Long-Range Transportation Plan Year 2040

LRTP2040

Bristol Tennessee/Virginia Urban Area
Metropolitan Planning Organization

THE REGIONAL MULTIMODAL TRANSPORTATION PLAN 2040

Adopted: September 27, 2016

Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization

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BRISTOL TENNESSEE – VIRGINIA URBAN AREA METROPOLITAN PLANNING ORGANIZATION
P.O. BOX 1189, 104 8TH STREET ♦ BRISTOL TENNESSEE 37621 ♦ PHONE 423-989-5519

Bristol MPO Resolution 16-05

A Resolution Adopting the
Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040

WHEREAS, the U. S. Department of Transportation requires each Metropolitan Planning Organization (MPO) to have a current regional long-range transportation plan that addresses all modes of transportation in the Metropolitan Planning Area, and

WHEREAS, the long-range transportation plan must have a planning horizon of at least 20 years and provide the basis for future transportation planning decisions within the Metropolitan Planning Area.

WHEREAS, various state, local, and regional agencies involved with multimodal transportation planning for the Metropolitan Planning Organization have cooperatively development the Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040, and

WHEREAS, the Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040 was developed in accordance with the requirements of 23 CFR, Part 450 of the Code of Federal Regulations.

NOW, THEREFORE, BE IT RESOLVED by the Executive Board of the Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization that the Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040 is hereby approved.

Executive Board

9/27/16
Date

Secretary

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CHAPTER 1: INTRODUCTION

The movement of people and goods is, to a great extent, regional. People often live in one locality and commute to another. Various businesses, medical, educational and other services are oriented towards meeting the needs of a metropolitan area market, which requires access and mobility at the regional level. Basic mobility needs of the local population are satisfied through a network of roadways, transit routes, pedestrian and bicycle paths, paratransit services, and other systems that enhance the movement of people. In addition to ensuring the efficient movement of people throughout the region, it is equally important to provide for transportation choices for the movement of goods.

The *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* is the initial step and framework in developing a regionally based network of transportation facilities and services that meets the travel needs of the region in the most efficient and effective manner as possible. As traffic patterns shift because of changes in land use patterns, the original design of an established transportation network may become outdated. Analysis behind the transportation plan strives to identify those portions of the transportation network which are or will be overburdened by traffic conditions and to categorically quantify those developing weaknesses in the transportation system in order to formulate short-term and long-term priorities for improvement.

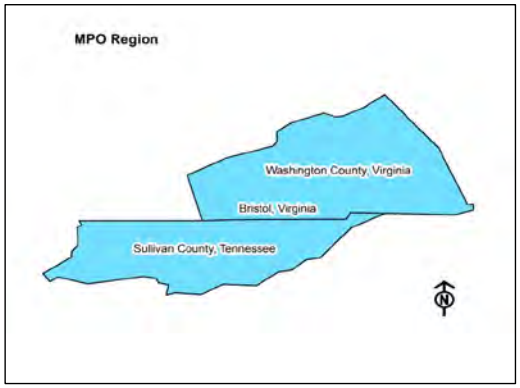
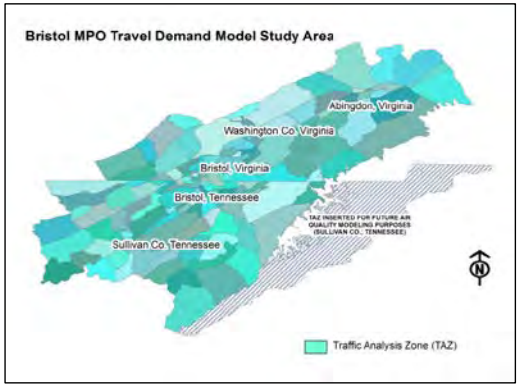
BRISTOL TENNESSEE/VIRGINIA URBAN AREA LONG-RANGE TRANSPORTATION PLAN YEAR 2040

The intent of the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* is to create the best possible plan of action to help maintain a functional transportation system for the Metropolitan Planning Area. As required by federal law, the plan is updated on a regular cycle and includes a planning horizon of at least 20 years. This plan represents an update of the Year 2035 Transportation Plan.

For transportation projects to be eligible for federal funding, they must first appear in the long-range transportation plan. This document provides an overview of the existing transportation system, including roadways, public transportation services, bicycle/pedestrian facilities, and freight movements, and evaluates future transportation improvements. Additionally, federal law requires the preparation of a long-range transportation plan that is realistic, both from an implementation and a financial standpoint.

Geographies referenced in the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* include the MPO Region, the Metropolitan Planning Area (MPA), and the MPO Study Area. The significance of each of these areas is addressed in the following illustration (Map 1-1).

Map 1-1
MPO Geography

MPO Region	Metropolitan Planning Area (MPA)	MPO Study Area
		
The MPO Region consists of all of Sullivan County, Tennessee; Washington County, Virginia; and the independent city of Bristol, Virginia.	Federal regulations base the Metropolitan Planning Area on the census-defined urbanized area, plus the contiguous area expected to become urbanized within a 20-year forecast period. The urbanized area includes Bristol Tennessee/Virginia; Abingdon, Virginia; and a portion of Sullivan County, Tennessee and Washington County, Virginia.	The MPO Study Area is based on census tract geography and includes the entire Metropolitan Planning Area as well as additional fringe territory for the purposes of data collection and continuity of the highway network.
What does it mean?	**What does it mean?**	**What does it mean?**
Many demographic data sets provided the U.S. Census Bureau are only available at the county geography level. In order to provide an overview of statistical data as it relates to the region, county-wide data is utilized. The MPO Region is for statistical purposes only and has no impact on the planning requirements for this Plan.	This is the official planning boundary of the MPO, approved by the Governors of Tennessee and Virginia. This boundary relates to project eligibility for federal transportation funds. Federal funds cannot be utilized for projects within the Metropolitan Planning Area unless they are included in this Plan.	Creating a regional traffic demand model is an important component of transportation planning. This boundary is based on Transportation Analysis Zones utilized for traffic modeling and is larger than the Metropolitan Planning Area to incorporate the impact of regional mobility on the highway network.

WHAT IS AN MPO?

Greatly enhanced by the freedom of the automobile, the settlement of land around cities and into suburban environs has developed into regional economies that span across governmental boundaries. The federal government recognized that regional economics are dependent on the large-scale movement of people and goods over regional transportation networks; however, it is difficult to address regional transportation impacts and needs when you have multiple jurisdictions of political authority.

The federal government sought to address regional transportation by requiring states to establish Metropolitan Planning Organizations (MPO), composed of local elected officials and state representatives to review and approve transportation investments in urbanized areas. The *Highway Act of 1962* required a Metropolitan Planning Organization to be established in all urbanized areas over 50,000 in population and made federal highway aid contingent a continuing, comprehensive, and cooperative transportation planning process know as the "3-C Process". Over the years, Congress has significantly added and revised the expectations for the 3-C Process, such as the addition of performance-based planning. The current legislation for federal metropolitan planning requirements is the *Fixing America's Surface Transportation (FAST) Act*.

The five core functions of an MPO include:

Establish a setting: Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.

Identify alternatives: Use data and planning methods to generate and evaluate alternative transportation improvement options.

Maintain a Long-Range Transportation Plan (LRTP): Develop and maintain a transportation plan covering a planning horizon of at least twenty years that is multimodal, fiscally constrained, fosters mobility and access for people and goods, provides efficient system performance and preservation, and improves the quality of life.

Develop a Transportation Improvement Program (TIP): Develop a short-term (four-year) program of transportation investments based on the long-range transportation plan.

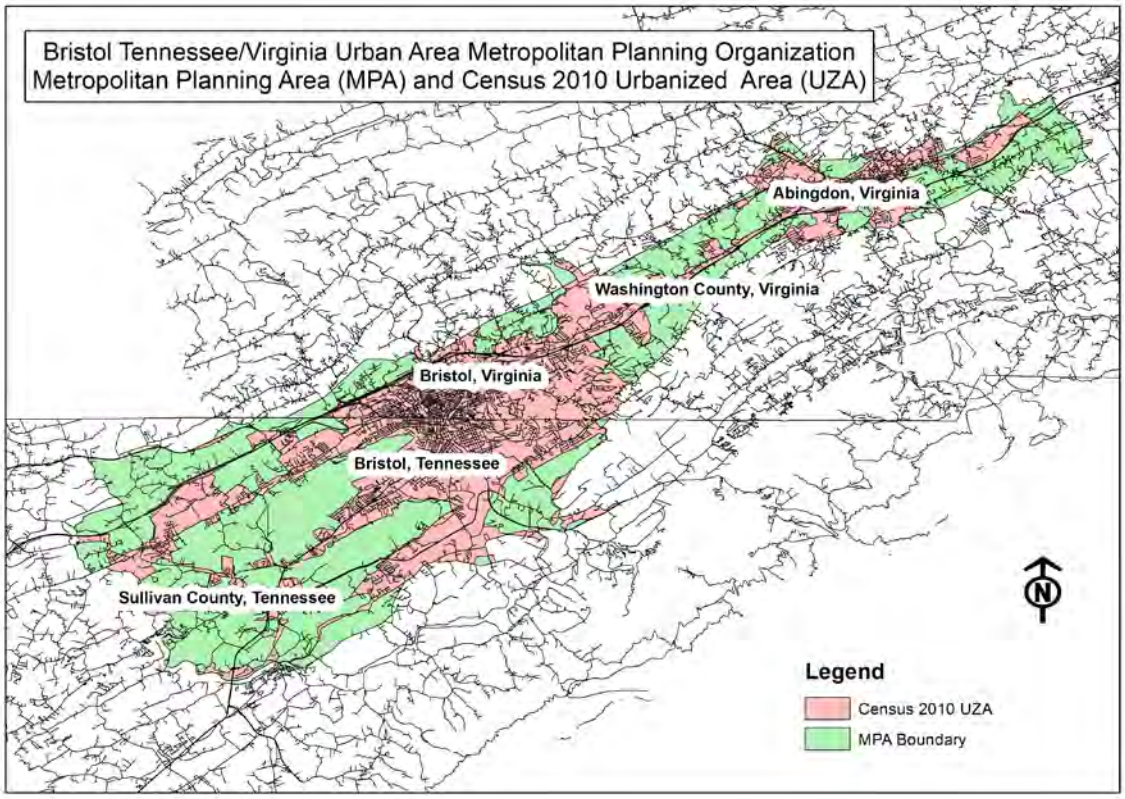
Involve the Public: Involve the general public and other interested parties in the essential MPO functions listed above.

BRISTOL TENNESSEE/VIRGINIA URBAN AREA MPO

Following the 1980 Census of Population the U. S. Bureau of the Census designated Bristol, Tennessee/Virginia as an "Urbanized Area." As a result, the Bristol MPO was established in 1982 under agreement with the governors of the State of Tennessee and Commonwealth of Virginia, and the local governments within the urbanized area. Each successive Census redefines the urbanized area based on the changes in population characteristics. As delineated in the Bureau of the Census 2010 urbanized area designations, the Bristol Tennessee/Virginia urbanized area includes the City of Bristol, Tennessee; the City of Bristol, Virginia (an independent city outside of the jurisdiction of any county); the Town of

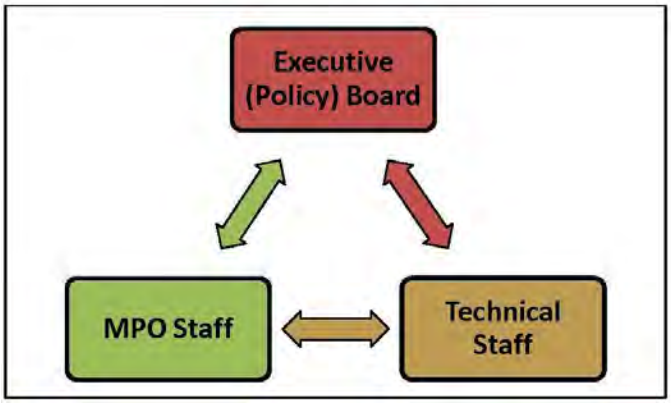
Abingdon, Virginia; and certain surrounding areas of Sullivan County, Tennessee, and Washington County, Virginia. The Metropolitan Planning Area (MPA), as identified in Map 1-2, for the Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organizations represents the existing urbanized area and the contiguous geographic area expected to become urbanized within a 20-year forecast period of the transportation plan.

Map 1-2



MPO Structure. The MPO functions under a committee structure comprised of an Executive Board and Technical Staff (Chart 1-1). Final responsibility for transportation planning and policy decision-making is vested with the Executive Board. The Technical Staff is comprised of individuals of governments and agencies with technical responsibility for implementation of transportation planning activities. Daily administrative functions and coordination of the Metropolitan Planning Organization is provided by the MPO staff.

Chart 1-1



The **Executive Board** of the Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization is composed of the principal elected officials from:

State of Tennessee
Commonwealth of Virginia
City of Bristol, Tennessee
City of Bristol, Virginia
Town of Abingdon, Virginia
Sullivan County, Tennessee
Washington County, Virginia
Federal Highway Administration (non-voting)
Federal Transit Administration (non-voting)

The **Technical Staff** is composed of representatives of governments and agencies having functional responsibility for transportation planning in the metropolitan area. The Technical Staff primarily consists of planners and engineers from the following agencies:

Abingdon, Virginia
Bristol, Tennessee
Bristol, Virginia
Sullivan County, Tennessee
Washington County, Virginia
Abingdon Local Transit System
Bristol Tennessee Transit (BTT)
Bristol Virginia Transit (BVT)
District Three Public Transportation
NET Trans
Virginia Highlands Airport
First Tennessee Development District
Mount Rogers Planning District Commission
Tennessee Department of Transportation
Virginia Department of Transportation
Virginia Department of Rail and Public Transportation (DRPT)
Federal Highway Administration (non-voting)
Federal Transit Administration (non-voting)

TRANSPORTATION PLANNING PROCESS

The MPO, in cooperation with the Tennessee and Virginia Departments of Transportation and local transit services, are responsible for carrying out the metropolitan planning process. Transportation planning is a cooperative process designed to foster involvement by all users of the system such as the business community, community groups, the traveling public, freight operators, and the general public. The planning process (Chart 1-2) includes an analysis of current and projected future transportation needs and identifies alternatives and strategies to address those needs. The process includes a number of steps from establishing a vision and guiding principles to developing a financial plan for project implementation.

Chart 1-2
MPO Planning Process

CHAPTER 2: GOALS, OBJECTIVES, AND PLANNING FACTORS

The creation of goals and objectives in the development of a long-range transportation plan establishes the foundation for achieving the results most desired and needed for the metropolitan area. It is important for MPO member jurisdictions and local communities to have a unified vision of the role that regional transportation will have in defining the quality of life for the community.

One of the first steps in the metropolitan planning process is to establish guiding principles. The following goals and objectives provide the foundation for the development of this long-range transportation plan. The goals and objectives were developed to meet the ten planning factors identified under the Fixing America's Surface Transportation (FAST) Act, as well as provide consistency with local land use and comprehensive plans.

GOAL: SYSTEM EFFICIENCY AND ASSET MANAGEMENT

Develop and maintain a transportation system to move people and goods at the most effective level of public and private cost.

Objectives:

- Maintain the efficiency and state of good repair of the existing transportation system.
- Maximize the cost-effectiveness of transportation investments.
- Select and program projects based on identified need and effectiveness.

GOAL: ECONOMIC DEVELOPMENT

Provide transportation resources to support economic growth and strengthen the regional economy.

Objectives:

- Enhance the transportation access to commercial and industrial areas.
- Increase the accessibility options for freight movement.
- Proactively plan and accommodate for growth in the regional economy.

GOAL: HEALTHY AND SUSTAINABLE COMMUNITIES

Develop a transportation system to preserve and enhance the natural environment and improve quality of life.

Objectives:

- Minimize adverse environmental impacts of the urban transportation system.
- Reduce vehicle emissions and promote activities that reduce greenhouse gases.
- Coordinate the provision of transportation facilities with land use activities to promote active transportation and healthy multimodal lifestyles that minimize single-occupancy vehicle travel.

GOAL: MOBILITY OPTIONS

Develop a transportation system that provides an opportunity for a choice of mode for the movement of people and goods.

Objectives:

- Encourage the development of bicycle facilities, sidewalks, and greenways.
- Enhance the connectivity of the transportation system between modes.
- Maintain an efficient and cost effective public transportation system.

GOAL: USER SAFETY AND SECURITY

Develop a transportation system for the movement of people and goods, which is safe for all modes and provides security for users and transportation infrastructure.

Objectives:

- Reduce motorized crashes, injuries, and fatalities.
- Reduce non-motorized crashes, injuries, and fatalities.
- Coordinate with state and local agencies to improve transportation security for critical infrastructure.

CONSISTENCY WITH FEDERAL PLANNING FACTORS

In order to ensure a continuing, coordinated and comprehensive transportation planning within the Metropolitan Planning Area, the principles and strategies of the long-range transportation plan must consider the ten federal planning factors in the FAST Act. These ten planning factors are addressed in the goals and objectives of the *Bristol Tennessee/Virginia Urban Area Long-Range Plan Year 2040* (Chart 2-1).

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 of people and freight.
5) Protect and enhance the environment, promote energy conservation, and improve 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.
9) Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.
10) Enhance travel and tourism.

Chart 2-1
FAST Act Planning Factors Addressed

FAST Act Planning Factors	Transportation Plan Goals & Objectives				
	System Efficiency & Asset Management	Economic Development	Healthy-Sustainable Communities	Mobility Options	Safety & Security
1) Economic Vitality		♦			
2) System Safety				♦	♦
3) System Security					♦
4) Mobility Options		♦	♦	♦	
5) Protect Environment			♦		
6) System Connectivity		♦	♦	♦	
7) System Efficiency	♦			♦	
8) System Preservation	♦				♦
9) System Resiliency/Stormwater	♦		♦		
10) Enhance Tourism		♦	♦	♦	

CHAPTER 3: PERFORMANCE MANAGEMENT

Increasing the accountability and measuring the effectiveness of investments in the transportation infrastructure has become a priority at the Federal level. Beginning with Federal legislation Moving Ahead for Progress in the 21st Century Act (MAP-21) and continued under the current legislation, the FAST Act, the Federal-aid program for transportation improvements is being transformed by refocusing project decision-making on performance-based planning.

