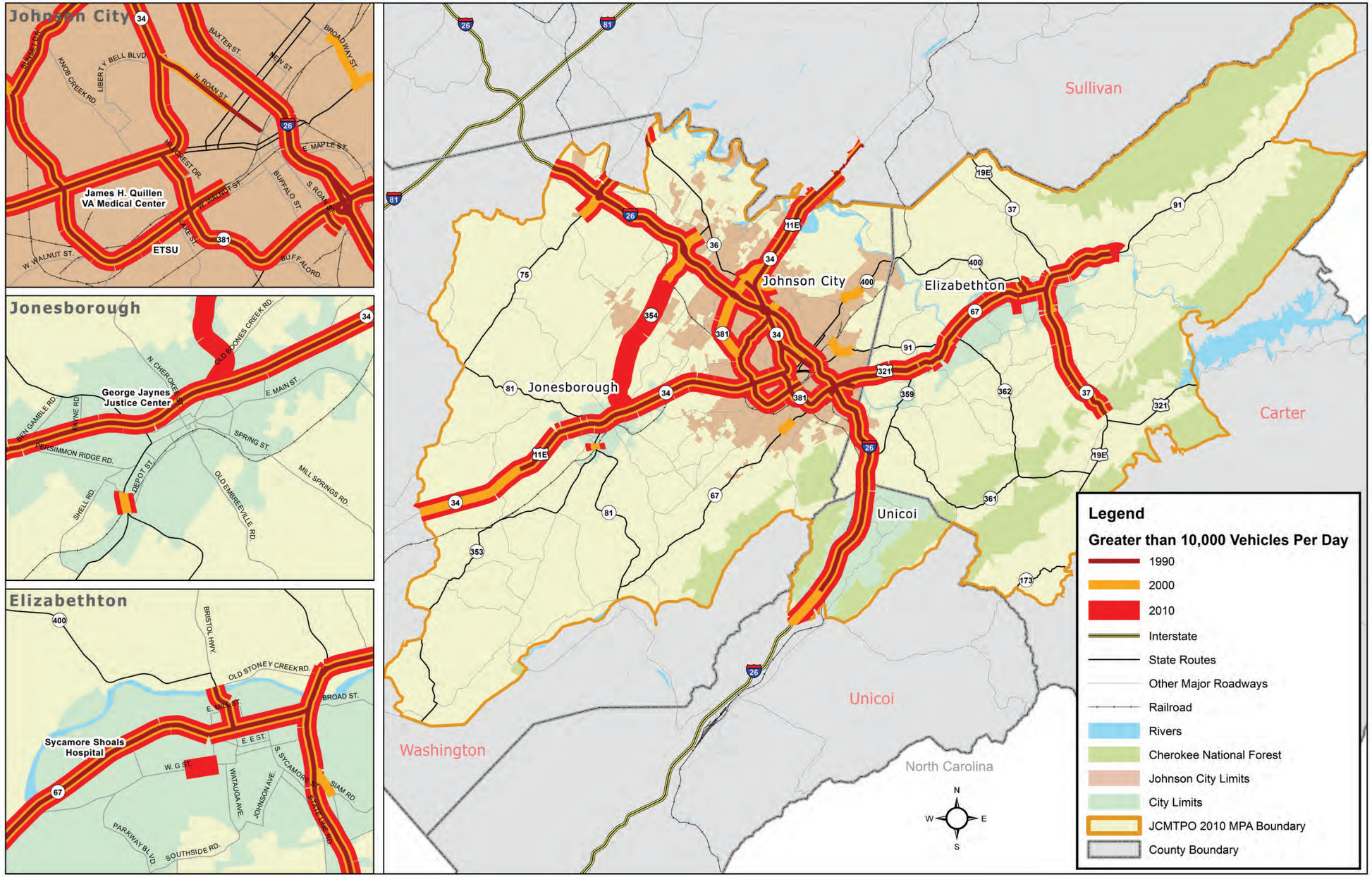
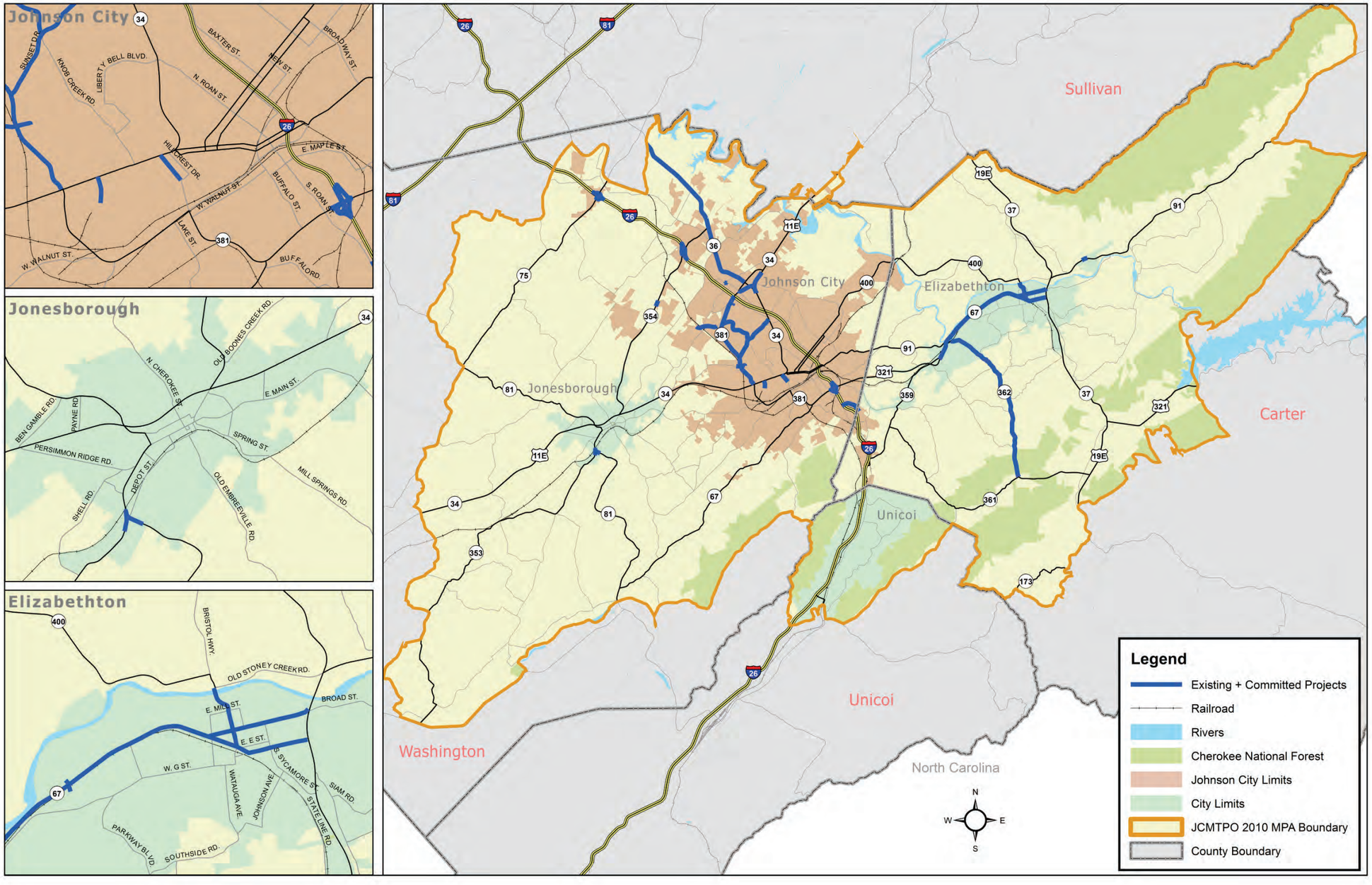


Table 5-2
Projects Completed Since 2008 & Committed Improvements (E+C Network)

Project/Route	From/To	Type of Improvement	Improvement Description	Funding Status	Project Status
Projects Completed Since Last Plan (2008)					
Boones Creek Road (SR 354)	Highland Church Road to Knob Creek Road	Intersection Improvement	Add turn lanes and traffic signal	Complete	Complete
Plymouth Road	Roan Street to Mountainview Drive	Safety	Safety Improvements (re-align curve)	Complete	Complete
Oakland Avenue	Roan Street to Bristol Highway	Reconstruction	Improve 3 lane	Complete	Complete
Knob Creek Road	State of Franklin to Sunset Drive	Reconstruction	Improve to standard 2 lane	Complete	Complete
State of Franklin Road (SR 381)	I-26 to West Market Street	ITS	Traffic signal optimization	Complete	Complete
University Parkway (a.k.a. Tennessee Street Extension)	Lamont Street to West Market Street	New Roadway	Construct new 4-lane road	Complete	Complete
Lynn Avenue (SR 400)	US 321 to Watauga River	Widening	Realign and widen from 4 lanes to 5 lanes	Complete	Complete
Elk Avenue and Broad Street (SR 67)	SR 359 (Milligan Hwy.) to US 19E	ITS	Install fiber optic cable and synchronize signals	Complete	Complete
Lynn Avenue (SR 400)	Watauga River LM 5.16	Bridge Replacement	Bridge replacement	Complete	Complete
Lynn Avenue	Elk Avenue to SR 67	Widening	Widen from 4 to 5 lanes	Complete	Complete
Kingsport Highway (SR 36)	SR 381 to Boone Avenue	Widening	Widen from 2 lanes to 5 Lanes	Complete	Complete
Sunset Drive	Knob Creek Road to SR 36	Widening	Widen from 4 lanes to 5 lanes	Complete	Complete
Sunset Drive	SR 381 to Knob Creek Road	Widening	Re-Stripe from 4 lanes to 5 lanes	Complete	Complete
Bristol Highway (SR 34)	SR 36 (Roan Street) to SR 381 (State of Franklin Road)	Widening	Widen from 4 lanes to 5 lanes	Complete	Complete
Committed Projects					
Kingsport Hwy (SR 36)	SR 354 (Boone Avenue) to SR 75	Widening	Widen from 2 lanes to 5 Lanes	Funded thru Construction	Under Construction
Gap Creek Road (SR 362)	SR 67 to SR 361	Reconstruction	Reconstruct & Widen - 2 and 3 lanes	Funded thru Construction	Under Construction
SR 75	SR 36 to SR 357	Widening	Widen from 2 lanes to 5 Lanes	Funded thru Construction	Under Construction
SR 381	Intersection with Indian Ridge Road and Skyline Drive	Intersection Improvement	Add turn lanes, bridge rehabilitation	Funded thru Construction	Under Development
Traffic Signal Upgrades in Johnson City	Intersection/Signalization improvements at 10 locations in Johnson City	Intersection Improvement	Install traffic signals	Funded thru Construction	Under Development
Johnson City ITS Project (formerly IVHS)	Select State Routes in Johnson City	ITS	Install ITS (sensors, TOC, etc.) for Johnson City Traffic Division	Funded thru Construction	Under Development
I-26 Exit 13 (SR 75)	Exit 13 on I-26 (SR 75 / Suncrest Road / Bobby Hicks Highway @ I-26)	Interchange Improvement	Interchange modification	Funded thru Construction	Under Development
Traffic Circle for Mountainview Road	Intersection of Mountainview Road and Browns Mill Road	Intersection Improvement	Construct a roundabout	Funded thru Construction	Under Development
Greenline Road	Intersection of Peoples Street and Greenline Road	Intersection Improvement	Intersection Improvement (Roundabout option under consideration)	Funded thru Construction	Under Development
SR 91 and SR 67 Signals	Judge Ben Allen Road @ SR 91; SR 67 @Williams Avenue in Elizabethton	Intersection Improvement	Install new traffic signals at intersections in Elizabethton	Funded thru Construction	Under Development
Knob Creek Road Extension	West of Mizpah Hills Drive to Marketplace Boulevard	Reconstruction	Construct new 5 lane (overpass crossing CSX RR)	Funded thru ROW*	Under Development
VA Hospital Connector	West Market Street to VA Hospital	New Roadway	Construct new 2-lane road	Funded thru ROW*	Under Development
Elizabethton Connector (SR 91 Extension)	US 19E to US 321	Reconstruction	Add center turn lane along the 4-lane undivided portion of West Elk Avenue from Holly Lane to North Roan Street. Sidewalk improvements and repaving of SR 91 from West G Street to SR 37 (US 19E)	Funded thru ROW*	Under Development
I-26 Exit 17 (SR 354)	Exit 17 on I-26 (SR 354 / Boones Creek Road @ I-26)	Interchange Improvement	Interchange modification	Funded thru PE*	Under Development
I-26 Exit 24 (SR 67)	Exit 24 on I-26 (SR 67 / University Parkway @ I-26)	Interchange Improvement	Ramp modification	Funded thru PE*	Under Development
SR 81 & SR 353 (Jonesborough Five Points Intersection)	Intersection of SR 81 with SR 353 with Depot Street in Jonesborough	Intersection Improvement	Construct a roundabout	Funded thru PE*	Under Development

* To comply with fiscal constraint requirements, projects not fully funded through the construction phase are also included in Table 7-1 of the 2040 LRTP to account for remaining project funding obligations and to demonstrate fiscal constraint of the MTPO's 2040 LRTP

Figure 5-3
Projects Completed Since 2008 & Committed Improvements (E+C Network)



5.1.1.3 Level of Service

Traffic volume data derived from the MTPO's travel demand model, along with roadway characteristics such as number of lanes, facility type, etc., helps in defining traffic operations or level of service (LOS) conditions along a roadway.

The transportation industry categorizes LOS into one of six traffic operation conditions, as illustrated in Table 5-3.

Table 5-3
General Descriptions of Levels of Service (LOS)

Level of Service	Description
A	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high.
B	Within the range of stable flow, but the presence of others in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A.
C	Within the range of stable flow, but LOS C marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
D	LOS D represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
E	LOS E represents operating conditions at or near capacity levels. Freedom to maneuver within the traffic stream is extremely difficult. Comfort and convenience levels are extremely poor and driver frustration is generally high.
F	LOS F is used to define forced or breakdown flow. This condition exists when the amount of traffic approaching a point exceeds the amount that can traverse the point.

Source: Highway Capacity Manual, TRB 2010

Average Daily Traffic (ADT) is the total number of vehicle trips on a roadway in a 24 hour period. Based on the ADT, number of lanes, and classification of the roadway an LOS is assigned to the roadway segment. Table 5-4 presents the level of service thresholds by functional classification that were used to evaluate the roadway network in the Johnson City MTPO region.

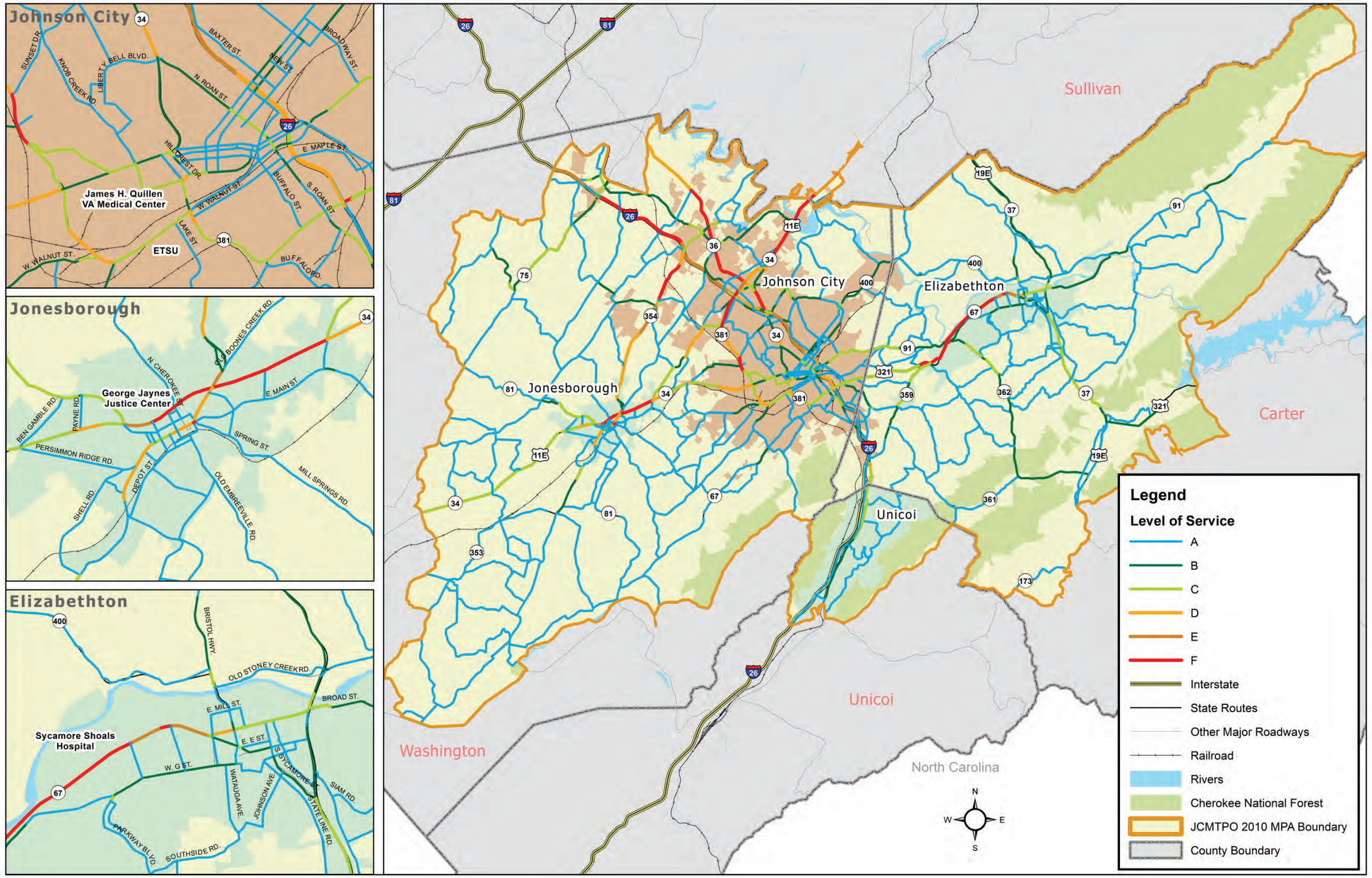
Table 5-4
Level of Service (LOS) Thresholds by Roadway Type

Roadway Type	LOS/Roadway Average Daily Traffic Volumes				
	A	B	C	D	E
2-Lane Urban	6,500	9,700	13,800	16,150	18,700
2-Lane Rural	7,900	10,000	14,900	18,000	23,400
3-Lane	6,400	9,200	11,300	15,300	17,100
4-Lane	10,700	17,500	26,000	32,700	34,500
5-Lane	13,400	20,200	27,300	34,400	37,500
6-Lane	20,500	29,400	36,400	44,000	58,700
4-Lane Interstate	31,700	45,300	56,200	68,000	90,700
6-Lane Interstate	47,600	68,000	84,300	102,000	136,000

Source: Highway Capacity Manual, RPM Transportation Consultants
Note: If the ADT is greater than the LOS E volume, the roadway operates at LOS F.

Figure 5-4 illustrates the future level of service of the MTPO area roadways in 2040, assuming no additional improvements to the transportation system beyond the E+C network (as described in Table 5-2).

Figure 5-4
2040 Level of Service - Without Additional Transportation Improvements



The level of service capacity analysis of the existing plus committed transportation system shows that transportation improvements, beyond those already committed, will be necessary to provide acceptable traffic operations for the year 2040. As shown in Figure 5-4, a number of roadways within the MTPO region are expected to experience severe capacity deficiencies in the year 2040, should no additional roadway projects be constructed beyond those currently under construction and/or in the development process.

From a systems level, with projected increases in population and employment in the region over the next 27 years, travel conditions (delay) within the region, in 2040 would be nearly sixty percent worse than today if the region were to construct no additional transportation improvements over those currently committed (the E+C network). Table 5-5 illustrates the vehicle hours traveled (VHT) in the region currently, versus 2040 conditions were the region to add no more lanes or roadways over the 27 year period beyond what is currently under construction and/or in the development process.

Table 5-5
Current & Future Vehicle Hours Traveled
Without Additional Improvements

Roadways	2010 (Base Year)	2040 (E+C)	Percent Change
Interstate	30,684	50,982	66%
Principal Arterial	38,020	57,399	51%
Minor Arterial	48,499	76,473	58%
Collector	31,421	53,552	70%
Total VHT	**148,625**	**238,407**	**60%**

Notes: Vehicle Hours Traveled (VHT) are daily totals. The table represents a comparison between current travel and development conditions (2010 population and employment on the 2010 base year highway network) to the future travel and development conditions (2040 population and employment on the 2040 E+C highway network – as described in Table 5-2)

As illustrated in the table above, significant increased hours of travel are projected to occur over the 27-year planning horizon. To address these system failures, and to adequately accommodate the projected population and employment growth of the region, a list of transportation roadway improvements was established and tested as a Vision Plan Scenario. The Vision Plan Scenario was created to assess needed transportation improvements without consideration of funding constraints. The results of the Vision Plan test, coupled with the findings of the 2040 E+C Scenario, became the basis of the recommended Cost Feasible 2040 LRTP project improvements (see Section 7.0 of the Plan for a listing of the transportation projects considered as part of the Vision Plan as well as projects in the Cost Feasible Plan analysis).

Figure 5-5 illustrates the predicted roadway level of service conditions in 2040 based on implementing recommended improvements as part of the Vision Plan Scenario. From this analysis a Cost Feasible Plan Scenario was developed (e.g. project recommendations that could be implemented based on projected revenues to the region over the 27-year planning horizon). Figure 5-6 illustrates the results of the Cost Feasible Plan Scenario. Table 5-6 also provides a comparison of the three scenarios.

Figure 5-5
2040 Level of Service – Vision Plan Scenario

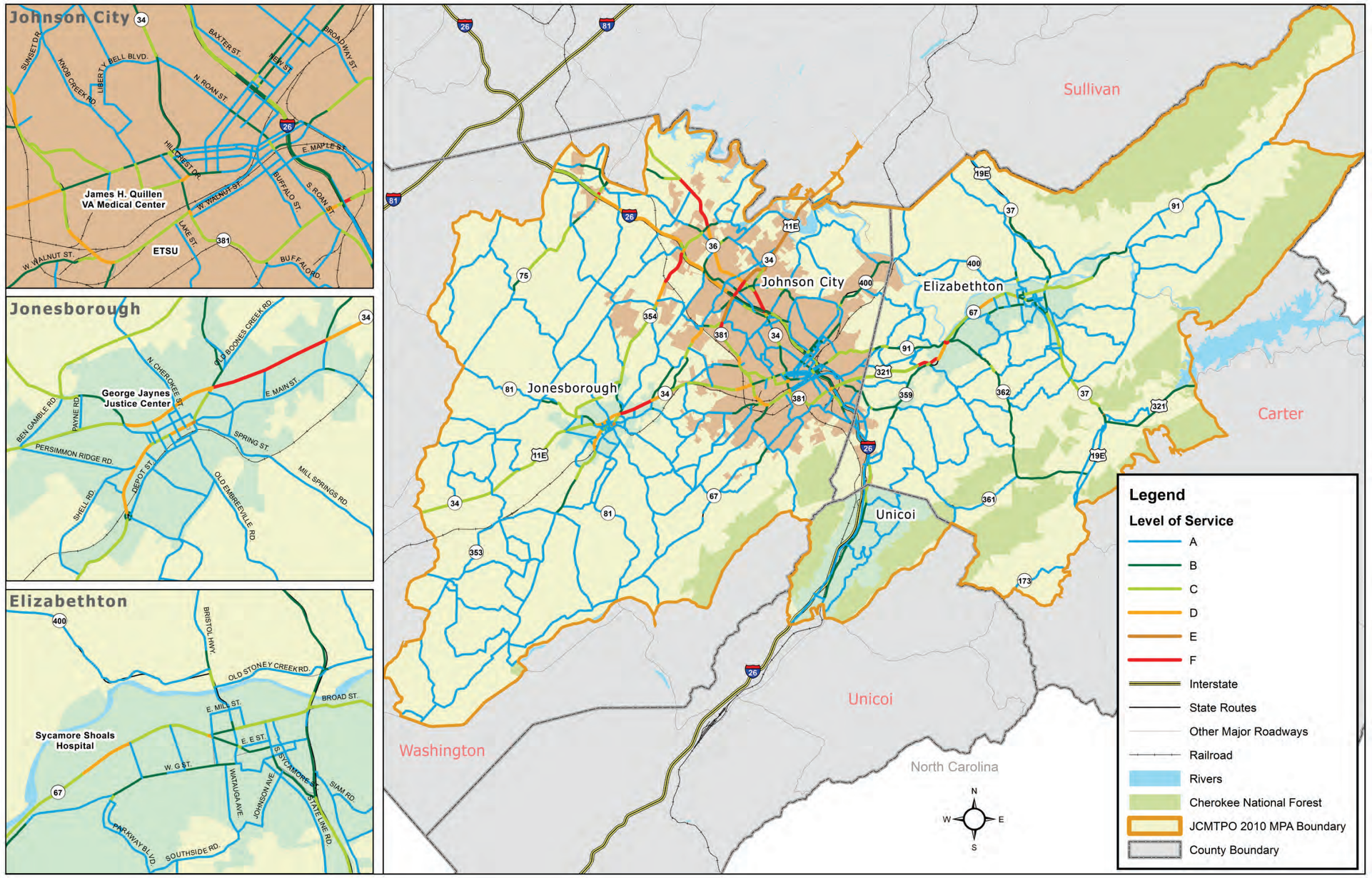


Figure 5-6
2040 Level of Service – Cost Feasible Plan

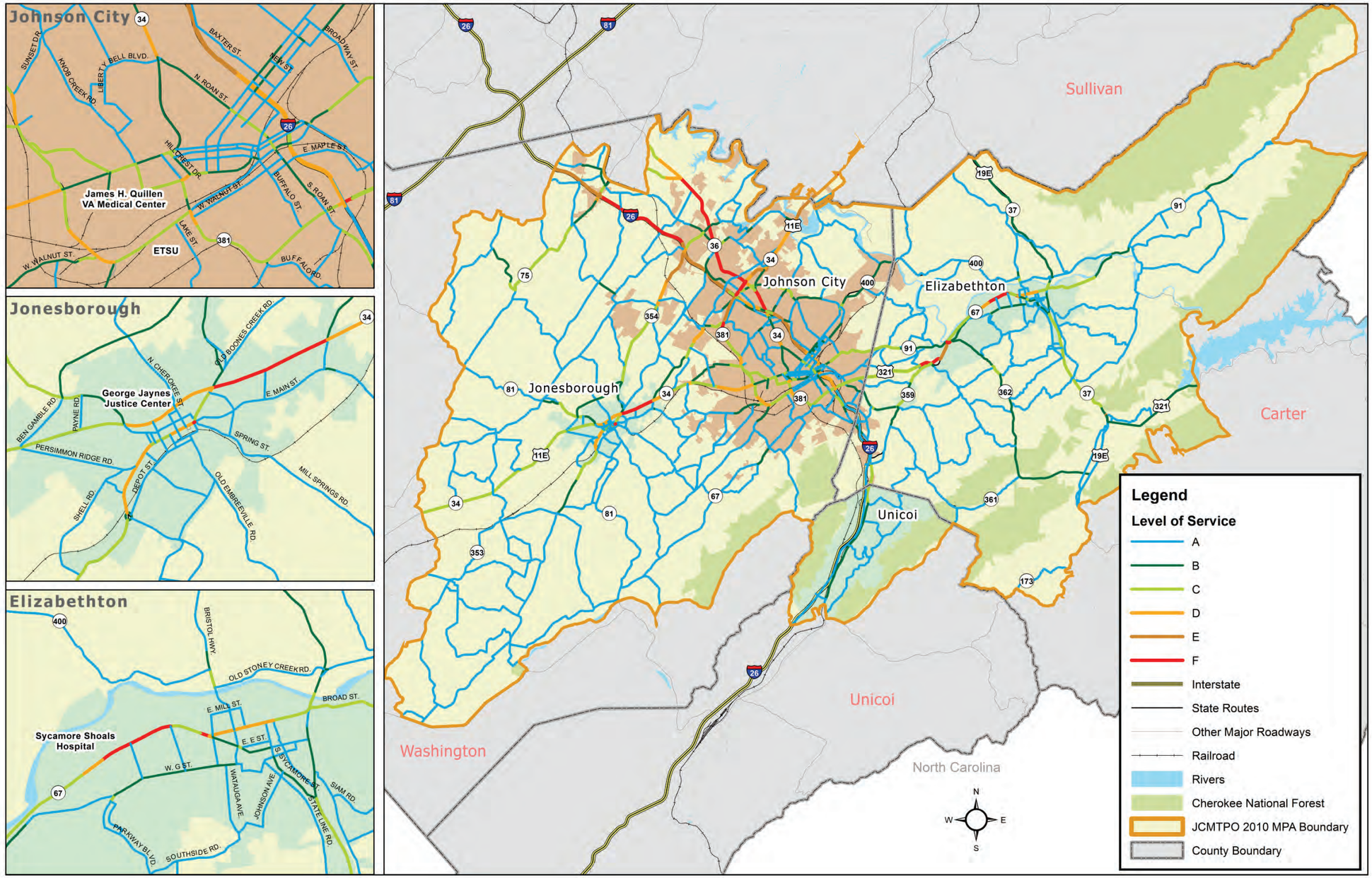


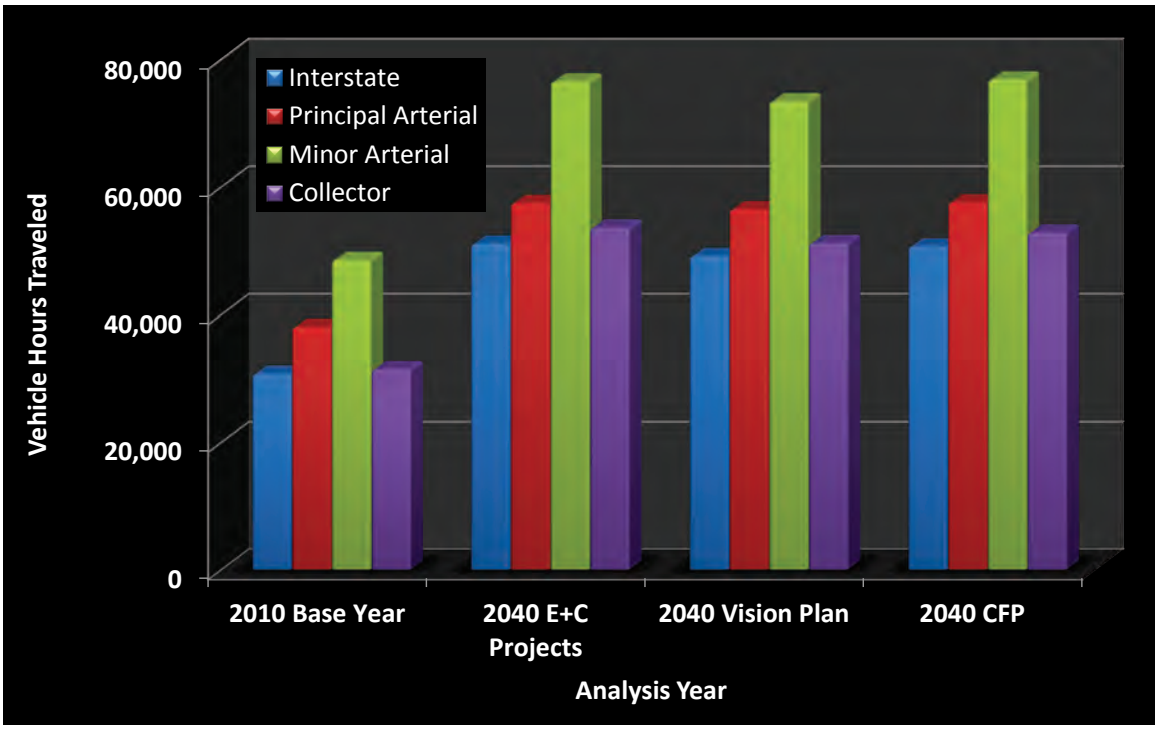
Table 5-6
2040 Vehicle Hours Traveled
With & Without Future Planned Improvements

Roadways	E+C Scenario Without Improvements*	Vision Plan Scenario With Improvements**	Cost Feasible Scenario With Improvements***
Interstate	50,982	49,040	50,545
Principal Arterial	57,399	56,408	57,501
Minor Arterial	76,473	73,385	76,788
Collector	53,552	51,094	52,767
Total VHT	**238,407**	**229,927**	**237,601**

* Without additional road improvements beyond transportation improvements currently under construction/development as described in the existing and committed (E+C) roadway network– as described in Table 5-2.
** With improvement recommendations listed in Section 7.0 (without consideration of funding constraints)
*** With improvement recommendations listed in Section 7.0 (with consideration of funding constraints)

Figure 5-7 illustrates the projected vehicle hours traveled (VHT) by facility type for 2010 (the base year), the 2040 E+C Scenario, the 2040 Vision Plan Scenario, and the 2040 Cost Feasible Plan Scenario. As illustrated from the analysis, implementation of the Cost Feasible planned improvements by 2040 should accommodate the region's growing travel demands.

Figure 5-7
Vehicle Hours Traveled by Roadway Type – 2040 LRTP Scenario Results



Source: Johnson City MTPO Travel Demand Model, 2012

5.1.2 Public Transportation

A variety of public transportation and transit services are offered throughout the Johnson City MTPO area. These services range from fixed-route services in the City of Johnson City to flexible, demand-response service in the rural portions of the MTPO area, as well as national intercity bus services via Greyhound. The combination of transit provisions in the cities and rural areas is intended to meet the varied needs of the MTPO's population. Johnson City Transit or "JCT" provides fixed route and demand response services in the City of Johnson City. Northeast Tennessee Transit System or "NET Trans" provides service to the rural areas of Carter, Unicoi, and Washington counties, with a focus on the cities of Elizabethton, Jonesborough, and Unicoi. Figure 5-8 illustrates these transit services available in the MTPO area.

The following five subsections (5.1.2.1 through 5.1.2.4) provide an assessment of current public transportation conditions (fixed route, demand response, and other transit and travel demand management programs and services) within the MTPO area. Subsection 5.1.2.5 discusses future transit needs.

5.1.2.1 Fixed Route Services

Johnson City Transit System (JCT) began operations in 1979 as the first new municipal transit system in Tennessee since World War II. The Johnson City Transit Center, located at 137 West Market Street in downtown Johnson City, was built in 1985 as a rehab and major expansion of the existing Greyhound Bus Lines terminal. JCT operations are centered around the Transit Center, which serves not only as a transfer point for JCT patrons, but also for patrons of Greyhound Bus Lines and local taxi companies.

JCT operates a quality fixed route service (including BUCSHOT service on/around ETSU campus) and demand-response service (including paratransit service for individuals with disabilities, and Job Access service) within Johnson City corporate limits and has among the highest ridership of all small urban systems in Tennessee. All major commercial and institutional facilities in Johnson City are served by the JCT fixed route, including East Tennessee State University, the Mountain Home Veterans Administration Center, hospitals, shopping malls and centers, and government offices. In addition, the major residential neighborhoods and group housing complexes are served. All fixed route buses are lift-equipped (or equipped with ramps) to meet the needs of clients with special needs.

JCT operates seven buses on 13 fixed routes in the City. Ten of JCT's 13 fixed routes are approximately 30 minutes in length and alternate, once each per hour. Two fixed routes (Orange North route and Orange West route) are approximately 45 minutes in length and alternate every 45 minutes. One fixed route (Silver route) is approximately 60 minutes in length. All JCT fixed routes begin and end at the Transit Center. JCT's fixed route services operate Monday through Friday from 6:15 a.m. to 6:15 p.m., and on Saturday from 8:15 a.m. to 5:15 p.m. JCT does not operate on Sundays or major holidays. Fixed route base fare is $1.00. Seniors (age 65 and over), children (grades K-5), and individuals with disabilities or with Medicare cards pay a half-fare of 50 cents. Children under the age of five ride free. Discounted multi-ride passes are available. Transfers are free.

In addition to the 13 fixed routes, the East Tennessee State University (ETSU) campus area is served by the JCT BUCSHOT fixed routes, which are open to the public. The BUCSHOT service began in August 2003 through a contractual agreement between JCT and ETSU. The BUCSHOT provides shuttle service on the ETSU campus and adjacent housing areas. The BUCSHOT connects with the other JCT fixed route services via various stops throughout the campus area. BUCSHOT is provided during ETSU Fall and Spring semesters with varying loops around campus that have 15 to 20 minute headways and run from 7:15 a.m. to 5:00 p.m., Monday through Friday. BUCSHOT service also includes an evening route that operates on fixed-route schedule from 5:00 p.m. until 10:45 p.m., Monday through Friday, and call-in Safe Voyage service which is available from 8:00 p.m. until midnight, Monday through Friday. ETSU students, faculty, and staff, as well as the public, ride the BUCSHOT for free. ETSU students, faculty, and staff may also ride the entire JCT fixed route bus system for free, with a valid ETSU I.D.

Figure 5-8 illustrates the JCT fixed route system map and Figure 5-9 illustrates annual ridership for the fixed route bus service from 2008 through 2012. As shown, bus ridership has increased over the past five years with increased ETSU campus ridership and a growing demand from captive riders.

JCT operates a Job Access service to "bridge the transportation gap" between low-income individuals, welfare recipients, and disabled individuals and their places of employment and/or employment-related activities. Job Access service is provided within the corporate limits and is provided as a supplemental service to the fixed route system. Job Access riders whose origin (residence) or destination (place of employment or employment-related service) is on the JCT fixed route service, and whose trip is during fixed route operating hours, ride the fixed route to the JCT Transit Center, where they are picked up by a Job Access demand response vehicle to complete the portion of their trip which is not on the fixed route. Job Access riders whose trips are outside fixed route operating hours, or who have trips with both origin and destination outside the fixed route service area, ride in a Job Access demand response vehicle during the entire trip.

Job Access service is available from 5:30 a.m. until midnight, Monday through Saturday (excluding holidays). Reservations must be made at least two days advance of a Job Access demand response trip. Job Access service is provided using small buses or vans. These vehicles are also equipped with wheelchair lifts (or ramps), grab-rails, and low steps to accommodate riders with special needs. The Job Access fare is $2.50 per one-way trip.

In 2011, JCT undertook the development of an advanced intelligent transportation systems (ITS) project. This ITS project provides advanced vehicle location (AVL) and data collection as part of JCT's transit service operations. JCT's fixed route system operates on a predetermined, established schedule. For the fixed route system the advanced technology project tracks vehicles providing speed, route adherence and vehicle location in real-time to JCT dispatch and JCT Administration. The system installed on the fixed route fleet allows for stops to be announced and displayed on an LED screen automatically and allows drivers the ability to input passenger count information for boarding and alighting via the mobile data computer. In addition the general public is provided real-time passenger information via cell phone texting and website. In the event there is a system failure the JCT fleet continues to operate per the fixed route published schedule and ridership data is collected with traditional methods manually.

Figure 5-8
Transit Services in the Johnson City MTPO Area

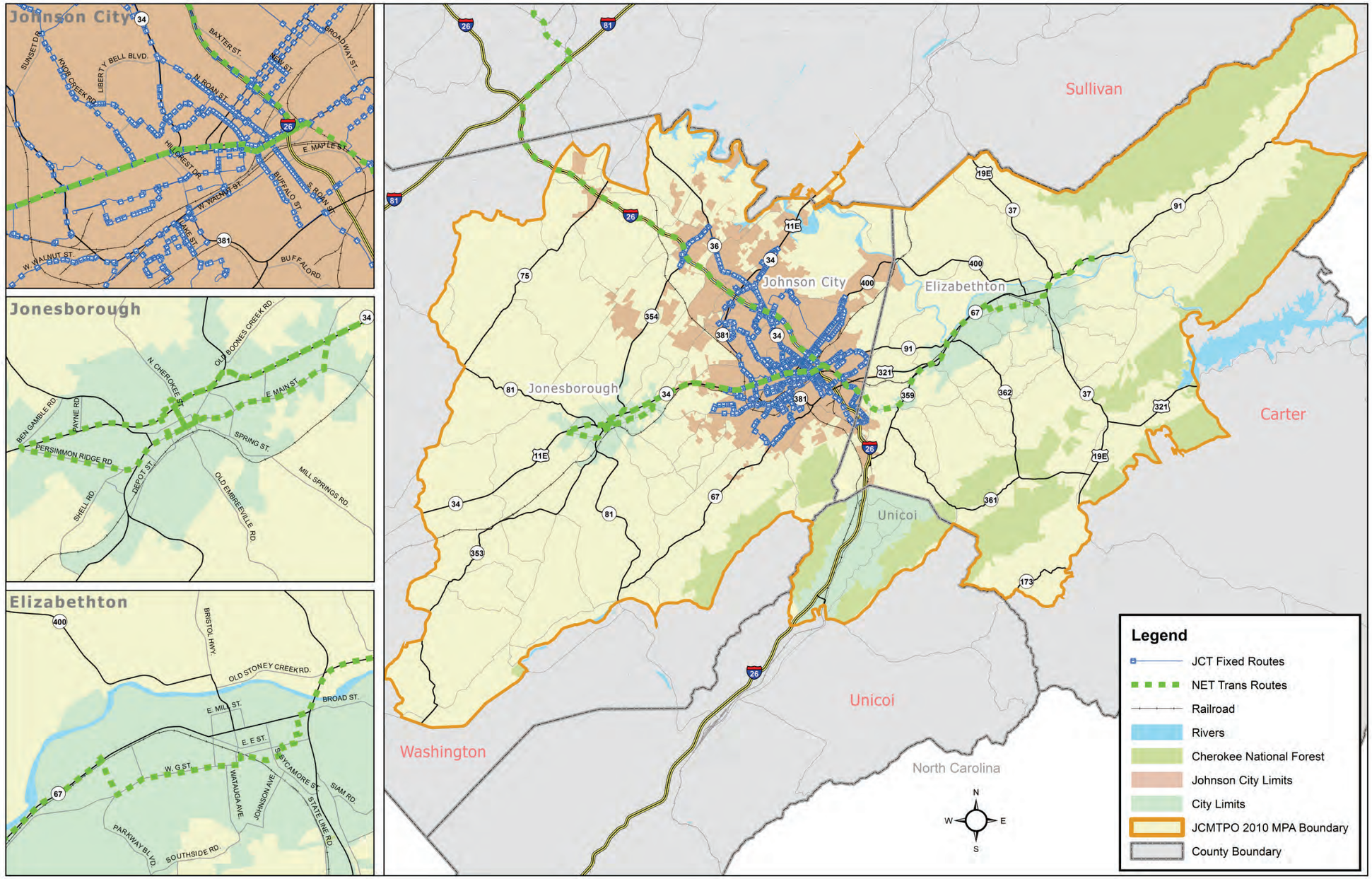
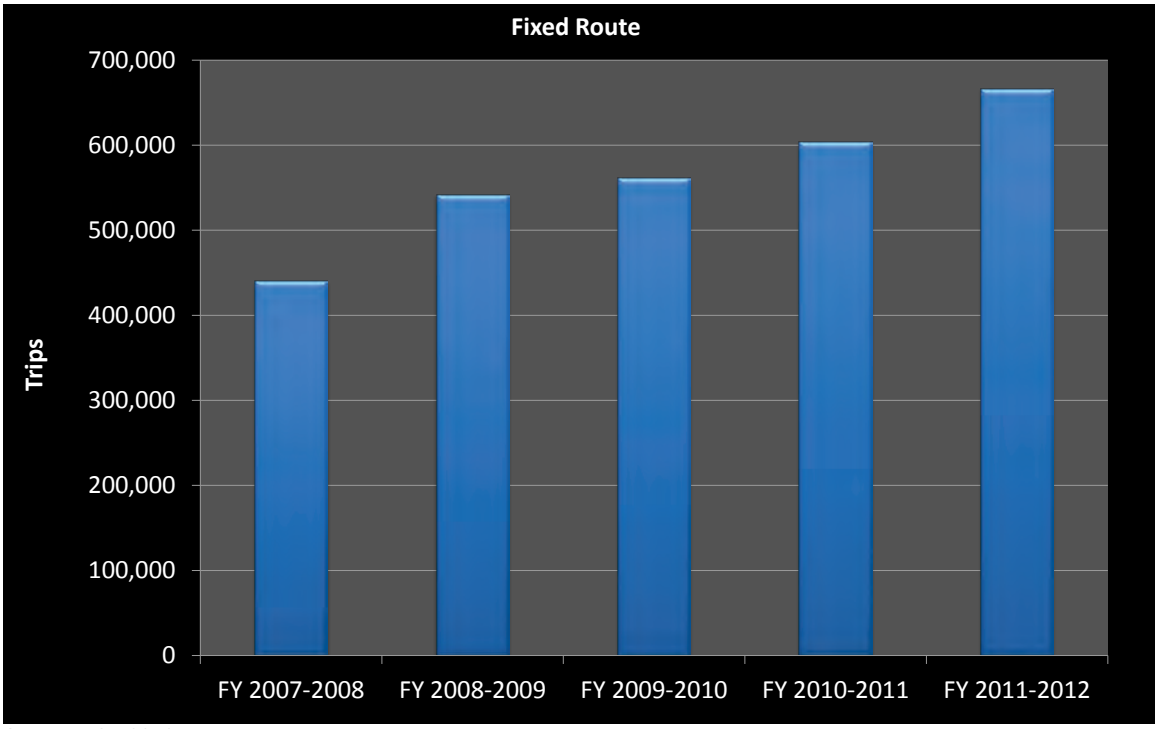


Figure 5-9
JCT Annual Fixed Route Ridership (2008-2012)



Source: JCT 2012

5.1.2.2 Demand Response Services

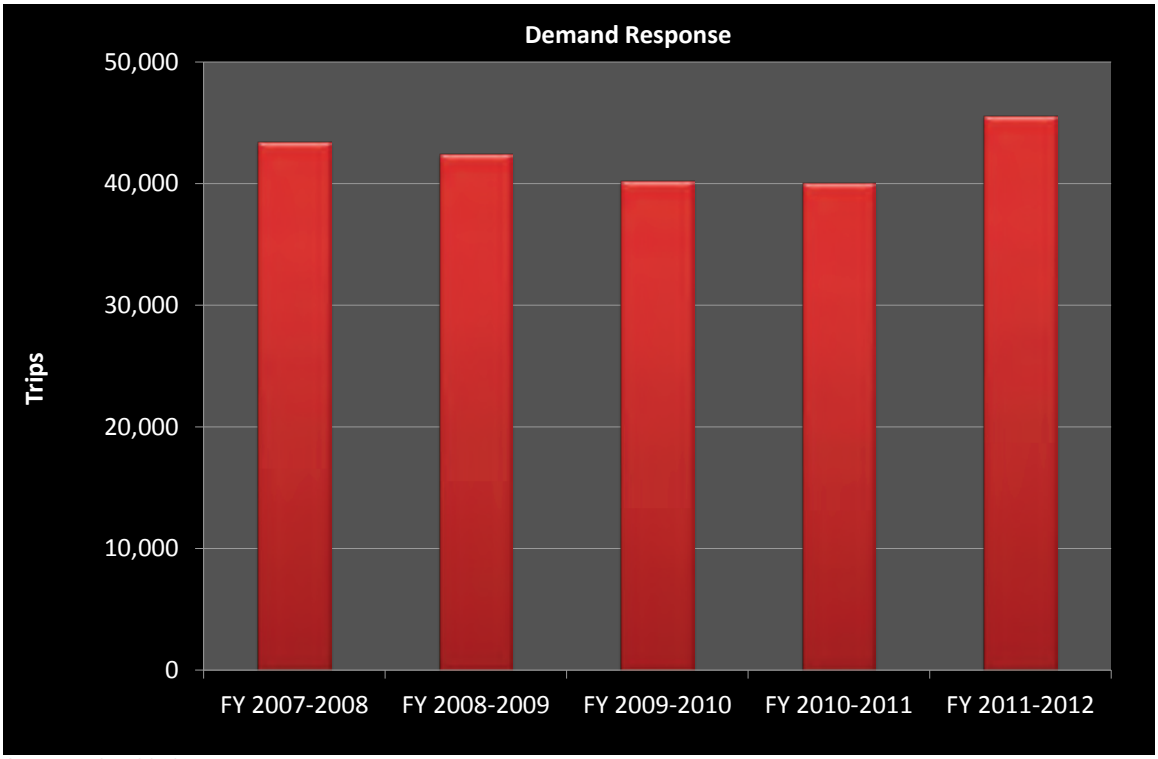
Within the MTPO region there are two public transit demand response service providers – JCT and NET Trans. Each service system is described below.

JCT

JCT also provides a curb-to-curb demand-response transportation service for the mobility impaired in Johnson City. The "XTRA" service is provided for those unable to use the regular fixed route service. Riders are required to request a trip by 5:00 p.m. of the day before the trip. XTRA hours of operation are the same as for fixed route services. The JCT "XTRA" service area is the corporate city limits of Johnson City or 3/4 mile of a JCT fixed route, whichever provides furthest service to the JCT patron. The fare for XTRA is $2.00 per one-way trip if the trip is located with ¾ mile of the fixed route service area. Buses for XTRA are equipped with wheelchair lifts, grab rails, and low steps. Figure 5-10 illustrates ridership trends of JCT's demand response services over the last five years which has been relatively steady but is growing.

Like JCT's fixed route system, demand response operations include ITS technologies. For the demand response fleet, current real-time vehicle location information is provided to dispatchers and administrative staff. The system collects current and historical bus location, speed, and vehicle identification which is used for analysis of service operations. The demand response transit system does not announce or display stops and the dispatching is not automated. In the event of system failure, scheduling continues as per established procedures; however the real-time vehicle location information is not available and communications to drivers continues via the JCT radio system.

Figure 5-10
JCT Demand Response Service Ridership (2008-2012)



Source: JCT, 2012

NET Trans

NET Trans (Northeast Tennessee Rural Public Transit) is the service provider of First Tennessee Human Resource Agency (FTHRA) with services to a seven-county region outside of JCT service area, including Washington, Carter, Unicoi, and Sullivan counties. NET Trans does not provide services when a trip origination and destination are within the city limits of Johnson City (only services feeding into or beyond the JCT service area).

NET Trans has built a quality rural public transportation program using local, state, and federal dollars. They primarily use 15-passenger, lift-equipped vans and generally operate on routes and schedules dictated by the needs of patrons. Operating hours are Monday through Friday, between the hours of 6:00 am and 6:00 pm, excluding holidays, and fares are zone-based, ranging from $1.50 to $8.50 per one-way trip. NET Trans provided 113,000 trips in 2009, running over 2 million miles.

Table 5-7 provides NET Trans ridership trends over the last five years for both fixed route and demand response services. As seen in Table 3 2, NET Trans did not start to offer fixed route service until fiscal year (FY) 2010-2011. Shuttle-type fixed route services for Elizabethton and Jonesborough to Johnson City were both initially identified as transportation gaps/needs as part of Johnson City's first coordinated public transit-human services transportation plan developed in 2007.

In addition to providing the general public transportation in the non-urbanized area, NET Trans also provides Families First Transportation and Job Access service. The Families

First Program is funded through TDOT and provides transportation to and from work and required classes for eligible clients. The Job Access Program provides transportation to and from work and work-related activities (child care centers) for eligible clients. The service is especially designed to link rural areas with job opportunities. The program can accommodate shift work and weekends.

Table 5-7
NET Trans Fixed-Route & Demand Response Ridership (2008-2012)

	Fixed Route Trips	Demand Response Trips	Total Trips	Absolute Change	Percent Change
FY 2007-2008	0	112,270	112,270	-	-
FY 2008-2009	0	113,376	113,376	1,106	1%
FY 2009-2010	0	124,701	124,701	11,325	10%
FY 2010-2011	2,441	182,182	184,623	59,922	48%
FY 2011-2012	8,489	200,306	208,795	24,172	13%

Source: NET Trans, 2012

5.1.2.3 Transit Fleets

The following is a snapshot of the level of capital investments that exist in the MTPO region relative to available transit vehicles.

JCT

JCT currently maintains a fleet of 40 vehicles, which is comprised of 22 fixed route buses, 15 paratransit vehicles, 2 support trucks, and one staff automobile. The fixed route buses, all of which are accessible by either a low floor with electronic ramp or a wheelchair lift, have a total seating capacity of 505 seats (or 23 seats per vehicle). The average vehicle age of the fixed route fleet of buses is 4 years old.

JCT has 15 demand response vehicles, all of which are accessible by either a low floor with manual ramp or a wheelchair lift. The seating capacity of these vehicles is 115 seats (or 8 seats per vehicle). The average vehicle age of this fleet is 4 years old. In August 2012, six of JCT's demand response vehicles were damaged due to severe storms and a flooding event. These damaged vehicles are being replaced (via insurance claims) and will result in a slightly newer average age demand response vehicle fleet in the short-term.

NET Trans

NET Trans maintains a fleet of 84 vehicles, which are available for service in the seven-county First Tennessee Human Resource Agency Region. Seventy-eight percent of the vehicles are wheelchair lift-equipped with an average vehicle seating capacity of 11 seats per vehicle.

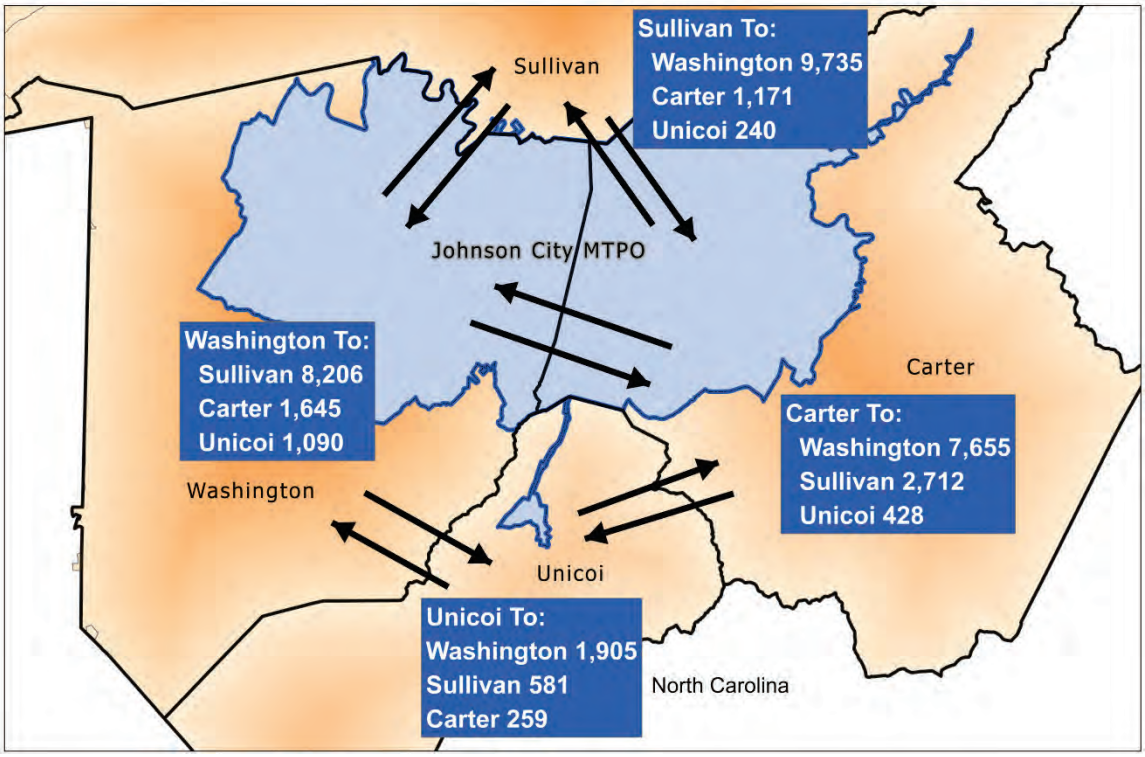
5.1.2.4 Other Transit and Travel Demand Management Activities

In addition to public transportation services provided by JCT and NET Trans there are other passenger bus services operating within the MTPO area. Greyhound Lines, Inc. provides intercity bus service within the Johnson City MTPO area, with four (4) daily arrivals via its national service network. Greyhound buses arrive and depart from the Greyhound passenger station at the JCT Transit Center connecting with the Greyhound national route system. Approximately 180 Greyhound riders per day pass through the

station with destination options of connecting with JCT or taxi companies at the Center. Greyhound service is provided seven days per week and on holidays.

According to US Census data, in 2010 nearly 7,700 Carter County residents commuted to Johnson City and Washington County each weekday for employment. Additionally, over 18,000 commuters travel between Washington County and Sullivan County (and vice Versa) each weekday for work. Figure 5-11 illustrates commuter patterns within the Tri-Cities Region. NET Trans' recent service offerings between Johnson City and Kingsport and Johnson City and Elizabethton are meeting a demand that once was only met by informal ridesharing.

Figure 5-11
Commuting Patterns (2010)



Note: Number of persons commuting each weekday – 2010 data
Source: US Census Bureau, Center for Economic Studies, 2012

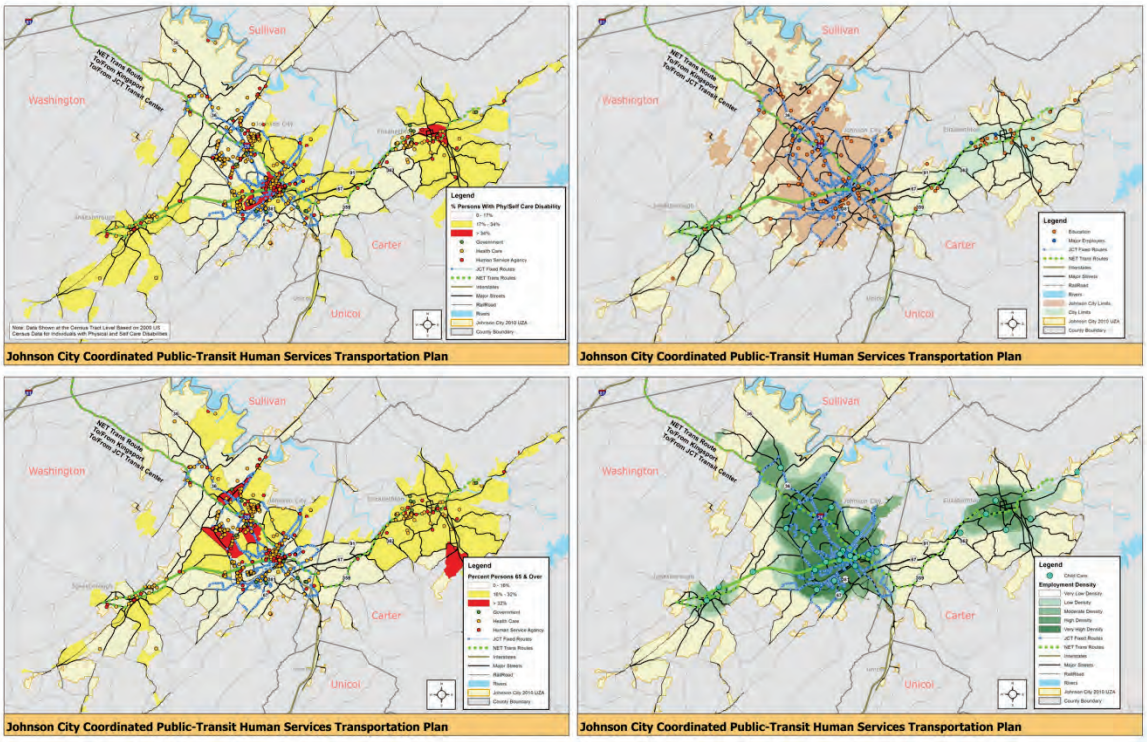
5.1.2.5 Future Conditions

Transit services, both fixed route and demand response within the MTPO area are an integral part of the current transportation system. The need and demand for public transportation services in the MTPO region is clearly demonstrated as seen in the ridership numbers of JCT and NET Trans and demographic and development characteristics of the region.