Performance Measures. The U.S. Department of Transportation (USDOT) is currently implementing the new requirements and establishing performance measures through a number of Federal rulemakings released in several phases. The rulemaking process provides public and private transportation stakeholders with the opportunities to review and comment on proposed performance measures. The FAST Act identifies specific elements in establishing the performance management framework. With the exception of the Final Rule for the Highway Safety Performance Measures, the Notice of Proposed Rulemaking is on-going to define the USDOT performance measures (Chart 3-1).

Chart 3-1
USDOT Performance Measures

Planning		**Status**
Metropolitan and Statewide Planning Rule	▪ Establish a performance-based planning process at the metropolitan and state level. ▪ Define coordination in the selection of targets, linking planning and programming to performance targets.	Final Rule May 2016.
Highway Safety		**Status**
Safety Performance Measure Rule	▪ Propose and define fatalities and serious injuries measures, along with target establishment, progress assessment and reporting requirements. ▪ Discuss the implementation of MAP-21 performance requirements.	Final Rule March 2016.
Highway Safety Improvement Program (HSIP) Rule	▪ Integration of performance measures, targets, and reporting requirements into the HSIP. ▪ Strategic Highway Safety Plan updates.	Final Rule March 2016
Highway Safety Program Grants Rule	▪ State target establishment and reporting requirements. ▪ Highway safety plan content, reporting requirements, and approval.	Final Rule January 2013

Highway Conditions		Status
Pavement and Bridge Performance Measures Rule	▪ Propose and define pavement and bridge condition measures, along with minimum condition standards, target establishment, progress assessment and reporting requirements.	Proposed Rule January 2015
Asset Management Plan Rule	▪ Contents and development process for asset management plan.	Proposed Rule February 2015
	▪ Minimum standards for pavement and bridge management systems.	
Congestion/System Performance		**Status**
System Performance Measure Rule	▪ Define performance of the interstate system, non-interstate national highway system, and freight movement on the interstate system.	Proposed Rule April 2016
	▪ Finalize interpretation of scope of CMAQ performance requirements, including congestion and on-road mobile source emissions.	
	▪ Summarize MAP-21 highway performance measure rules.	
Transit Performance		**Status**
Transit Asset Management Rule	▪ Define state of good repair and establish state of good repair performance measures.	Pending
	▪ Require transit providers to set targets and report on progress.	
	▪ Transit asset management plans.	
National Transit Safety Program Rule	▪ Define transit safety criteria and standards.	Pending
	▪ Include definition of state of good repair.	
Transit Agency Safety Plan Rule	▪ Transit safety plan content and reporting requirements.	Pending
	▪ Target setting requirements for transit agencies and states.	

The Final Rule for the Highway Safety Improvement Program identifies five performance measures. Each measure is based on a 5-year rolling average and each measure has a defined methodology for data collection and calculation. The highway safety performance measures include:

1) Number of fatalities;
2) Rate of fatalities;
3) Number of serious injuries;
4) Rate of serious injuries; and
5) Number of non-motorized fatalities and non-motorized serious injuries.

Once the USDOT performance measures are finalized, TDOT and VDOT will set state performance targets in reference to the national performance measures. Lastly, the MPO will establish performance targets after the state-wide performance targets have been defined (Chart 3-2).

Chart 3-2
Flow Chart of Performance Measures and Performance Targets

After performance targets are selected, the FAST Act requires the MPO to reflect these targets in metropolitan transportation plans and programs. The intent of performance-based planning and programming is to link investment priorities to achieving performance targets.

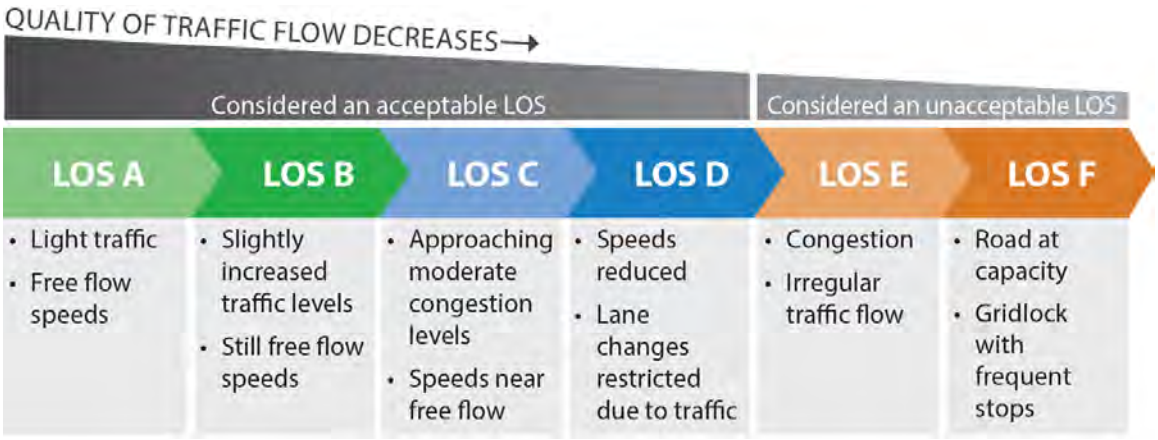
Sample of Current State (TDOT/VDOT) Measures. Performance-based planning and programming is inherently data-driven. Both Tennessee and Virginia maintain and update various databases in reference to performance measures at the state level. Some on-going data collection and performance areas include the National Fatality Analysis Reporting System (FARS), the Highway Performance Monitoring System (HPMS), the National Bridge Inspection (NBI) Program, State Strategic Highway Safety Plan (SHSP), and the National Transit Database (NTD). A sample of current performance areas utilized by TDOT and VDOT include:

- Fatality Rate on Roadways.
- State-wide Transit Trips.
- Interstate Roughness Index (IRI) Rating.
- Pavement Quality Index (PQI) Rating.
- Bridge Condition Rating System.
- Roadway Volume/Capacity Ratio (congestion)

Current MPO Measures. The Bristol Tennessee/Virginia Urban Area MPO has a number of measures as a part of other planning efforts; however, it is important to note that these will need to be consistent with TDOT and VDOT performance requirements when those are determined.

Level of Service – Evaluation of roadway performance is based on volume-to-capacity ratio which indicates what volume of traffic a roadway is carrying compared to its maximum capacity. Level of Service (LOS) is a process utilized to describe how well traffic flows on a roadway based on a scale from A to F (Chart 3-3). A Level of Service analysis is applied to all roads in the Study Area. The current and projected LOS for specific roads in the MPA is discussed in Chapter 5.

Chart 3-3
Level of Service



Crash Data – Roadway intersection and lane departure crash data is maintained for the Metropolitan Planning Area to provide an analysis of crash rates and trends. For Tennessee crash data, the MPO utilizes Critical Rate Factors (CRF) as a statistical measure of how many crashes are occurring at a given location at a given volume of traffic compared to similar intersections across the State of Tennessee. Virginia does not provide the statewide statistics to develop CRFs. As a result, Virginia crash rates in the Metropolitan Planning Area are compiled per million entering vehicles which provides the MPO an indication of high-crash locations when comparing one intersection against another.

Public Transportation – Transit agencies within the MPO's Metropolitan Planning Area collect a variety of performance data that can be used to evaluate the effectiveness of services they provide. Commonly used transit performance factors include:

- Revenue per Mile
- Revenue per Vehicle Hour
- Passengers per Mile
- Passengers per Hour

CHAPTER 4: CURRENT TRENDS AND FUTURE CHALLENGES

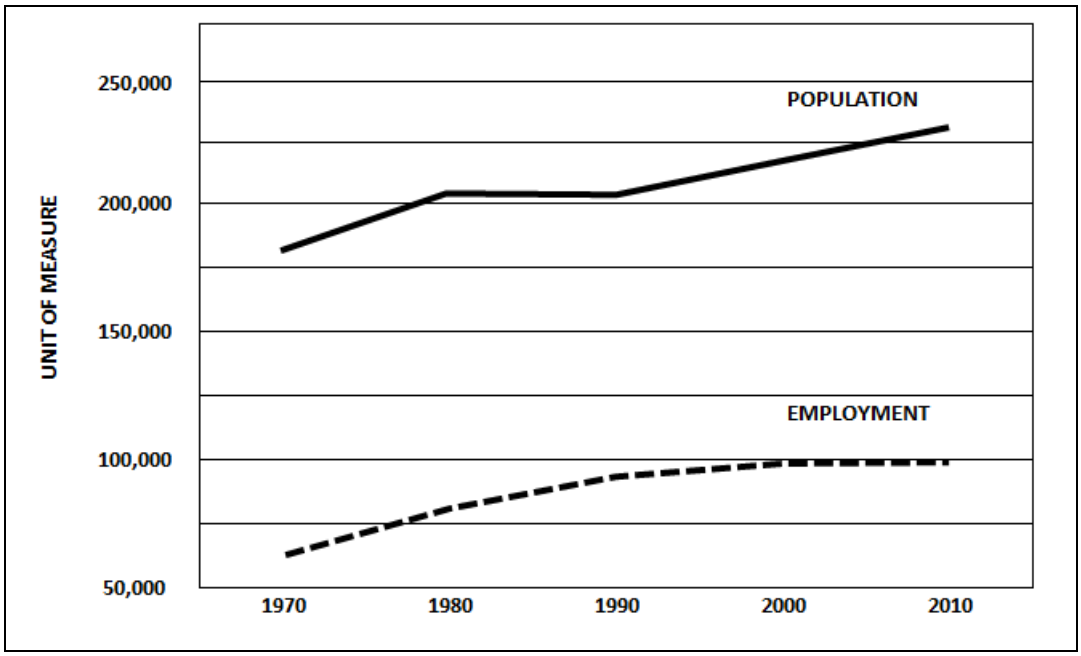
CURRENT TRENDS

The demand for transportation within the region is directly related to the demographic, economic, and land use characteristics of the area. Population, households, and employment patterns help to characterize an area – be it urban, suburban, or rural. Because the transportation network influences to varying degrees where people live and work, the evaluation of demographic, socio-economic, and commuting characteristics is important in developing the long-range transportation plan. Population and employment growth increases the demand for transportation as well as decisions on land use and zoning at the city and county level.

Data for the Bristol Urban Area was gathered from the 2010 U.S. Census, the 2010 Census Transportation Planning Package, and the 2013 American Community Survey. Since a majority of data is configured by county, the evaluation of some general demographic and transportation trends represent the "MPO Region", which includes all of Sullivan County, Tennessee, and Washington County, Virginia (inclusive of the independent city of Bristol, Virginia).

Population and Employment. Population in the MPO Region increased from 183,021 in 1970 to 229,534 in 2010 (Chart 4-1). In recent years, much of the growth has been concentrated in Washington County, Virginia. Over the last 40 years the MPO Region increased by 25% with the strongest growth demonstrated between 1970 and 1980.

Chart 4-1
Population and Employment Trends



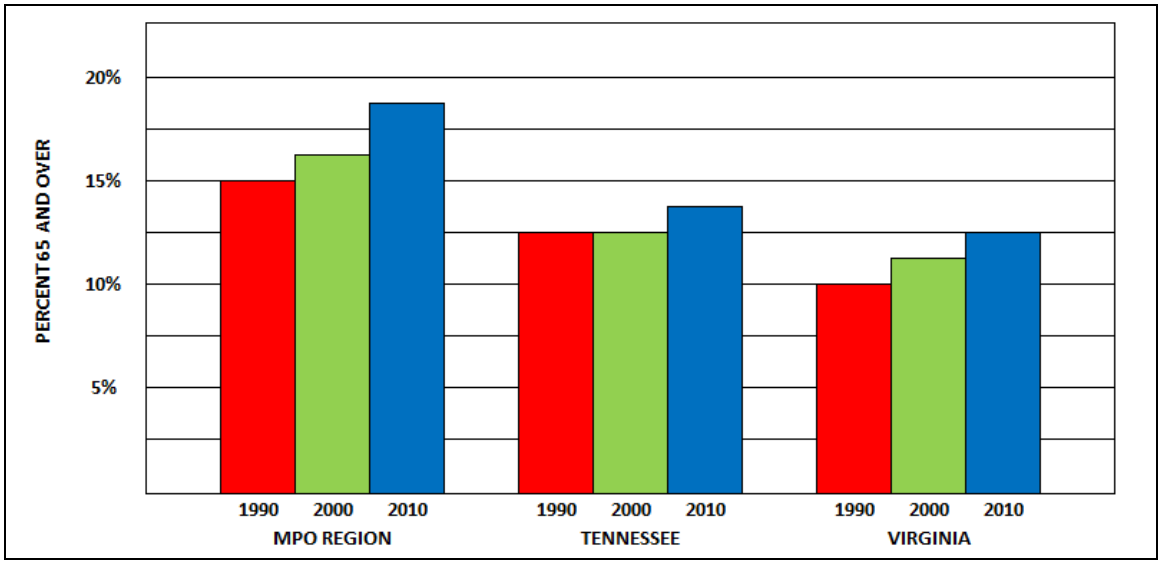
Source: U.S. Census Bureau

Employed persons in the MPO Region has grown from 87,502 in 1970 to 99,283 in 2010, which represents a 13.5% growth in employment over a 40 year period. Employment growth was strongest between 1970 and 1990, but has tapered off in recent years in part due to the effects of the 2007-2009 Recession.

Detailed population and employment forecasts for the MPO Study Area are discussed in Chapter 5, Travel Demand Modeling Process and Data Sources.

Age. The proportion of the MPO Region's population represented by individuals 65 and over has increased from 15% in 1990 to 19% in 2013. This trend is projected to continually increase based on State and National population forecasts. The MPO Region represents a larger percentage of persons 65 and over than the Tennessee and Virginia statewide percentages (Chart 4-2).

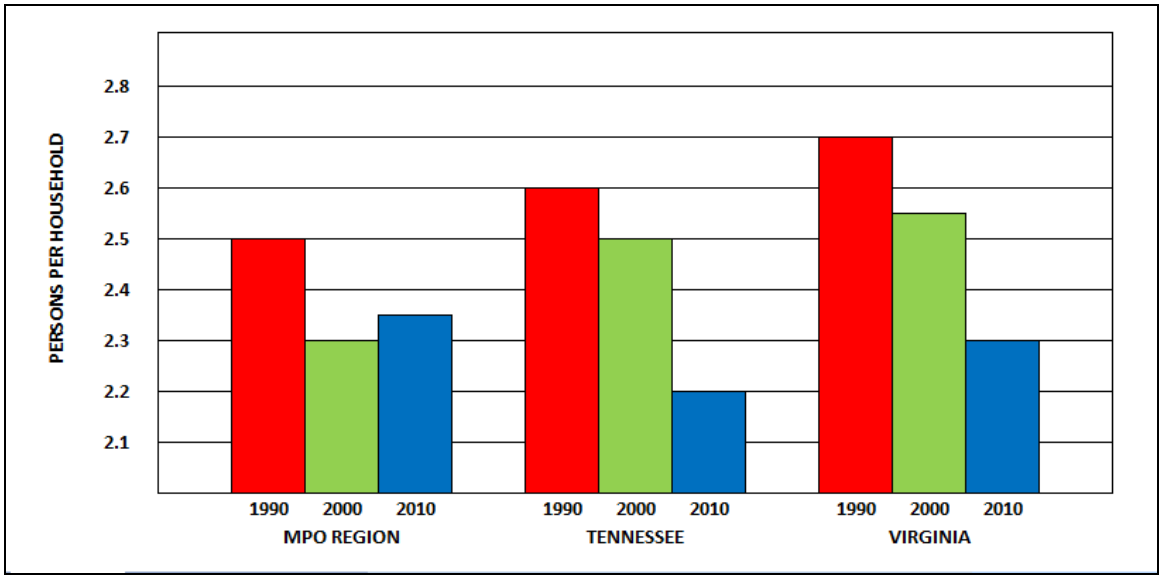
Chart 4-2
Persons 65 and Older



Source: U.S. Bureau of the Census

Households. The number of persons per household is an important factor in determining trip rates for an area. Statewide, for both Tennessee and Virginia, the average household size continued to decrease from 1990 to 2010. In the Bristol Region the average number of persons per household decreased from 2.47 in 1990 to 2.30 in 2000, but rose again to 2.36 in 2010 (Chart 4-3).

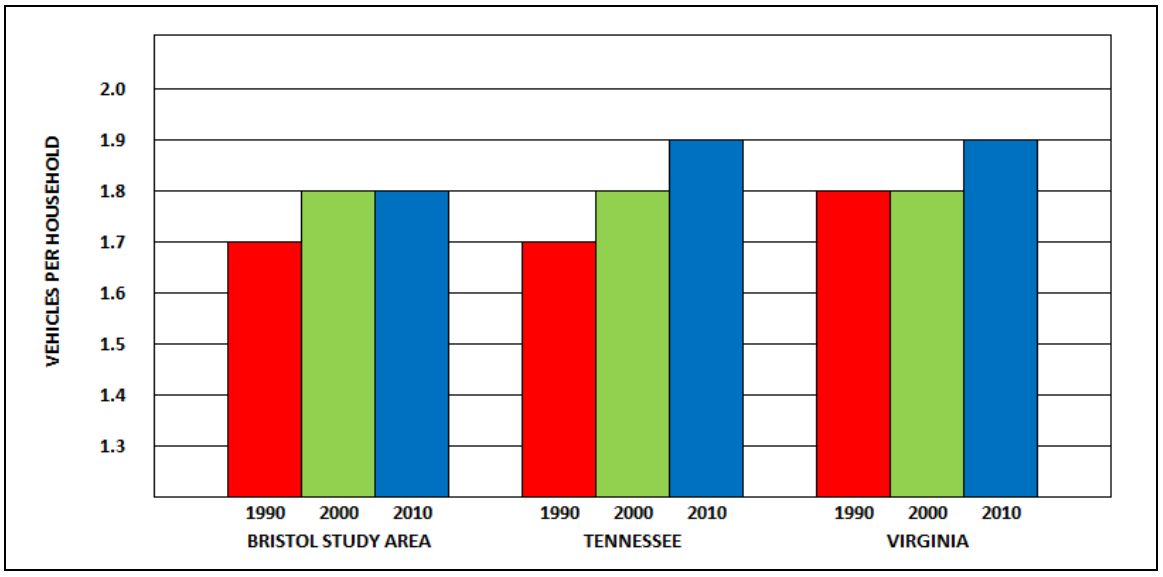
Chart 4-3
Average Household Size



Source: U.S. Bureau of the Census

Vehicle Availability. While the average household size at the state level has trended downward, the number of vehicles has increased. Although lower, the number of vehicles available per household for the MPO Region has been consistent with the statewide averages for Tennessee and Virginia (Chart 4-4).