In 2012, the MTPO, JCT, and NET Trans completed the development of a Coordinated Public Transit-Human Services Transportation Plan (CPTHSTP) for the MTPO area. The requirement for a CPTHSTP was first called for under SAFETEA-LU and reaffirmed under MAP-21 as a requirement for a region to be eligible to receive certain federal public transportation funding. The MTPO's CPTHSTP planning effort took approximately

10 months to develop and engaged nearly 50 transportation and human service providers and over 200 citizens in the review and development of the plan. Figure 5-12 highlights the transit needs assessment effort from the CPTHSTP which included the review of service provisions and concentrations of individuals with disabilities, older adults, and people with low incomes compared to destinations within the MTPO region.

Figure 5-12
Assessment of Transit Service Needs



Source: JC Coordinated Public Transit-Human Services Transportation Plan, 2012

Table 5-8 contains the resulting transit service strategies and priorities established as part to the MTPO's CPTHSTP. A key theme in addressing service gaps and unmet needs was the provision of an expanded service area and expanded service hours.

Summary

Transit services in the MTPO area must continue to expand in order to meet the growing mobility needs of the region, and to provide transportation options that help to reduce exclusive dependence on the automobile. Necessary improvements needed to accommodate these demands include adequate rolling stock for service expansion, transfer stations, and other capital and operating investments for the Johnson City region's fixed route service provider, JCT. Additionally, with JCT maintaining a rolling stock of vehicles that are nearly five years old, a considerable amount of future resources must be committed over the planning horizon for vehicle replacement as well as continued investments in intelligent transportation systems (ITS) and other technologies to increase service efficiencies and meet growing customer demands. Making the most of these resources will be key to JCT remaining at the top of its class when it comes to service efficiency.

Table 5-8
Transit Service Strategies & Priorities

Issue	Strategies	High Priority	Medium Priority	Low Priority
Maintain Current Level of Services	1. Maintain education efforts for community leaders in role of public transportation	√		
	2. Participate in planning activities to include awareness of transit in development	√		
	3. Identify funding opportunities (federal, State, and local)	√		
	4. Inform public of transportation services currently available within study area	√		
	5. Continue coordination between Providers, as feasible	√		
	6. Maintain current transportation services within the Johnson City Urbanized Area	√		
Issue	Strategies	High Priority	Medium Priority	Low Priority
Expand Current Service	1. Expand Johnson City Transit (JCT) hours of operation to evening hours		√	
	2. Expand JCT service area		√	
	3. Expand JCT paratransit service for ADA clients to evening hours		√	
	4. Expand days of JCT service to include Sunday			√
	5. Same Day Service for ADA clients		√	
	6. Reduce time between buses on a route (resulting in operation of more buses)			√
	7. Expand JCT hours of operation to special events (Blue Plum Festival, Christmas)			√
Issue	Strategies	High Priority	Medium Priority	Low Priority
Begin New Service	1. Evaluate demand periodically to determine any change in demographics, warranting service		√	
	2. Identify potential funding for future start- up of service in outlying areas		√	
	3. Identify potential funding opportunities for future start-up of new type of service		√	
Issue	Strategies	High Priority	Medium Priority	Low Priority
Other Transportation Related Service Needs	1. Provide/investigate with volunteer agencies, escorts for elderly and/or disabled clients, otherwise, unable to use services		√	
	2. Coordinate with agencies for transportation, in particular, job-related and medical-related, for individuals unable to pay a fare	√		
	3. Address limitation of ability to serve certain areas (due to vehicle size and/or lack of turning space for vehicle (ex. Cul-de-sac or no outlet)			√

Source: JC Coordinated Public Transit-Human Services Transportation Plan, 2012

As the urbanized area of the MTPO continues to grow, JCT will face increasing challenges and demands. Johnson City is rapidly growing north into the Boones Creek and Gray communities. Major retail development, call centers, a major payment center, and the Johnson City Power Board have created new employment and shopping destinations. In addition, these areas are also experiencing a significant amount of residential growth. Service expansion and the development of a transfer center in this area are likely over the 27-year planning horizon.

In terms of demand response service, JCT and NET Trans will need to continue investments in automatic vehicle locator (AVL) systems. This ITS technology is important to coordinating/scheduling trips by knowing the exact locations and speeds of vehicles. Additionally, as illustrated in the MTPO's CPTHSTP, a high level of coordination currently occurs between human service agencies and JCT and NET Trans in the provision and funding of transportation services within the region. An important element of the MTPO's future transportation system is the need to continue to provide coordinated transportation services. The MTPO will continue to facilitate the

development of the region's CPTHSTP (which is on the same update cycle of the MTPO's LRTP) as a means of promoting efficient and effective use of limited transportation resources while increasing mobility to those who most need it.

5.1.3 Walkways and Bikeways

While non-motorized travel traditionally does not receive the same level of visibility as automobile travel, over the last two decades the MTPO area has made considerable progress in promoting non-motorized travel as an integral component to the overall transportation system. The MTPO area currently has numerous bicycle and pedestrian transportation facilities. On a local level, these facilities provide connections to destinations and are used for both transportation and recreational trips.

The following subsection provides an assessment of current conditions (sidewalks, bikeways, and greenways) within the MTPO area, an assessment of sidewalk, bikeway, and greenway needs, and recommended improvements for walking and biking within the MTPO area.

5.1.3.1 Existing Conditions

Sidewalks

Currently, approximately 247 miles of roadway within the MTPO area have sidewalks. As illustrated in Figure 5-13, the bulk of these sidewalks are located in the City of Johnson City (which has approximately 216 miles of roadways with sidewalks) followed by the City of Elizabethton (which has approximately 27 miles of roadways with sidewalks). The Town of Jonesborough has about 4 miles of roadways with sidewalks.

The majority of sidewalk facilities throughout the region are located along local streets. Looking specifically at functionally classified roadways, 68 miles are along urban classified roadways. Table 5-9 illustrates the breakdown of urban classified roadways in the MTPO area with sidewalks, which is approximately 20 percent of the MTPO's urban classified roadways.

Table 5-9
Urban Classified Roadways within the MTPO with Sidewalks

Roadway Functional Classification	Total Miles	Miles With Sidewalk	Percent With Sidewalk
Urban Principal Arterial	50	12	23%
Urban Minor Arterial	141	39	28%
Urban Collector	155	17	11%
Total Miles	**346**	**68**	**20%**

Since 1995 the City of Johnson City has maintained a sidewalk plan which was last updated in 2007. A major element of this plan is an inventory and inspection of the City's sidewalks. Approximately 78 percent of these facilities rated as "new" or "good" and 22 percent rated as "fair" or "poor". Currently none of the other municipalities within the MTPO area maintain a sidewalk conditions rating system for their sidewalk facilities.

Bikeways

In the MTPO area there are approximately 16 miles of bicycle accommodations (bike lanes and multi-use paths). Of these facilities, 6 miles are signed and striped bicycle lanes and 10 miles are multi-use paths. Figure 5-13 shows the location of these facilities

within the region. The two most significant multi-use paths (in terms of length) is the path along State of Franklin in Johnson City and the Linear Path in Elizabethton.

Bicycle Level of Service Conditions

In 2011, TDOT updated Tennessee's statewide bike route plan using the procedures documented in the National Cooperative Highway Research Program (NCHRP) Report 616, to determine bicycle level of service (BLOS) for all state highways in Tennessee. BLOS is a way to objectively rate the quality of roadways for cyclists. The BLOS score is based on research, which gauged the comfort level of cyclists of all age groups and riding capabilities when asked to ride on a variety of roadway conditions. The roadway condition factors used in the BLOS calculation include the Average Daily Traffic (ADT) volume, number of through lanes on the roadway segment, speeds, percentage of trucks, the width of the outside travel lane, shoulder, and bike lane, the condition of the pavement, and the occupancy rate of on-street parking. The result is a score ranging from A to F with A being the best conditions and F the worst conditions.

As shown in Figure 5-14, approximately 70 miles of state highway in the region are identified as BLOS A, B, or C. Segments of several major arterial roads like SR 37 (US 19E) and SR 34 (West Market St/Andrew Johnson Highway) are considered to have good cycling conditions because of wide paved shoulders.

5.1.3.2 Future Conditions

As part of the MTPO's 2030 LRTP, developed in 2008, a series of recommended bicycle and pedestrian improvement projects were established. Figure 5-15 shows the specific recommended facility improvements, which were selected to:

- Provide connectivity between major origins and destinations
- Serve concentrations of attractors
- Provide direct routes
- Help form a connective network of bikeways
- Extend in each major direction within the MTPO area

Of these proposed improvements, one of the most significant bicycle and pedestrian projects is the development of a rails-to-trails project between Johnson City and Elizabethton. In early 2012, the MTPO initiated the development of a master plan for converting the existing East Tennessee Rail line from Johnson City through Elizabethton to a multi-use trail system. The conversion of this rail line to bicycle and pedestrian activities will provide the MTPO area with a significant addition to the region's overall non-motorized network.

Section 7.0 of the LRTP provides a program approach to providing funding over the 27-year planning horizon for non-motorized accommodations. While recommended bicycle and pedestrian improvements have been developed and local municipalities, such as Johnson City, are planning for sidewalk and bikeway facilities, the region would benefit from a standalone regional bicycle and pedestrian plan. Within the next 3 to 5 years the MTPO proposes developing such a plan to forge greater integration and inclusion of non-motorized accommodations into the MTPO's overall transportation system.

Figure 5-13
Existing Bicycle & Pedestrian Facilities Map

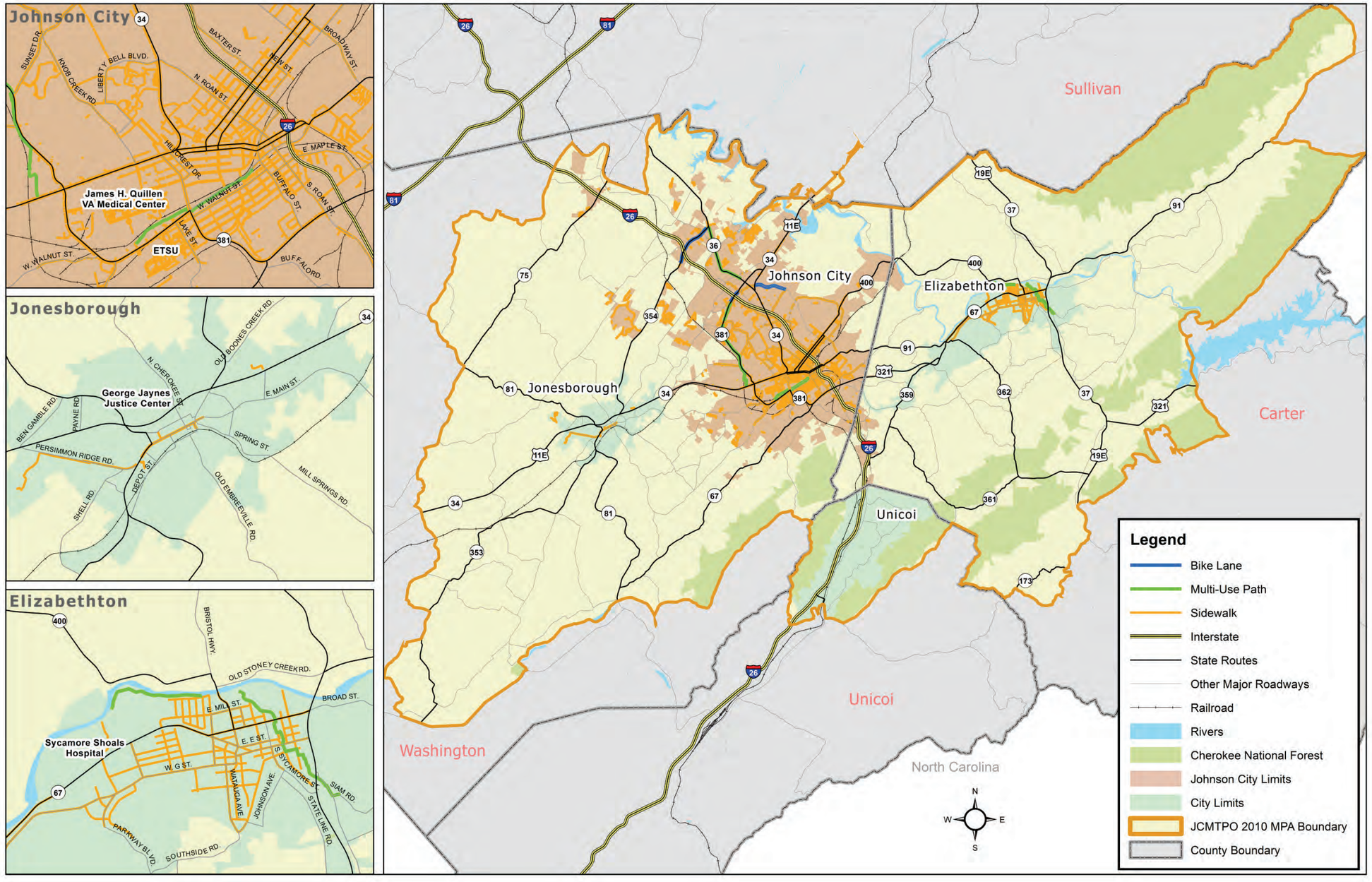


Figure 5-14
Bicycle Level of Service (BLOS) Map

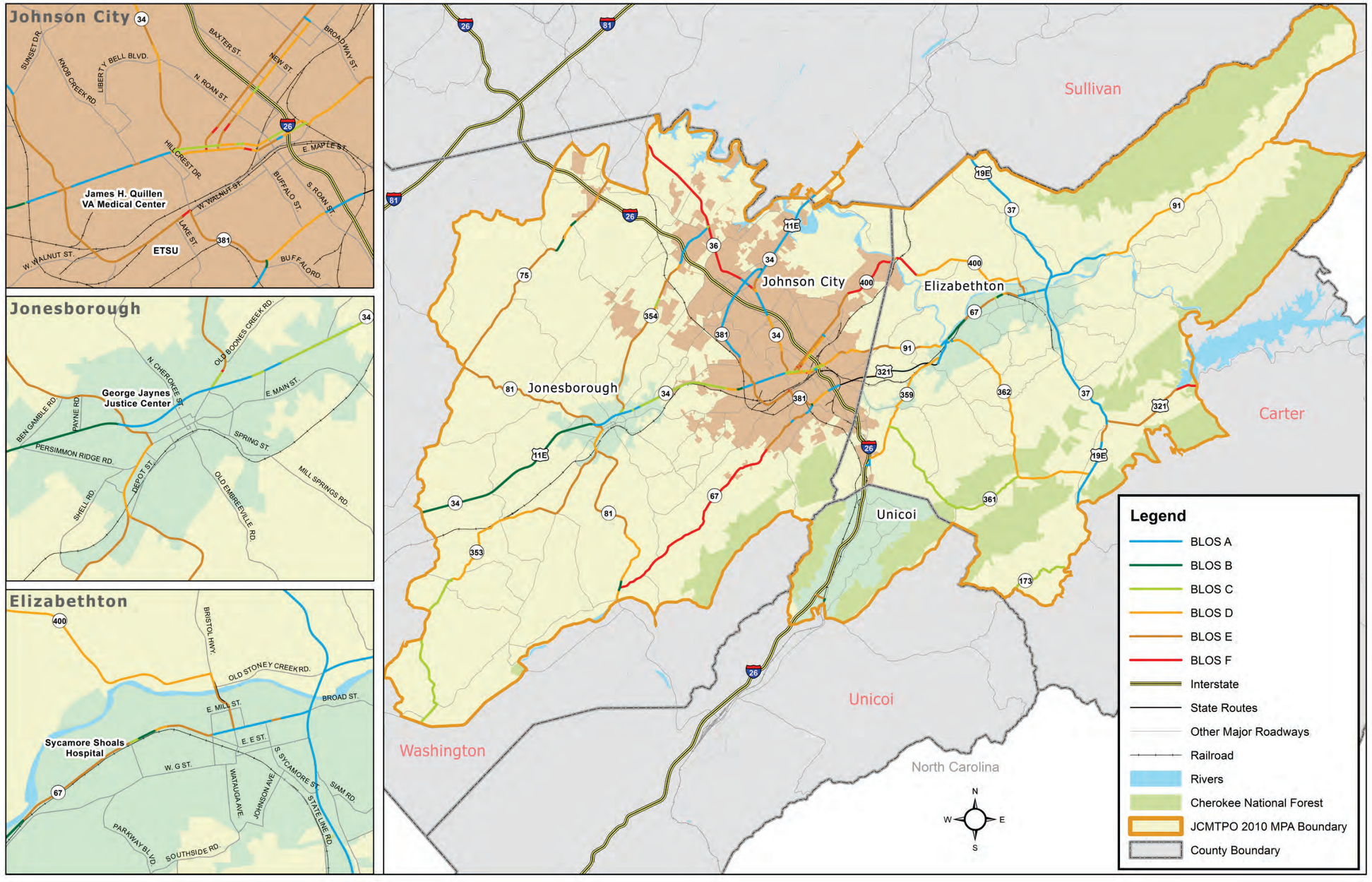
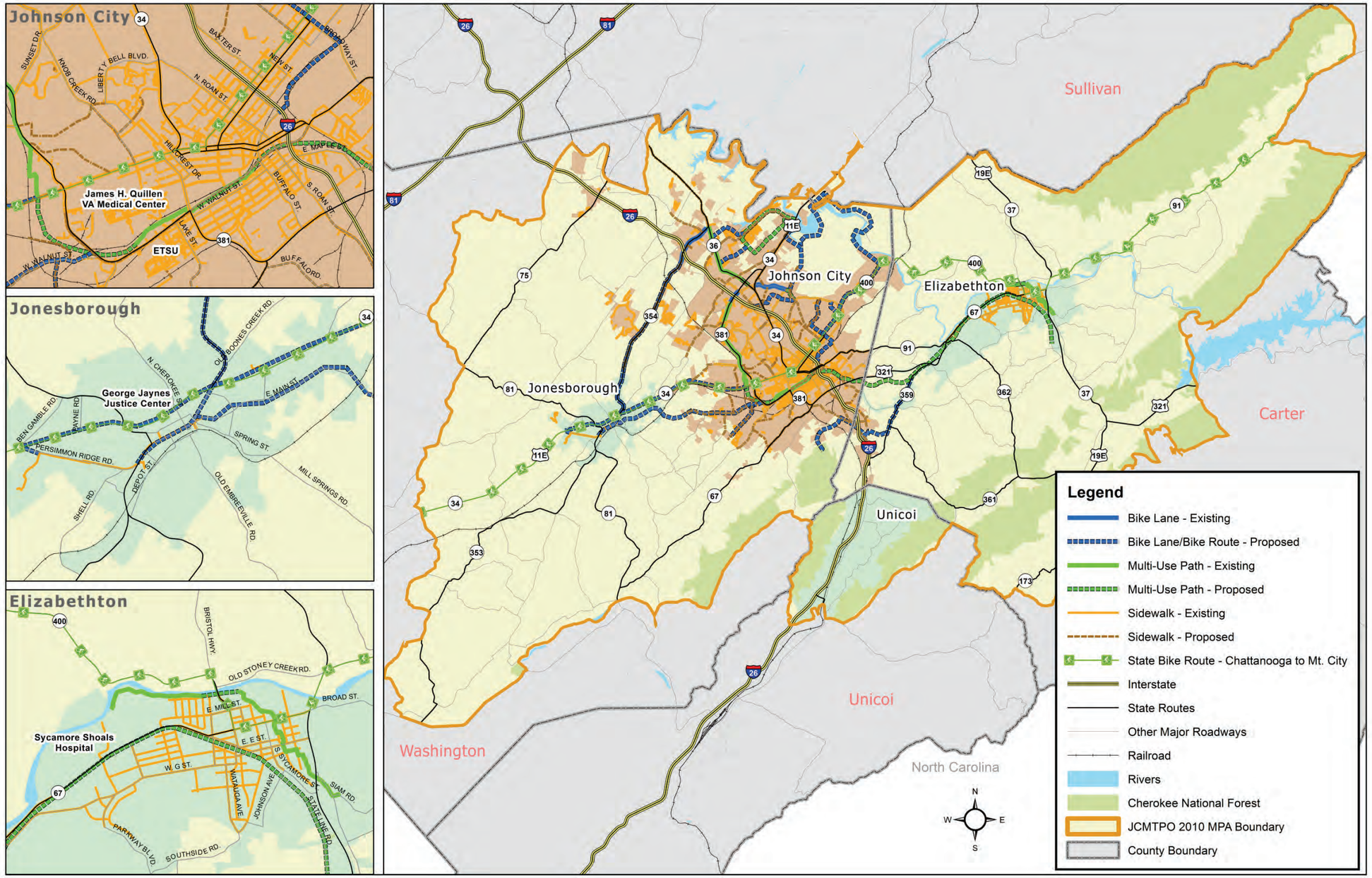


Figure 5-15
Proposed Bicycle & Pedestrian Facilities Map



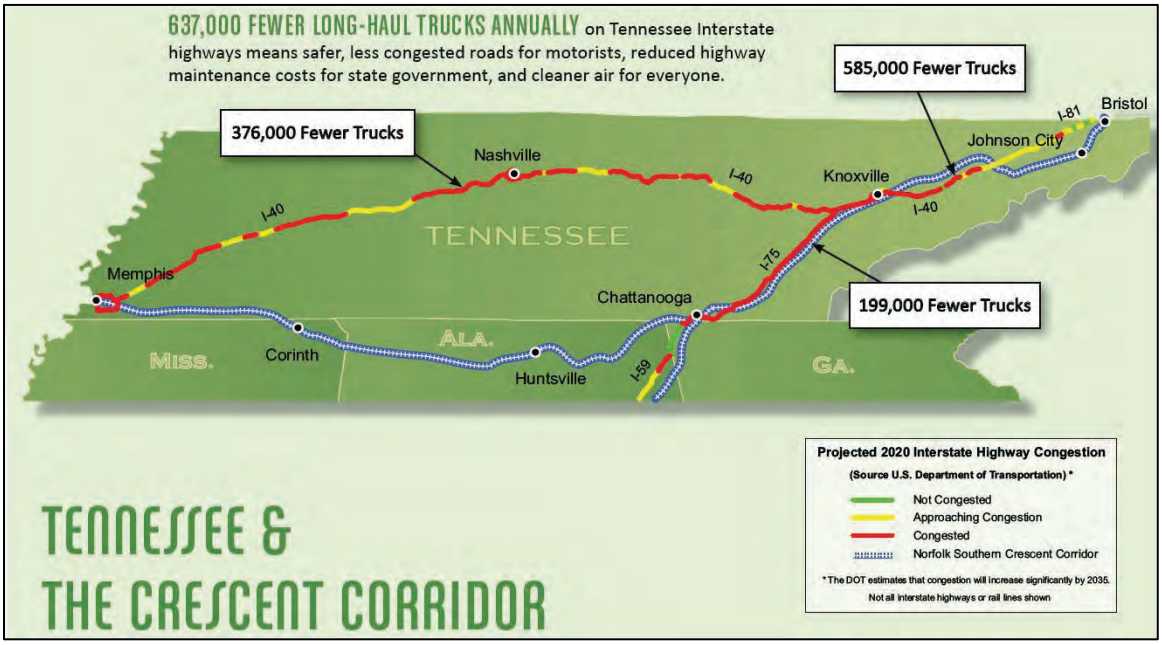
5.1.4 Rail

At the present time, there are no passenger rail services in the MTPO area. However, there are currently two Class I railroads, CSX and Norfolk Southern, that serve the Johnson City region. The CSX line runs from the northwest corner to the southeast corner of Washington County. Norfolk Southern runs from east Washington County through Johnson City and into Carter County where it takes a northerly turn to the rail yard in Bristol, Virginia. From this point, the rail line has access to the port of Norfolk in Virginia and other markets in the Northeast. Figure 5-17 shows the locations of the rail lines.

CSX operates 1,137 miles of track in Tennessee and employs approximately 2,100 Tennessee residents. Furthermore, CSX operates a major rail yard in Erwin, Tennessee, just south of the MTPO study area. There is a rail-to-truck metals distribution facility in Johnson City. The nearest rail-to-truck transloading facility is in Knoxville. Norfolk Southern operates 850 miles of track in the state and has about 1,900 employees. The Norfolk Southern lines in East Tennessee are part of a larger north-south route serving as a North American Free Trade Agreement route between the Northeastern region of the United States and Mexico.

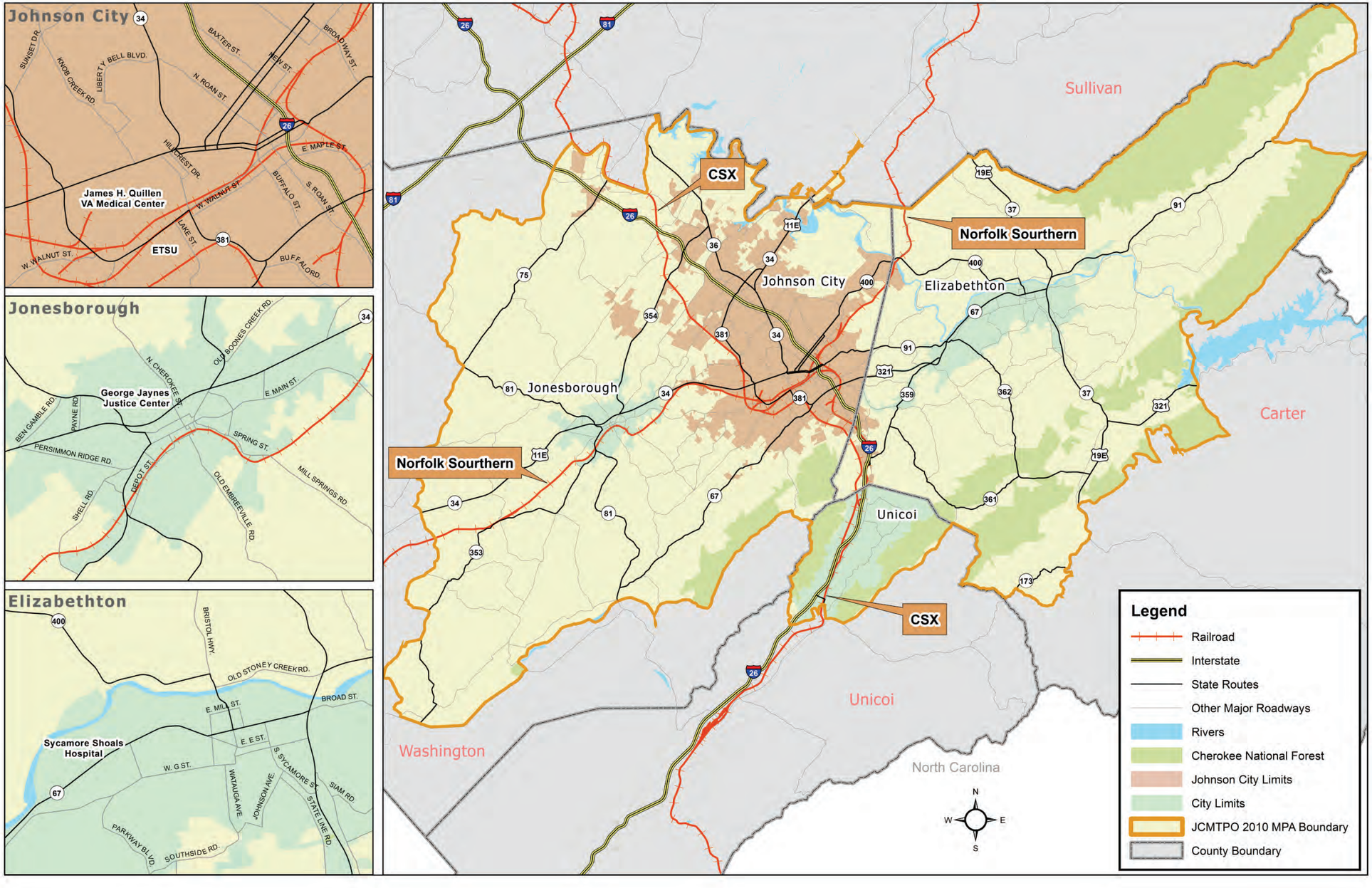
While intermodal operations in the Tri-Cities region have changed in recent years with closure of Eastman Chemical Company's intermodal operations, Norfolk Southern is expanding its intermodal capabilities as part of Norfolk Southern's Crescent Corridor, a 2,500-mile rail route that will link key markets in the Northeast and Southeast with high-quality rail intermodal services. Figure 5-16 depicts some of the benefits of Norfolk's Crescent Corridor investments to Tennessee and the I-81 corridor, which provide direct benefit to the Johnson City area.

Figure 5-16
Norfolk Southern Crescent Corridor Map



Source: Norfolk Southern

Figure 5-17
Rail System Map



5.1.5 Aviation

There are three airports serving the Tri-Cities region; two are located inside the MTPO planning area and one is located northwest of the MTPO planning area. The two located within the MTPO area, the Johnson City Airport and the Elizabethton Municipal Airport, are small General Aviation airports used mostly by smaller private planes and flight training facilities. The largest and only airport facility in the region having commercial passenger and air cargo flights is the Tri-Cities Regional Airport, which serves the entire northeast Tennessee and southwestern Virginia region.

The Johnson City Airport is a privately owned facility whereas the Elizabethton Municipal Airport is owned by the City of Elizabethton, and the Tri-Cities Regional Airport is jointly owned by the cities of Kingsport, Johnson City, Bristol Tennessee/Virginia, and Sullivan and Washington Counties. Figure 5-18 shows the location of these three airport facilities.

At this time, of the three airport facilities, from the perspective of intermodal transportation with surface transportation demand, the Tri-Cities Regional Airport has the greatest impact and influence in the region. Of the two other airports, the Elizabethton Municipal Airport has the potential for greater private plane operations and some air cargo followed by the Johnson City Airport. The following are key highlights of each of these airport facilities:

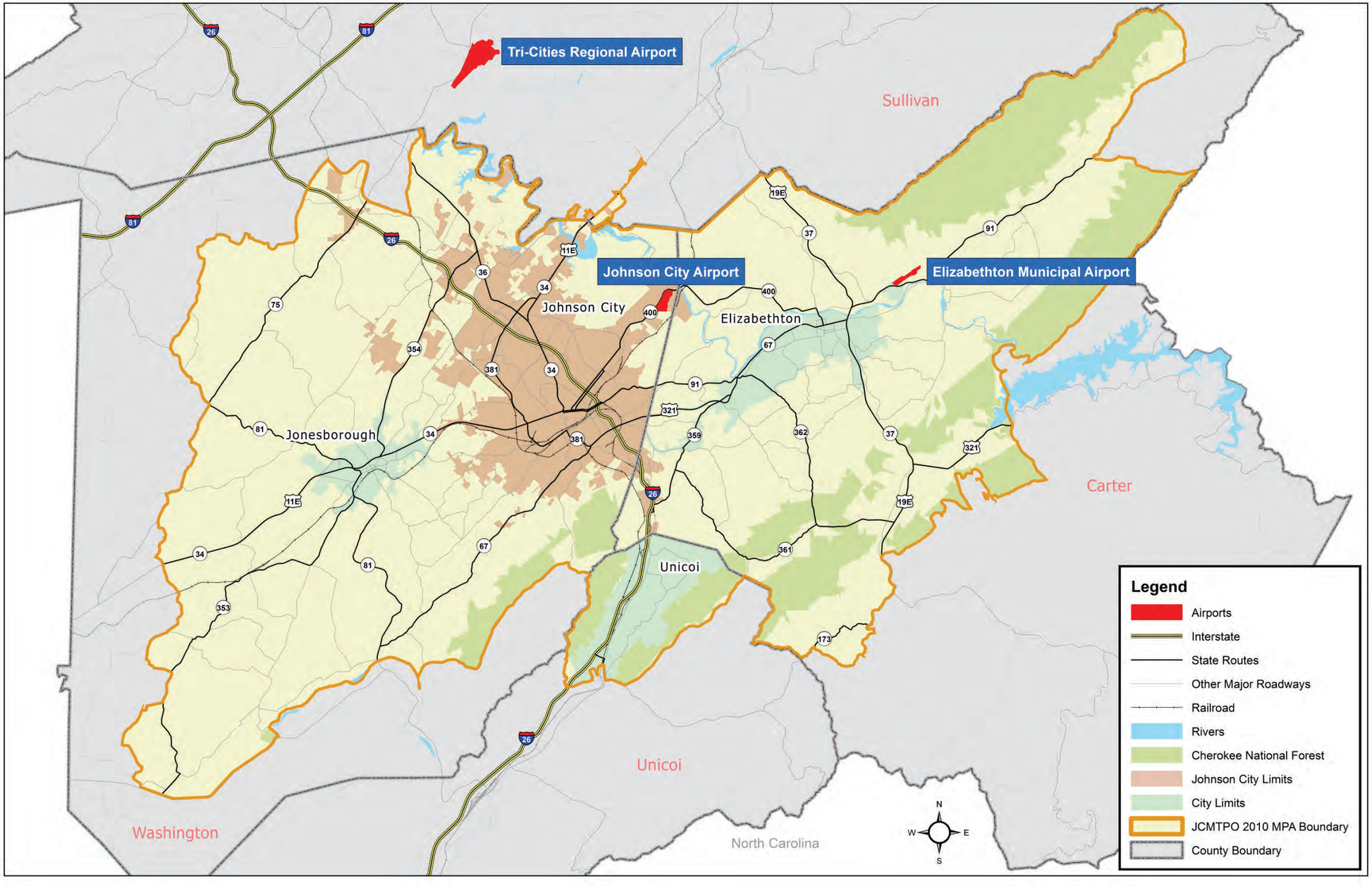
Tri-Cities Regional Airport

The airport recently expanded services to better serve the Tri-Cities area with passenger, charters, and air cargo activity. It has an asphalt surface primary runway to the length of 8,000 feet and a secondary runway to 4,447 feet. Airlines servicing the Tri-Cities area include American Connection, Delta Connection, Northwest Airlink, and US Airways Express. Daily flight activity includes approximately 28 departure flights and approximately 31 arrival flights.

Air cargo volumes have fluctuated over the years, going from less than 200,000 pounds in 1948 to a high of about 10.3 million pounds in 1987. In the 1990s air cargo volumes dropped to a low of roughly 3 million pounds and fluctuated between 4 and 5 million pounds in the early 2000s. Changes in air freight business and an increasing reliance on cheaper ground transportation has made traditional air cargo carrier service extremely challenging for smaller communities. The reduction in size of airline aircraft over the past 20 years and the decrease in “belly” cargo capacities have significantly shifted the emphasis towards scheduled and non-scheduled air cargo carriers. The combination of smaller airline aircraft and faster/cheaper truck transportation has also contributed to a downward trend in airmail processed through the Airport over the last two decades.

In August 2005, a new 13,000-square foot air cargo logistics center was opened. The new facility offers 174,000 square feet of cargo apron space and 4,000 linear feet of parallel taxiway and a new cargo apron connector. In addition, heavy truck traffic can access the facility via a newly built industrial access road. There are also plans for future air cargo expansion via a 35-acre development area capable of accommodating approximately 220,000 square feet of direct aircraft access facilities and/or warehousing and distribution operations. Air cargo volumes for 2005 totaled approximately 2,000 tons. The airport offers full customs and border protection services and, in 1994, was awarded a Grant of Authority to establish, operate and maintain a Foreign Trade Zone. The zone currently comprises eight (8) general-purpose sites and one (1) subzone.

Figure 5-18
Airport Facilities Map



A number of air cargo carriers, expediters, freight forwarders, and contract carriers have used the Airport over the years. Familiar names such as Burlington Northern, DHL, Emery Worldwide, FedEx, and UPS are only a few of the companies that have operated on a scheduled basis.

Elizabethton Municipal Airport

Located in the City of Elizabethton, the Elizabethton Municipal Airport is strategically located off SR 91 northeast of US 19E. The airport is located adjacent to a high amount of industrial lands which makes for the potential of future air cargo operations as industrial development in the area grows.

The airport has a runway of 4,500 feet in length and is considered full service providing refueling, maintenance, storage, basic amenities, and comprehensive flight training. The airport has about 80 aircraft operations daily of which 86 percent are local and 14 percent are transient. Approximately 48 aircraft are based at the airfield.

Johnson City Airport

The Johnson City Airport is located in the City of Johnson City off SR 400, north of the downtown. As with the Elizabethton Municipal Airport, the Johnson City Airport is located adjacent to a high amount of industrial lands. The Johnson City Airport is primarily used by smaller planes and has about half the flight activity of the Elizabethton Airport.

The airport has a runway of 3,000 feet in length and provides about 20 aircraft operations daily of which 87 percent are local and 13 percent are transient. Approximately 20 aircraft are based at the airfield.

5.1.5.1 Future Conditions

The two most recent aviation-related studies that impact aviation conditions within the MTPO area include:

Tennessee Statewide Aviation System Plan – commissioned in 2002 by TDOT to develop a statewide long range aviation plan to assist airports within Tennessee to grow as a part of the State's aviation transportation economy.

Tennessee 2004 Updated Aviation System Plan – an update to the 2002 plan by TDOT to account for major events that had changed aviation planning assumptions. Items considered included September 11, 2001 terrorist attacks, recent economic downturn, and cargo trends.

Both studies project positive growth in commercial as well as air cargo transportation over the next 20 to 25-years. As revealed in the Tennessee Statewide Aviation System Plans, major capital improvements for Tri-Cities Regional Airport in the near term (by 2015) include parking and ramp expansions, a multi-modal center, expansion of the cargo area and new cargo buildings, widening of the airport perimeter road, and widening of the state route west of the airport (SR 75). Major improvements through 2020 include further expansion of the cargo area, and additional corporate hangar development. Major improvements through 2030 include multiple runway extensions and parallel taxiways, as well as a new runway, parallel taxiway, and taxiway extension.

5.1.6 Freight Transportation and Intermodal Connectivity

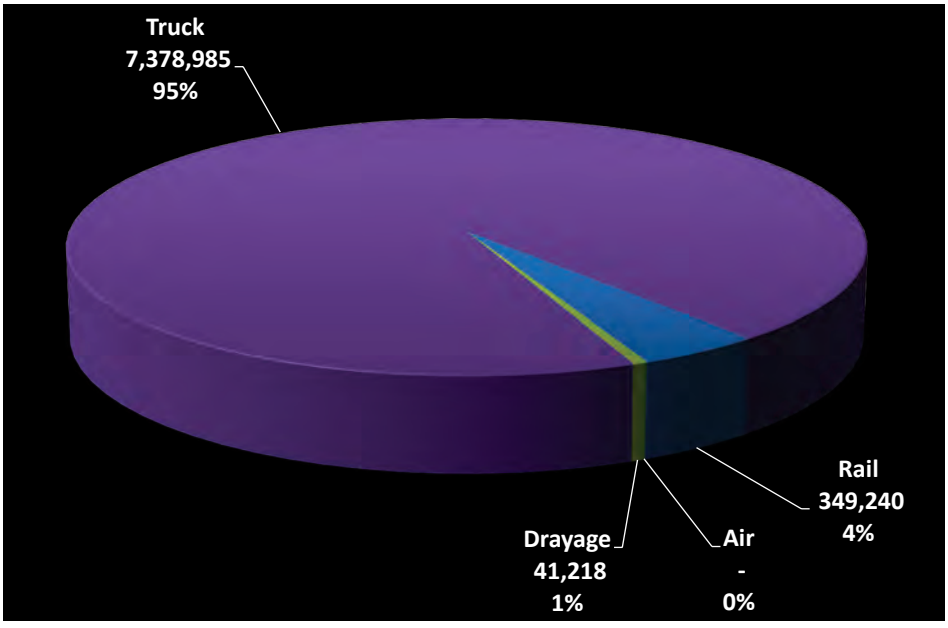
The increasing economic competitiveness among regions within the US, and the globalization of the economy, has further increased the importance of a metropolitan area's freight transportation infrastructure. The changing nature of business practices, with an emphasis on reliable, just-in-time delivery (JIT), places a premium on the efficient operation of the freight transportation system. It also increases the burden on that infrastructure. Globalization of the economy has also changed the transportation and service requirements of shippers and receivers. Manufacturers can serve markets globally, but this requires a greater reliance on and greater efficiencies in the transportation system.

The following subsections describe the current commodity flows within and throughout the region, a general understanding of intermodal connections (highway, rail, and air) within the region, and a comparison of these modal demands to the recommended planned transportation improvements (presented in Section 7.0).

5.1.6.1 Commodity Flows

Annually, nearly 7.8 million tons of goods are transported in and out of the counties of Carter, Washington, and Unicoi, Tennessee. Truck transport represents about 95 percent of all commodities flowing into and out of the region. Rail transport represents about 4 percent of all commodities flowing into and out of the region. Drayage transport and air cargo represent less than 1 percent each of all commodities flowing into and out of the region. Figure 5-19 identifies the total freight share by mode for Carter, Washington, and Unicoi Counties, Tennessee.

Figure 5-19
Total Freight Share (By Weight & Mode) For MTPO Counties (2007)



Source: IHS Global Insight Transearch, 2007

An analysis of commodity flows was performed based on the TRANSEARCH commodity flow data purchased by TDOT from IHS Global Insight. This data provides freight flows by weight moving into, out of, within, and through the State of Tennessee for 2007. This

data is disaggregated by commodity, mode, and origin/destination pair. The commodity flow analysis provides summaries of these characteristics. The following highlights key findings from the analysis:

From Carter County, TN (in 2007)

- Approximately 822,000 tons of commodities were shipped from Carter County to other parts of the US (with all reported shipments being by truck)
- The in-state county receiving the largest number of goods by truck (in terms of weight) was Johnson County, Tennessee, which received 525,000 tons, which was mostly broken stone/riprap
- The out-of-state county receiving the largest number of goods by truck (in terms of weight) was Smyth County, Virginia, which received 15,400 tons, which was mostly broken stone/riprap
- The top 5 commodities (in terms of weight) shipped from Carter County by truck were broken stone/riprap, aluminum/alloy, textile goods, warehouse/distribution center goods, and containers/boxes/paper (accounting for 97 percent of all commodities shipped from Carter County)
- No reported commodities were shipped by air, rail, or water from Carter County

To Carter County, TN (in 2007)

- Approximately 1.88 million tons of commodities were shipped to Carter County from other parts of the US (with all reported shipments being by truck)
- The area shipping the largest number of goods to Carter County by truck (in terms of weight) was Sullivan County, Tennessee, which shipped 713,000 tons (or 38 percent) most of which was broken stone/riprap, ready-mix concrete, and warehouse and distribution goods
- The number one commodity transported to Carter County by truck (in terms of weight) was broken stone/riprap at 1.67 million tons
- The out-of-state county shipping the largest number of goods by truck (in terms of weight) to Carter County was Avery County, North Carolina, which shipped 172,000 tons, which was mostly broken stone/riprap
- No reported commodities were shipped by air, rail, or water to Carter County

From Washington County, TN (in 2007)

- Nearly 1.25 million tons of commodities were shipped from Washington County to other parts of the US
- 85 percent (or 1.07 million tons) of all commodities (in terms of weight) shipped from Washington County were transported by truck
- Nearly 15 percent (or 181,000 tons) of all commodities (in terms of weight) shipped from Washington County were transported by rail
- The county receiving the largest number of goods by truck (in terms of weight) was Shelby County, Tennessee, which received 95,000 tons (or 9 percent) most of which was warehouse and distribution center goods and automobile parts
- Roanoke, Virginia received the largest amount of freight by rail (in terms of weight) from Washington County, which received nearly 110,000 tons of metal scrap/tailings
- No commodities were shipped by air or water from Washington County

To Washington County, TN (in 2007)

- Over 2.78 million tons of commodities were shipped to Washington County from other parts of the US

- 98 percent (2.72 million tons) of all commodities (in terms of weight) shipped to Washington County were transported by truck
- 2 percent (or over 61,000 tons) was shipped by rail, with potassium/sodium compound being the largest commodity
- The area shipping the largest number of goods to Washington County by truck (in terms of weight) was Sullivan County, Tennessee, which shipped 912,000 tons (or 33 percent) most of which was broken stone/riprap
- No commodities were shipped by air or water to Washington County

From Unicoi County, TN (in 2007)

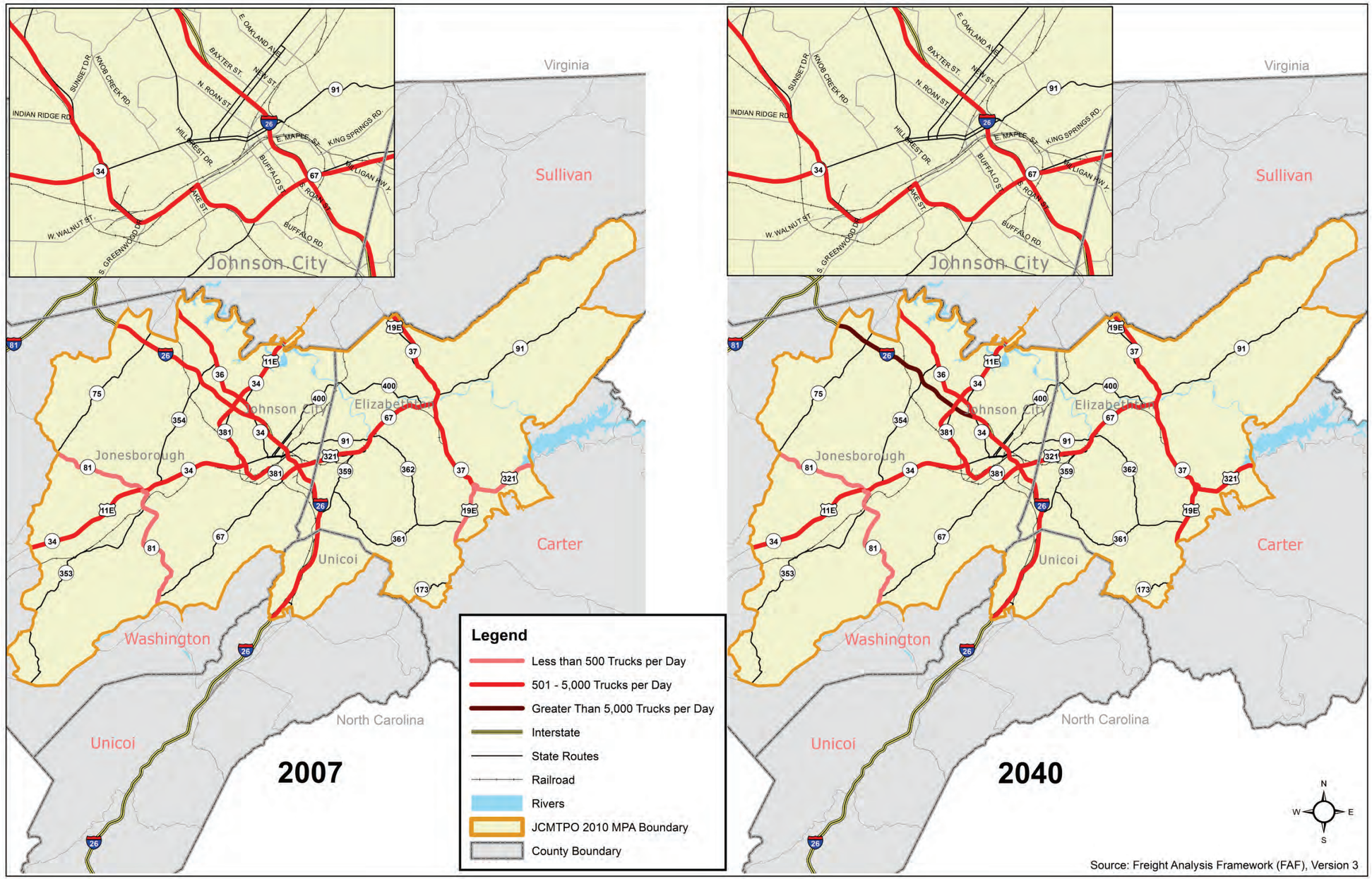
- Over 841,000 tons of commodities were shipped from Unicoi County to other parts of the US
- 99 percent (or 836,000 tons) of all commodities (in terms of weight) shipped from Unicoi County were transported by truck
- 1 percent (or 5,000 tons) of all commodities (in terms of weight) shipped from Unicoi County were transported by rail
- The county receiving the largest number of goods by truck (in terms of weight) was Carter County, Tennessee, which received 394,000 tons (or 47 percent) most of which was broken stone/riprap
- Boyd County, Kentucky received the largest amount of freight by rail (in terms of weight) from Unicoi County, which received 4,000 tons of metal scrap/tailings
- No commodities were shipped by air or water from Unicoi County

To Unicoi County, TN (in 2007)

- Over 200,000 tons of commodities were shipped to Unicoi County from other parts of the US
- 51 percent (or 102,000 tons) was shipped by rail, with lumber/dimension stock being the largest commodity
- 49 percent (98,000 tons) of all commodities (in terms of weight) shipped to Unicoi County were transported by truck
- The area shipping the largest number of goods to Unicoi County by truck (in terms of weight) was Shelby County, Tennessee, which shipped 11,500 tons (or 6 percent) most of which was warehouse and distribution center goods
- No commodities were shipped by air or water to Unicoi County

Figure 5-20 illustrates daily commercial vehicle truck flows (e.g. semi-trucks) through the MTPO planning area based on FHWA's Freight Analysis Framework (FAF^3) data for the years 2007 and 2040. As illustrated in the figure, the transport of goods to and from the region is projected to increase with the greatest volume of truck traffic occurring along I-26 in Washington County and along US 321 and US 19E in Carter County.

Figure 5-20
Freight Analysis Framework Daily Truck Flows (2007–2040)



5.1.6.2 Intermodal Connections

In total, 76 major freight businesses and freight generating facilities were identified within the MTPO area, with American Water Heater Company being one of the largest. Most of these facilities are located along roadways with direct access to a major highway and/or rail line.

Figure 5-21 illustrates the existing transportation system – rail, air, and truck that serve the area. A major determinant of current and future freight movement patterns is the location of industrial employers. The key to achieving greater efficiency in freight movement is the placement of these sites relative to existing transportation infrastructure. Figure 5-22 illustrates areas of industrial use within the MTPO area and how these locations are served by the various transportation systems.

As depicted in Figure 5-22, industrial use concentrations are mostly located near the existing railroad in Johnson City and Unicoi County, near interchanges along I-26, and along SR 400 in Johnson City and SR 91 in Elizabethton. Ensuring that uses are compatible and strategically placed improves the intermodal exchange of goods and helps to reduce costs in transport – both directly and indirectly.

5.1.6.3 Future Conditions

As discussed in earlier sections of this plan, the Johnson City area has a diverse transportation system that is conducive to the movement of goods and services. The recommended improvements of this plan illustrate considerable benefits across and between modes, and to each respective transportation system.

Numerous improvements to the transportation system over the next 27 years, such as interchange improvements to I-26, the widening of SR 400 and SR 354; the construction of the Jonesborough Parkway; safety improvements for SR 75 and SR 81; along with the deployment of intelligent transportation systems (ITS) technologies are intended to ensure adequate capacity and connectivity within the transportation system relative to transporting goods. These projects, along with other improvements within the plan, are intended to facilitate greater opportunities for the movement of goods and services within and through the MTPO area. Implementing the recommendations of the plan (described in Section 7.0) is key to this objective and the region's long term economic vitality.

Figure 5-21
Air, Rail & Truck Facilities Map

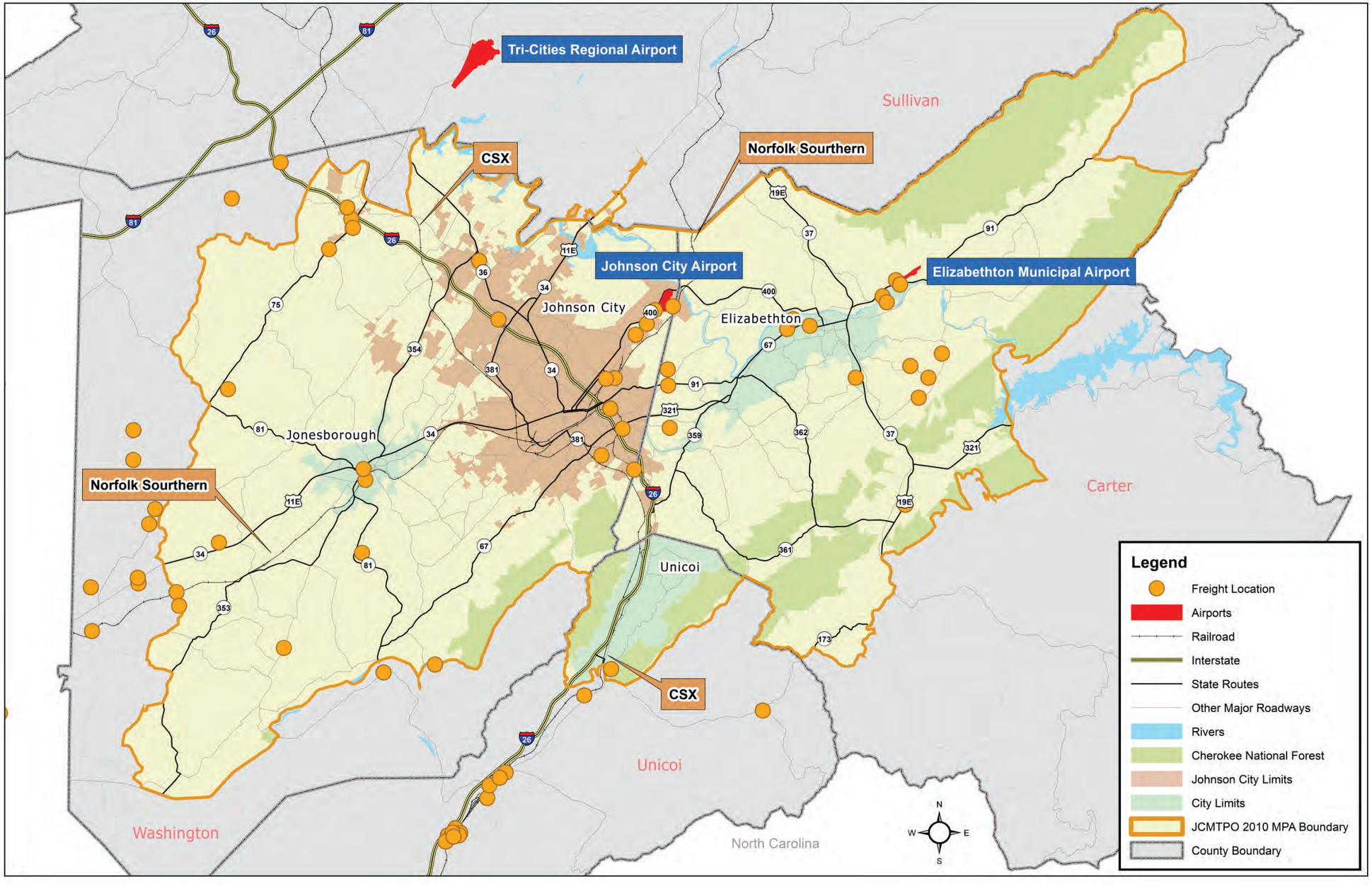
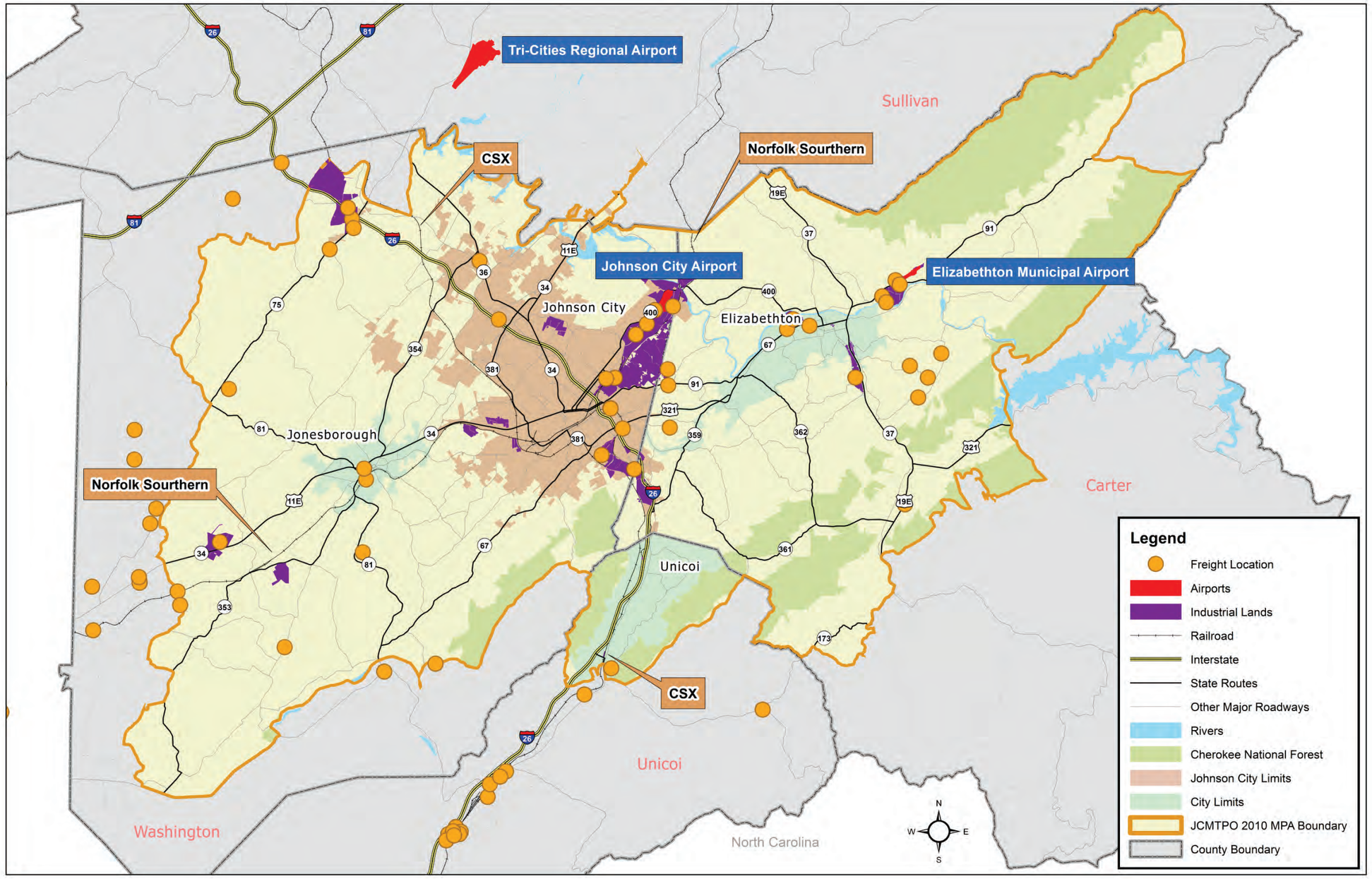


Figure 5-22
Freight System & Industrial Lands Map



5.1.7 Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) refers to use of technological innovation to manage the existing transportation system more effectively, improve its efficiency, and to make the system more user friendly. A wide variety of ITS technologies are under development or are being used in cities and towns throughout the US and internationally, ranging from motorist message signs to automatic vehicle locator (AVL) systems on transit vehicles.