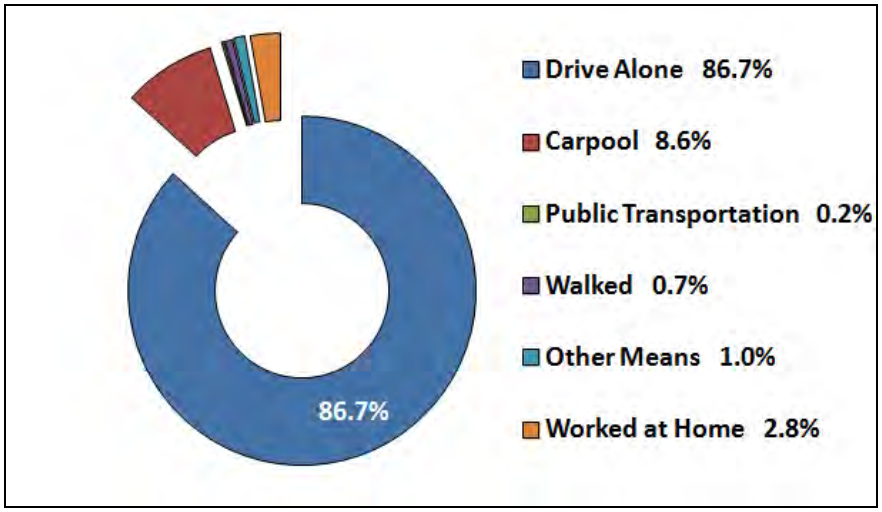
Chart 4-4
Average Vehicles per Household



Source: U.S. Bureau of the Census

Commuting to Work. Travel characteristics of all transportation modes play an important role in determining future transportation needs. The automobile is the predominate choice of transportation within the MPO Region, with over 86 percent of workers commuting to work in a single-occupant vehicle (Chart 4-5). In 2010, public transportation represented 0.2 percent of the work trips; however, regional transit service is limited in the Bristol Region outside the municipal limits of both Bristols and Abingdon.

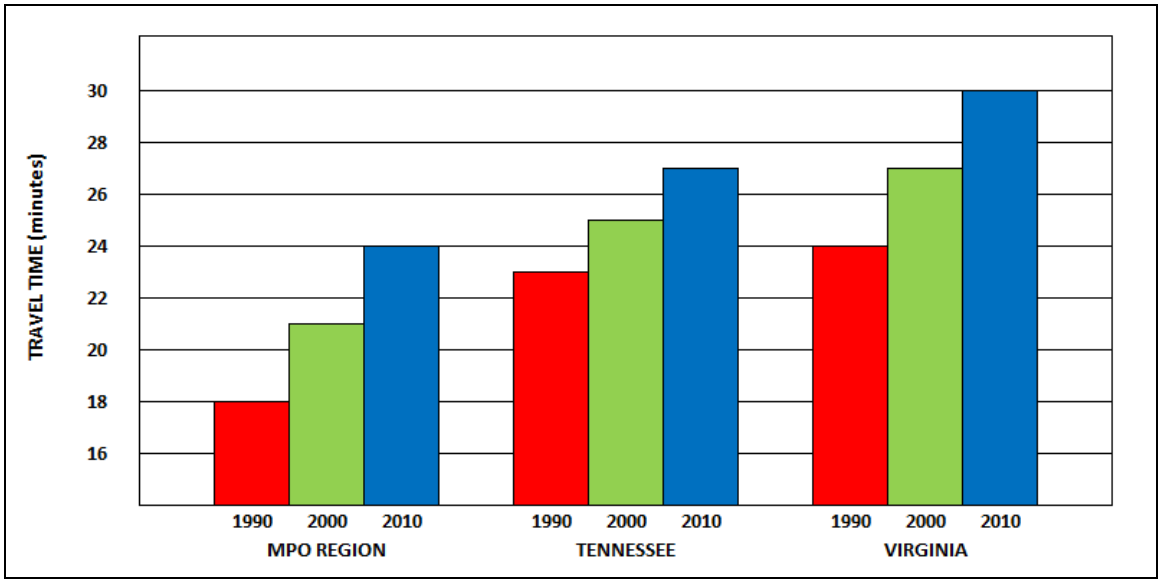
Chart 4-5
Bristol Region Commute to Work by Mode of Transportation (2010)



Source: U.S. Bureau of the Census, American Community Survey 2013

Throughout the MPO Region commuting times have also increased, although they still remain less that the two statewide averages (Chart 4-6). For the Bristol Region, this is consistent with the national trend of suburban growth and the availability of the automobile.

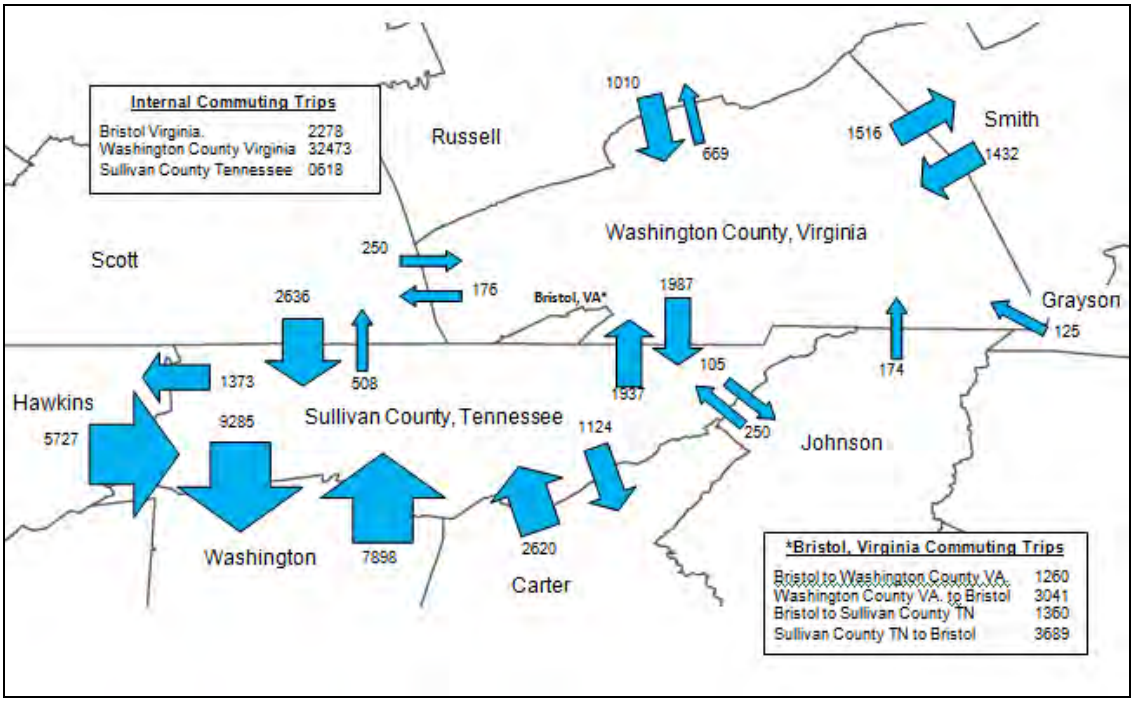
Chart 4-6
Bristol Region Travel Time to Work (Minutes)



Source: U.S. Bureau of the Census 2010, American Community Survey 2013

The counties surrounding the Bristol area function coherently as a single economic region. Residents from one county often commute to another county for work. Some of the larger county-to-county commuting patterns within the Bristol region are between Washington County, Tennessee, and Sullivan County, Tennessee (Map 4-1).

Map 4-1
Bristol Region County-by-County Daily Commuter Flows
Between Adjacent Counties (2010)

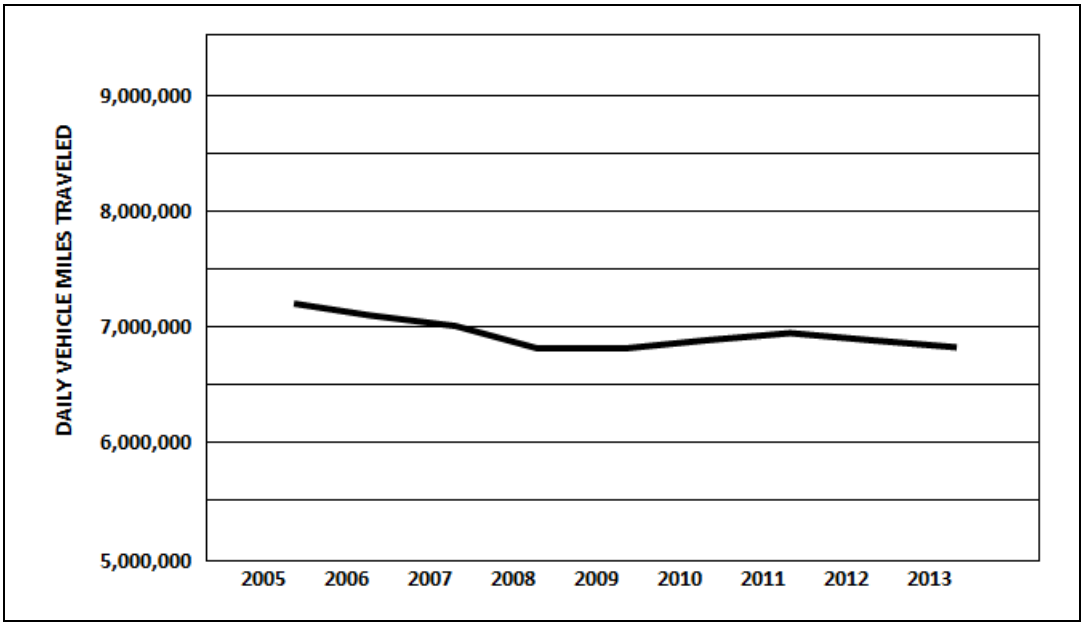


Source: Bureau of the Census 2010

Daily Vehicle Miles(VMT) Traveled. The demand for travel on a national level, at least for highway travel, appears to be slowly decreasing since the onset of the 2007 recession. Speculation for this decline has included many causes from generational, economic and technological factors, and lifestyle preferences. However, it should be noted a substantial contributor to VMT is freight movements.

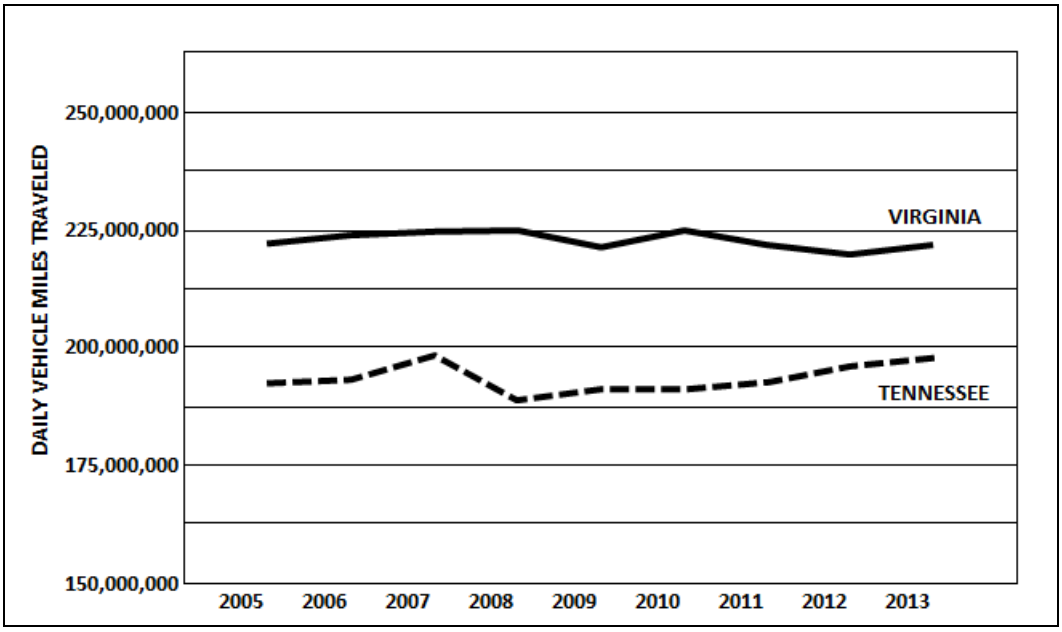
Overall, the MPO Region (Chart 4-7), as well as Tennessee and Virginia (Chart 4-8), has generally mirrored the national trend in Daily Vehicle Miles Traveled although Tennessee has been trending toward a steady increase in VMT since the recession.

Chart 4-7
Daily Vehicle Miles Traveled for the MPO Region



Source: Tennessee Department of Transportation, Virginia Department of Transportation

Chart 4-8
Daily Vehicle Miles Traveled by State



FUTURE CHALLENGES

Aging Population. The characteristics and transportation needs of senior populations is unique to that age group. Typically, seniors drive fewer miles that the rest of the adult population because retirement diminishes daily driving needs, specifically at peak travel times. Seniors also report a higher incidence of disability and may be less likely to drive or may cease driving entirely, relying on other forms of transportation, such as public transportation.

Public Health and Transportation. Transportation systems that encourage walking or bicycling can help people to increase physical activity, resulting in significant potential health benefits and disease prevention. The Centers for Disease Control and Prevention reports 33.7% of adults in Tennessee and 27.2% of adults in Virginia are obese. Because the transportation system impacts how communities are designed and operate, it can have a profound influence, both positive and negative, on public health. Where transportation infrastructure is designed to accommodate non-motorized transportation, it can have a positive effect on public health. The benefits on physical activity, including active transportation activities like walking and bicycling, can help prevent weight gain and lower the risks of obesity, diabetes, and heart disease.

Household Transportation Costs. Due to the cost of gasoline, vehicle upkeep and insurance, and longer driving distances and commuting times, household transportation costs are rising. Transportation expenditures can be particularly burdensome for the middle and lower income families. For the average American, transportation expenditures rank second only to housing expenditures (Chart 4-9). Given how much Americans spend on transportation, public investments which lower the cost of transportation could have a meaningful impact on families' budgets. Reducing fuel consumption, reducing the costs associated with congestion, and providing the availability and accessibility of public transportation would allow Americans to spend less money on transportation.

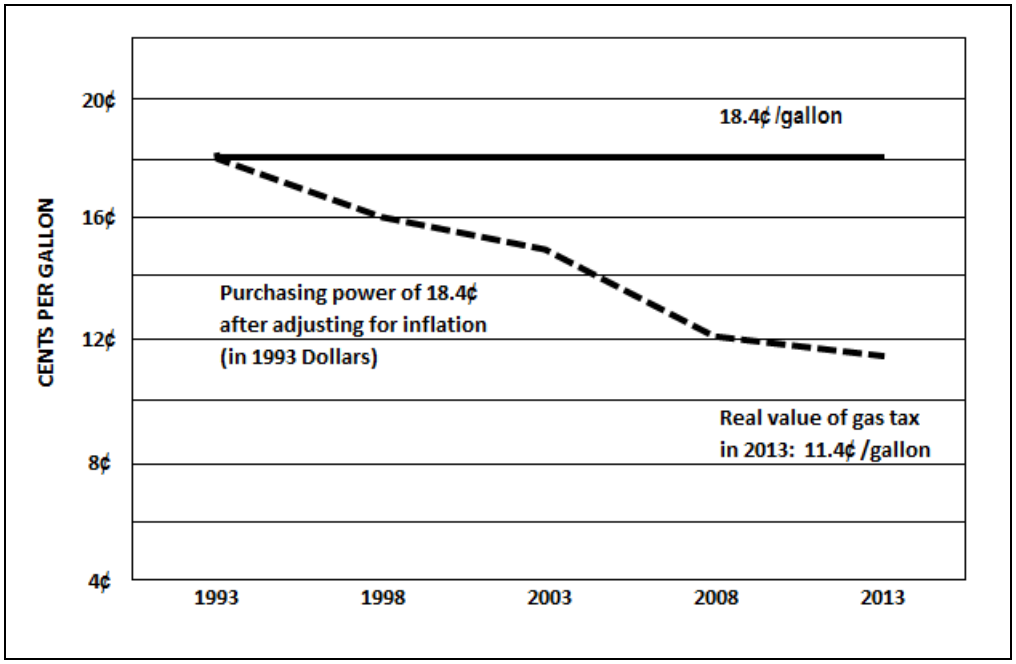
Chart 4-9
Average Household Expenditures

Source: July 2012 through June 2013 Consumer Expenditure Survey, Bureau of Labor Statistics

Transportation Funding. The economics of building and maintaining the transportation system has historically been associated with the gas tax, the single most important source of transportation funding for the federal government. Currently, the federal gas tax is levied as a fixed amount of 18.4 cents per gallon. Two unrelated developments have greatly reduced the purchasing power of the federal gas tax, which has not been increased since 1997 (Chart 4-10). Improvements in vehicle fuel-efficiency have cut gas tax revenues by allowing drivers to travel farther distances while buying less gas. At the same time, inevitable growth in the cost of asphalt, machinery, and other construction materials has put additional strain on the gas tax because the rate has not been adjusted to keep pace with inflation.

Much like improvements to fuel efficiency, decreases in the amount of driving or vehicle miles traveled (VMT) have reduced the gas tax revenue. At the national level, not only is the aging population driving less, but young American's transportation preferences and needs have changed as technology has allowed more would-be drivers to work from home as well as socialize from home. The Millennial generation, presently age 20-34, have different driving habits than their predecessors including preferences for urban housing/employment locations and replacing driving with other forms of transportation such as public transportation.

Chart 4-10
Purchasing Power of the Federal Gas Tax



The current gas tax revenue shortfall has resulted in the growth rate of federal (and state) transportation funds not keeping up with increasing transportation needs. As a result, fewer funds are available for transportation investments at a time when our infrastructure continues to age, requiring more maintenance. The necessity to maintain and preserve the existing transportation system, when coupled with less revenue, means less available revenue for new infrastructure. Providing additional federal support for transportation infrastructure investment would be prudent given the ongoing budgetary pressures facing state and local governments.