In order to be eligible for federal transportation funding, regions must show that their ITS projects conform to a regional ITS architecture. ITS architectures provide a framework for implementing ITS projects, encourage interoperability and resource sharing among agencies, identify applicable standards to apply to projects, and allow for cohesive long-range planning among regional stakeholders. The requirement for a regional ITS architecture was first established in 1998 by the Transportation Equity Act for the 21st Century, and implemented in 2001 by the Federal Highway Administration's and Federal Transit Administration's policy on the National ITS Architecture. This requirement is continued under MAP-21.

The Johnson City Regional Intelligent Transportation System Architecture was developed in 2006 to organize the implementation of ITS technologies in the Johnson City region. The primary goals of the architecture were to steer the creation of a functional ITS program that satisfies the demands of local and regional transportation stakeholders and to formulate a realistic vision for the future of Johnson City's ITS network. The architecture was developed in conjunction with the existing Tennessee ITS Statewide Architecture.

In development of the Johnson City ITS architecture, 12 local, regional, state, and federal stakeholders, in addition to the MTPO, were consulted for input and assistance in defining the operation of the Johnson City networks. The Johnson City ITS stakeholders included:

- City of Elizabethton – Public Works
- City of Johnson City - Public Works
- City of Johnson City – Planning
- FHWA – Tennessee Division
- First Tennessee Development District
- Johnson City MTPO
- Johnson City Transit
- TDOT - HELP
- TDOT – Knoxville TMC
- TDOT – Region 1 Traffic
- TDOT – Long Range Planning Division
- TDOT – Design Division
- Washington County–Johnson City Emergency Management Agency

The Johnson City ITS Architecture contains 32 of the 85 market packages defined in the National ITS Architecture. The services (either existing or to be implemented in the future) in the Johnson City ITS architecture are listed as follows:

Travel & Traffic Management

- Network Surveillance
- Surface Street Control
- Traffic Information Dissemination
- Regional Traffic Control
- Traffic Incident Management System
- Standard Railroad Grade Crossing
- Speed Monitoring

Emergency Management

- Emergency Call-Taking & Dispatch
- Emergency Routing
- Wide-Area Alert
- Roadway Service Patrols
- Disaster Traveler Information
- Disaster Response and Recovery
- Evaluation and Reentry Management

Traveler Information

- Broadcast Traveler Information
- Interactive Traveler Information

Maintenance and Construction Management

- Road Weather Data Collection
- Weather Information Processing and Distribution
- Work Zone Management
- Maintenance & Construction Activity Coordination
- Vehicle & Equipment Tracking
- Winter Maintenance

Public Transportation Management

- Transit Fixed-Route Operations
- Transit Vehicle Tracking
- Transit Traveler Information
- Transit Security
- Demand Response Transit Operations
- Transit Passenger & Fare Management
- Transit Maintenance
- Multimodal Coordination

Archived Data Management

- Data Mart
- ITS Data Warehouse

As part of the Regional ITS Architecture an ITS Deployment Plan was also developed. The ITS Deployment Plan, while not required by FHWA and FTA, is a useful tool for regions to identify specific projects to be deployed in order to implement the architecture. The ITS Deployment Plan builds on the architecture by outlining specific ITS project recommendations and strategies for the Region as well as identifying deployment timeframes so that the recommended projects and strategies can be implemented over time. The following is a listing of the highest priority ITS projects for the Johnson City Region, some of which have been recently implemented, and/or are currently under development:

Travel and Traffic Management Projects

- City of Elizabethton Signal System Upgrades*
- City of Elizabethton Signal Timing Improvements
- City of Elizabethton CCTV Cameras
- City of Johnson City Signal System Upgrades*
- City of Johnson City TOC Upgrades
- City of Johnson City CCTV Cameras*
- City of Johnson City Dynamic Message Signs (DMS)
- City of Johnson City Communications Backbone Expansion
- City of Johnson City Traffic Signal Battery Backup
- City of Johnson City Vehicle Detection
- TDOT Smartway Deployment (I-26)
- TDOT HELP Vehicle AVL
- TDOT HELP Vehicle Service Area Expansion
- TDOT Interstate Reference Marker Deployment*
- TDOT Portable CCTV Camera Technology with Cellular Communications

Emergency Management Projects
- City of Elizabethton Emergency Vehicle Signal Preemption Expansion
- Washington County Emergency Vehicle Signal Preemption Expansion

Maintenance and Construction Management Projects
- City of Elizabethton Portable DMS
- City of Johnson City Upgrade and Expansion of Flood Detection Network
- TDOT Portable DMS Upgrade to Support Remote Communications

Public Transportation Management Projects
- Johnson City Transit Automated Passenger Counters
- Johnson City Transit AVL*
- Johnson City Transit Paratransit Schedule and Call Back System
- Johnson City Transit Real Time Arrival Information

** Denotes projects that have been implemented since 2006*

The use of ITS technologies will become an increasingly important component of the transportation system within the MTPO area as a means of better managing traffic flow and incidents on heavily traveled roadways, both today and in the future. In some cases, even with long-term roadway capacity improvements (as presented in Section 7.0) a number of high volume roadways throughout the region will continue to experience peak hour congestion. Roadways such as:

- US 11E (Bristol Highway/Roan St in Johnson City)
- US 11E (West Main St/East Jackson Blvd in Jonesborough and Johnson City)
- SR 381 (State of Franklin Rd in Johnson City)
- SR 36 (Roan St/Kingsport Hwy in Johnson City)
- US 321 (in Johnson City and in the City of Elizabethton)
- I-26 (the corridor and interchanges throughout the region)

will require transportation system management (TSM) solutions and ITS improvements to manage current and future traffic operations within the MTPO area over the 27-year planning horizon. Section 7.0 of the 2040 LRTP provides a program approach to funding such solutions as part of the MTPO's Cost Feasible LRTP with specific projects selected and implemented through the MTPO's TIP (as described in Section 6.2.4).

5.1.8 Transportation Safety

Federal legislation (MAP-21) requires that an MPO's LRTP include a safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the MPO area that are contained in the State's Strategic Highway Safety Plan. The discussions in this section are provided in accordance with these requirements and are intended to increase transportation safety for all roadway users within the Johnson City MTPO area. As illustrated in the following sections, much like other regions of the country, the Johnson City MTPO area has largely experienced a downward trend in vehicular crashes and fatalities. These trends are consistent with national data which are attributed to a number of factors including increased seat belt use, reductions in alcohol-related fatalities, and increased education and enforcement which have targeted various driver behaviors associated with vehicular fatalities.

5.1.8.1 Vehicular Crashes

Communities everywhere are searching for ways to make their roadways safer. In 2010 alone, there were 5.4 million crashes with over 30,000 fatalities, 1.5 million injury crashes, and 3.8 million crashes where property damage occurred on roadways throughout the US. The total number of people injured in motor vehicle accidents during 2010 was 2.2 million. The national fatality rate per 100 million vehicle miles traveled fell in 2010 to a historic low of 1.10.

Table 5-10 shows the number of vehicular crashes by type within Washington, Carter, and Unicoi Counties. From the year 2007 to 2011, the Johnson City region has seen a decrease in the total number of crashes from 5,498 to 4,927, a 10 percent decrease. All three types of crashes - fatal, injury crashes, and property damage only (PDO) - showed a decrease from 2007 to 2011. The largest drop was seen in the total number of fatal crashes, which fell from 37 in 2007 to 18 in 2011, a decrease of 51 percent.

Table 5-10
Number of Crashes by Type (2007-2011)

Year	Number of Fatal Crashes	Number of Injury Crashes	Number of PDO Crashes	Total Number of Crashes
Washington County				
2007	19	726	3,465	4,210
2008	11	636	2,748	3,395
2009	11	617	2,858	3,486
2010	9	640	3,114	3,763
2011	8	665	3,070	3,743
Percent Change (2007-2011)	-58%	-8%	-11%	-11%
Carter County				
2007	12	325	635	972
2008	5	287	685	977
2009	10	376	933	1,319
2010	9	360	886	1,255
2011	8	349	827	1,184
Percent Change (2007-2011)	-33%	7%	30%	22%
Unicoi County				
2007	6	95	215	316
2008	2	90	187	279
2009	0	85	213	298
2010	1	103	241	345
2011	2	75	229	306
Percent Change (2007-2011)	-67%	-21%	7%	-3%
Total Region				
2007	37	1,146	4,315	5,498
2008	18	1,013	3,620	4,651
2009	21	1,078	4,004	5,103
2010	19	1,103	4,241	5,363
2011	18	1,014	3,897	4,927
Percent Change (2007-2011)	-51%	-12%	-10%	-10%

Source: TN Dept. of Safety and Homeland Security, Research, Planning and Development Division

5.1.8.2 Vehicular Fatalities

Table 5-11 illustrates the number of vehicular fatalities since 2007 for each county within the Johnson City region. Over the 5 year time period on average, 25 people lost their lives annually in vehicular crashes on roadways within the region. From 2007 to 2011 the Johnson City region experienced a 65 percent drop in the number of vehicular fatalities.

Table 5-11
Number of Fatalities (2007-2011)

	2007	2008	2009	2010	2011	Percent Change (2007-2011)
Washington County	22	12	13	11	7	-68%
Carter County	15	6	11	10	8	-47%
Unicoi County	6	2	0	1	0	-100%
Total	**43**	**20**	**24**	**22**	**15**	**-65%**

Source: National Highway Traffic Safety Administration

Table 5-12 shows the number of alcohol-related fatalities per 100,000 population from 2006-2010. During this time period, the region saw a 75 percent decrease in alcohol-related vehicular fatalities per 100,000 population.

Table 5-12
Alcohol Related Fatalities per 100,000 Population (2006-2010)

	2006	2007	2008	2009	2010	Percent Change (2006-2010)
Washington County	2.59	6.79	3.33	4.11	2.43	-6%
Carter County	10.37	5.19	1.73	5.20	3.49	-66%
Unicoi County	11.02	21.97	0.00	0.00	0.00	-100%
Total	**23.98**	**33.95**	**5.06**	**9.31**	**5.92**	**-75%**

Source: National Highway Traffic Safety Administration

Table 5-13 illustrates the number of unrestrained fatalities per 100,000 population for each of the three counties in the Johnson City region. Each county in the region posted significant decreases, which resulted in a 67 percent decrease for the region.

Table 5-13
Unrestrained Fatalities per 100,000 Population (2006-2010)

	2006	2007	2008	2009	2010	Percent Change (2006-2010)
Washington County	6.90	6.79	5.00	4.11	4.05	-41%
Carter County	10.37	8.65	5.18	5.20	5.23	-50%
Unicoi County	11.02	27.46	5.47	0.00	0.00	-100%
Total	**28.29**	**42.90**	**15.65**	**9.31**	**9.28**	**-67%**

Source: National Highway Traffic Safety Administration

National studies have shown that the use of seat belts has increased in states that have used the "Click It or Ticket" campaign along with publicized enforcement efforts. Tennessee is among the states that showed more than a 10 percent increase in seat belt usage after implementing the program. The MTPO region appears to be benefiting from this statewide initiative.

5.1.8.3 Bicycle and Pedestrian Crashes

Pedestrians and cyclists are among the most vulnerable roadway users on our transportation system. The state of Tennessee had 90 pedestrian fatalities and 4 cyclist fatalities during 2010. Statewide during that same time period there were nearly 1,500 cyclists and pedestrians hit on Tennessee's roadways. From 2006 to 2010, there were 90 pedestrian crashes and 42 cyclist crashes in the Johnson City region. Table 5-14 shows the bicycle and pedestrian crashes in each of the three counties.

Table 5-14
Bicycle and Pedestrian Crashes (2006-2010)

Year	Washington County		Carter County		Unicoi County		Total	
	Cyclist	Pedestrian	Cyclist	Pedestrian	Cyclist	Pedestrian	Cyclist	Pedestrian
2006	3	19	3	6	1	1	7	26
2007	8	19	3	8	2	1	13	28
2008	8	14	0	3	1	2	9	19
2009	2	11	2	5	1	1	5	17
2010	6	*	2	*	0	*	8	*

*The number of pedestrian crashes has not been reported for 2010.

As pedestrian and bicycle travel increases in the MTPO area, it is important for the Johnson City region to design facilities that accommodate walking and biking. Policies should be created that encourage the evaluation of bicycle and pedestrian facilities as part of new roadway projects. Where the facilities are deemed necessary, the type of facility should be designed with consideration of the safety of all roadway users. Additionally, in addressing bicycle and pedestrian safety issues, it is critical to work in cooperation with local and state law enforcement to reduce violations of traffic rules intended to protect non-motorized users.

5.1.8.4 Tennessee Strategic Highway Safety Plan

Improvement of highway and traffic safety depends on the "4-Es": engineering, enforcement, emergency services, and education. Engineering involves the built roadway and transportation infrastructure and encapsulates design standards; warrants; materials and construction practices; and signage, striping, and signalization policies. Enforcement is aimed toward modifying (enforcing) human behavior. Enforcement affects drivers in the following way: a law will be enforced, an offender will be detected, the adjudicatory process will be swift and certain, and punishment will follow conviction. Emergency services include the assemblage of ambulance companies, fire rescue services, and third party emergency response units and emergency rooms/trauma centers. Obtaining accurate post-crash diagnosis and high quality post-crash care is a critical factor in transportation safety. Finally, similar to the enforcement programs that modify behavior through enforcement, education programs are intended to modify behavior through knowledge. Education encompasses driver licensing programs, driver remediation programs (e.g. traffic school), advanced driving courses, educational campaigns such as "Click It or Ticket" and "Booze it & Lose It," and school education programs aimed at K-12 and college level students. Combined, the 4-Es capture the range of transportation safety related investments that are needed to improve safety within any jurisdiction.

As previously mentioned, MAP-21 legislation requires that MPO's LRTP include a safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects for the MPO area that are contained in the State's Strategic Highway Safety Plan. Discussion in this section incorporates Tennessee's Strategic Highway Safety Plan and is provided to address the MAP-21 requirements.

Safety Plan in Tennessee

The general and specific goals and strategies for improving the safety of the region's transportation system are predominantly based on the Tennessee Strategic Highway Safety Plan. The mission, vision, and goal statements of the Tennessee Strategic Highway Safety Plan are as follows:

- *Tennessee's Mission Statement* – Through coordination of education, enforcement, engineering, and emergency response initiatives reduce the number of crashes that result in fatalities, injuries, and related economic losses on Tennessee's roadways.

- *Tennessee's Vision Statement* – All roadway users arrive safely at their destination.

- *Tennessee's Goal Statement* – Achieve fewer than 900 fatalities annually by the end of calendar year 2012.

To provide the most efficient and safest highway facilities, the Tennessee Strategic Highway Safety Plan identifies data-driven emphasis areas and strategies to reduce the number of fatal and serious injury crashes. The identified emphasis areas and strategies fall into seven categories which are:

- Improve Crash Data
- Reduce Lane Departures
- Improve Intersection Safety
- Improve Work Zone Safety
- Improve Motor Carrier Safety
- Improve Driver Behavior
- Educational and Awareness Programs

Under each of these categories are a series of stated strategies. As part of the development of the 2040 LRTP, the MTPO and its member jurisdictions reviewed each of the strategies from the Tennessee Strategic Highway Safety Plan compared to their efforts involving highway safety. Appendix II provides a listing of the efforts the MTPO and its member jurisdictions have been and/or continue to be involved in relative to strategies consistent with the State's Strategic Highway Safety Plan. Several specific initiatives of important focus to the MTPO include improved intersection safety, improved driver behavior, and increased educational and awareness programs intended to improve transportation safety for all roadway users. An area of focus the MTPO envisions playing a more active role in, in the future, is the facilitation and coordination of a regional traffic incident management team. As the MTPO region grows, the need for increased initiatives in highway safety will be necessary to mitigate the dangers of roadway travel and the hazards of congestion related crashes.

5.1.9 Security Element

Awareness of both man-made and natural security concerns has increased in the last decade due to events like September 11, 2001 and Hurricanes Katrina and Rita. The vulnerability of the transportation system and its use in emergency evacuations are issues receiving new attention. Federal requirements include security as a factor to be considered in transportation planning processes at both the metropolitan and statewide levels, stating that the planning process should provide for consideration and implementation of projects, strategies, and services that will increase the security of the transportation system for motorized and non-motorized users.

Transportation system security can be defined as the freedom from intentional harm and tampering that affects both motorized and non-motorized travelers, as well as natural disasters. Security goes beyond safety and includes the planning to prevent, manage, or respond to threats of a region and its transportation system and users. Though the MTPO is often not involved in specific security or emergency planning activities, the MTPO does communicate with state and local emergency management and law enforcement agencies, local engineering officials, and emergency personnel on major transportation plans and projects with the intention of developing a transportation system that is as secure as possible. An example of this can be seen in the MTPO's efforts in 2006 in planning for ITS technologies within the region. The MTPO's Regional ITS architecture helps to ensure that the planned ITS projects will be implemented with specific protocols and standards that allow for complete ITS interoperability. The architecture ensures that all agencies involved in transportation (emergency responders, law enforcement, transit agencies, local and regional transportation agencies) have the ability to share resources and information to better manage the overall daily operations of the transportation system.

Additionally, the implementation of ITS technologies is more than an ability to reduce congestion or respond to a traffic incident. ITS technologies provide enhanced management and operations of transportation facilities and often include surveillance equipment to monitor roadways for congestion and incidents; variable message signs that display traffic information to motorists; vehicle detection devices that report traffic counts, speed, and travel time; and motorist service patrols that respond to incidents in a timely manner. These technologies are equally important in providing a secure transportation system.

At many levels, ITS elements can have significant benefits in the event of an emergency. For example, Tennessee's 511 traveler information system which allows travelers to dial "511" on their telephone and get real-time travel information for most of the major roadways in Tennessee. This system can be used in the event of an emergency to disperse road closure and detour information as well as alternate route information to travelers, thus helping avoid further incident-related congestion.

Local transit agencies have always placed an emphasis on providing a safe, secure, and reliable service for its passengers and employees. These efforts are continuing and are an integral part of providing transit service. While transit must be concerned about safety and security as it relates to the provision of service, transit itself can be a valuable resource to a community in providing rescue or evacuation services. Local transit providers can participate as part of the larger community emergency preparedness efforts.

Lastly, each jurisdiction within the MTPO has an emergency operation plan and/or equivalent hazard mitigation plan that includes measures for homeland security factors for the region. These documents identify various potential man-made and natural hazards that could occur in the region and identify agency responsibilities in the event of an incident. Locally, the MTPO has attended meetings and provided input in the development of mitigation plans. Typically, the content of a hazard mitigation plan provides a risk and vulnerability assessment and establishes mitigation strategies. An example plan within the MTPO area is the Hazard Mitigation Plan for Elizabethton, Watauga, and Carter County which was developed in 2006 and is a multi-jurisdictional/agency approach to safeguarding against natural and man-made hazards within the region. TDOT has also developed a number of incident response plans, which define alternate routes when sections of the interstate are closed.

Emergency preparedness and hazard mitigation planning are important elements in providing a safe and secure transportation system. The MTPO is committed to continued participation in these efforts whereby transportation infrastructure and transportation decisions play an important role in protecting human life. The MTPO will seek opportunities to coordinate with TDOT, JCT, and other agencies and jurisdictions to develop appropriate incident and emergency preparedness plans, hazard mitigation efforts, and adaptation measure to reduce harm and risk associated with the impacts of climate change and extreme weather events on the region's transportation system.

6.0 FINANCIAL PLAN

The ability to maintain, improve and enhance transportation facilities and services in the MTPO area depends on adequate financial resources. This section includes:

- A description of the various revenue sources available to the MTPO for transportation-related improvements;
- A summary of the MTPO area's historic transportation revenue trends; and
- A forecast of future years' anticipated revenue for the MTPO region over the 27-year planning horizon.

The section concludes with a demonstration of fiscal constraint (i.e. demonstrating that transportation operations, maintenance, and recommended capital improvements can be afforded and adequately maintained into the future).

Financial assumptions of the LRTP were developed in consultation with the Tennessee Department of Transportation; the cities of Johnson City, Elizabethton, Jonesborough, and the Town of Unicoi; and Carter, Washington, and Unicoi Counties; and JCT. Revenue forecasts were developed based on historical funding levels and anticipated future inflationary factors. To account for anticipated future funding increases, an annual inflation factor of 3 percent was applied to each future year through 2040.

6.1 OVERVIEW OF FUNDING SOURCES

Funding for transportation facilities and services comes from a variety of sources – federal, state, local, and private. This subsection provides a brief description of the funding sources and categories that are available for transportation expenditures within the MTPO area.

Federal

There are a variety of federal transportation funds available to MPO areas. Surface transportation authorization acts authorize spending on federal highway and public transportation programs. The most recent multi-year authorization for federal surface transportation programs is MAP-21, adopted in July 2012. MAP-21 consolidated 87 programs under SAFETEA-LU to less than 30 programs. For purposes of providing a historic perspective of funding levels to the MTPO area under SAFETEA-LU, Table 6-1 provides a summary of the funding categories, cross referencing MAP-21 funding categories with those of SAFETEA-LU. This list is not all-inclusive, but serves to highlight the major Federal funding categories available within the MTPO area. General rules for the funding ratio of projects by type of funding program are also provided (percent of Federal compared to percent of state or local funds). This table is intended to be used only as a general guideline, as there are situations where the funding ratios may vary depending on the particular details of the project.

Table 6-1
Federal Transportation Funding Programs

MAP-21 Federal Programs	SAFETEA-LU Federal Programs	Description	Funding Ratio
National Highway Performance Program (NHPP)			
Combines the Interstate Maintenance, National Highway System, and on-system Federal-Aid Highway Bridges Programs into one program.	Interstate Maintenance (IM)	Provides funding to rehabilitate, restore, and resurface the Interstate System. Reconstruction is also eligible if it does not add new capacity, with the exception of High-Occupancy-Vehicle (HOV) lanes or auxiliary lanes in non-attainment areas, which can be added.	90% Federal 10% Non-Federal
	National Highway System (NHS)	Provides funding for major roads including the Interstate System, a large percentage of urban and rural principal arterials, the Strategic Defense Highway Network (STRAHNET), and strategic highway connectors.	80% Federal 20% Non-Federal
	Bridge Replacement and Rehabilitation – State (BRR, BR, or BRBD)	Provides funding for on-system bridge replacement, or to rehabilitate aging or substandard bridges based on bridge sufficiency ratings.	80% Federal 20% Non-Federal
Surface Transportation Program (STP)			
Program is largely the same as under SAFETEA-LU with the exception that STP funds can be used on bridge projects on any public road and for Appalachian Development Highway System (ADHS) projects.	Surface Transportation Program – State (STP or S-STP)	Provides funding for roads functionally classified as rural major collector and above. Funds may be utilized on projects in Rural Areas, Urbanized Areas, Small Urban Areas, Enhancement, Safety and Rail-Highway Crossings.	80% Federal 20% Non-Federal
	Surface Transportation Program – Local (L-STP)	Provides funding to areas of 5,000 to 50,000 in population for improvements on routes functionally classified urban collectors or higher.	80% Federal 20% Non-Federal
	Bridge Replacement and Rehabilitation – Local (BRR, BR, or BRBD)	Provides funding for off-system bridge replacement, or to rehabilitate aging or substandard bridges based on bridge sufficiency ratings.	80% Federal 20% Non-Federal
Highway Safety Improvement Program (HSIP)			
Program is largely the same as under SAFETEA-LU.	Highway Safety Improvement Program (HSIP)	Provides funding for making high hazard improvements on state highways (and at rail-highway grade crossings).	80% Federal 20% Non-Federal
Congestion Mitigation and Air Quality Program (CMAQ)			
Program is largely the same as under SAFETEA-LU.	Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Provides funding for transportation projects in air quality non-attainment or maintenance areas. CMAQ projects are designed to contribute toward meeting the national ambient air quality standards.	80% Federal 20% Non-Federal
Transportation Alternatives Program (TA)			
Combines the Transportation Enhancement Program, Safe Routes to School Program, and Recreational Trails Program into one program. Changes how some funds under this program can be used, but in general funding continues to support non-motorized transportation accommodations.	Transportation Enhancement Program (TE or ENH)	Provides funding for a set of exclusive activities such as bicycle and pedestrian facilities, rehabilitation of historic transportation related structures, and a defined set of environmental mitigation activities.	80% Federal 20% Non-Federal
	Safe Routes to School Program (SRTS)	Provides funding to substantially improve the ability of primary and middle school students to walk and bicycle to school safely.	80% Federal 20% Non-Federal (Previously 100% Federal)
	Recreational Trails Program (RTP)	Provides funding for the creation, rehabilitation and maintenance of multi-use recreational trails.	80% Federal 20% Non-Federal

MAP-21 Federal Programs	SAFETEA-LU Federal Programs	Description	Funding Ratio
Federal Lands and Tribal Transportation Programs			
Restructures the Indian Reservation Roads Program, Park Roads & Parkways Program, Refuge Roads Program, and Public Lands Highways Program into three programs.	Forest Highway/Public Lands or Public Lands Highways (FH/PL or PLHD)	Provides funding for roads providing access to and within Federal and Indian lands. Under MAP-21, the restructured programs include: • Tribal Transportation Program (TTP) • Federal Lands Transportation Program (FLTP) • Federal Lands Access Program (FLAP)	100% Federal or 80% Federal 20% Non-Federal
Urbanized Area Formula Grant (Section 5307)			
Program provides grants to Urbanized Areas for public transportation capital, planning, job-access and reverse-commute projects, as well as operating expenses in certain circumstances. The Jobs Access and Reverse Commute Program was eliminated in MAP-21, but the activities carried out under the program are an eligible expense under Section 5307.	Federal Transit Administration (FTA-5307)	Section 5307 is a formula grant program for urbanized areas providing capital, operating, and planning assistance for mass transportation.	80% Federal, 20% Non-Federal (Capital) 50% Federal, 50% Non-Federal (Operating)
	Federal Transit Administration Job Access/Reverse Commute (JARC-5316 or FTA-5316)	A Job Access project provides new or expanded transportation service designed to fill gaps that exist for welfare recipients and other low-income individuals to and from jobs and other employment-related services. Reverse Commute projects facilitate the provision of new or expanded public mass transportation services for the general public from urban, suburban, and rural areas to suburban work sites. Under MAP-21 this program has been eliminated but job-access and reverse-commute projects are eligible under the Section 5307 Program and Section 5310 Program.	80% Federal, 20% Non-Federal (Capital) 50% Federal, 50% Non-Federal (Operating)
Enhanced Mobility of Seniors and Individuals with Disabilities (Section 5310)			
MAP-21 consolidates the Elderly & Disabled Program and New Freedom Program into one program. Operating assistance is now available under this program.	Federal Transit Administration Elderly & Disabled Program (FTA-5310)	Section 5310 grants provide funding for capital expenses of private, nonprofit groups providing service to elderly persons or persons with disabilities. The State agency assures that local applicants and proposed projects are eligible and comply with federal requirements.	80% Federal 20% Non-Federal
	Federal Transit Administration New Freedom Program (FTA- 5317)	The New Freedom Program provides funding to serve persons with disabilities. The purpose of the program is to provide transportation services that either go beyond the minimum requirements of the Americans with Disabilities Act (ADA), or provide new public transportation services which help meet the needs of people with disabilities.	80% Federal, 20% Non-Federal (Capital) 50% Federal, 50% Non-Federal (Operating)
Formula Grant for Rural Areas (Section 5311)			
The program is largely the same as under SAFETEA-LU, with the exception that job-access and reverse-commute projects are eligible under this program.	Federal Transit Administration Formula Grants for Other than Urban Areas (Rural Areas) (FTA-5311)	Section 5311 formula funding is provided to states to support public transportation in areas of less than 50,000 population. Funds are available for transportation systems providing rural, general public transportation. Funding is available for capital, planning, and operating assistance. In the Johnson City MTPO area, NET Trans is a recipient of these funds as their services are offered outside the MTPO's urbanized area.	80% Federal, 20% Non-Federal (Capital) 50% Federal, 50% Non-Federal (Operating)
Bus and Bus Facilities (Section 5339)			
Program provides capital funding to replace, rehabilitate and purchase buses, vans, and related equipment, and to construct bus-related facilities. Replaces the Section 5309 Bus and Bus Facilities Program.	Federal Transit Administration (FTA-5309)	Provides funding for the establishment of new rail or busway projects (new starts), the improvement and maintenance of existing rail and other fixed guideway systems that are more than seven years old, and the upgrading of bus systems.	80% Federal 20% Non-Federal

State and Local

Within Tennessee, there are thirteen funding sources that provide various levels of funding towards transportation investments within the state. These funds are used primarily to match the federal programs listed above and fund state DOT functions. Additionally, a large portion of these funds are redistributed back to local jurisdictions to use for their individual transportation needs. Of these thirteen sources, three are dedicated to transportation.