CHAPTER 5: TRAVEL DEMAND MODELING PROCESS AND DATA SOURCES

This section describes the transportation related data that was collected, assimilated, and analyzed in the development of the *Bristol Urban Area Long-Range Transportation Plan Year 2040.* The MPO has obtained data from various sources, collected some of its own, and assimilated them into this document to present the existing state of the regional transportation system as well as future traffic estimates utilizing the TransCAD travel demand model.

The *Bristol Urban Area Long-Range Transportation Plan 2040* was developed with consultation and input from the public, municipal officials, TDOT, VDOT, FHWA, FTA, and other transportation, economic development, environmental, and land use planning agencies throughout the MPO region. Numerous plans and studies were referenced prior to the development of this document to ensure coordination and to promote consistency between transportation improvements and State and local planned growth areas as well as economic development patterns.

Part A: TRAVEL DEMAND MODEL DEVELOPMENT

Travel demand models provide the capability of performing a traditional four-step transportation planning process that includes trip generation, trip distribution, mode split[1], and traffic assignment. It was decided early in the process that the size and scope of the Bristol model did not require the additional complexity of an activity based model; the traditional model approach was sufficient.

To incorporate the impact of the regional highway network, the boundary of the regional travel demand model is represented by the MPO Study Area, which is larger than the federally recognized Metropolitan Planning Area (Map 5-1). Topography plays a large role in development of the traffic model's boundary. For instance, one could argue that it is not practical to expect the Hickory Tree area of southeastern Sullivan County to become urbanized in the foreseeable future. However, because of the presence of Holston Mountain and South Holston Lake, practically all trips in and out of the Hickory Tree area must pass through the Bristol study area. Instead of representing the Hickory Tree area as a series of external nodes[2], it was decided to include the entire area of Hickory Tree up to Holston Mountain in the modeled network. The MPO Study Area also includes that portion of Sullivan County east of South Holston Lake in the model for air quality purposes.

In reference to the current Census 2010 population of the MPA and the MPO Study Area (Table 5-1), the difference between the two boundaries represents the impacts of the rural populations of Washington and Sullivan County since all three of the incorporated cities are within the Metropolitan Planning Area.

[1] For a typical four-step model, a mode split (sometimes referred to as *mode choice*) step is included. However, the Bristol transit ridership is small enough that the mode split step is skipped, and all trips are assigned as highway trips, with the error thus introduced being negligible and resulting in slightly conservative future traffic volumes.

[2] See the *Roadway Network* section of this chapter for a fuller explanation of external nodes.

Map 5-1
MPO Study Area and Metropolitan Planning Area

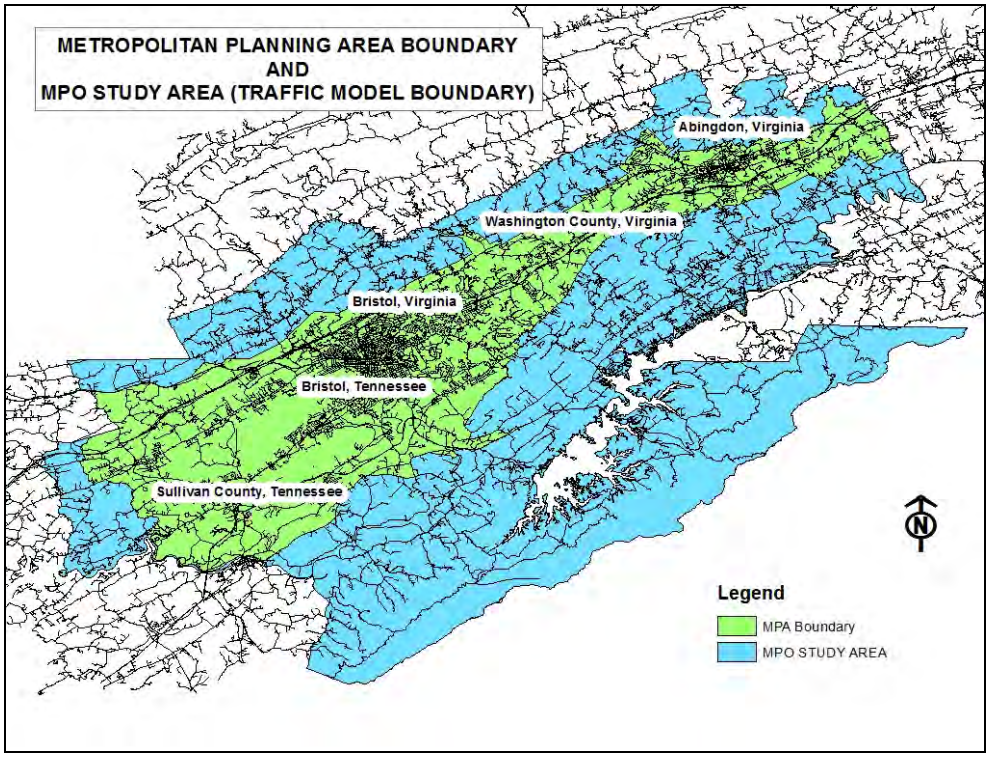


Table 5-1
MPO Metropolitan Planning Area and Study Area Population in 2010

Area	Metropolitan Planning Area Population	MPO Study Area Population
Bristol, Tennessee	26,702	26,702
Sullivan County, Tennessee (part)	14,813	29,474
Tennessee Subtotal	***41,515***	***56,176***
Bristol, Virginia	17,835	17,835
Abingdon, Virginia	8,191	8,191
Washington County, Virginia (part)	11,820	24,095
Virginia Subtotal	***37,846***	***50,121***
Total Populati0n	**79,361**	**106,297**

Source: U.S. Bureau of the Census 2010

The model was validated and calibrated for 2010 traffic volumes and land use conditions and was then updated to the year 2015 to represent the current transportation network, including the existing-plus-committed (E+C) roadway sections that were either under construction as of the date of the model (December 31, 2015) or for which the funding was obligated. The model could then be utilized to develop future year traffic models and volume estimates. The following discussion provides an overview of the modeling process.

MODELING PROCESS

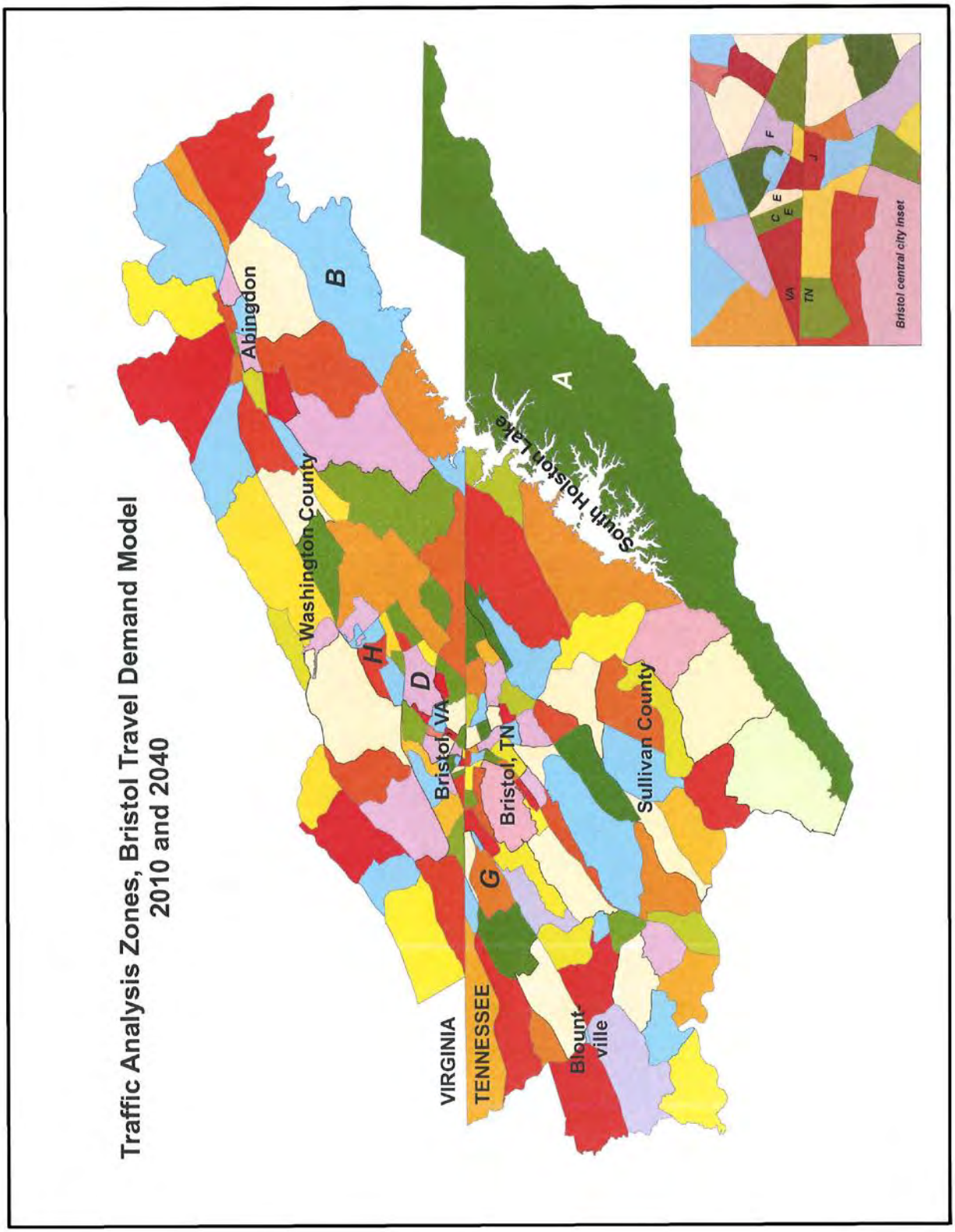
Traffic Analysis Zones. The study area is broken down into Traffic Analysis Zones, or TAZs. Each TAZ should represent a relatively homogenous area from a land-use standpoint without being so small as to be excessively detailed. For instance, a single TAZ can be predominantly residential, but still have small sections of retail areas within it. The MPO Study Area has 150 TAZs, of which 76 are in Tennessee and 74 are in Virginia (Map 5-2). TAZs are typically bound by physical features, such as roadways, railroads, water courses, ridge tops and large power lines. TAZ boundaries cannot cross the state line or county[3] boundaries. Employment (by class) and populations are geographically assigned as being within a specific TAZ. While the TAZs are in and of themselves relatively homogenous, there are vast differences between them (Table 5-2 and shown on Map 5-2). Each TAZ is assigned a name based on its location and a unique number (for instance, TAZ SUL091 is in Sullivan County; BVA021 is in Bristol, Virginia; BTN005 is in Bristol, Tennessee; WSH107 is in Washington County, Virginia; and ABN005 is in Abingdon).

Table 5-2: 2010 TAZ Statistics

(letters correspond to TAZ labels shown on Map 5-2)

A	Largest TAZ	TAZ SUL091, at 58.90 square miles (Holston Mountain in Sullivan County)
C	Smallest TAZ in area	TAZ BVA021, at 0.06 square miles (west of downtown Bristol, Virginia, at old Southern Railway yard)
D	Largest TAZ in population	TAZ BVA079, at 2,346 population (northeastern Bristol, Virginia, north of Kings Mill Pike and east of Bonham Road)
E	Smallest TAZ in population	Two industrial-area TAZs in Bristol, Virginia, have no population (TAZs BVA021 and BVA025)
F	Highest Population Density TAZ	TAZ BVA033, at 10,763 persons per square mile (just northeast of downtown Bristol, Virginia)
E	Lowest Population Density TAZ	Two industrial-area TAZs in Bristol, Virginia, have no population (TAZs BVA021 and BVA025)
G	Highest Employment TAZ	TAZ BTN005, at 2,643 employees (hospital/Exit 74 area of Bristol, Tennessee)
H	Lowest Employment TAZ	TAZ WSH039, in Wallace community of Washington County, has no employees
J	Highest Employment Density TAZ	TAZ BTN029, at 24,289 employees per square mile (downtown Bristol, Tennessee)
H	Lowest Employment Density TAZ	TAZ WSH039, in Wallace community of Washington County, has no employees

[3] For the purposes of this document, the City of Bristol, Virginia, as an independent city, will be considered as a county, as it is by the Census Bureau. Thus, there are three county-level jurisdictions in the Bristol study area (Bristol, Virginia; Washington County, Virginia; and Sullivan County, Tennessee).



Map 5-2
Transportation Analysis Zones (TAZ)

Population and Employment. Population and employment data are generated to determine the trips that are produced, attracted, and thus taken on the highway network. Population data was available from the 2010 Census. The 2040 population forecasts were developed through a top-down allocation process, following an analysis by the consultant team to determine the overall population growth for the entire area as a control total. In this top-down allocation process, local planning staff from the various jurisdictions allocated the population growth to various areas based on such factors as land availability (i.e., not in floodplains, steep slopes, or heavy rock areas), planned utility extensions, soil conditions, and other local knowledge.

The employment data was purchased from InfoUSA for 2010, to match the same timeframe as the available Census data. In a process similar to the population data, the 2040 employment overall control amount was determined and allocated top-down to the various areas by local staff, using local knowledge. The employment data included location, number of employees by class[4], and type of employee by class based on the North American Industry Classification System (NAICS) codes (agricultural/mining/construction, manufacturing, retail, service, office, and governmental). School attendance for both public and private schools were collected separately from the various school districts and allocated appropriately.

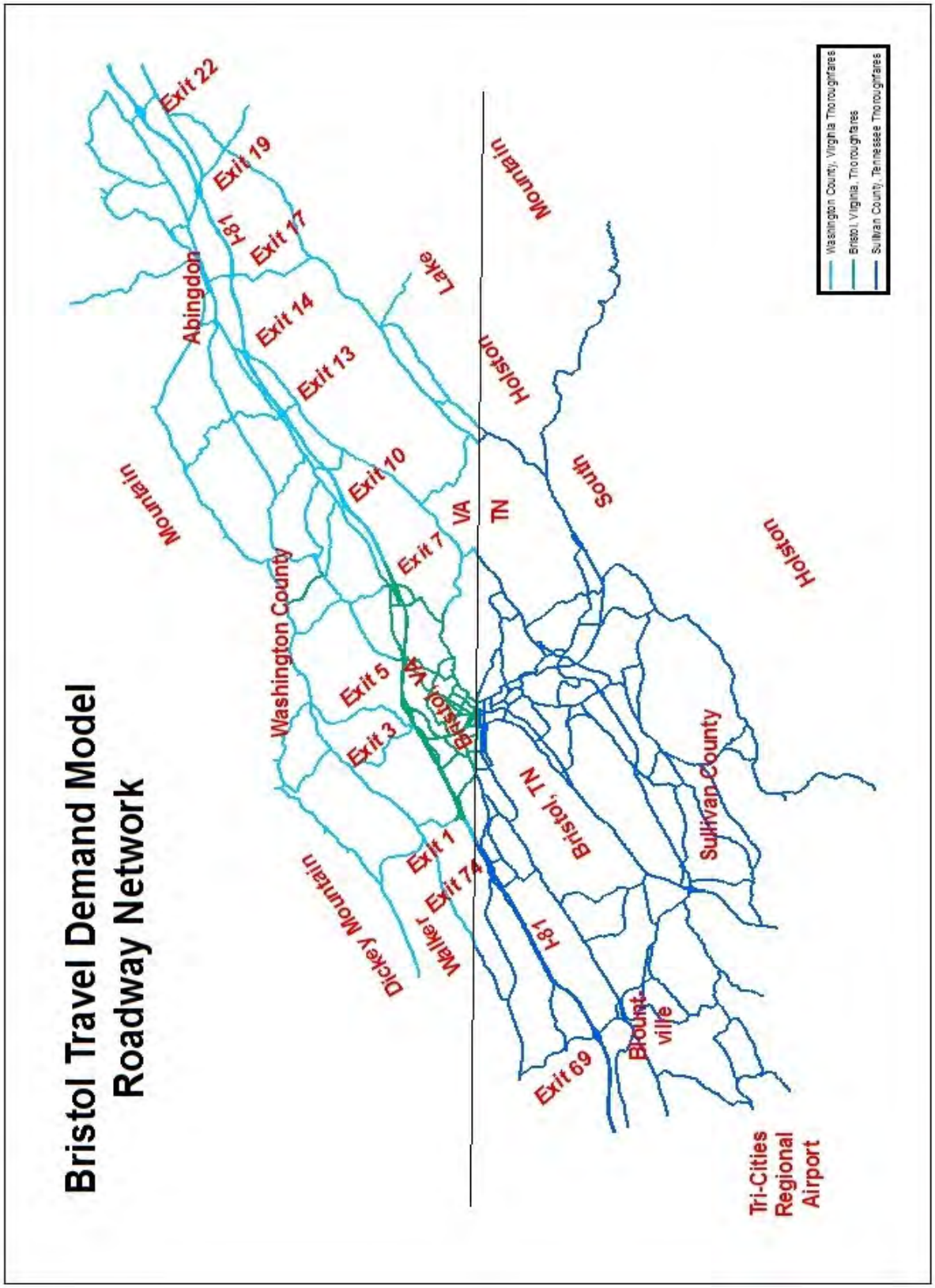
The planning assumptions and methodology for the population and employment forecasts are documented in Part B of this chapter.

Roadway Network. The roadway network for the Bristol travel demand model is a mathematical representation of the actual roadway network (Map 5-3). Roadways within the study area are broken into segments, or *links*; such a break is made when the travel or roadway characteristics change (such as number of lanes or speed limit) or when the roadway crosses a county boundary. Each link is assigned particular data of the roadway (such as road segment length, capacity, number of lanes, travel times, and free-flow speeds) to represent its characteristics. A junction of links is referred to as a *node*; a node thus represents an intersection or a point where a link crosses a boundary.

The TAZs are condensed to a single point, called a *centroid*, and they are connected to the roadway network at a node by a special type of link, called a *centroid connector*. In the mathematical representation of the network, trips to and from a particular TAZ can travel on centroid connectors, but through trips that do not begin or end in that TAZ cannot.