Table 6-2 provides a summary of these funding sources and restrictions on their use.

Table 6-2
Statewide Transportation Funding Sources

State & Local Funding Sources		Restrictions of Use
Petroleum Taxes	Tennessee levies four main taxes on petroleum products: 1) a gasoline tax, 2) a (diesel) motor fuel tax, 3) a special petroleum tax, and 4) an environmental assurance fee.	
	The Gasoline Tax was first imposed by the legislature in 1923. The current tax rate is $.20 per gallon. The gasoline tax is the largest shared revenue source for combined county and municipal governments. Shared gasoline tax revenues are restricted to funding street and road construction and mass transit systems.	Roads & Mass Transit
	The Motor Fuel Tax was enacted in 1941. The tax is imposed on the sale of diesel fuel and alternate vehicle fuels. The tax is $0.17 per gallon. The state highway fund receives 66.8 percent (these funds are used on 100% state funded projects - STA), state general fund receives 1.2 percent, counties receive (for their highway fund) 21.3 percent, and municipalities receive 10.7 percent.	Roads & Mass Transit
	The Gasoline Inspection Tax was enacted in 1899 for the purpose of assuring that gasoline and oil sold in the state met minimum quality standards. The tax was reenacted on January 1, 1979, and imposed at a rate of $0.01 for each gallon of gasoline and other volatile fuels sold, used, or stored. The state highway fund receives 98 percent of the net collections and the general fund receives two percent. However, before the revenue is distributed, an annual amount of $12,017,000 is to be set aside monthly to a local government fund to be spent solely for county roads and city streets.	Roads
Sales and Use Tax	The retail sales and use tax, imposed in 1947, immediately became the state's largest single revenue source.	
	The major purpose in enacting the sales tax was to provide for state and county education programs. The current state sales and use tax rate is seven percent and is applied to the sale, use, consumption, distribution, lease, or rental of tangible personal property and of selected services.	None
Hall Income Tax	The Hall Income Tax was enacted in 1929 and is levied on certain types of dividend and interest income from stocks and "bonds" as broadly defined in the Tennessee Code Annotated (TCA) Section 67-2-101.	None
Other State Shared Taxes	The following are the remaining state shared taxes collected, which provide revenue to cities and counties in Tennessee.	
	Alcoholic Beverage, Beer Excise, Wholesale Beer, Corporate Excise, Severance - Crude Oil/Natural Gas, and TVA Payments	None
	Mixed Drink	50% Education
	Severance - Coal	Education & Highways

Source: Tennessee Code and Department of Revenue

All local jurisdictions receive at least some transportation funding from the state (i.e., the state shared revenue from state-imposed taxes with local jurisdictions). The largest of these shared taxes is the petroleum tax, which commonly is used by local jurisdictions for transportation. The state also shares various sales taxes with localities, and funds from the other sources, which are usually placed in a jurisdiction's general fund.

In addition to the state shared revenues, there are several exclusive local taxes that provide revenue to cities and counties which can be used for transportation investments. These revenue sources include:

- Property Taxes
- Beer and Liquor Taxes
- Hotel/Motel Taxes
- In Lieu of Tax Payments
- Sales Taxes
- Business Taxes

Other Potential Funding Options
While not considered part of the 2040 LRTP Financial Plan, other regions are exploring the following funding options in meeting their transportation funding needs which may be worth considering in the Johnson City MTPO area:

- Creation and use of tax increment financing and capital improvement district funds for targeted areas within the region
- Creation and use of local adequacy fees which some communities in Tennessee use to offset development infrastructure costs

6.2 HISTORIC TRANSPORTATION REVENUE TRENDS

Historic funding trends provide a reasonable foundation for estimating likely future funding levels over the next 27-year period in the MTPO area. As previously described, numerous revenue sources provide funding for transportation in the MTPO area. These revenue sources have, and continue to provide, a steady stream of funding for transportation infrastructure and services in the MTPO area.

Table 6-3 and Table 6-4 provide a historic perspective of federal transportation revenues for highway and transit related projects from the above referenced federal transportation funding programs. Historic revenue trend data comes from past MTPO Transportation Improvement Programs (TIPs) which provides federal, state, and local funding levels for transportation expenditures in the region. For illustrative purposes, historic revenues are cross referenced to MAP-21 funding categories, serving as a basis of the MTPO's assumptions for future year revenue forecasts.

Table 6-3
Summary of Historic Revenue for Highways in the MTPO Area – Federal

Funding Source	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	5 Year Average Annual Funding Level
National Highway Performance Program (NHPP)						
IM	$50,000	$102,800	$760,000	$405,000	$1,930,000	$649,560
NHS	$200,000	$200,000	$200,000	$0	$200,000	$160,000
Bridge - BRR-S	$9,786,000	$1,010,000	$20,000	$229,000	$20,000	$2,213,000
Surface Transportation Program (STP)						
STP (State)	$4,980,000	$7,220,000	$13,260,000	$81,778,618	$1,010,000	$21,649,724
STP (Local)	$6,027,993	$3,781,443	$3,821,665	$8,699,066	$2,497,808	$4,965,595
Bridge - BRR-L	$2,510,000	$312,294	$110,000	$88,000	$88,000	$621,659
Bridge - BRBD	$0	$1,015,000	$10,000	$10,000	$10,000	$209,000
Highway Safety Improvement Program (HSIP)						
Safety - HSIP	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Transportation Alternatives Program (TA)						
ENH	$858,000	$550,000	$550,000	$2,437,760	$664,000	$1,011,952
SRTS	$250,000	$250,000	$250,000	$500,000	$0	$250,000
Discretionary Funding Programs*						
HPP*	$7,574,819	$5,856,300	$0	$10,072,519	$5,653,089	$5,831,345
IVHS*	$0	$0	$0	$3,446,843	$0	$689,369
NHCB*	$400,000	$0	$0	$320,000	$0	$144,000
ARRA-Local*	$0	$2,435,941	$0	$0	$0	$487,188
ARRA-State*	$0	$23,039,000	$0	$0	$0	$4,607,800
Local Matching Funds						
Local (100%)	$1,981,512	$575,000	$662,000	$2,541,547	$253,000	$1,202,612
Total	$35,618,324	$47,347,778	$20,643,665	$111,528,353	$13,325,897	$45,692,803

* Discretionary funding programs (HPP-High Priority Projects, IVHS-Intelligent Vehicle/Highway System, NHCB-National Historic Covered Bridge Preservation Program, ARRA-American Recovery and Reinvestment Act)

Sources: JC MTPO FY2003-2006 TIP, JC MTPO FY2006-2008 TIP, JC MTPO FY2008-2011 TIP, and JC MTPO FY2011-2014 TIP

Table 6-4
Summary of Historic Revenue for Transit in the MTPO Area – Federal

Operating & Preventative Maintenance						
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5307 - Operating Funds	$873,655	$971,090	$1,001,700	$1,075,000	$1,105,000	$1,005,289
State Match Funds	$436,828	$449,311	$456,804	$466,000	$470,000	$455,789
Local Match Funds	$436,828	$521,779	$544,896	$609,000	$635,000	$549,500
Total Allocated	$1,747,310	$1,942,179	$2,003,400	$2,150,000	$2,210,000	$2,010,578
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5307 - Preventive Maint. & Capital Projects	$214,880	$212,200	$348,250	$374,970	$260,000	$282,060
State Match Funds	$26,860	$26,525	$43,531	$46,871	$32,500	$35,258
Local Match Funds	$26,860	$26,525	$43,531	$46,871	$32,500	$35,258
Total Allocated	$268,600	$265,250	$435,313	$468,712	$325,000	$352,575
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5317 - New Freedom Program	$50,000	$100,000	$100,000	$125,000	$125,000	$100,000
State Match Funds	$25,000	$50,000	$50,000	$62,500	$62,500	$50,000
Local Match Funds	$25,000	$50,000	$50,000	$62,500	$62,500	$50,000
Total Allocated	$100,000	$200,000	$200,000	$250,000	$250,000	$200,000
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5316 - Job Access/Reverse Commute	$100,000	$100,000	$100,000	$150,000	$241,000	$138,200
State Match Funds	$50,000	$50,000	$50,000	$75,000	$79,500	$60,900
Local Match Funds	$50,000	$50,000	$50,000	$75,000	$79,500	$60,900
Total Allocated	$200,000	$200,000	$200,000	$300,000	$400,000	$260,000
Total Operating & Maintenance Funding	$2,315,910	$2,607,429	$2,838,713	$3,168,712	$3,185,000	$2,823,153
Capital						
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5307 - Capital	$215,453	$212,200	$163,200	$228,250	$228,250	$209,471
State Match Funds	$26,525	$26,525	$20,400	$23,375	$23,375	$24,040
Local Match Funds	$26,622	$26,525	$20,400	$23,375	$23,375	$24,059
Total Allocated	$268,600	$265,250	$204,000	$275,000	$275,000	$257,570
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5309 – Discretionary Capital Funding	$133,315	$300,000		$228,250	$228,250	$222,454
State Match Funds	$16,665	$30,725		$23,375	$23,375	$23,535
Local Match Funds	$16,665	$30,725		$23,375	$23,375	$23,535
Total Allocated	$166,645	$361,450	$0	$275,000	$275,000	$269,524
Funding Source/Amount Allocated	FY2008	FY2009	FY2010	FY2011	FY2012	Average Annual
FTA 5310 – Elderly/Persons with Disabilities	$90,066			$121,000		$105,533
State Match Funds	$11,259			$15,125		$13,192
Local Match Funds	$11,259			$15,125		$13,192
Total Allocated	$112,583	$0	$0	$151,250	$0	$131,917
Total Capital Funding	$547,828	$626,700	$204,000	$701,250	$550,000	$659,011
Total Transit Funding	$2,863,738	$3,234,129	$3,042,713	$3,869,962	$3,735,000	$3,482,164

Sources: JC MTPO FY2003-2006 TIP, JC MTPO FY2006-2008 TIP, JC MTPO FY2008-2011 TIP, and JC MTPO FY2011-2014 TIP

Table 6-5 and Table 6-6 provide a historic perspective of transportation revenues and expenditures in the MTPO area over a five year period from state-shared gas tax revenues, local property taxes for transportation, and road aid funds.

Table 6-5
Summary of Historic Revenue for Transportation in the MTPO Area - City

City of Johnson City	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Annual Average
Total Government Budget	$295,131,446	$312,452,173	$349,912,489	$332,845,041	$362,885,387	
Public Works (PW)	$11,954,349	$11,759,714	$14,699,318	$15,041,881	$14,922,121	$13,675,477
PW % of Total Budget	4%	4%	4%	5%	4%	
State-Shared Funds	$7,521,751	$7,899,793	$7,735,744	$8,244,943	$9,156,477	$8,111,742
Gas & Motor Fuel Tax	$1,702,075	$1,727,483	$1,613,445	$1,628,378	$1,678,320	$1,669,940
All Other State-Shared Taxes	$5,819,676	$6,172,310	$6,122,299	$6,616,565	$7,478,158	$6,441,802
City of Elizabethton	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**Annual Average**
Total Government Budget	$13,702,393	$13,517,947	$14,322,095	$18,745,686	$16,534,934	
Public Works (PW)	$1,710,488	$1,709,253	$1,975,372	$1,892,643	$2,096,641	$1,876,879
PW % of Total Budget	12%	13%	14%	10%	13%	
State-Shared Funds	$1,863,891	$1,914,648	$2,732,648	$2,198,437	$2,104,543	$2,162,833
Gas & Motor Fuel Tax	$424,865	$427,962	$398,485	$401,054	$413,249	$413,123
All Other State-Shared Taxes	$1,439,025	$1,486,686	$2,334,163	$1,797,383	$1,691,294	$1,749,710
Town of Jonesborough	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**Annual Average**
Total Government Budget	$9,135,358	$10,056,740	$10,669,575	$11,350,956	$11,235,433	
Streets Department (SD)	$954,519	$628,090	$691,267	$1,054,357	$811,742	$827,995
SD % of Total Budget	10%	6%	6%	9%	7%	
State-Shared Funds	$526,480	$564,114	$561,387	$566,928	$616,969	$567,176
Gas & Motor Fuel Tax	$130,761	$131,713	$122,642	$123,432	$136,096	$128,929
All Other State-Shared Taxes	$395,719	$432,401	$438,746	$443,496	$480,874	$438,247
Town of Unicoi	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**Annual Average**
Total Government Budget	$944,619	$1,154,677	$1,210,217	$1,070,167	$1,086,550	
Public Works (PW)	$301,446	$351,904	$352,720	$277,903	$250,160	$306,827
PW % of Total Budget	32%	30%	29%	26%	23%	
State-Shared Funds	$395,011	$405,397	$379,547	$373,324	$392,676	$389,191
Gas & Motor Fuel Tax	$106,662	$107,440	$100,040	$100,682	$103,745	$103,714
All Other State-Shared Taxes	$288,349	$297,957	$279,507	$272,642	$288,931	$285,477

Source: Tennessee Comptroller of the Treasury

These revenues primarily fund the maintenance and operations of the local transportation system. Maintenance and operating costs generally include paving, signs and painting, right-of-way maintenance, traffic signal maintenance, surveillance and inspection, street lighting, and other various repairs and minor modifications to streets, bridges, sidewalks, and intersections in a maintenance capacity.

Table 6-6
Summary of Historic Revenue for Transportation in the MTPO Area - County

Carter County	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Average Annual
Administration	$657,754	$692,797	$741,990	$761,616	$772,457	
Asphalt Plant Operations						
Capital Outlay	$512,617	$209,671	$605,052	$53,948	$205,369	$282,460
Highway and Bridge Maintenance	$1,639,831	$1,535,732	$1,239,171	$1,415,480	$1,670,104	
Operation and Maintenance of Equipment	$466,382	$528,457	$420,627	$521,031	$700,221	
Other Charges	$92,015	$81,993	$81,071	$82,877	$84,001	
Traffic Control/Litter & Trash Collection	$27,641	$81,772	$37,818	$37,796	$28,438	
Total	$3,396,240	$3,130,422	$3,125,729	$2,872,748	$3,460,590	$3,126,538
Total (Without Capital Outlay)	$2,883,623	$2,920,751	$2,520,677	$2,818,800	$3,255,221	$2,844,078
State-Shared Funds - Transportation	$2,127,352	$2,092,943	$2,175,388	$2,207,272	$2,199,477	$2,160,486
Washington County	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**Average Annual**
Administration	$1,781,750	$1,803,417	$1,719,973	$1,374,660	$1,693,115	
Asphalt Plant Operations	$1,906,180	$2,280,802	$2,027,727	$2,754,335	$2,900,591	
Capital Outlay	$523,019	$43,375	$240,676	$153,935	$448,512	$299,360
Highway and Bridge Maintenance	$1,998,043	$2,388,504	$2,342,774	$2,151,133	$2,482,929	
Operation and Maintenance of Equipment	$705,188	$667,789	$693,768	$714,270	$786,482	
Other Charges	$87,225	$112,135	$111,832	$114,471	$201,500	
Traffic Control					$131,356	
Total	$7,001,405	$7,296,022	$7,136,750	$7,262,804	$8,644,485	$7,438,912
Total (Without Capital Outlay)	$6,478,386	$7,252,647	$6,896,074	$7,108,869	$8,195,973	$7,139,552
State-Shared Funds - Transportation	$4,153,937	$3,830,548	$3,219,765	$4,137,867	$3,578,969	$3,784,217
Unicoi County	**FY 2007**	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**	**Average Annual**
Administration	$329,865	$345,460	$361,206	$387,087	$403,751	
Asphalt Plant Operations						
Capital Outlay	$46,300	$839,869	$345,107	$302,114	$443,356	$391,796
Highway and Bridge Maintenance	$972,831	$1,024,615	$1,189,212	$1,099,153	$911,619	
Operation and Maintenance of Equipment	$207,958	$245,427	$206,642	$233,159	$230,611	
Other Charges	$111,993	$119,956	$120,178	$129,558	$110,035	
Traffic Control						
Total	$1,668,947	$2,575,327	$2,222,345	$2,151,071	$2,099,372	$2,100,955
Total (Without Capital Outlay)	$1,622,647	$1,735,458	$1,877,238	$1,848,957	$1,656,016	$1,709,159
State-Shared Funds - Transportation	$1,382,899	$1,962,374	$1,322,575	$1,554,794	$1,610,502	$1,566,629

Source: Tennessee Comptroller of the Treasury

In addition to these local funds for maintenance and operations, TDOT expends on average nearly $4 million annually ($1.3 million in Carter, $1.6 million in Washington, and $1 million in Unicoi) for maintenance and operation activities on state and interstate roadways in the three-county region.

6.2.1 Funding Forecast

Historic revenue trends provide a foundation for making realistic projections on potential future funding. This subsection provides a projection of likely funds available for transportation in the MTPO area over the plan horizon based on historic trends. Assumptions on available revenues and assumptions on likely increases in revenues over time were derived by reviewing historic funding levels from the revenue sources presented in subsections 6.1 and 6.2. Additionally, the MTPO reviewed various tax revenue publications from the State of Tennessee. This information, coupled with discussions with TDOT and JCT, resulted in the revenue assumptions and likely annual increases in revenues over the 27-year planning horizon for the MTPO region. It is important to note that discretionary funding (i.e. congressional earmarks) were not included in future year revenue assumptions and single high funding level years, per funding category, were removed when determining historic funding levels for future year projections.

6.2.2 Streets and Highways

Historic funding trends for streets and highways operations and maintenance and capital investments from all previously discussed funding sources over the 27-year planning horizon resulted in an availability of:

- $ 1,124,169,000 for operating/maintenance funds, and
- $ 538,393,000 for capital investments.

Operating and maintaining existing infrastructure is a sizable portion of the overall transportation budget accounting for more than two-thirds of funds available of all streets and highway funds. The expense of maintaining the current transportation system is typically shared between state and local governments. State highway maintenance funds are provided through the Tennessee Department of Transportation for items such as pavement markings, signage, resurfacing, snow removal, and minor repairs.

Local governments provide a substantial amount of equipment and manpower to maintain local streets and roads, including some state routes. Local government budgets specify funding through public works departments for maintaining streets in a variety of activities, including resurfacing, cleaning, right-of-way mowing, litter control, signage, pavement markings, snow removal, and others.

A conservative three percent compounded annual growth rate was assumed over the 27-year planning horizon. Table 6-7 and Table 6-8 illustrate the funding availability by horizon year for streets and highways within the MTPO area and include federal, state, and local revenues.

Table 6-7
2040 Streets & Highways Operating and Maintenance Funding Forecast

Operations and Maintenance Funding

Revenue Source	Annual Average [1]	Inflation Factor [2]	Revenue Projections			
			2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
TDOT (Various State Sources) [3]	$ 3,890,000	1.03	$ 30,701,000	$ 56,491,000	$ 75,919,000	$ 163,111,000
City of Johnson City - State & Local Gas/State Aid Funds	$ 8,110,000	1.03	$ 64,007,000	$ 117,774,000	$ 158,279,000	$ 340,060,000
City of Elizabethton - State & Local Gas/State Aid Funds	$ 2,160,000	1.03	$ 17,047,000	$ 31,368,000	$ 42,156,000	$ 90,571,000
Town of Jonesborough - State & Local Gas/State Aid Funds	$ 570,000	1.03	$ 4,499,000	$ 8,278,000	$ 11,124,000	$ 23,901,000
Town of Unicoi - State & Local Gas/State Aid Funds	$ 390,000	1.03	$ 3,078,000	$ 5,664,000	$ 7,611,000	$ 16,353,000
Carter County - State & Local Gas/State Aid Funds [4]	$ 2,840,000	1.03	$ 22,414,000	$ 41,243,000	$ 55,427,000	$ 119,084,000
Washington County - State & Local Gas/State Aid Funds [4]	$ 7,140,000	1.03	$ 56,351,000	$ 103,688,000	$ 139,348,000	$ 299,387,000
Unicoi County - State & Local Gas/State Aid Funds [4]	$ 1,710,000	1.03	$ 13,496,000	$ 24,833,000	$ 33,373,000	$ 71,702,000
Total	**$26,810,000**		**$ 211,593,000**	**$ 389,339,000**	**$ 523,237,000**	**$ 1,124,169,000**

[1] Annual average revenues are based on a review of historic funding levels to the MTPO region
[2] Revenue forecasts assume a 3 percent annual growth rate of funding unless otherwise noted
[3] TDOT maintenance funds shown are for state maintained roadways for the complete counties of Carter, Washington, and Unicoi Counties
[4] County maintenance funds shown are for the complete counties of Carter, Washington, and Unicoi Counties
Projections rounded to the nearest thousands

Table 6-8
2040 Streets & Highways Capital Funding Forecast

Capital Funding

Revenue Source	Annual Average [1]				Revenue Projections			
	Federal Share	Non-Federal Share	Total	Inflation Factor [2]	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
National Highway Performance Program (NHPP) Funds (NHS, IM, & portion BRR/BR Funds) - (80%/20%)	$ 1,112,000	$ 278,000	$ 1,390,000	1.03	$ 10,970,000	$ 20,186,000	$ 27,128,000	$ 58,284,000
Surface Transportation Program (S-STP) Funds (S-STP & portion of BRR/BR Funds) State Selected Projects - (80%/20%)	$ 4,000,000	$ 1,000,000	$ 5,000,000	1.03	$ 39,462,000	$ 72,610,000	$ 97,582,000	$ 209,654,000
Highway Safety Improvement Program (HSIP) Funds Safety Funding (90%/10%)	$ 900,000	$ 100,000	$ 1,000,000	1.03	$ 7,892,000	$ 14,522,000	$ 19,516,000	$ 41,930,000
Surface Transportation Program (L-STP) Funds MPO Selected Projects (80%/20%)	$ 2,560,000	$ 640,000	$ 3,200,000	1.03	$ 25,255,000	$ 46,471,000	$ 62,453,000	$ 134,179,000
Transportation Alternatives (TA) Funds (Enhancement, RT, SRTS Funds) (80%/20%)	$ 600,000	$ 150,000	$ 750,000	1.03	$ 5,919,000	$ 10,892,000	$ 14,637,000	$ 31,448,000
State (STA or SP and SPPR) Funds State Selected Projects (100% State)		$ 300,000	$ 300,000	1.03	$ 2,368,000	$ 4,357,000	$ 5,855,000	$ 12,580,000
Local Funding (100% Local)		$ 1,200,000	$ 1,200,000	1.03	$ 9,471,000	$ 17,427,000	$ 23,420,000	$ 50,318,000
Total	**$ 9,172,000**	**$ 3,668,000**	**$ 12,840,000**		**$ 101,337,000**	**$ 186,465,000**	**$ 250,591,000**	**$ 538,393,000**

[1] Based on a review of historic funding levels to the MTPO region.

[2] Revenue forecasts assume a 3 percent annual growth rate of funding.
Projections rounded to the nearest thousands

6.2.3 Public Transportation

As previously discussed, a variety of transit services are offered throughout the Johnson City MTPO area. These services range from fixed-route and demand-response services in the City of Johnson City to flexible, demand-response service in the rural portions of the MTPO area.

Historic funding trends for transit operating assistance and capital investments from all transit related funding sources resulted in availability over the 27-year planning horizon of:

- $118,377,000 for operating assistance; and
- $ 27,633,000 for capital investments.

A conservative 3 percent compounded annual growth rate was assumed for operating and capital funds over the 27-year planning horizon.

Table 6-9 and Table 6-10 illustrate the funding availability by transit agency by horizon year for public transportation within the MTPO area. The majority of these funds are associated with JCT, as they are the largest provider of services in the MTPO area.

Table 6-9
2040 Public Transportation Operating Funding Forecast

Transit - Operating Funding

Revenue Source	Annual Average*	Inflation Factor**	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
JCT						
Operating Assistance - FTA 5307 (Federal)	$ 1,181,577	1.03	$ 9,325,000	$ 17,159,000	$ 23,060,000	$ 49,544,000
Operating Assistance - TN (State)	$ 590,788	1.03	$ 4,663,000	$ 8,579,000	$ 11,530,000	$ 24,772,000
Operating Assistance - Johnson City (Local)	$ 590,788	1.03	$ 4,663,000	$ 8,579,000	$ 11,530,000	$ 24,772,000
FTA 5307 Total	**$ 2,363,153**		**$ 18,651,000**	**$ 34,317,000**	**$ 46,120,000**	**$ 99,088,000**
JCT & Other Transit Providers						
Operating Assistance - Other FTA Programs (Federal) 50%	$ 238,200	1.03	$ 1,880,000	$ 3,459,000	$ 4,649,000	$ 9,988,000
Operating Assistance - Other FTA Programs (Non-Federal Match) 50%	$ 221,800	1.03	$ 1,751,000	$ 3,221,000	$ 4,329,000	$ 9,301,000
Other FTA Programs (FTA 5316, 5317) & Discretionary Funds * Total**	**$ 460,000**		**$ 3,631,000**	**$ 6,680,000**	**$ 8,978,000**	**$ 19,289,000**
Total Operating Assistance	**$ 2,823,153**		**$ 22,282,000**	**$ 40,997,000**	**$ 55,098,000**	**$ 118,377,000**

* Based on a review of historic funding levels to the MTPO region (FY08-FY11 MPO and FY11-FY14 MPO TIP)
** Revenue forecasts assume a 3 percent annual growth rate of funding.
*** Conservative estimate of FTA funds likely to be available within the MTPO region over the 27-Year Planning Horizon
Projections rounded to the nearest thousands

Table 6-10
2040 Public Transportation Capital Funding Forecast

Transit - Capital Funding

Revenue Source	Annual Average*	Inflation Factor**	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
JCT						
Capital Assistance - FTA 5307 (Federal) 80%	$ 206,056	1.03	$ 1,626,000	$ 2,992,000	$ 4,021,000	$ 8,639,000
Capital Assistance - TN (State) 10%	$ 25,757	1.03	$ 203,000	$ 374,000	$ 503,000	$ 1,080,000
Capital Assistance - Johnson City (Local) 10%	$ 25,757	1.03	$ 203,000	$ 374,000	$ 503,000	$ 1,080,000
FTA 5307 Total	**$ 257,570**		**$ 2,032,000**	**$ 3,740,000**	**$ 5,027,000**	**$ 10,799,000**
JCT & Other Transit Providers						
Capital Assistance - Other FTA Programs (Federal) 80%	$ 327,987	1.03	$ 2,589,000	$ 4,763,000	$ 6,401,000	$ 13,753,000
Capital Assistance - Other FTA Programs (Non-Federal Match) 20%	$ 73,454	1.03	$ 580,000	$ 1,067,000	$ 1,434,000	$ 3,081,000
Other FTA Programs (FTA 5309, 5310, 5316, 5317) & Discretionary Funds* Total**	**$ 401,441**		**$ 3,169,000**	**$ 5,830,000**	**$ 7,835,000**	**$ 16,834,000**
Total Capital Assistance	**$ 659,011**		**$ 5,201,000**	**$ 9,570,000**	**$ 12,862,000**	**$ 27,633,000**

* Based on a review of historic funding levels to the MTPO region (FY08-FY11 MTPO and FY11-FY14 MTPO TIP)
** Revenue forecasts assume a 3 percent annual growth rate of funding.
*** Conservative estimate of FTA funds likely to be available within the MTPO region over the 27-Year Planning Horizon
Projections rounded to the nearest thousands

6.2.4 Relationship of LRTP to the Transportation Improvement Program

As part of the MTPO planning process, the interaction of the LRTP with the Transportation Improvement Program (TIP) is important in facilitating a smooth transition, from the planning stages of a project to implementation. The LRTP identifies needed transportation improvements over a 20-plus year planning horizon and is used to identify the list of projects for inclusion into the MTPO's TIP. MTPO member governments select these projects, based on funding, schedule, priorities, and citizen input. The TIP thus reflects specific long-range plan projects, according to several factors, including needs, costs, and overall design ensuring adequate mobility in the region is maintained bearing in mind fiscal constraints. The TIP presents a listing of the selected projects scheduled for the next four years. It also presents a more detailed project cost estimate, description of the type of improvements associated with the project, the funding sources and mixture, and the funding amounts for the specific project.

6.3 FISCAL CONSTRAINT

Demonstrating that transportation operations, maintenance, and capital investments can be funded and adequately maintained into the future is not only mandated by federal law but is an essential component of good planning. This subsection demonstrates fiscal accountability by presenting a financially constrained plan for:

- Operations and Maintenance - for both roadways and public transportation
- Capital Investments - for streets and highways, which includes roadway widening and new roads, bridges, transportation system management and intelligent transportation systems (ITS), walkways and bikeways, as well as public transportation

through the year 2040 for the MTPO area. All revenues and expenses in this analysis represent year of expenditure (YOE) dollars as required by MAP-21.

Year of Expenditure Costs

To comply with the requirement of 23 CFR 450.322 (10), (iv) "year of expenditure dollars", US inflation rate data were evaluated. Inflation is an increase in the price you pay or a decline in the purchasing power of money. In other words, Price Inflation is when prices get higher or it takes more money to buy the same item. Inflation is measured by the Bureau of Labor Statistics in the United States using the Consumer Price Index. Long-term US inflation trends (over a 25 to 30 year time period) track at about 3 percent per year (source: http://inflationdata.com). Based on the long-term average 3 percent, revenues have been projected to increase at a 3 percent annual growth rate compounded annually over current funding levels. Consequently, project costs and program categories of the 2040 LRTP have been escalated at the same rate to reflect a likely project cost at "year of expenditure".