For the outer boundary of the model, or *cordon line*, a special type of link and node (*external node* and *external link*) are used to show the interaction between the roadways along the model boundary and the world outside of that boundary. The external node is thus always shown at the end of a dead-end link on the periphery of the network. For the Bristol travel demand model, there are 35 external nodes.

[4] The data did not include the exact number of employees per location. Instead, it aggregated the number of employees into broad categories (1 to 5 employees, 6 to 20 employees, etc.). By assigning the average number of employees in the group (such as assigning three employees to every location that had 1 to 5 employees) to each location, the error in employee assignment should average out.


Bristol Travel Demand Model
Roadway Network
Washington County, Virginia Thoroughfares
Bristol, Virginia Thoroughfares
Sullivan County, Tennessee Thoroughfares
Exit 22
Exit 19
I-81
Exit 17
Abingdon
Exit 14
Exit 13
Lake
Mountain
Holston
Exit 10
Mountain
South
Holston
VA
TN
Exit 7
Washington County
Exit 5
Bristol, VA
Exit 3
Bristol, TN
Exit 1
Exit 74
Walker Mountain
Dickey Mountain
I-81
Sullivan County
Exit 69
Blount-
ville
Tri-Cities
Regional
Airport

Map 5-3

For a smaller network such as Bristol, the level of detail can be additionally focused to include minor arterials, collectors, some local streets, and even one private roadway that is heavily used by public traffic[5]; however, it is impractical to model every roadway. The network is dominated by Interstate 81, running southwest to northeast, and its twelve interchanges in the study area (Exits 69 and 75 in Tennessee, and Exits 1, 3, 5, 7, 10, 13, 14, 17, 19, and 22 in Virginia).

Trip Generation. The raw demographic data has to be converted into trips as part of the *trip generation* step of the four-step modeling process. In trip generation, the number of persons and employees are input into equations to predict the number of vehicle trips that would be produced or attracted to each traffic zone. Those equations developed for each TAZ to predict the number of trips produced (outgoing) or attracted (incoming) for several different trip purposes:

- Home-based work trips
- Home-based shopping trips
- Home-based social-recreational trips
- Home-based school trips
- Home-based other trips
- Non-home based trips (trips that do not start or end at home, such as going to a restaurant for lunch from work)
- Internal/external trips (trips that pass over the cordon line defining the outer edges of the study area)
- Truck trips, broken down into light (four-tire), single-unit (SU) and combination unit (CU) trucks

Such demographics as population, vehicle availability, number of children in the household, and number of workers in the household are used to develop the trip rates by purpose through a cross-classification process. At this point in the analysis, the numbers of trips produced and attracted in each TAZ are person-trips. For external nodes, trip generation values are based on traffic counts at those locations.

The vehicle-trip productions and attractions thus calculated are loaded onto the mathematical model network at those points in the network where such trips would enter or exit one of the modeled roadways as an attribute of the centroids.

Trip Distribution. The next step in the four-step process is *trip distribution*. In trip distribution, it is known, for example, that so many trips are produced as home-to-work trips in a certain TAZ. Trip distribution will determine how many of those outgoing trips are attracted to each of all the TAZs. In the Bristol model, a gravity model was used. For example, if a trip produced in a TAZ can go to either of two other TAZs, and one of those two TAZs is twice as far away as the other, then trips are four times more likely to go to the nearer TAZ than they are to the further TAZ. The end result of trip distribution is a trip table, by trip purpose, that identifies how many trips are going between each pair of TAZs for each trip purpose. For the 150-zone Bristol network, each of the trip purposes will have a 150 by 150 matrix listing the number of trips between each

[5] Since the traveling public uses this private roadway (Craig Drive in Bristol, Tennessee), to leave it out of the travel demand model would not faithfully represent the actual trip paths in this part of the network and introduce errors on the adjacent public roadway links.

pair of TAZs. Trips are also calculated for trips that stay within a particular TAZ and thus do not enter the major thoroughfare network.

Mode Choice. The third step in the four-step process is *mode split,* or *mode choice*. In mode choice, the trips between each TAZ pair is examined to determine how many will travel by car, by public transit, by vanpool, by walking, etc. For mathematical simplicity, the Bristol model postulates that all trips will be by vehicle and not by public transit or other modes. This results in a conservative error of overestimating the number of trips using the highways. However, the number of trips utilizing transit or other modes in the Bristol area is small enough that any such error will not be great. The one portion of mode choice that was used in the Bristol travel demand model was the mathematical process of converting the calculated trips, which are person-trips, into vehicle-trips by using equations that describe the occupancy of vehicles by trip purpose and trip length.

***Traffic Assignment*.** Finally, *traffic assignment* loads the trip tables onto the appropriate highway to produce traffic volumes for each roadway segment. Highway assignment in the Bristol model uses two different approaches. For truck trips, an all-or-nothing assignment is used first, loading the network with these trips first only on those links that are coded as truck routes. Afterward, for the balance of the trips, the model utilizes a mathematical equilibrium process to simulate congestion effects on the roadway system that is loaded onto the network after the truck trips have been assigned. Output from the highway assignment is a network file that includes the assigned roadway volumes for each roadway segment.

Model Calibration and Future Year Model Development. The network is then calibrated using the 2010 data. That is, if the employment, population, and network information for the year 2010 is inputted into the mathematical model, then the answers should be close to the 2010 traffic counts measured in the field. The network and its data are then adjusted in a calibration process to match the 2010 traffic counts as closely as possible and within the calibration parameters established by FHWA and the Tennessee Modeler User's Group (TNMUG) organization. An exact fit is never possible for several reasons: (a) since every street is not modeled, those trips that use nonmodelled roadways are assigned to other, modeled roadways; (b) the model postulates that all motorists will behave the same way; and (c) the model assumes that every motorist has an omnipotent knowledge of the network and real-time congestion levels throughout the system. A purely mathematical process will not account for a trip route choice because a motorist wants to avoid a steep grade on a snowy day, or takes a new route because they are tired of the old one, or any of a thousand other reasons other than pure mathematical optimization of travel.

Once the model is calibrated, it represents predicted travel demand for the year 2010. The next step is to update the network from 2010 to the current calendar year of 2015 to account for modifications made in the roadway network since 2010. Included as well are projects that may not be completed, but are committed to construction, either because construction is actually underway or that the financial commitment is in place. This results in a 2015 network that is referred to as the "existing + committed" (*E+C*) network.

For the selected target year (in this case, the year 2040), the predicted population and employment data for the TAZs must be generated. Once these are generated, they are loaded onto the 2015 E+C network. The end result of this process should be the predicted traffic

volumes on each roadway segment of the network in the year 2040 by time of day if no additional projects are built. This is referred to as the 2040 "no build" network. This network will illustrate those links that have volume/capacity ratios in the ranges of interest, showing locations where volume is nearing or greater than capacity and thus congestion may result if remedial action is not taken. Those needs then contribute in analyzing proposed projects for the study period.

Projects may also be selected for other reasons besides inadequate volume/capacity ratios. Projects may also be selected to alleviate safety issues, to help develop multi-lane roadway networks within a jurisdiction, to add capacity for proposed economic development, for better operations of intersections, or for combinations of these and other factors.

Accounting for Truck and Rail Movements in the Bristol Travel Demand Model. Because of the importance of freight in the Bristol study area as elsewhere, the travel demand model featured a freight component. Mainline railroad operations have a considerable impact on road travel in the Bristol study area. For rail movements, all mainline surface crossings are mathematically represented in the network of roadways by reducing the capacity of those roadways. Capacity is not reduced on modeled roadways to account for the spur crossings.

Where appropriate (because of weight restrictions, size restrictions, or local ordinances), links in the network are coded as a truck route or as a no-truck route. For truck routes, as mentioned above, capacities are further reduced on links with mainline railroad crossings to account for the additional induced delays. Truck trips are generated separately from the demographic data (broken down further into single-unit [light] and combination-unit [heavy] trucks) and assigned to the network first with an all-or-nothing assignment. Only after the trucks are assigned to the network are the passenger vehicles assigned to the network with an equilibrium assignment, using the capacity left over after the truck assignment.

References. The model used in this process for this document was developed using TransCAD, a software package developed by Caliper Corporation. The Bristol TransCAD model was developed by the Kimley-Horn and Associates consultant firm, utilizing network and demographic data supplied by the MPO. Future demographic data was developed by the MPO, its member jurisdictions, and Kimley-Horn and Associates.

Part B: Population and Employment

Analysis and forecasts for population and employment data is specific to the MPO Study Area. To better interpret the study area, the population and employment data are analyzed by transportation analysis zones (TAZs). TAZs serve as the geographic unit for socioeconomic data used in the travel demand model to project future trips. To project future travel demand, population and employment within the MPO Study Area are estimated for the target year 2040. Future population and employment projection rates and trends were developed by the consultant team.

As part of the development of the long-range transportation plan, each of the MPO jurisdictions' comprehensive plans were reviewed in an effort to make the plan consistent with adopted goals and objectives, land use, and economic growth plans proposed by local jurisdictions.

POPULATION

The primary source of population and household data is the U.S. Bureau of the Census. The population of any study area is generally a reflection of the complexity of its economic and social structure. The Census was the source of the aggregate base year population data utilized for development of the travel demand model (Table 5-3).

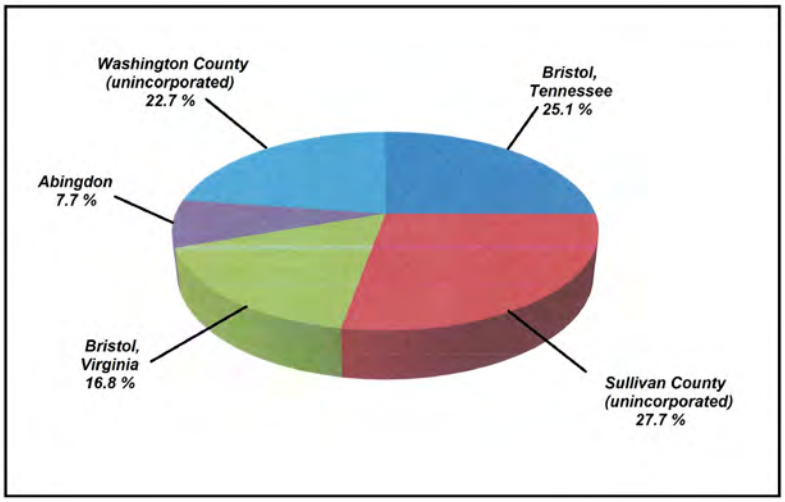
Table 5-3
MPO Study Area Population in 2010

MPO Study Area	Population
Bristol, Tennessee	26,702
Sullivan County, Tennessee (part)	29,474
Tennessee Subtotal	***56,176***
Bristol, Virginia	17,835
Abingdon, Virginia	8,191
Washington County, Virginia (part)	24,095
Virginia Subtotal	***50,121***
Total Population	**106,297**

Source: U.S. Bureau of the Census 2010

The Tennessee portion of the MPO Study Area represents approximately 53 percent of the 2010 population, which includes Bristol; the unincorporated community of Blountville; and the eastern part of Sullivan County. The Virginia portion of the MPO Study Area includes the City of Bristol, Virginia; Town of Abingdon; and the southwestern part of Washington County, and contains approximately 47 percent of the population of the study area between them. Chart 5-1 illustrates the percent of year 2010 population by jurisdiction for the MPO Study Area boundary.

Chart 5-1
MPO Study Area
Year 2010 Percent of Population by Jurisdiction



Source: U.S. Bureau of the Census 2010

Methodology. The overall study area population was projected to increase approximately eight percent between 2010 and 2040 based on normal growth trends. Projections were obtained from secondary sources, which served as control totals for the study area. These included Woods and Poole Economics, University of Virginia Cooper Center, University of Tennessee Center for Business and Economic Research, and local resources. While some forecasts were prepared exclusively for the urban areas Bristol, Tennessee, Bristol, Virginia, and Abingdon, the other estimates were prepared for unincorporated portions of Sullivan County, Tennessee, and Washington County, Virginia, which have extensive areas outside the study area.

Once an overall total population for the target year was determined by jurisdiction, this was broken up further to allocate those populations to each of the TAZs. This was accomplished by first assigning the 150 TAZs into eighteen "super regions". Based on the local land use and comprehensive plans of the various jurisdictions, as well as local knowledge of such issues as slopes, utility availability, and floodplains, a certain proportion of the additional population was allocated to each of the "super regions." Then, in turn, the additional population for each "super region" was further allocated to each TAZ.

Population Estimates. Ultimately an aggressive growth scenario was developed for the MPO Study Area and utilized for the travel demand model to develop 2040 population estimates. Such a scenario accounts for demographic influencing factors as proactive local governmental initiatives to foster growth, as well as accounting for the changes in household size and vehicle availability indicated by the trends that have become evident. This scenario also assumed the development of a new sewage treatment facility in Washington County, Virginia, that would support substantial population growth in that county. Based on these assumptions, an aggressive population estimate was developed, which represented a projected increase of approximately eight percent between 2010 and 2040 for the entire study area (Table 5-4).

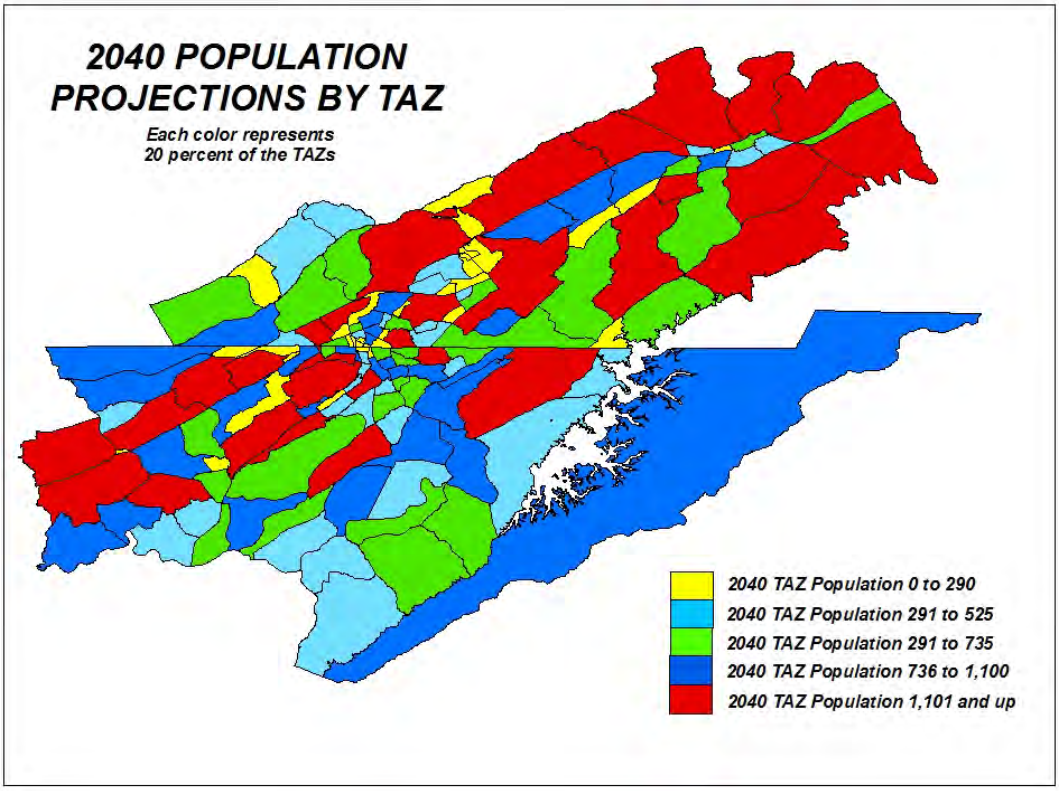
Because population projections are developed at the TAZ level, which are not consistent with political boundaries, 2040 population by jurisdiction for the MPO Study Area is not provided.

Maps 5-4 and 5-5 show the projected 2040 population and population density, respectively, for the entire study area by TAZ.

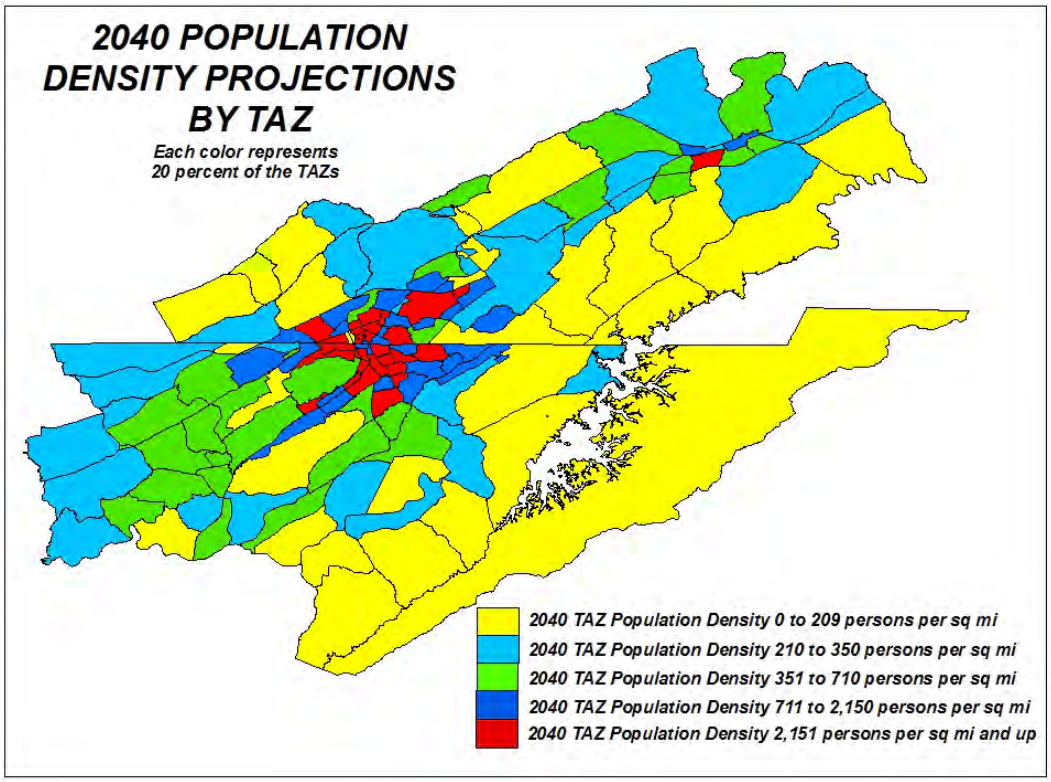
Table 5-4
Population for Years 2010 and 2040

MPO Study Area	2010 Population	2040 Population	Percent Change
Tennessee *City of Bristol* *Sullivan County (part)*	*56,176*	*58,532*	*4.2%*
Virginia *City of Bristol* *Town of Abingdon* *Washington County (part)*	*50,121*	*56,372*	*12.5%*
Total MPO Study Area	**106,297**	**114,904**	**8.1 %**

Source: U.S. Bureau of the Census, Kimley-Horn and Associates



Map 5-4



Map 5-5

EMPLOYMENT

Employment growth in the study area has generally followed regional and state patterns and the cyclical nature of the national economy. Throughout the nation, a shift in the employment base has occurred. The service industry is replacing traditional industries such as manufacturing and wholesale trade. The Bristol region is no exception. No longer does the Central Business District serve as the region's sole primary employment center. Instead, the percentage of employment is expanding away from the central business district, where land is more abundant and less expensive. 2010 employment data for the MPO Study Area were purchased from InfoUSA, which provides employment records for employers by SIC/NAICS code and address (Table 5-5). Because employment data is compiled at the TAZ level, 2010 employment by jurisdiction for the MPO Study Area is not provided.

The data used in Bristol's travel demand models continues to become more sophisticated and detailed. In the 2000 model, there were only two employment categories (basic and service). For the 2010 model, this was expanded to six employment categories (agricultural/mining, manufacturing, retail, office, service, and governmental) to allow for more sophisticated trip generation equations to be used. In addition, school enrollment figures for the 2010 base year were included for more detailed trip generation analysis.

Table 5-5
MPO Study Area
2010 Employment by Category and School Enrollment

CATEGORY	TENNESSEE *City of Bristol* *Sullivan County (part)*	VIRGINIA *City of Bristol* *Town of Abingdon* *Washington County (part)*	MPO STUDY AREA
Agricultural/Mining	1,733	2,040	3,773
Manufacturing	5,725	6,519	12,244
Retail	2,410	4,881	7,291
Office	2,292	4,009	6,301
Service	9,509	9,315	18,824
Government	2,605	3,231	5,836
TOTAL EMPLOYMENT	**24,274**	**29,995**	**54,269**
SCHOOL ENROLLMENT	**9,046**	**8,243**	**17,289**

Source: InfoUSA and Bristol MPO

Methodology. An initial estimate of 2040 employment by category was based on a constant ratio of jobs to population for the MPO Study Area. This initial estimate was modified when it was determined that the growth rates for population and employment did not converge. Additional analysis on growth of the available labor force by jurisdiction to fill those employment needs resulted in the final modified employment values used for the target year to account for the aging population of the region. In addition to the ambient employment growth, economic development initiatives by local jurisdictions were included in the employment forecasts that promote economic activity beyond the ambient population growth. Specific initiatives include reutilization of the former Raytheon industrial plant and construction of the Bristol Business Park and Partnership Park II in Tennessee, Oak Park in Washington County, and additional retail development (The Pinnacle at Exit 74 in Bristol, Tennessee, and The Falls at Exit 5 in Bristol, Virginia).

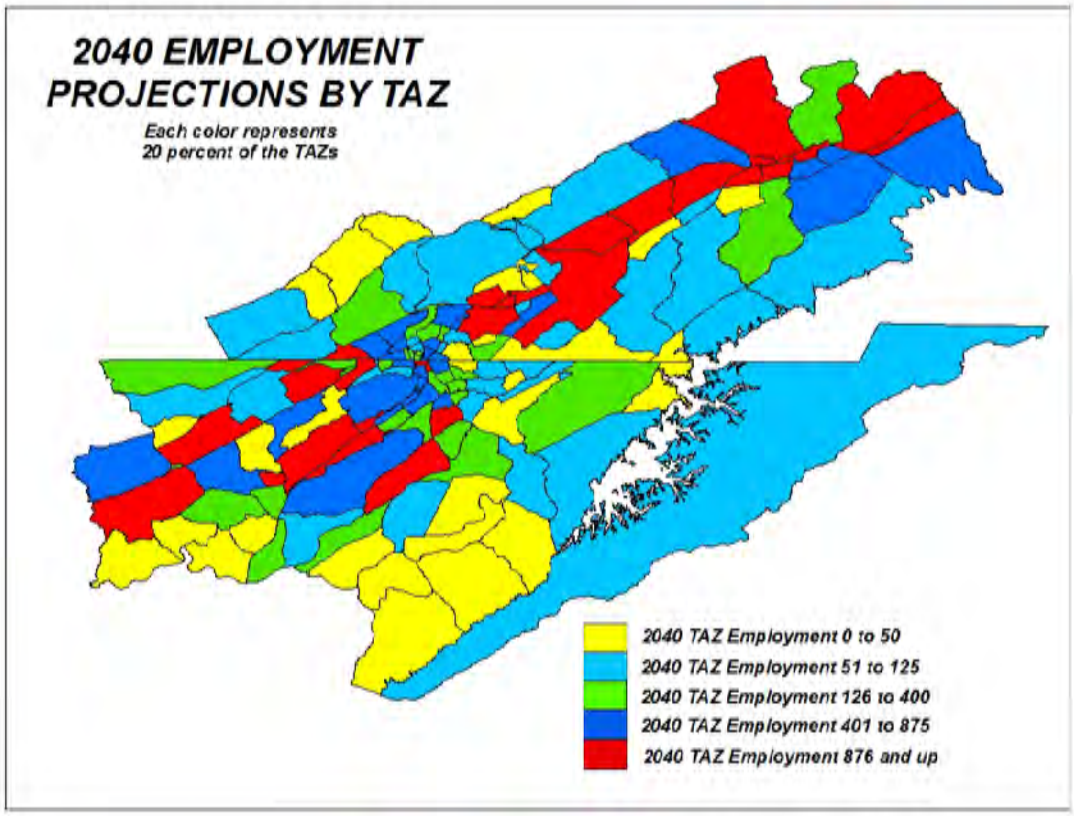
The consultant team determined the original overall growth in employment for the entire study area by jurisdiction and by employment type for the target year based on the above data. Once the overall employment for the target year was determined by jurisdiction, this was broken up further to allocate those employees to each of the TAZs. This was accomplished by first assigning the 150 TAZs into eighteen “super regions”. Based on the local land use and comprehensive plans of the various jurisdictions, as well as local knowledge of such issues as slopes, zoning, utility availability, and floodplains, a certain proportion of the additional employees were allocated to each of the “super regions.” Then, in turn, the additional employees for each “super region” were further allocated to each TAZ. Thus, the impact of various types of employment growth is reflected into the travel patterns developed in the traffic model.

***Employment Estimates*.** The employment estimates for 2040 (Table 5-6) were developed utilizing the methodology described above. Maps 5-6 and 5-7 show the projected 2040 employment and employment density by TAZ.

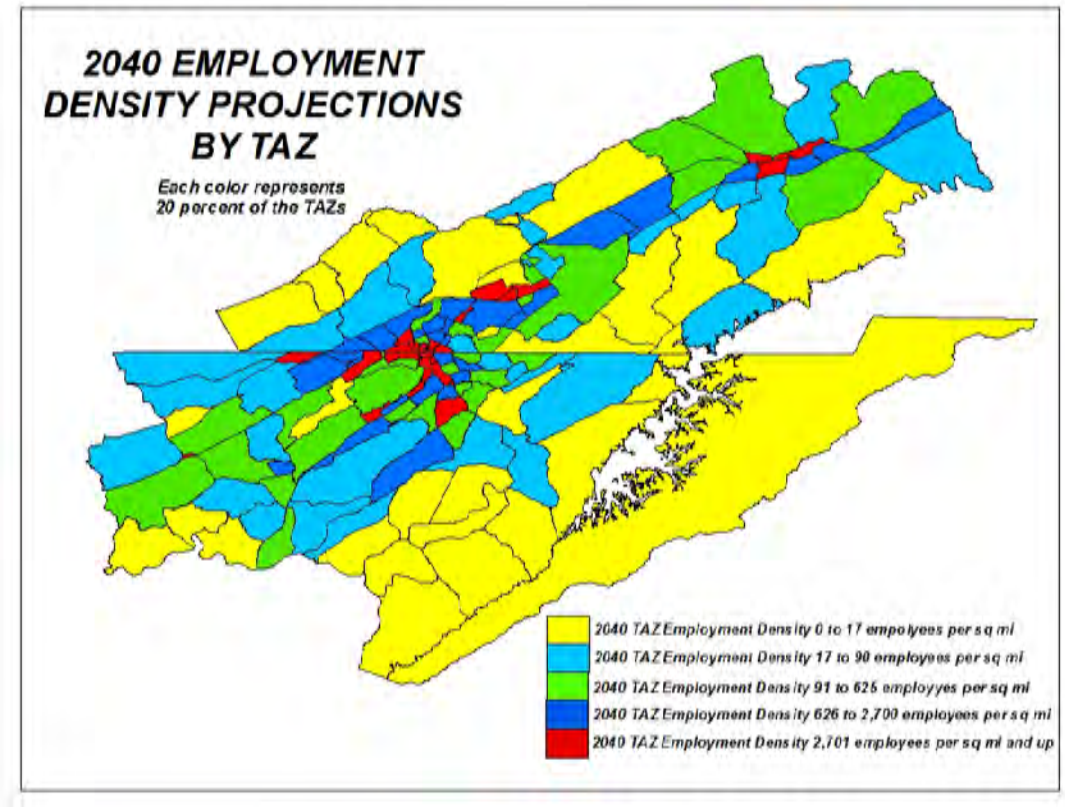
Table 5-6
Employment for Years 2010 and 2040

MPO Study Area	2010 Employment	2040 Employment	Percent Change
Tennessee *City of Bristol* *Sullivan County (part)*	*24,274*	*33,502*	*38.0%*
Virginia *City of Bristol* *Town of Abingdon* *Washington County (part)*	*29,995*	*45,769*	*52.6%*
Total MPO Study Area	**54,269**	**79,271**	**46.1 %**

Source: InfoUSA and Kimley-Horn and Associates



Map 5-6



Map 5-7

Part C: History of the Bristol Travel Demand Model

History of the Modeling Process in Bristol. The 2015 travel demand model is the seventh edition of this model, and the fourth one utilizing the TransCAD software package. As Map 5-8 shows, travel demand models were developed based on the roadway networks in 1969, 1985[6], 1995, 2000, 2005, 2010, and 2015. The initial 1969 network (innermost gray area) did not extend very far from the Bristol downtown; such areas now considered integral to the Bristol area network that were outside of the model in 1969 includes Blountville, Exit 69, much of the Bristol Motor Speedway area, and much of the Exit 7 area of Bristol, Virginia.

1985. The 1985 study boundary was expanded by the MPO to include such areas as State Route 37[7] south of Interstate 81; Blountville; the Wallace community of Washington County; Exit 13 (then Exit 6); and all of the four-lane portion of Highway 421 (then under construction) to the Vinegar Hill community.

[6] The 1985 model was started by TDOT and VDOT's predecessor, VDH&T (Virginia Department of Highways and Transportation) in the early 1980s, prior to the creation of the Bristol MPO, based on the 1980 Census; the model was completed by those agencies, but the long-range transportation plan developed from that data was the first plan developed by the newly formed Bristol MPO.

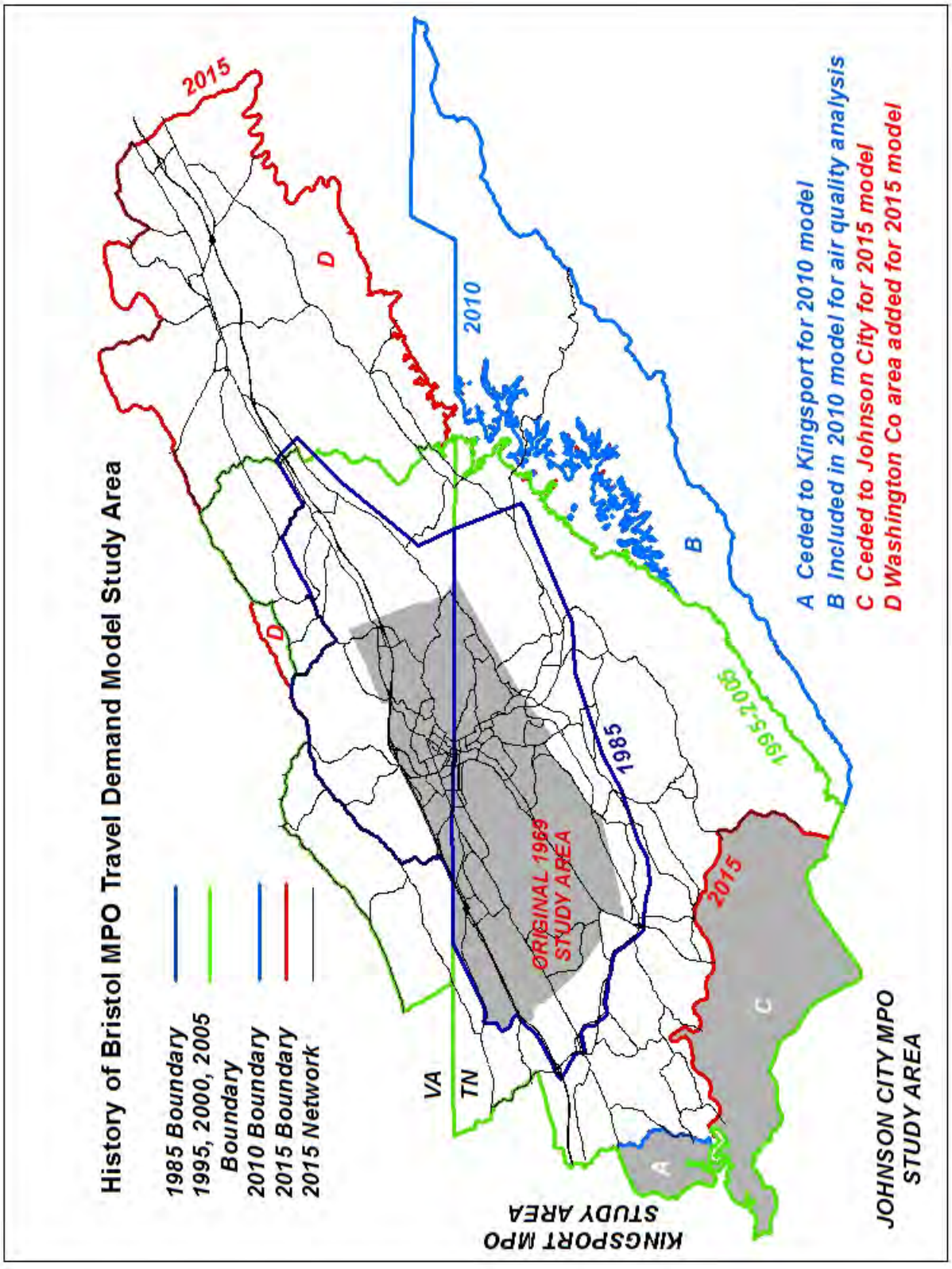
[7] The two-lane State Route 37 was superseded by the multi-lane Highway 394, starting in the 1990s and working westward.

1995. For the 1995 travel demand model, which was based on the data from the 1990 Census, the study boundary was considerably expanded to include Bluff City; Sullivan County north and east of Exit 66 and west of South Holston Lake; and Washington County west to the Scott County line and east to include the Mock Knob area and portions of the Old Jonesboro Road area. This study area boundary was unchanged for the 2000 and 2005 models.

2010. Based on the 2000 Census, a small area in the Muddy Creek community east of Tri-Cities Regional Airport was removed from the Bristol 2010 model and ceded to the Kingsport study area, since it contained a small corner of the Kingsport urbanized area (area A on Map 5-8). It was for this model that, for the first time, air quality considerations were added. At that time, there were three areas of Sullivan County that were not included in any travel demand model of the three MPOs. It was decided that each MPO would add one of these three unmodeled areas to their study networks, so that if air quality modeling were to become necessary, all of Sullivan County would be modeled at the MPO level. The Cold Springs area of Sullivan County north of Highway 11W was modeled by Kingsport; the southern Piney Flats area south of Allison Road/Piney Flats Road was included by Johnson City; and the Bristol model was expanded to include Holston Mountain in the east to the county boundary (area B on Map 5-8).

2015. The 2015 model, based on the 2010 Census, represents a major shift in modeling focus. With the continued growth of the Tri-Cities and the new definitions by the Census Bureau to determine urbanized area boundaries, all three MPO travel demand models are fully contiguous. Piney Flats, Bluff City, and part of the Chinquapin community were removed from the Bristol study area and added to the Johnson City travel demand model study area (area C on Map 5-8). The Bristol study area cannot grow westward, as it contacts the Kingsport study area. It cannot grow southward, as it contacts the Johnson City study area. With the new definitions of urbanized areas that included not only population densities but also impervious surfaces and commercial activity, the gap near Virginia Highlands Airport and Exit 13 between the Bristol urbanized area and the Town of Abingdon was closed, which brought the Abingdon and Exit 22 areas into the Bristol study area (the eastern area D on Map 5-8). A small area was also added north of the Clear Creek area so that all of the Bristol, Virginia corporate limits are inside of the study area. The resulting study area boundary is shown on Map 5-8. The 2010 Census urban population split is nearly equal between Tennessee and Virginia, with just under 4,000 more Tennesseans than Virginians in the Bristol Tennessee/Virginia urbanized area; however, for the overall study area, however, there are about 6,000 more Tennesseans than Virginians.

The 2015 model is also a “first” for the Bristol area in that it is a true time-of-day model. For previous models, the future AADT (average annual daily traffic) volume was forecasted, and ten percent of that total was designated as the peak hour flow; the hourly volume-to-capacity ratios were then calculated on that ten-percent ratio. For this model, there are actually four models: morning peak, midday, afternoon peak, and off-peak. The volumes used in the volume-to-capacity calculations are a composite value of these four time-of-day models, as per approved TDOT practice.