6.3.1 Operations and Maintenance – Revenue & Expenses

This subsection summarizes the operating and maintenance revenues and expenditures of the 2040 LRTP. Revenues are consistent with the financial analysis as described in Subsection 6.2 and expenditures are described in Section 7.0.

Streets and Highways

The most expensive non-capital highway activity is roadway maintenance and operations. Maintenance costs include routine and regular expenditures required to keep highways, streets, and rights-of-way in usable conditions such as patching repairs, bridge painting, and other maintenance activities. Additionally, there are other traffic service costs such as snow and ice-removal, pavement marking, signs, and litter removal.

The MTPO, in consultation with TDOT was able to determine future operations and maintenance funding levels for streets and highways for the MTPO area based on historic funding trends. A three percent annual growth rate, compounded annually over current funding levels, was determined to be appropriate for operations and maintenance funding based on past funding growth trends within the MTPO area. While maintenance expenditures within the MTPO area are estimated to increase in the future, various safeguards are in place to ensure the continued long-term maintenance of streets and highways within the region. For example, within Tennessee, to remain eligible for state gas tax revenues, Tennessee law requires that local governments annually appropriate and allocate funds for road maintenance purposes from local revenue sources in an amount not less than the average of the five proceeding fiscal years. If a jurisdiction fails to meet this provision, they in turn lose out on the State Gas Tax revenues that otherwise would have come to that jurisdiction. In addition, Tennessee law requires TDOT to set-a-side State Highway funds for accelerating the resurfacing of the state system of highways in order to establish a 12-year cycle for resurfacing of state roads and eight years on the interstate system.

Operating and maintenance expenses are assumed to grow at a similar rate accounting for incremental increases in operating and maintenance costs and the additional lane-miles that are to be added to the roadway system through system expansion over the next 27 years. Table 6-11 illustrates the anticipated revenues and expenditures for operation and maintenance (O&M) activities within the MTPO area over the 27-year plan horizon.

Table 6-11
Streets & Highways Operations & Maintenance Revenues and Expenditures

Revenue Source	Anticipated O & M Revenues (2014-2040)	Anticipated O & M Costs (2014-2040)	Fiscal Constraint Summary[1]
TDOT [2]	$ 163,111,000	$ 163,111,000	$0
City of Johnson City	$ 340,060,000	$ 340,060,000	$0
City of Elizabethton	$ 90,571,000	$ 90,571,000	$0
Town of Jonesborough	$ 23,901,000	$ 23,901,000	$0
Town of Unicoi	$ 16,353,000	$ 16,353,000	$0
Carter County [3]	$ 119,084,000	$ 119,084,000	$0
Washington County [3]	$ 299,387,000	$ 299,387,000	$0
Unicoi County [3]	$ 71,702,000	$ 71,702,000	$0
Total	$ 1,124,169,000	$ 1,124,169,000	$0

[1] Funding balance after subtracting planned expenditures from anticipated revenues
[2] TDOT maintenance funds shown are for state maintained roadways for the complete counties of Carter, Washington, and Unicoi Counties
[3] County maintenance funds shown are for the complete counties of Carter, Washington, and Unicoi Counties

Public Transportation

The MTPO, in consultation with JCT and TDOT determined future operating revenue levels for transit for the MTPO area based on historic funding trends. Table 6-12 illustrates the revenues and expenditures for transit operations within the MTPO area over the 27-year plan horizon.

Table 6-12
Transit Operations & Maintenance Revenues and Expenditures

Revenue Source	Anticipated O & M Revenues (2014-2040)	Anticipated O & M Costs (2014-2040)	Fiscal Constraint Summary*
Operating Assistance – FTA Funds (Federal)	$ 59,532,000	$ 59,532,000	$0
Operating Assistance - TN (State)	$ 29,422,500	$ 29,422,500	$0
Operating Assistance – Johnson City (Local)	$ 29,422,500	$ 29,422,500	$0
Total Operating Assistance	$ 118,377,000	$ 118,377,000	$0

* Funding disposition after subtracting planned expenditures from anticipated revenues

Since NET Trans largely operates outside of the MTPO area, operations and maintenance revenues and expenditures are not included in the 2040 LRTP.

6.3.2 Capital – Revenue & Expenses

This subsection summarizes the capital revenues and expenditures of the recommended 2040 LRTP which is presented in Section 7.0 of this Plan.

The following is a summary of the 2040 LRTP's planned transportation improvements (by Streets and Highways and Public Transportation funding programs) balanced against anticipated revenues, which have been forecasted to the year 2040.

Streets and Highways
The MTPO, in consultation with TDOT, was able to determine future capital revenues for Streets and Highways for the MTPO area based on historic funding trends. A summary of planned improvements to roads and bridges, which includes roadway widening and new roads, transportation system management and intelligent transportation systems (ITS), and walkways and bikeways, are presented in Section 7.0.

Table 6-13 illustrates the revenues and expenditures of transportation improvements over the planning horizon within the MTPO area. The total budget for these planned improvements is $538,393,000. Of this amount, $2,308,000 is envisioned to be flexed to the public transportation program to cover transit capital needs that exceed historic transit funding levels over the 27-year planning horizon. Including these flexed funds, all anticipated funding is allocated on a project or program with no anticipated surplus in funds for streets and highways.

Public Transportation
Table 6-14 illustrates the revenues and expenditures of the planned improvements for transit projects over the planning horizon. Nearly $30 million in transit capital needs are envisioned over the 27-year plan horizon. As mentioned above, $2,308,000 will need to be flexed from the MTPO's streets and highways program to the public transportation program to meet future year transit capital needs.

As illustrated in Table 6-13 and Table 6-14, the MTPO's Financial Plan of the 2040 LRTP demonstrates fiscal constraint and complies with the federal requirement for developing a financially constrained long range transportation plan.

Table 6-13
Streets & Highways
Capital Revenues and Expenditures

Capital Funding - Budget

Revenue Type	Revenue Projections			
	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
National Highway Performance Program (NHPP) Funds (NHS, IM, & portion BRR/BR Funds) - (80%/20%)	$ 10,970,000	$ 20,186,000	$ 27,128,000	$ 58,284,000
Surface Transportation Program (S-STP) Funds (S-STP & portion of BRR/BR Funds) State Selected Projects - (80%/20%)	$ 39,462,000	$ 72,610,000	$ 97,582,000	$ 209,654,000
Highway Safety Improvement Program (HSIP) Funds Safety Funding (90%/10%)	$ 7,892,000	$ 14,522,000	$ 19,516,000	$ 41,930,000
Surface Transportation Program (L-STP) Funds MPO Selected Projects (80%/20%)	$ 25,255,000	$ 46,471,000	$ 62,453,000	$ 134,179,000
Transportation Alternatives (TA) Funds (Enhancement, RT, SRTS Funds) (80%/20%)	$ 5,919,000	$ 10,892,000	$ 14,637,000	$ 31,448,000
State (STA or SP and SPPR) Funds State Selected Projects (100% State)	$ 2,368,000	$ 4,357,000	$ 5,855,000	$ 12,580,000
Local Funding (100% Local)	$ 9,471,000	$ 17,427,000	$ 23,420,000	$ 50,318,000
Total	**$ 101,337,000**	**$ 186,465,000**	**$ 250,591,000**	**$ 538,393,000**

Capital Funding - Expenditures

Revenue Type	Project Costs			
	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
National Highway Performance Program (NHPP) Funds (NHS, IM, & portion BRR/BR Funds) - (80%/20%)	$ 10,970,000	$ 3,100,000	$ 44,214,000	$ 58,284,000
Surface Transportation Program (S-STP) Funds (S-STP & portion of BRR/BR Funds) State Selected Projects - (80%/20%)	$ 28,515,000	$ 64,826,000	$ 116,313,000	$ 209,654,000
Highway Safety Improvement Program (HSIP) Funds Safety Funding (90%/10%)	$ 4,925,000	$ 17,489,000	$ 19,516,000	$ 41,930,000
Surface Transportation Program (L-STP) Funds MPO Selected Projects (80%/20%)	$ 22,524,000	$ 29,587,000	$ 82,068,000	$ 134,179,000
Transportation Alternatives (TA) Funds (Enhancement, RT, SRTS Funds) (80%/20%)	$ 5,919,000	$ 10,892,000	$ 14,637,000	$ 31,448,000
State (STA or SP and SPPR) Funds State Selected Projects (100% State)	$ 775,000	$ 5,950,000	$ 5,855,000	$ 12,580,000
Local Funding (100% Local)	$ 9,471,000	$ 15,422,000	$ 25,425,000	$ 50,318,000
Total	**$ 83,099,000**	**$ 147,266,000**	**$ 308,028,000**	**$ 538,393,000**

Capital Funding - Fiscal Constraint Results

Revenue Type	Project Costs			
	2020 Horizon Year	2030 Horizon Year	2040 Horizon Year	Total 2014-2040
National Highway Performance Program (NHPP) Funds (NHS, IM, & portion BRR/BR Funds) - (80%/20%)	$ -	$ 17,086,000	$ -	$ -
Surface Transportation Program (S-STP) Funds (S-STP & portion of BRR/BR Funds) State Selected Projects - (80%/20%)	$ 10,947,000	$ 18,731,000	$ -	$ -
Highway Safety Improvement Program (HSIP) Funds Safety Funding (90%/10%)	$ 2,967,000	$ -	$ -	$ -
Surface Transportation Program (L-STP) Funds MPO Selected Projects (80%/20%)	$ 2,731,000	$ 19,615,000	$ -	$ -
Transportation Alternatives (TA) Funds (Enhancement, RT, SRTS Funds) (80%/20%)	$ -	$ -	$ -	$ -
State (STA or SP and SPPR) Funds State Selected Projects (100% State)	$ 1,593,000	$ -	$ -	$ -
Local Funding (100% Local)	$ -	$ 2,005,000	$ -	$ -
Remaining Balance/Carryover Balance	**$ 18,238,000**	**$ 57,437,000**	**$ -**	**$ -**

Table 6-14
Public Transportation
Capital Revenues and Expenditures

Transit - Capital Funding

Revenue Source	2020 Horizon Year Rev Est.	2020 Horizon Year (Cost)	2020 Horizon Year (Difference)	2030 Horizon Year Rev Est.	2030 Horizon Year (Cost)	2030 Horizon Year (Difference)	2040 Horizon Year Rev Est	2040 Horizon Year (Cost)	2040 Horizon Year (Difference)	Total 2014 - 2040 Rev Est	Total 2014-2040 Horizon Year (Cost)	Total 2014 - 2040 Difference
JCT												
FTA 5307 Capital Assistance - Total	$ 2,032,000	$ 2,032,000	$ -	$ 3,740,000	$ 3,740,000	$ -	$ 5,027,000	$ 5,027,000	$ -	$10,799,000	$10,799,000	$ -
JCT & Other Transit Providers												
Other FTA Programs (FTA 5309, 5310, 5316, 5317) & Discretionary Funds Total	$ 3,169,000	$ 2,701,000	$ 468,000	$ 6,298,000	$ 6,298,000	$ -	$ 7,835,000	$ 7,835,000	$ -	$16,834,000	$16,834,000	$ -
Total Capital Assistance	$ 5,201,000	$ 4,733,000	$ 468,000	$10,038,000	$10,038,000	$ -	$12,862,000	$12,862,000	$ -	$27,633,000	$27,633,000	$ -
Flexed Federal Highway Funds												
L-STP	$ -	$ -	$ -	$ 1,322,000	$ 1,322,000	$ -	$ 986,000	$ 986,000	$ -	$ 2,308,000	$ 2,308,000	$ -
Total Capital Funding	$ 5,201,000	$ 4,733,000	$ 468,000	$11,360,000	$11,360,000	$ -	$13,848,000	$13,848,000	$ -	$29,941,000	$29,941,000	$ -

7.0 RECOMMENDED PLANNED IMPROVEMENTS

This section includes the recommended planned improvements for the Johnson City MTPO area over the next 27 years. Needed transportation improvements were identified based on a review of previous planning efforts, agency involvement, citizen and stakeholder input, and results from the MTPO's regional travel demand model. Each transportation recommendation was evaluated based on the MTPO's established LRTP project selection criteria as presented in Section 2.0 and Appendix III. This information was then balanced against the MTPO's projected financial revenue availability, which subsequently resulted in the recommended projects of this Plan. Transportation improvements within the recommended plan are financially constrained (i.e. have been balanced against forecasted revenues presented in Section 6.0 of the LRTP).

7.1 PLANNED TRANSPORTATION IMPROVEMENTS

This subsection provides a complete listing of the 2040 LRTP planned transportation improvements, which are to be implemented over the 27-year plan horizon within the Johnson City MTPO area.

These improvements can be implemented within the anticipated revenues that have been forecasted over the planning horizon.

7.1.1 Streets and Highways

This category includes planned improvements for roadways (i.e. roadway widening, new roadway construction, and roadway reconstruction), bridges, transportation system management/safety and intelligent transportation systems, and walkways and bikeways.

7.1.1.1 Roadways

Planned roadway improvements for the MTPO area are contained in Table 7-1 and illustrated in Figure 7-1.

7.1.1.2 Transportation System Management (TSM)/ITS/Safety and Bridge

In an effort to address systems operations and management needs in a more short-term approach, funding has been allocated for the implementation of transportation system management (TSM) and intelligent transportation systems (ITS) solutions along with program funding for safety and bridge replacement/rehabilitation/maintenance projects.

Table 7-2 contains allocated funding levels for these improvement project solutions which may include intersection and signal improvements, minor ramp improvements, and various other geometric, safety, and operational related improvements including ITS applications. As part of the MTPO's TIP development, project needs will be identified and funded from this program approach.

Table 7-1
2040 Planned Roadway Improvements

2040 LRTP NO	Vision Plan 2040 LRTP NO	Jurisdiction	Roadway	From	To	Length (Miles)	Federal Functional Classification	Type of Improvement	Project Description	Non-Motorized Accommodation [1]		Current Number of Lanes	Future Number of Lanes	Modeled in Travel Demand Model [2]	Air Quality (E)xempt (N)on-Exempt	Time Frame [3]	Anticipated Funding Source	Total Estimated Project Cost [4]	Year of Expenditure Cost [5]
										Bike	Ped								
C-1	C-1	Johnson City	Knob Creek Road Extension	West of Mizpah Hills Drive	Marketplace Boulevard	0.94	Collector	Reconstruction	Construct new 5 lane (overpass crossing CSX RR)	Appropriate	Appropriate			Yes	N	2020	L-STP	$9,000,000	$9,548,000
C-2	C-2	Johnson City	VA Hospital Connector	West Market Street	VA Hospital	0.2	Proposed Collector	New Road	Construct new 2-lane road	Appropriate	Appropriate	-	2	Yes	N	2020	Local	$1,900,000	$2,016,000
C-3	C-3	Elizabethton	Elizabethton Connector (SR 91 Extension)	US 19E	US 321	0.4	Principal Arterial	Reconstruction	Add center turn lane along the 4-lane undivided portion of West Elk Avenue from Holly Lane to North Roan Street. Sidewalk improvements and repaving of SR 91 from West G Street to SR 37 (US 19E)	Appropriate	Appropriate			Yes	E	2020	S-STP	$9,000,000	$9,548,000
C-4	C-6	Johnson City	I-26 Exit 17	SR 354 (Boones Creek Road)		-	Interstate	Interchange Modification	Interchange Modification	-	-	-	-	Yes	E	2020	NHPP/S-STP	$12,000,000	$12,731,000
C-5	C-7	Johnson City	I-26 Exit 24	SR 67 (University Parkway)		-	Interstate	Interchange Modification	Interchange Modification	-	-	-	-	Yes	E	2020	NHPP/S-STP	$12,000,000	$12,731,000
C-6	C-8	Jonesborough	SR 81	SR 353		-	Collector	Construct a roundabout	Intersection of SR 81 with SR 353 with Depot Street in Jonesborough	Appropriate-WC	Appropriate-WC	-	-	Yes	E	2020	L-STP	$2,000,000	$2,122,000
5	VP-05	Johnson City	Boones Creek Rd (SR 354)	I-26	Highland Church Rd	2.2	Minor Arterial	Widening	Widen existing 2 lane roadway to 4 lanes	Appropriate	Appropriate-WC	2	4	Yes	N	2040	S-STP	$21,400,000	$38,651,000
6	VP-06	Washington Co	Boones Creek Rd (SR 354)	Highland Church Rd	Jonesborough Parkway	2.9	Minor Arterial	Widening	Widen existing 2 lane roadway to 4 lanes	Appropriate	Appropriate-WC	2	4	Yes	N	2040	S-STP	$28,200,000	$50,932,000
7	VP-07	Jonesborough	Boones Creek Rd (SR 354)	Jonesborough Parkway	US 11E	1.2	Minor Arterial	Widening	Widen existing 2 lane roadway to 4 lanes	Appropriate	Appropriate-WC	2	4	Yes	N	2040	L-STP/S-STP	$11,600,000	$20,951,000
8	VP-08	Jonesborough	Jonesborough Parkway	Boones Creek Rd (SR 354)	US 11E	2.7	Proposed Minor Arterial	New Road	Construct new 3 lane roadway	Appropriate	Appropriate-WC	-	3	Yes	N	2040	L-STP	$29,400,000	$53,100,000
9	VP-09	Johnson City	N. State of Franklin (SR 381)	I-26	Knob Creek Rd	1.0	Principal Arterial	Widening	Widen existing 4 lane roadway to 6 lanes	Exist	Exist	4	6	Yes	N	2030	L-STP	$9,000,000	$14,022,000
10	VP-10	Johnson City	N. State of Franklin (SR 381)	Knob Creek Rd	Indian Ridge Rd	1.9	Principal Arterial	Widening	Widen existing 4 lane roadway to 6 lanes	Exist	Exist	4	6	Yes	N	2030	S-STP	$17,100,000	$26,641,000
12	VP-12	Elizabethton	Elk Ave (SR 67)	Milligan Hwy (SR 359)	Hudson Dr	2.6	Principal Arterial	Widening	Widen existing 4/5 lane roadway to 6 lanes	Appropriate	Appropriate-WC	4/5	6	Yes	N	2030	S-STP	$22,600,000	$35,210,000
13	VP-13	Johnson City	Bristol Hwy (SR 34)	N. State of Franklin (SR 381)	MTPO Planning Boundary	3.1	Principal Arterial	Widening	Widen existing 4/5 lane roadway to 6/7 lanes	Appropriate	Appropriate-WC	4	6/7	Yes	N	2040	NHPP/S-STP	$26,800,000	$48,404,000
15	VP-15	Johnson City	Roy Martin Rd	Gray Station Rd	Bobby Hicks Hwy (SR 75)	0.2	Proposed Collector	Reconstruction	Reconstruct 2 lane roadway addressing geometric issues to align with Roy Martin Rd Ext	Appropriate	Appropriate-WC	2	2	Yes	E	2040	Local	$1,600,000	$2,890,000
16	VP-16	Washington Co	Roy Martin Rd Extension	Bobby Hicks Hwy (SR 75)	Free Hill Rd	1.0	Proposed Collector	New Road	Construct new 2 lane roadway	Appropriate	Appropriate-WC	-	2	Yes	N	2040	Local	$3,900,000	$7,044,000
17	VP-17	Washington Co	Free Hill Rd	Free Hill Rd	Kingsport Hwy (SR 36)	1.6	Proposed Collector	Reconstruction	Reconstruct 2 lane roadway addressing geometric issues	Appropriate	Appropriate-WC	2	2	Yes	E	2040	Local	$750,000	$1,355,000
18	VP-18	Johnson City	Knob Creek Rd	Mizpath Hills Dr	Boones Creek Rd (SR 354)	2.0	Proposed Collector	Widening	Widen existing 2 lane roadway to 4 lanes	Appropriate	Appropriate	2	4	Yes	N	2030	Local	$9,000,000	$14,022,000
19	VP-19	Elizabethton	W G St	W Elk Ave (SR 67)	Hudson Dr	2.0	Minor Arterial	Reconstruction	Reconstruct existing 2 lane roadway to 3 lanes (adding a center turn lane)	Appropriate	Appropriate	2	3	Yes	E	2020	L-STP	$8,500,000	$9,854,000
20	VP-20	Johnson City	Watauga Rd (SR 400)	Broadway St	E Fairview Ave	1.1	Minor Arterial	Reconstruction	Reconstruct existing 2 lane roadway to 3 lanes (adding a center turn lane)	Appropriate	Appropriate-WC	2	3	Yes	E	2030	STA	$3,300,000	$5,141,000
21	VP-21	Johnson City	Watauga Rd (SR 400)	E Fairview Ave	Piney Flats Rd	2.8	Minor Arterial	Reconstruction	Reconstruct existing 2 lane roadway to 3 lanes (adding a center turn lane)	Appropriate	Appropriate-WC	2	3	Yes	E	2030	L-STP	$8,500,000	$13,243,000
22	VP-22	Washington Co	Bob Jobe Rd Extension	Eastern Star Rd (Bob Jobe Rd)	Ford Creek Rd	1.5	Proposed Collector	Reconstruction	Reconstruct 2 lane roadway addressing geometric issues to align with Bob Jobe Rd Ext	Appropriate	Appropriate-WC	2	2	Yes	E	2020	Local	$2,300,000	$2,513,000
23	VP-23	Washington Co	Bob Jobe Rd Extension	Ford Creek Rd	Center St	1.5	Proposed Collector	New Road	Construct new 2 lane roadway	Appropriate	Appropriate-WC	-	2	Yes	N	2020	Local	$4,500,000	$4,917,000
24	VP-24	Johnson City	Hopper Rd	W Market St (US 11E)	Indian Ridge Rd	0.7	Proposed Collector	Reconstruction	Reconstruct 2 lane roadway addressing geometric issues to align with Hopper Rd Ext	Appropriate	Appropriate	2	2	Yes	E	2040	Local	$550,000	$993,000
25	VP-25	Johnson City	Hopper Rd Ext	Indian Ridge Rd	Claude Simmons Rd	1.0	Proposed Collector	New Road	Construct new 2 lane roadway	Appropriate	Appropriate	-	2	Yes	N	2040	Local	$4,600,000	$8,308,000
26	VP-26	Carter Co	Okolona Rd (SR 359)	I-26	Existing Okolona Rd (SR 359)	0.7	Collector	Realignment	Realign existing roadway with interchange to create better access	Appropriate	Appropriate-WC	2	2	Yes	E	2040	L-STP	$6,000,000	$10,837,000
27	VP-27	Washington Co	SR 75	Boonesboro Rd	MTPO Planning Boundary (i.e. to US 11E)	12.8	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2030	HSIP	$4,400,000	$6,855,000
28	VP-28	Washington Co	SR 81	Jonesborough Parkway	MTPO Planning Boundary (i.e. to I-81)	14.4	Minor Arterial	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2030	HSIP	$4,900,000	$7,634,000
29	VP-29	Washington Co	Leesburg Rd	US 11E	SR 81	3.9	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2040	Local	$1,900,000	$3,432,000
30	VP-30	Washington Co	SR 353	SR 81	SR 107	13.3	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2040	HSIP	$4,600,000	$8,308,000
31	VP-31	Washington Co	SR 81	SR 353	MTPO Planning Boundary (i.e. to I-26)	13.8	Minor Arterial	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2040	S-STP	$6,200,000	$11,198,000
32	VP-32	Carter Co	SR 361	SR 359	US 19E	8.9	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2040	HSIP	$3,000,000	$5,418,000
33	VP-33	Carter Co	Okolona Rd (SR 359)	Milligan Hwy (SR 359)	S Roan St	1.6	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2040	STA	$2,400,000	$4,335,000
34	VP-34	Washington Co	Highland Church	SR 75	Boones Creek Rd (SR 354)	5.3	Collector	Safety/Geometric	Safety/geometric improvements (including paved shoulder improvements at select locations/intersections as determined thru the project development process)	Appropriate	Appropriate-WC	2	2	Yes	E	2020	HSIP	$1,800,000	$2,087,000

Notes:
[1] Consideration of non-motorized accommodation/preliminary assessment: (Appropriate = a bicycle or pedestrian facility maybe appropriate as part of the improvement; Appropriate-WC = Appropriate with conditions (conditions may depend on land use surroundings, right-of-way, or demand))
[2] Roadway facilities are modeled in the MTPO travel demand model according to the number of capacity lanes per horizon year
[3] Anticipated year open to traffic
[4] Current year dollars (2012)
[5] Estimated project cost in future year based on inflation (See Section 6.3.2 for further details)

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Figure 7-1
2040 Planned Cost Feasible Roadway Improvements

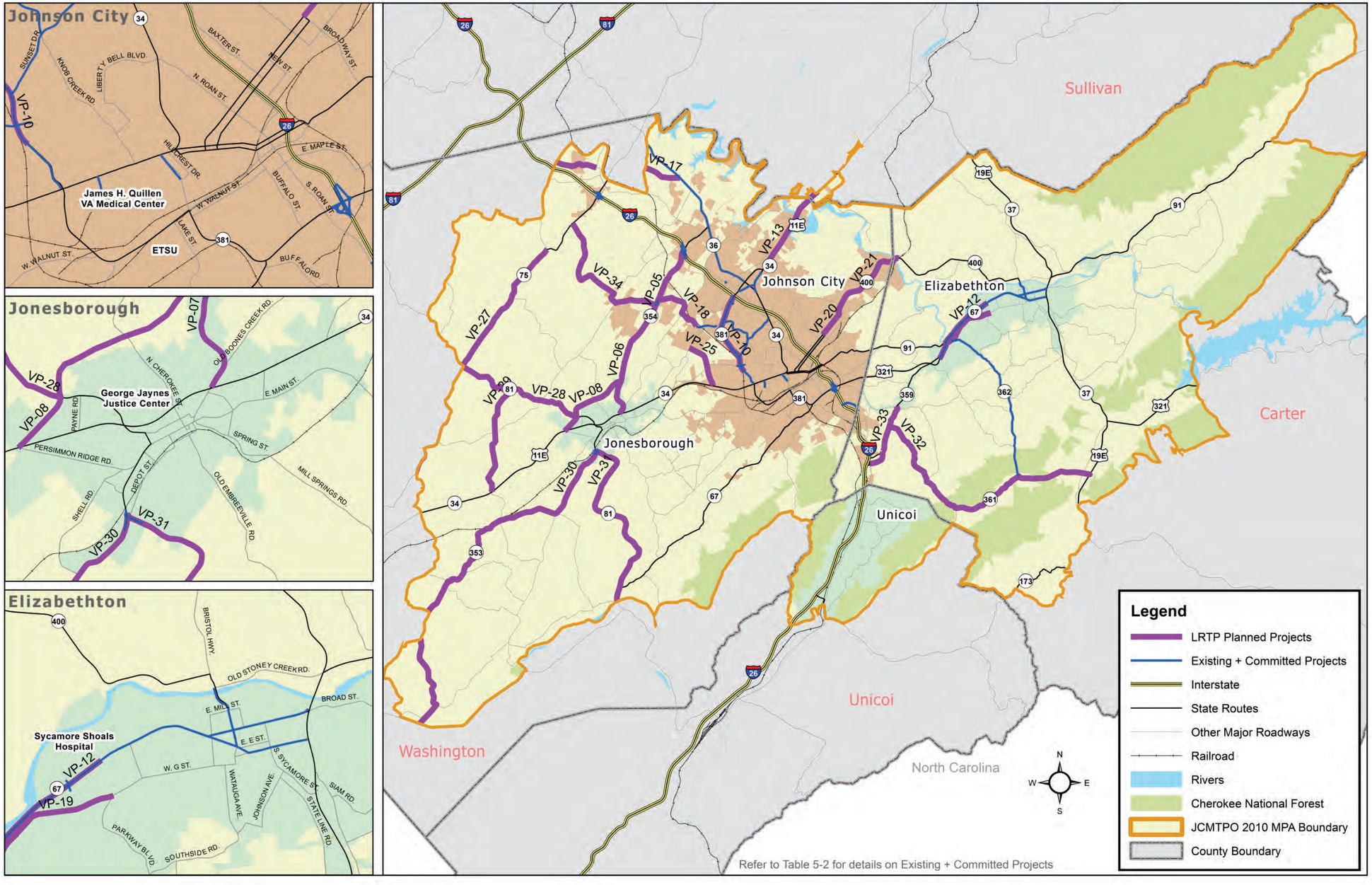

Table 7-2
2040 Planned TSM/ITS/Safety & Bridge Improvements

2040 LRTP No.	Type of Improvement	Air Quality (E)xempt (N)on-Exempt	Time Frame	Anticipated Funding Source	Total Estimated Funding
TISB-20	TSM/ITS/Safety/Bridge Improvements	E	2020	STP/NHPP/HISP/Local	$9,113,000
TISB-30	TSM/ITS/Safety/Bridge Improvements	E	2030	STP/NHPP/HISP/Local	$12,284,000
TISB-40	TSM/ITS/Safety/Bridge Improvements	E	2040	STP/NHPP/HISP/Local	$16,249,000
				Total	$37,646,000

Notes: TSM projects include a broad range of management and operational techniques designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety. TSM projects may include: interchange improvements on interstates (e.g. additional turning lanes and/or ramp reconfigurations, and/or signal improvements, signage, and lighting); intersection improvements on non-interstates (e.g. additional turning lanes and/or signal improvements, including pedestrian signals (when warranted), and/or signage and lighting); and other traffic operational improvements (e.g. signal timing, access management, traffic calming, etc.). Additionally, ITS projects are to be based on the Regional ITS Architecture which includes the following categories of project recommendations: Travel and Traffic Management, Public Transportation Management, Emergency Management, and Maintenance and Construction Management).