History of Bristol MPO Travel Demand Model Study Area
1985 Boundary
1995, 2000, 2005 Boundary
2010 Boundary
2015 Boundary
2015 Network
A Ceded to Kingsport for 2010 model
B Included in 2010 model for air quality analysis
C Ceded to Johnson City for 2015 model
D Washington Co area added for 2015 model
2015
2010
1995-2005
1985
ORIGINAL 1969 STUDY AREA
VA
TN
KINGSPORT MPO STUDY AREA
JOHNSON CITY MPO STUDY AREA
A
B
C
D

Map 5-8

CHAPTER 6: OPERATIONAL ANALYSIS AND CONGESTION MANAGEMENT

Based on national trends, congestion studies show that over half of traffic delay is non-recurring, meaning it is caused by various types of incidents such as crashes, disabled vehicles, work zones, poor weather, and special events. The remaining portion is recurring congestion, delay that occurs in the same place at the same time of day. Understanding the relative magnitudes of recurrent vs. non-recurrent congestion is critical to the selection of proper countermeasures and the appropriate allocation of resources to address congestion problems. Small urban areas, such Bristol Metropolitan Planning Area typically lack the extensive traffic sensor networks necessary to monitor and record traffic performance on a continuous basis.

While the causes of recurring and non-recurring congestion are different, the impacts are generally similar. Congestion reduces economic efficiency since freight shipments greatly rely on efficient travel between destinations. For the general public, congestion reduces travel time and creates frustration. Congestion also negatively impacts the environment due to increase emissions when traveling at greatly reduced speeds.

The Federal Highway Administration (FHWA) Office of Operations identifies seven general causes of roadway congestion and unreliable travel, as discussed below.

SOURCES OF CONGESTION

Category 1: Traffic-Influencing Events

- *Traffic Incidents:* These are incidents that physically impede the flow of traffic. Such incidents include traffic crashes, vehicular breakdowns, and debris in the roadway. Other examples include incidents that distract the driver and thus influence driver behavior, such as activity or debris on the shoulder. Finally, incidents completely off the highway can also influence driver behavior through distraction (such as a structure fire visible to motorists).
- *Work Zones:* This is a separate example of a phenomenon that physically impedes the flow of traffic. This can take the form of actual lane closures, or other techniques that influence driver behavior (such as lane shifts and shoulder closures). Work zones are often cited as frustrating encounters by motorists, again influencing their driving behavior, often in counterproductive ways such as road rage.
- *Weather:* It is desired that motorists alter their driving behavior based on environmental conditions, which can take the form of influencing roadway characteristics (water, snow, ice, or wet leaves on the roadway) or influencing visibility characteristics (fog, heavy precipitation, smoke, or bright sunlight at sunrise or sunset) to increase safety as appropriate, which often reduces roadway capacity as an unintended by-product.

Category 2: Traffic Demand

- *Fluctuations in Normal Traffic:* Since traffic volumes are shown to vary by month-to-month, as well as displaying day-to-day variations, this can create issues at certain times on roadways with fixed capacities that do not react to such fluctuations. It is not economically sound to design a roadway to handle the traffic flow for the heaviest-volume day of the year; rather, typical engineering standards call for a roadway design to handle the 30th-highest hour of traffic in a given year. Such a standard results in certain times of the year that the demand is greater than the design capacity. Another example is the difference in acceleration and deceleration characteristics of heavy vehicles mixed in with lighter vehicles and thus influencing the latter's travel experience as well.
- *Special Events:* This is an example of how traffic flow patterns, often in volumes far in excess of or vastly different from typical traffic patterns, can overwhelm a roadway network. Special techniques to alleviate congestion issues in response to increased traffic demand (such as temporary one-way streets or contraflow lanes) bring additional issues for everyday ambient motorists in the area as their typical travel patterns are disrupted. Often, increased on-street parking demand further degrades traffic operations. Examples include sporting events and weather- or industrial incident-induced evacuations.

Category 3: Physical Highway Features

- *Traffic Control Devices:* Poorly timed or coordinated traffic signals are often identified as a culprit in congestion, but other traffic control devices can be included as well, such as excessive STOP sign usage and ramp metering.
- *Physical Bottlenecks:* Congestion-inducing features in this category include such items as inadequate lane and shoulder widths; grades and curves; lane drops and merging requirements; and features that stop traffic altogether, such as railroad crossings and manual toll booths.

Better management of work zones, better incident response and better traveler information can significantly reduce congestion caused by traffic influencing events such as weather and special events. Solving recurring congestion related to fluctuations in normal traffic, traffic control devices, and physical bottlenecks requires strategies to maximize the capacity of the infrastructure already in place or investing in additional lanes to increase capacity.

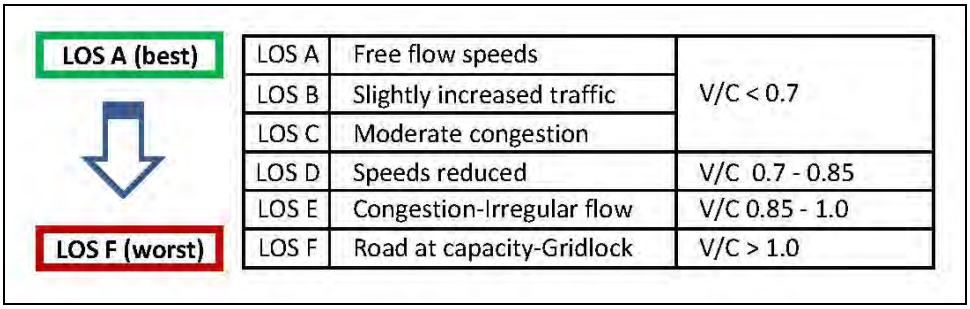
OPERATIONAL ANALYSIS

One of the primary purposes of long-range planning is to determine at which locations additional road capacity will be required in the future so that facilities can be constructed to manage that predicted travel demand and thus help to alleviate additional congestion induced by traffic volume growth. As such, the data from the travel demand model is aimed at alleviating future congestion induced by recurring congestion. For the Bristol Study Area, this was done by contracting with the consultant firm of Kimley-Horn and Associates to develop and operate a mathematical model of the Bristol network utilizing the TransCAD software developed by the Caliper Corporation. A year 2010 model was developed, utilizing year 2010 population,

employment, network, and traffic count data that could be used for calibration purposes. Once the 2010 network was calibrated, it was converted to a 2015 "existing + committed" (E+C) network to update the network to projects completed or committed. Population and employment data predicted for the target year 2040 is then loaded onto that network and run to serve as the year 2040 "no build" scenario to determine what traffic volumes could be predicted if no further projects were built beyond what is committed in 2015.

Evaluation of roadway performance is based on volume-to-capacity (V/C) ratio which indicates what volume of traffic a roadway is carrying compared to its maximum capacity. For example, a V/C of 1.0 indicates the roadway facility is operating at its capacity. Level of Service (LOS) is the process utilized to describe on a scale from A to F how well traffic flows on a roadway based on it's volume/capacity ratio (Chart 6-1). There are several areas within the Study Area that were identified as having volume/capacity (V/C) problems by the TransCAD model; however, the vast majority of roadway segments fell into the LOS categories of A, B, and C.

Chart 6-1
Level of Service



LOS A	Free flow speeds	V/C < 0.7
LOS B	Slightly increased traffic	
LOS C	Moderate congestion	
LOS D	Speeds reduced	V/C 0.7 - 0.85
LOS E	Congestion-Irregular flow	V/C 0.85 - 1.0
LOS F	Road at capacity-Gridlock	V/C > 1.0

Those of special interest for this chapter are those roadways with higher V/C ratios and an LOS identified as D, E, and F. If consecutive modeled roadway segments have the same high LOS rating, they are listed as a single long section, rather than as each individual segment. In some cases, the higher V/C ratio is because a traffic signal or stop sign reduces the capacity at the intersection at one or both ends of the roadway segment (Big Hollow Road in Sullivan County is a case in point, where the STOP sign at Highway 394 is the capacity restraint).

In some cases, the level of detail for the TransCAD model is not sufficient to illustrate the full capacity of the different turn lanes available on a particular approach to an intersection, and so the higher V/C rate does not necessarily indicate that additional lanes are needed. This is particularly evident for off-ramp segments. Examples of this phenomenon are the northbound Highway 11E off-ramp to Highway 394 in southern Bristol, Tennessee, where the downstream traffic signal does not serve the YIELD-controlled right-turn movement but does control a dual-left turn lane. However, since this ramp is a single link in the model, it is listed as a single-lane link (which it is at the upstream-end gore of the ramp) rather than the three lanes at the downstream end of the ramp. Had the model broken this link into two sections (the upstream one-lane section at the gore and the downstream three-lane section at the traffic signal), it likely would not have shown up in the 2040 model as LOS F. Other likely examples of this exit ramp phenomenon are at northbound Exit 69, northbound Exit 1, and both directions of Exit 7. This phenomenon also shows up in the model at both directions of Exits 5 and 17; in these cases,

there is a genuine lack of turning movement capacity in addition to issues arising from insufficient model detail.

For these analyses, the green time-to-cycle time ratio (G/C) of an approach to a traffic signal was calculated as the same ratio of approach volumes. In this manner, the traffic signal is postulated to be optimized, so that real-time efforts to optimize traffic signals would already be accounted for in the model. In the same vein, an approach controlled by a YIELD sign was assigned a G/C ratio of 0.8, while a STOP-controlled approach was assigned a G/C ratio of 0.6. Finally, for links that crossed mainline railroad tracks, an additional capacity reduction was included to account for periods when the roadway is effectively out of service while trains block the crossing.

The model developed for this long-range plan is the first Bristol model that was a "time-of-day" model rather than an "all-day" model. For previous models and long-range plans, the future volumes were predicted for the entire day, and ten percent of that volume was assigned to peak hours and thus used as a basis for the hourly V/C calculations. For this model, four time periods were modeled (morning peak, midday, afternoon peak, and off-peak) for each future scenario. The V/C ratios shown in this plan are based on the aggregation traffic volumes from all four time-of-day periods. Daily capacity is calculated by applying an hourly-to-daily factor to the hourly capacity.

The following list (Table 6-1) describes the roadway segments identified on the 2040 Level of Service maps (Map 6-1 through 6-5). Any roadways not listed have an acceptable Level of Service of A, B, or C. The maps indicate the predicted ratio of volume to capacity in the year 2040 if no further projects were constructed after those completed or committed in 2015.

Table 6-1
Level of Service

Unincorporated Sullivan County, Tennessee

LOS	STREET	FROM	TO	MAP
F	Hwy 126	Hwy 75	Hwy 394	6-2
E	Hwy 75	Hwy 126	Camp Placid Rd	6-2
E	Interstate 81 northbound Exit 69 off-ramp			6-2
D	Big Hollow Rd	Hwy 394	Knob Hill Dr	6-2
D	Franklin Dr	Hwy 126	Hwy 394	6-2
D	Hwy 126	Blountville Blvd/ Blountville Bypass	Fain Rd	6-2
D	Hwy 126	Carden Hollow Rd	Carlton Rd	6-2
D	Hwy 394	Hwy 126	Blountville Bypass	6-2
D	Interstate 81 northbound	cordon line south	Exit 69 ramp gore	6-2
D	Interstate 81 northbound	Exit 69 merge point	Walnut Hill Rd bridges[1]	6-2
D	Interstate 81 southbound	Walnut Hill Rd bridges[1]	Exit 69 ramp gore	6-2
D	Interstate 81 southbound	Exit 69 merge point	cordon line south	6-2

[1] Interstate 81 changes from a six-lane facility to a four-lane facility at the Walnut Hill Road bridges just west of Tennessee Exit 74, with six lanes northeast of these bridges and four lanes southwest of these bridges.

Bristol, Tennessee

LOS	STREET	FROM	TO	MAP
F	Exide Dr	Bethel Dr	Hwy 11E/Volunteer Pkwy	6-2
F	Hwy 11E northbound off-ramp to Hwy 394			6-2
F	W State St, eastbound	Exit 74 easternmost ramp merge	Medical Park Blvd	6-2, 6-3
E	Volunteer Pkwy	Windsor Ave	Hill St/Holston Ave	6-3
E	Weaver Pike	Volunteer Pkwy	College Ave	6-3
D	Blountville Hwy	W State St/ Grove Park Dr	Stafford St	6-3
D	Hwy 11W	Island Rd/Stevens Trl	Pinnacle Pkwy	6-2
D	Medical Park Blvd	Meadow View Rd	southern end of four-lane facility	6-2, 6-3
D	Pennsylvania Ave	State St/E State St	Ash St	6-3
D	Virginia Ave	E Cedar St	Lakeview St	6-3
D	Volunteer Pkwy	State St/W State St	Shelby St	6-3
D	W State St	Carson Ln	Euclid Ave/ Gate City Hwy	6-3
D	Weaver Pike	Vance Tank Rd	South Acres Dr	6-3

Along state line between Bristol, Tennessee, and Bristol, Virginia

LOS	STREET	FROM	TO	MAP
D	W State St	state line near 22nd St	17th St/Peters St	6-3
D	W State St	Bob Morrison Blvd	Commonwealth Ave/ Volunteer Pkwy	6-3

Bristol, Virginia

LOS	STREET	FROM	TO	MAP
F	Interstate 81 northbound Exit 5 off-ramp			6-3
F	Interstate 81 southbound Exit 5 off-ramp			6-3
F	Interstate 81 southbound Exit 7 off-ramp			6-3, 6-4
F	Lee Hwy	Bonham Rd	signalized shopping center entrance east of Bonham Rd	6-3
F	Lee Hwy	Clear Creek Rd/ Old Airport Rd	Mt Vernon Dr/ Resting Tree Dr	6-3, 6-4
E	Euclid Ave	Bob Morrison Blvd	Commonwealth Ave	6-3
E	Interstate 81 northbound Exit 7 off-ramp			6-3, 6-4
E	Gate City Hwy	Midway St	Euclid Ave/Gate City Hwy	6-3
E	Lee Hwy	Alexis Dr/Travalite Dr	Bonham Rd	6-3
E	Old Airport Rd	Linden Dr	Lee Hwy	6-3, 6-4
D	Commonwealth Ave	Euclid Ave	Sycamore St	6-3
D	Cumberland St	Piedmont Ave	Moore St	6-3
D	Interstate 81 northbound Exit 1 off-ramp			6-3
D	Interstate 81 northbound	Exit 3 merge point	Exit 5 ramp gore	6-3

Bristol, Virginia (continued)

D	Interstate 81 southbound	Exit 5 merge point	Exit 3 ramp gore	6-3
D	Lee Hwy	Euclid Ave/ Euclid Ave Ext	Overhill Rd/ Wendover Rd	6-3
D	Lee Hwy	Mt Vernon Dr/ Resting Tree Dr	Bristol corporate limits north	6-4
D	Old Airport Rd	Bonham Rd (south intersection)	Kings Mill Pike	6-3
D	W Mary St	Martin Luther King, Jr Blvd	Goodson St	6-3

Abingdon, Virginia

LOS	STREET	FROM	TO	MAP
F	Cummings St	Cook St	Exit 17 southbound ramps	6-5
F	Russell Rd	W Main St	Valley St	6-5
F	W Main St	Russell Rd	Court St	6-5
F	W Main St	Jonesboro Rd	Abingdon corporate limits west	6-4, 6-5
E	E Main St	Exit 19 southbound on-ramp/Empire Dr	Old 11 Dr	6-5
E	Interstate 81 northbound	Exit 17 merge point	Abingdon corporate limits east	6-5
E	Interstate 81 southbound	Abingdon corporate limits east	Exit 17 ramp gore	6-5
E	Interstate 81 southbound	Exit 17 merge point	Exit 14 ramp gore/ Abingdon corporate limits west	6-4, 6-5
E	Interstate 81 northbound Exit 17 off-ramp			6-5
E	Interstate 81 southbound Exit 17 off-ramp			6-5
E	Russell Rd	Valley St	Academy Dr	6-4, 6-5
E	W Main St	Charwood Dr	Jonesboro Rd	6-4, 6-5
D	Cummings St	W Main St	Bradley St	6-5
D	E Main St	Court St	Tanner St	6-5
D	E Main St	Trigg St	Boone St	6-5
D	E Main St	Hillman Hwy	Old 11 Drive	6-5
D	Interstate 81 northbound	Abingdon corporate limits west	Exit 17 ramp gore	6-4, 6-5
D	Russell Rd	Porterfield Hwy	Campus Dr	6-4, 6-5
D	Valley St	Cummings St	Russell Rd	6-5
D	W Main St	Porterfield Hwy	Wyndale Rd	6-4, 6-5

Unincorporated Washington County, Virginia

LOS	STREET	FROM	TO	MAP
F	Lee Hwy	Forest Hills Cemetery entrance	Abingdon corporate limits west	6-4
F	Spring Creek Rd	Lee Hwy	Exit 13 southbound ramps	6-4
E	Interstate 81 northbound	Bristol corporate limits	Exit 10 ramp gore	6-4

Unincorporated Washington County, Virginia (continued)