7.1.1.3 Transportation Alternatives (Non-Motorized Modes)

Funding for transportation alternatives support greater travel and trip making by non-motorized modes (e.g. walking and biking). Improvements under this program may include bicycle and pedestrian facilities (e.g. sidewalks, bicycle lanes, bicycle routes, mobility paths, and greenways) and other accommodations (e.g. crosswalks, bike racks, wayfinding signs, lighting, etc.) that promote and support safe and convenient travel by non-motorized modes. Implementation strategies to accommodate facility improvements such as reducing the number of travel lanes or lane widths (i.e. a road diet) to add a bicycle facility or providing a neighborhood connection for safe and convenient walking and biking are considered transportation alternative solutions.

Table 7-3 provides a summary of funding levels for walkway and bikeway improvements within the MTPO area as part of the 2040 LRTP. Section 5.1.3 of the LRTP discusses sidewalk and bikeway recommendations within the MTPO area. The selection of pedestrian and bikeway improvements is to occur as part of the MTPO's TIP development to allow for coordination with other transportation improvements and programming decisions.

Table 7-3
2040 Planned Transportation Alternatives Improvements

2040 LRTP No.	Type of Improvement	Air Quality (E)xempt (N)on-Exempt	Time Frame	Anticipated Funding Source	Total Estimated Funding
TA-20	Transportation Alternatives (Bicycle & Pedestrian Improvements)	E	2020	Enhancement/RT/ SRTS /STP/Local	$5,919,000
TA-30	Transportation Alternatives (Bicycle & Pedestrian Improvements)	E	2030	Enhancement/RT/ SRTS /STP/Local	$10,892,000
TA-40	Transportation Alternatives (Bicycle & Pedestrian Improvements)	E	2040	Enhancement/RT/ SRTS /STP/Local	$14,637,000
				Total	$31,448,000

7.1.2 Public Transportation

This category includes planned improvements for transit and transit related investments.

7.1.2.1 Transit

Table 7-4 contains a listing of the public transportation improvements of the 2040 LRTP.

Table 7-4
2040 Planned Transit Improvements

Existing Service Vehicle Replacement - Capital Needs

Current Vehicle Fleet			Normal Service Life (Years)	Number of Vehicles Per Horizon Year			Total Number of Vehicles	Total Estimated Unit Cost [1]	Year of Expenditure Estimates [2]			
Type	Number of Vehicles	Year		2020	2030	2040			2020	2030	2040	Total 2014-2040
Vans	2	2005	5	4	4	4	12	$48,000	$224,000	$300,000	$348,000	**$872,000**
Vans	3	2006	5	3	6	6	15	$48,000	$168,000	$450,000	$522,000	**$1,140,000**
Vans	1	2009	5	2	2	2	6	$48,000	$112,000	$150,000	$174,000	**$436,000**
Vans	2	2009	5	4	4	4	12	$48,000	$224,000	$300,000	$348,000	**$872,000**
Vans	3	2009	5	6	6	6	18	$48,000	$336,000	$450,000	$522,000	**$1,308,000**
Vans	3	2008	5	6	6	6	18	$48,000	$336,000	$450,000	$522,000	**$1,308,000**
Vans	1	2009	5	2	2	2	6	$48,000	$112,000	$150,000	$174,000	**$436,000**
Buses	3	2004	12	3	3	3	9	$170,000	$591,000	$795,000	$921,000	**$2,307,000**
Buses	3	2006	10	3	3	3	9	$170,000	$591,000	$795,000	$921,000	**$2,307,000**
Buses	1	2002	12	1	1	1	3	$170,000	$197,000	$265,000	$307,000	**$769,000**
Vans	3	2003	5	6	6	6	18	$48,000	$336,000	$450,000	$522,000	**$1,308,000**
Buses	15	2009	12	0	15	15	30	$170,000	$0	$3,975,000	$4,605,000	**$8,580,000**
				40	**58**	**58**	**156**	**Total**	**$3,227,000**	**$8,530,000**	**$9,886,000**	**$21,643,000**

New Service & New Service Vehicle Replacement - Capital Needs

New to Vehicle Fleet		Normal Service Life (Years)	Number of Vehicles Per Horizon Year			Total Number of Vehicles	Total Estimated Unit Cost [1]	Year of Expenditure Estimates [2]			
Type	Number of Vehicles		2020	2030	2040			2020	2030	2040	Total 2014-2040
Vans	2	5	2	4	4	12	$48,000	$112,000	$300,000	$348,000	**$760,000**
Buses	2	12	2	2	2	9	$170,000	$394,000	$530,000	$614,000	**$1,538,000**
			4	**6**	**6**	**21**	**Total**	**$506,000**	**$830,000**	**$962,000**	**$2,298,000**

Other Transit - Capital Needs

Other Transit - Items	Year of Expenditure Estimates [2]			
	2020	2030	2040	Total 2014-2040
Bus Shelters, Benches, & Stop/Transfer/Terminal Improvements	$250,000	$500,000	$750,000	**$1,500,000**
System Signs, Amenities & Other Enhancements (e.g. bicycle & pedestrian facilities, safety, & security)	$250,000	$500,000	$750,000	**$1,500,000**
ITS-AVL & Other Technologies (e.g. software, systems, & equipment)	$250,000	$500,000	$750,000	**$1,500,000**
Support Facilities & Equipment	$250,000	$500,000	$750,000	**$1,500,000**
Total	**$1,000,000**	**$2,000,000**	**$3,000,000**	**$6,000,000**
Grand Total	**$4,733,000**	**$11,360,000**	**$13,848,000**	**$29,941,000**

Notes:
[1] Current year dollars (2012)
[2] Estimated cost in future year based on inflation (See Section 6.3 for further details)

7.2 UN-FUNDED NEEDS (ILLUSTRATIVE LIST)

Table 7-5 provides a listing of un-funded transportation improvement projects within the MTPO area. These projects, which are illustrated on Figure 7-2, are not financially affordable, given current assumptions on availability of future transportation funds over the plan horizon. As funding becomes available, these projects will need to be amended into the financially constrained portion of the 2040 LRTP in order to be funded.

7.3 SHORT RANGE STRATEGIES

Short-range strategies (3-5 year horizon) have been identified through the development of this plan. Implementation of these strategies is intended to result in a more detailed understanding of specific elements and demands on the transportation system, and ultimately aid in advancing sound transportation investments within the region. The short range strategies the MTPO should undertake in the next 3-5 years include:

- Update/develop a regional bicycle and pedestrian plan
- Continue to work with JCT and other transportation providers in furthering public transportation options within the MTPO area
- Partner with area MPOs (Kingsport and Bristol) to explore future regional transportation needs
- Work with local member jurisdictions to update local land use and transportation plans within the MTPO area
- Update MTPO's Regional ITS Architecture and ITS Deployment Plans
- Continue the use of corridor and subarea studies to evaluate transportation issues at the sub-regional level that can feed into the update of future LRTPs
- Explore opportunities to increase the MTPO area's understanding and incorporation of adaptation measures to reduce harm and risk associated with the impacts of climate change and extreme weather on the region's transportation system

Table 7-5
Unfunded Illustrative Vision Plan Projects

2040 LRTP NO	Vision Plan 2040 LRTP NO	Jurisdiction	Roadway	From	To	Length (Miles)	Federal Functional Classification	Type of Improvement	Project Description	Non-Motorized Accommodation [1]		Current Number of Lanes	Future Number of Lanes	Modeled in Travel Demand Model [2]	Air Quality (E)xempt (N)on-Exempt	Time Frame [3]	Anticipated Funding Source	Total Estimated Project Cost [4]	Year of Expenditure Cost [5]
										Bike	Ped								
ILL-1	VP-01	Johnson City	I-26	I-81	Bobby Hicks Hwy (SR 75)	3.7	Interstate	Widening	Widen existing 4 lane interstate to 6 lanes	-	-	4	6	Yes	N	ILL	ILL	$26,000,000	ILL
ILL-2	VP-02	Johnson City	I-26	Bobby Hicks Hwy (SR 75)	Boones Creek Rd (SR 354)	3.7	Interstate	Widening	Widen existing 4 lane interstate to 6 lanes	-	-	4	6	Yes	N	ILL	ILL	$26,000,000	ILL
ILL-3	VP-04	Johnson City	I-26	N Roan St (US11E)	US 321	3.7	Interstate	Widening	Widen existing 4 lane interstate to 6 lanes	-	-	4	6	Yes	N	ILL	ILL	$29,800,000	ILL
ILL-4	VP-11	Elizabethton	Elk Ave (SR 67)	Hudson Dr	Lynn Ave (SR 400)	1.4	Principal Arterial	Widening	Widen existing 4/5 lane roadway to 6 lanes	Appropriate	Appropriate	4/5	6	Yes	N	ILL	ILL	$24,300,000	ILL
ILL-6	VP-03	Johnson City	I-26	Boones Creek Rd (SR 354)	N Roan St (US11E)	3.4	Interstate	Widening	Widen existing 4 lane interstate to 6 lanes	-	-	4	6	Yes	N	ILL	ILL	$24,000,000	ILL

Notes:
[1] Consideration of non-motorized accommodation/preliminary assessment: (Appropriate = a bicycle or pedestrian facility maybe appropriate as part of the improvement; Appropriate-WC = Appropriate with conditions (conditions may depend on land use surroundings, right-of-way, or demand))
[2] Roadway facilities are modeled in the MTPO travel demand model according to the number of capacity lanes per horizon year
[3] Anticipated year open to traffic
[4] Current year dollars (2012)
[5] Estimated project cost in future year based on inflation (See Section 6.3.2 for further details)

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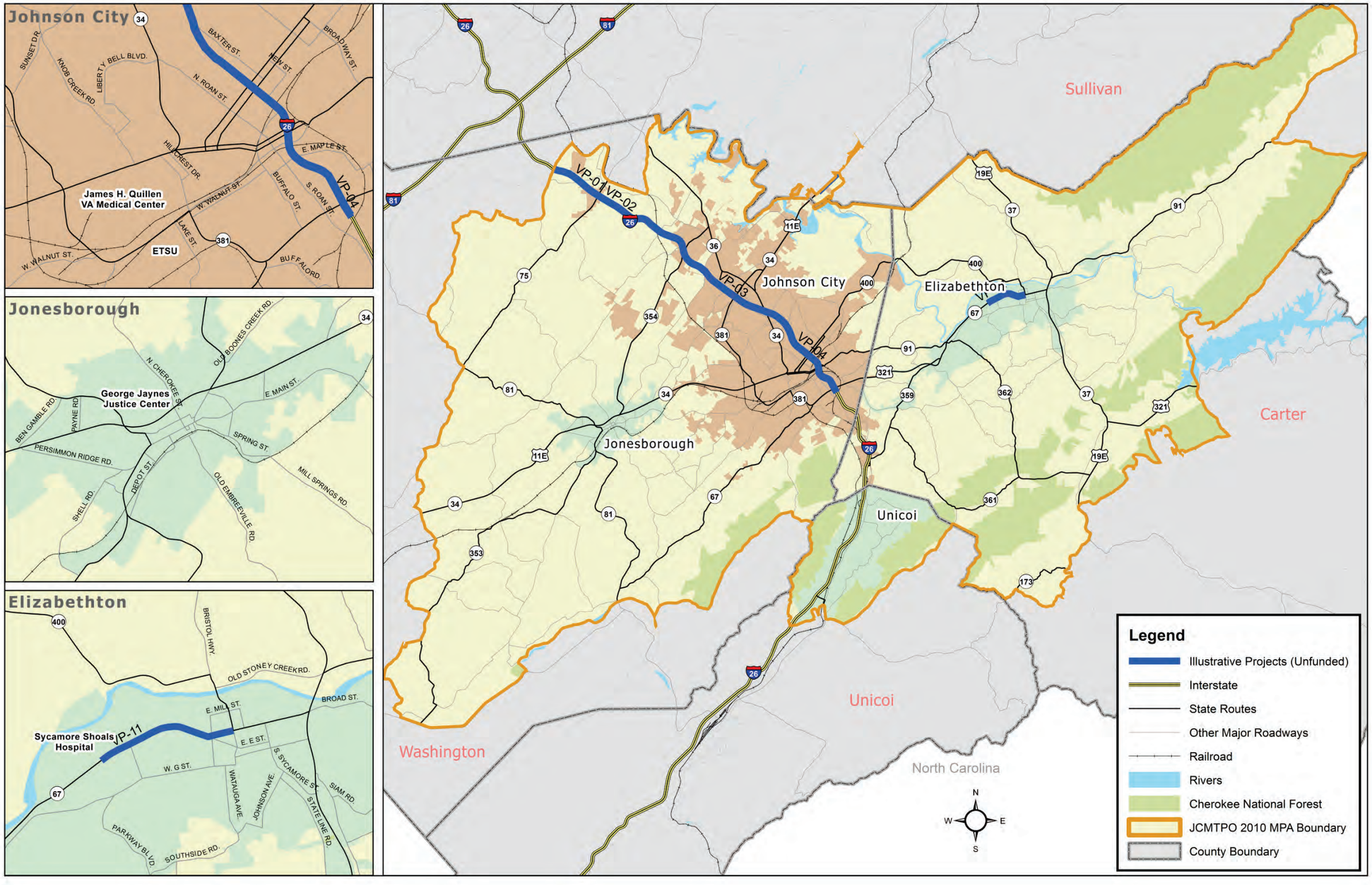
Figure 7-2
Illustrative Vision Plan Projects (Unfunded) Roadway Improvements



8.0 ENVIRONMENTAL REVIEW

MAP-21 calls for continued environmental consideration in the development of long range transportation plans. The Johnson City MTPO, as part of the 2040 LRTP, has developed an initial understanding of environmental conditions, which can be used to assist in the project development process once a project has moved from the planning stage of this document to the programming stage (e.g. the TIP) for ultimate project implementation.

The following section includes an initial review of the proposed LRTP projects (presented in Section 7.0 of this Plan) relative to environmental features such as, communities of concern (e.g. environmental justice populations), historic and cultural resources, wetlands, and floodplain areas. It also provides a discussion of potential environmental mitigation activities at the regional level. Lastly, a discussion on greenhouse gas (GHG) reduction strategies as well as a discussion of climate change adaptation strategies is reflected in the MTPO's 2040 LRTP.

8.1 TITLE VI AND ENVIRONMENTAL JUSTICE

Federal law requires that MPOs ensure that individuals not be excluded from participating in, denied the benefit of, or subject to discrimination under any program or activity receiving federal funding on the basis of race, color, national origin, age, sex, or disability.

While Title VI and Environmental Justice (EJ) concerns have most often been raised during project development, it is important to recognize that the law also applies equally to the processes and products of planning. Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, or national origin. Environmental Justice Executive Order 12898, Federal Actions to Address Environmental Justice (EJ) in Minority and Low-Income Populations, calls for the identification and addressing of disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations.

Appendix IV – Title VI and Environmental Justice Assessment documents the MTPO's efforts to determine benefits and burdens to EJ communities within the MTPO area relative to the 2040 LRTP. The analysis indicates that in general, neither low-income nor minority populations in the region would endure high and disproportionate impacts due to the projects proposed by the 2040 LRTP. Complete findings of this assessment, potential project impacts, and mitigation strategies are presented in Appendix IV.

8.2 HISTORIC, CULTURAL, AND NATURAL RESOURCES

As part of the 2040 LRTP, an environmental assessment of historic, cultural, and natural resources was developed to address Section 1201 provisions of MAP-21. The intent of MAP-21 Section 1201 is to incorporate environmental considerations early in the planning process so that the project development processes are more streamlined, by including realistic assumptions of potential environmental considerations, impacts, and costs.

Appendix V – Environmental Review, documents the MTPO's efforts to understand environmental conditions within the MTPO early in the planning process. The environmental assessment includes:

- a discussion of potential environmental impacts and avoidance and mitigation activities at the policy/strategy level based on environmental regulatory framework,
- a comparison of project recommendations in the 2040 LRTP with available local, state and federal, maps and inventories of historic and natural resources, and
- identifies environmentally sensitive areas and mitigation strategies that could be considered to reduce potential impacts related to transportation improvement projects.

Equally as important to this process is MAP-21 Section 1305 - Efficient Environmental Reviews for Project Decision-making, which provides for increased participation and coordination early in the planning process, as projects move from the MTPO's LRTP into the project development process. This early coordination and consultation with the various interested parties and stakeholders is documented in Appendix I and serves as a foundational point of the MTPO's commitment to Section 1305. Complete findings of this assessment, potential project impacts, and mitigation strategies are also presented in Appendix V.

8.3 ENVIRONMENTAL MITIGATION STRATEGIES

As previously discussed, MAP-21 includes several provisions intended to enhance the consideration of environmental issues and impacts within the transportation planning process. Under MAP-21 metropolitan and statewide transportation plans must include a discussion of types of potential environmental mitigation activities as part of their plans. The following strategies will be utilized by the MTPO to address and consider environmental impacts relative to the decisions of the MTPO early in the planning process:

- Embrace the principles of Context Sensitive Solutions (CSS) as a means of developing transportation facilities that fit its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility.

- Continue to utilize the Region's GIS to identify environmental features (both physical and social) early in the planning process as a means of avoidance and/or to establish early corrective action plans prior to project construction.

- Partner with local, state, and federal resource agencies early in the planning process to identify potential issues relative to projects under consideration in the MTPO's plans and programs to develop appropriate solutions prior to actually beginning the project development process.

- Minimize the construction of transportation investments that would impact wetlands.

- Construct greenways as a means of preserving environmentally sensitive lands from inappropriate development.

Environmental impacts cannot always be avoided. Mitigation is the attempt to offset potential adverse effects of human activity on the environment. Mitigation, as listed below, is one of the last steps in the avoidance and minimization process. The mitigation areas and activities will be consistent with legal and regulatory agencies pertaining to human and natural environments. Steps to take in the project development process include the following in relation to environmental impacts:

- Avoid Impacts - The first strategy in the environmental process is to avoid adverse impacts altogether.

- Minimize Impacts **-** Minimizing a proposed activity / project size or its involvement may be an option.

- Mitigate Impacts (preserve, repair and restore) **-** Precautionary, special operational management features and / or abatement measures may be used to reduce construction impacts and repair or restore existing resource.

- Compensate for Impacts **-** Compensation for environmental impacts by providing suitable replacement or substitute environmental resources of equivalent or greater value on or off-site could be utilized.

The MTPO will continue to work with the agencies, as defined in the MTPO's Public Participation Plan and Consultation process as projects proceed in the project development process, as appropriate. The MTPO recognizes that not every project will require the same level of mitigation; different projects may utilize more mitigation while others require very little. All impacts on environmentally sensitive areas will be analyzed on a project by project basis to examine what mitigation strategies are appropriate.

The following mitigation activities will be considered on a project by project basis. For major construction projects, such as new roadways, or for projects that may have a region-wide environmental impact, a context sensitive solution process should be considered in which considerable public participation and alternative design solutions are used to lessen the impact of the project.

Table 8-1 details mitigation activities that could be considered to deal with the primary areas of concern.

Table 8-1
Potential Mitigation Activities

Environmental Concern	Potential Mitigation Activities
Wetlands of Water Resources	Mitigation sequencing requirements involving avoidance, minimization, compensation (could include preservation, creation, restoration, in lieu fees, riparian buffers); design exceptions and variances; environmental compliance monitoring.
Forested and other Natural Areas	Avoidance, minimization; replacement property for open space easements to be of equal fair market value and of equivalent usefulness; design exceptions and variances; environmental compliance monitoring.
Agricultural Areas	Avoidance, minimization; design exceptions and variances; environmental compliance monitoring.
Threatened and Endangered Species	Avoidance, minimization; time of year restrictions; construction sequencing; design exceptions and sequencing; species research; species fact sheets; Memoranda of Agreements for species management; environmental compliance monitoring.
Noise	Alternate roadway design, noise barriers, speed control, surface pavement selection, and truck restrictions.
Ambient Air Quality	Transportation control measures, transportation emission reduction measures.
Underground Storage Tanks and Contaminated Sites	Avoidance, minimization, mitigation; design exceptions and variances; environmental compliance monitoring.
Mobile Source Air Toxics	Reduce engine activity or reduce emissions per unit of operating time; operational agreements that reduce or redirect work or shift times to avoid community exposures; technological adjustments to equipment (diesel retrofit technologies)
Neighborhoods, Communities, Homes & Businesses	Impact avoidance or minimization; context sensitive solutions for communities (appropriate functional and/or aesthetic design features).
Cultural Resources	Avoidance, minimization; landscaping for historic properties; preservation in place or excavation for archaeological sites; Memoranda of Agreement with the Department of Historic Resources; design exceptions and variances; environmental compliance monitoring.
Parks and Recreation Areas	Avoidance, minimization, mitigation; design exceptions and variances; environmental compliance monitoring.

8.4 CLIMATE CHANGE

In the United States, transportation is the largest source of greenhouse gas (GHG) emissions, after electricity generation. Transportation accounts for 27 percent of United States greenhouse gas emissions based on recent data. Reducing greenhouse gas emissions will lower the severity of climate change impacts over the long-term. However, even with aggressive action immediately to reduce emissions going forward, past emissions will continue to cause climate change impacts for many years.

An effective response to climate change must therefore include both mitigation (reducing greenhouse gas levels) and adaptation (reducing the vulnerability of human and natural systems to climate impacts). The following section pertains to strategies for greenhouse gas (GHG) reduction as well as adaption to climate change in the MTPO area.

Greenhouse Gas (GHG) Reduction Strategies

A wide range of strategies are available to reduce GHG emissions from the transportation sector. The Center for Climate Strategies, a nonpartisan nonprofit organization that assists governments with climate change issues, maintains a catalog of sample state-level GHG-reducing actions and policy options based on actions undertaken or considered by state, local, and private actors.

Table 8-2 provides a comparison of select transportation and land use GHG-reducing actions (from the Center for Climate Strategies Catalog of Sample State-Level GHG-Reducing Actions) to recommendations of the MTPO's 2040 LRTP. As illustrated in the table, there are a number of plan recommendations that work to reduce GHG emissions within the MTPO region.

Table 8-2
2040 LRTP Greenhouse Gas Reduction Strategies

Center for Climate Strategies Sample Transportation & Land Use GHG-Reducing Actions	2040 LRTP
PASSENGER VEHICLES **Passenger Vehicle Technology** • Hybrid buses **Passenger Vehicle Operations** • Enforce speed limits **Fuel-Related Measures** • Biodiesel expansion (biodiesel, liquefied petroleum gas, ethanol) • Alternative fuel infrastructure development	• A number of the 2040 LRTP goals and objectives (see Section 2.0) relate to promoting investment solutions that reduce carbon and other harmful emissions from transportation. • Efforts within the MTPO region and at a state level do exist relative to passenger vehicle GHG-reduction initiatives. For example, throughout TN the use of alternative fuel buses are being promoted and efforts are in place for expanding the infrastructure of available biodiesel facilities along the TN's interstate system. I-81 and I-26 through the MTPO area are part of TN's Biofuel Green Island Corridor Network with facilities available.
LAND USE EFFICIENCY AND MODAL OPTIONS **General Location Efficiency** • Statewide growth management plan • Smart growth planning, modeling, tools • Land use, zoning, tax, & building code reform • Use of flexible federal transportation funding • Downtown revitalization • Brownfield redevelopment • Infill redevelopment • Traffic calming **Increasing Low-GHG Travel Options** • Full use of Congestion Mitigation and Air Quality (CMAQ) funds • Improve transit service (frequency, convenience, quality) • Transit marketing & promotion, including individualized transit marketing • Expand transit infrastructure • Guaranteed ride home • Bike and pedestrian infrastructure	• Growth management provisions exist in Tennessee and the largest and fastest growing portion of the MTPO area is covered by growth management provisions (PC 1101). • Land use, zoning, and revitalization and infill plans are in place in the MTPO area. Johnson City, Jonesborough, and Elizabethton are beginning to see success in downtown redevelopment as a result of these plans. • The City of Johnson City has a neighborhood traffic calming program and the MTPO has stated goals and objectives (see Section 2.0) that are consistent with location efficiency strategies. • The MTPO and the 2040 LRTP fully support greater use of low-GHG travel options such as expanded transit services, promotion of TDM strategies as well as greater opportunities for sidewalk and bikeway infrastructure.

Center for Climate Strategies Sample Transportation & Land Use GHG-Reducing Actions	2040 LRTP
• Vanpooling and carpooling • Park-and-ride lots • Car sharing • Telecommute, live-near-your-work, and compressed work week • Require government agencies to use telecommuting • Telecommuting centers, support, and incentives **Incentives and Disincentives** • Commuter choice programs/parking cash-out	
HEAVY-DUTY VEHICLES **Heavy-Duty Vehicle Operations** • Enforce speed limits • Improve traffic flow • Truck stop electrification **Increasing Low-GHG Heavy-Duty Travel Options** • Intermodal freight initiatives • Feeder barge container service • Increase rail capacity and address rail freight system bottlenecks • Shift freight movements from truck to rail • Promote strategies to ease the movement of freight to reduce GHG **Heavy-Duty Vehicle Incentives & Disincentives** • Procurement of efficient fleet vehicles (public, private, or other) **Intercity Passenger Travel: Aviation, Rail, & Bus** • Airport ground equipment • Intercity bus incentives and subsidies **Off-Road Vehicles (e.g., construction equipment, etc.)** • Incentives for purchase of efficient vehicles and equipment • Improved operations, operator training • Increased use of alternative fuels or low-sulfur diesel	• There are a number of goals, objectives, and projects within the 2040 LRTP that address GHG reduction strategies for heavy duty vehicles and other vehicle operations. These include: ➢ Nearly $144 million (27 percent of the MTPO region's transportation capital funds) in ITS, safety, and other traffic operational investments as well as investments in transit and transportation alternatives within the MTPO region over the next 27 years. ➢ Continued support for enhancements at the Tri-Cities airport including air cargo transportation ➢ Continued support of intercity bus service between surrounding communities (Johnson City to Kingsport, Elizabethton, Jonesborough, etc.) ➢ Continued support of improvements to railroad infrastructure ➢ Continued support of improved traffic flow, signal operations, and access management.

In addition to the above GHG-reduction items for the Johnson City region, in 2009 TDOT developed a report titled, *Sustainable Transportation in Tennessee*, as a means of promoting greater internal awareness of sustainable transportation strategies, which TDOT could implement as part of their overall operations. The report defines sustainable transportation as a means of providing access and mobility across Tennessee in the most efficient and effective manner, while being a good steward of public funds and environmental resources, today and in the future. The report contains five recommendation categories of focus for promoting sustainable transportation and reducing GHGs in Tennessee by TDOT.

- Improve land use planning and development to reduce VMT
- Expand transit, bike, and pedestrian infrastructure
- Promote commuter choice/workplace TDM
- Improve intermodal freight transportation, and
- Increase transportation system efficiency.

While the report is largely a toolbox of proposed strategies and recommendations, it does demonstrate an increased interest at the state level for implementing measures, which target reduced GHG-emissions throughout Tennessee. A number of these

strategies are consistent with the goals, objectives, and projects of the MTPO's 2040 LRTP.

Climate Change Adaptation

The changing climate poses serious challenges to the transportation community, given the community's need to watch over transportation systems and infrastructure designed to last decades or longer. Transportation functions tied to construction, operations, maintenance, and planning should be grounded in an understanding of the environment expected to support transportation facilities. In the last several years, transportation agencies have begun to consider the possibility of climate change and the significant impacts it may have on transportation systems. Extreme temperature, increases in intense precipitation, and more severe storms all impact our transportation systems. Climate change and extreme weather vulnerability in the transportation context are a function of a transportation asset or system's sensitivity to climate effects, exposure to climate effects, and adaptive capacity.

The MTPO continues to work with its member jurisdictions and other agencies to understand these effects and to develop appropriate adaptation measures to reduce harm and risk associated with the impacts of climate change and extreme weather events on the region's transportation system. The MTPO will continue to partner with these entities as well as local and state emergency management agencies and seek to incorporate FHWA's *Climate Change and Extreme Weather Vulnerability Assessment Framework* into the local hazard mitigation planning processes as well as the MTPO's planning process as a means of understanding climate change and developing adaption measures for the region's transportation system today and into the future.

8.5 LIVABILITY INITIATIVE

The transportation system provides the foundation for how we live, how we connect with others, and how our economy grows at the national, regional, and local levels. In 2009, the US DOT, the US Department of Housing and Urban Development, and US EPA announced a new Interagency Partnership for Sustainable Communities to improve access to affordable housing, provide more transportation options, and lower transportation costs while protecting the environment in communities nationwide. The partnership established six livability principles:

- Provide more transportation choices
- Promote equitable, affordable housing
- Enhance economic competitiveness
- Support existing communities
- Coordinate and leverage policies and investments
- Value communities and neighborhoods

Transportation investments help shape the character of places and how we experience our daily lives. Addressing livability issues in transportation planning, development, and implementation ensures that transportation investments support both mobility and broader community goals. Communities across the country are looking for ways to develop transportation networks that serve these broader goals, such as supporting quality economic and community redevelopment, providing greater accessibility for

people of varying income and ability, and helping reduce the cost of housing and transportation so people have more economic freedom.

Livability in transportation is about using the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to good jobs, affordable housing, quality schools, and safe streets. There are a number of provisions within the 2040 LRTP that work to promote livability in the MTPO area and are supportive of the above liability principles. Examples of this include:

- The established goals and objectives of the 2040 LRTP which support livability initiative principles
- The consideration and coordination of land use policies and plans which form the basis of the MTPO's future year growth forecasts
- The assessment of proposed project improvements compared to the stated goals and objectives of the 2040 LRTP; and
- The level of funding investments of the 2040 LRTP towards:
  - Maintaining existing transportation infrastructure
  - Public transportation and non-motorized modes
  - ITS and TSM solutions; and
  - Safety improvements.

Promoting livability in transportation is a continuous process and the MTPO is committed to partnering with traditional and non-traditional partners to support long-term livability objectives within the MTPO area.