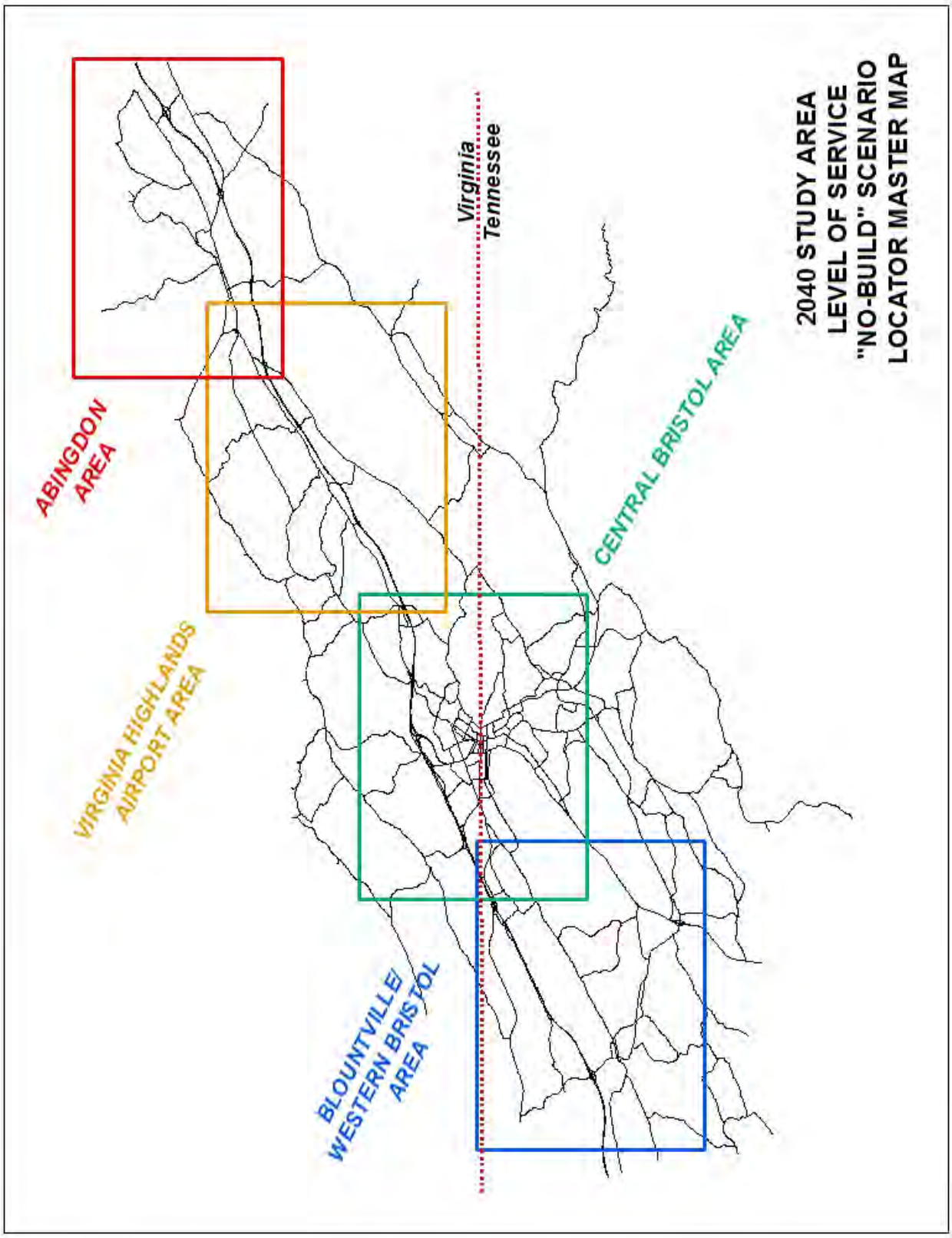
E	Interstate 81 northbound	Exit 10 merge point	Exit 13 ramp gore	6-4
E	Interstate 81 northbound	Exit 14 merge point	Exit 14 ramp gore	6-4, 6-5
E	Interstate 81 northbound	Abingdon corporate limits east	Exit 19 ramp gore	6-5
E	Interstate 81 southbound	Exit 19 southern-most merge point	Abingdon corporate limits east	6-5
E	Interstate 81 southbound	Exit 14 merge point	Exit 13 ramp gore	6-4
E	Interstate 81 southbound	Exit 13 merge point	Exit 10 ramp gore	6-4
E	Interstate 81 southbound	Exit 10 ramp gore	Bristol corporate limits north	6-4
E	Lee Hwy	Majestic Dr	point north of Industrial Park Rd	6-4
E	Lee Hwy	Astor Rd	Virginia Highlands Airport entrance	6-4
D	Interstate 81 northbound	Exit 10 ramp gore	Exit 10 merge point	6-4
D	Interstate 81 northbound	Exit 13 ramp gore	Exit 14 merge point	6-4, 6-5
D	Interstate 81 northbound	Exit 14 ramp gore	Abingdon corporate limits west	6-4, 6-5
D	Interstate 81 northbound	Exit 19 northern- most merge point	cordon line north	6-5
D	Interstate 81 southbound	cordon line north	Exit 22 ramp gore	6-5
D	Interstate 81 southbound	Exit 22 merge point	Exit 19 northernmost ramp gore	6-5
D	Interstate 81 southbound	Abingdon corporate limits west	Exit 14 ramp gore	6-4, 6-5
D	Interstate 81 southbound	Exit 13 ramp gore	Exit 13 merge point	6-4
D	Interstate 81 southbound	Exit 10 ramp gore	Exit 10 merge point	6-4
D	Lee Hwy	Bristol corporate limits north[2]	Majestic Dr	6-4
D	Lee Hwy	point north of Industrial Park Rd[3]	Astor Rd	6-4
D	Lee Hwy	Virginia Highlands Airport entrance	Forest Hills Cemetery entrance	6-4
D	Majestic Dr	Lee Hwy	Exit 10 southbound ramps	6-4

It is interesting to observe the changes in levels of service as one travels along Interstate 81 in both Tennessee and Virginia. In numerous cases (such as Tennessee Exit 69 and Virginia Exits 10, 13, 17, 19, and 22), the level of service drops from the mainline sections between the off-ramps and on-ramps. It is also interesting to note that the level-of-service is different for Interstate 81 northbound and southbound between the Exit 13 and Exit 17 interchanges in Virginia.

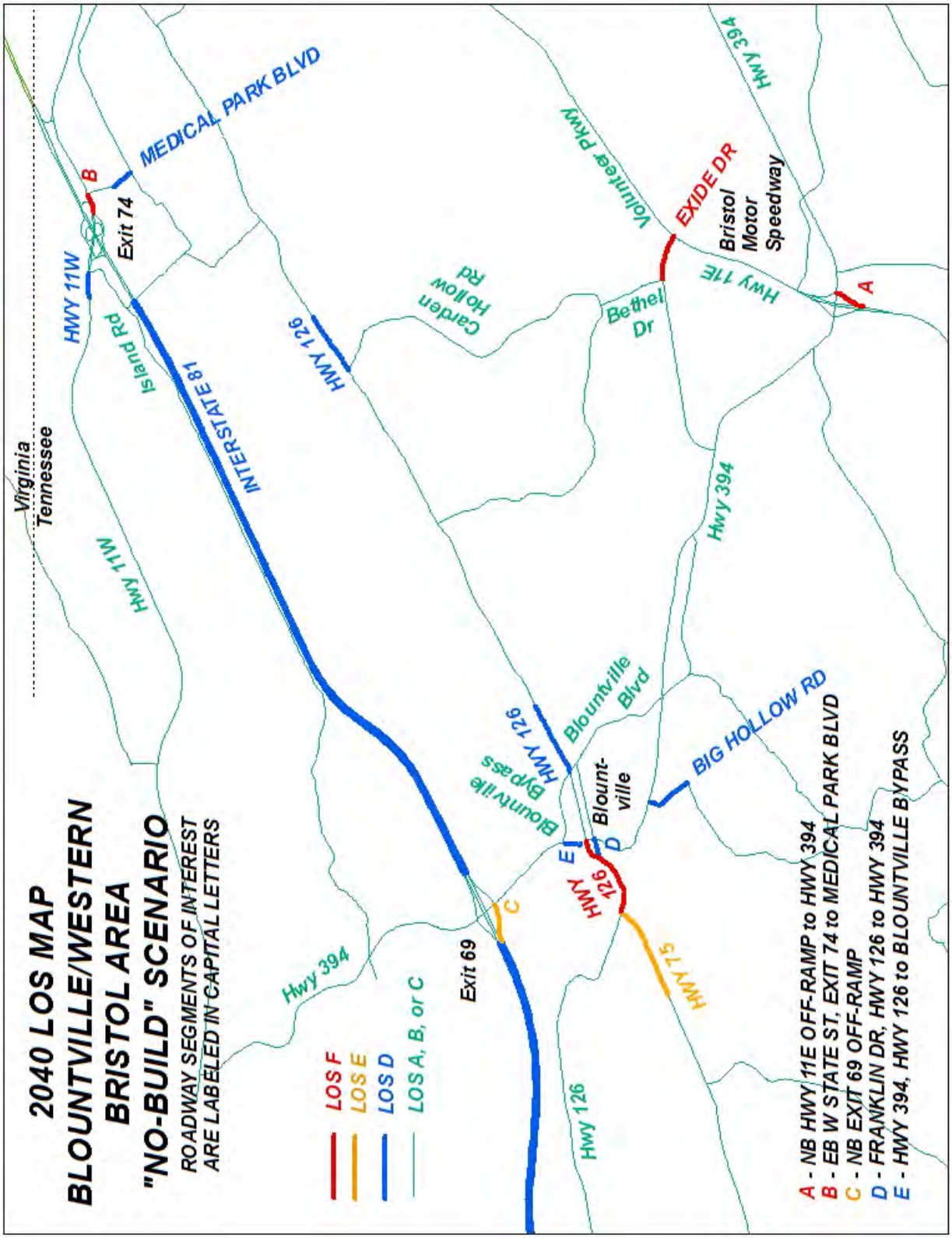
At Exit 14 on northbound Interstate 81, a similar phenomenon occurs where the section between the off-ramp and on-ramp has a *higher* level-of-service than the mainline upstream and downstream of the interchange. In this case, however, this interchange has the on-ramp merge upstream of the off-ramp gore in the northbound direction, with a weaving section

between the two, so one would expect the volume here to be higher as both the exiting and entering ramp volumes are traveling across this section.

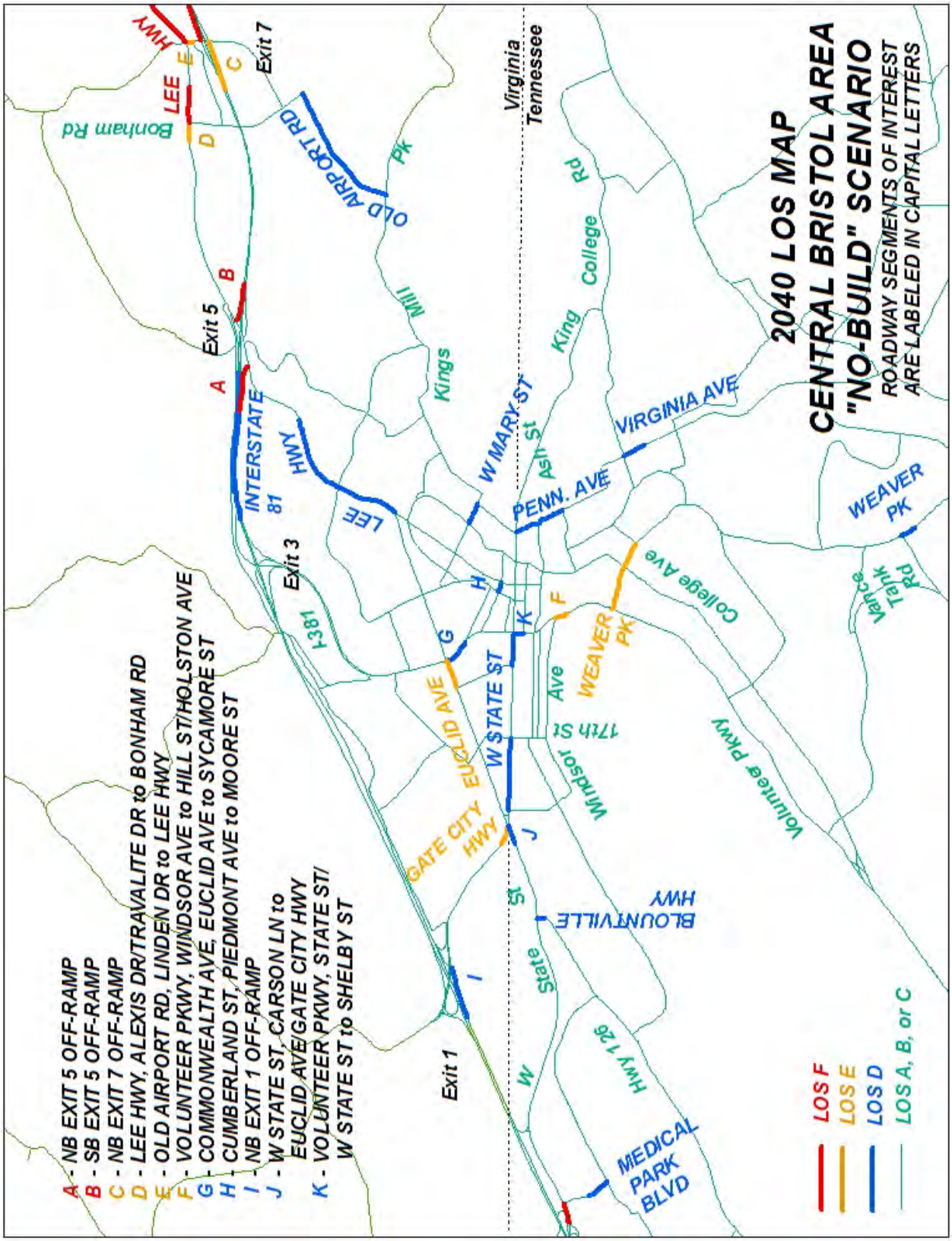
It is important to note that the travel demand model is only one tool that can be used to determine deficient roadways. One drawback of the model is that it can only measure effects of major improvement projects such as additional lanes or new roadways whereas smaller capacity improvements such as additional turn lanes at an intersection may not typically show much effect in the model. Congestion can also be a function of delay. In the Bristol transportation network, delay over a roadway segment is a function of delay at the intersections, in addition to delay generated by congestion on the roadway itself because of insufficient capacity. In those cases, particular sources of congestion at intersections are best identified by analysis on a more detailed level than TransCAD can provide.


2040 STUDY AREA
LEVEL OF SERVICE
"NO-BUILD" SCENARIO
LOCATOR MASTER MAP
Virginia
Tennessee
ABINGDON AREA
VIRGINIA HIGHLANDS AIRPORT AREA
CENTRAL BRISTOL AREA
BLOUNTVILLE/ WESTERN BRISTOL AREA

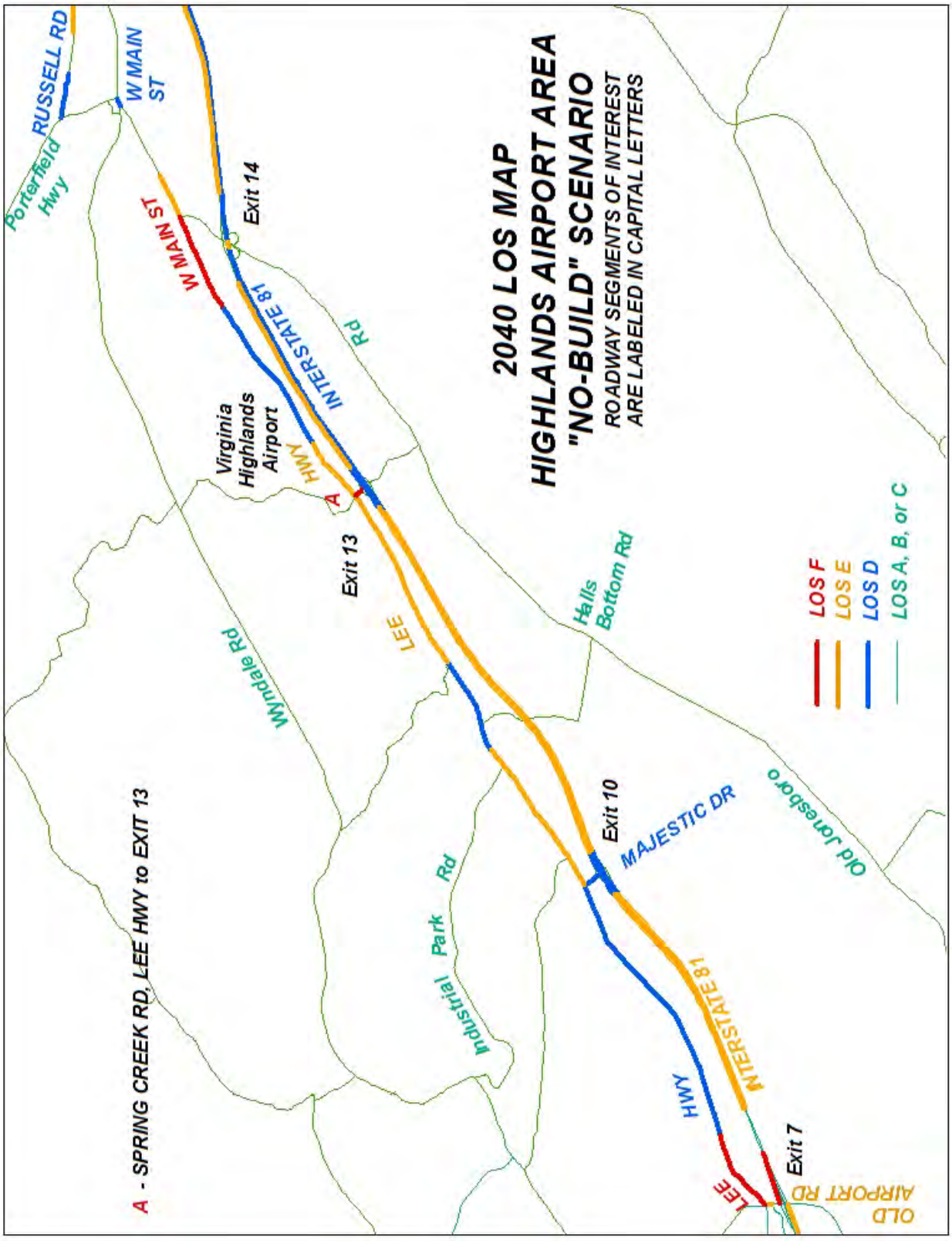
Map 6-1


2040 LOS MAP
BLOUNTVILLE/WESTERN
BRISTOL AREA
"NO-BUILD" SCENARIO
ROADWAY SEGMENTS OF INTEREST
ARE LABELED IN CAPITAL LETTERS
LOS F
LOS E
LOS D
LOS A, B, or C
A - NB HWY 11E OFF-RAMP to HWY 394
B - EB W STATE ST, EXIT 74 to MEDICAL PARK BLVD
C - NB EXIT 69 OFF-RAMP
D - FRANKLIN DR, HWY 126 to HWY 394
E - HWY 394, HWY 126 to BLOUNTVILLE BYPASS
Virginia
Tennessee
HWY 11W
Exit 74
MEDICAL PARK BLVD
Island Rd
INTERSTATE 81
HWY 11W
HWY 126
Carden Hollow Rd
Volunteer Pkwy
EXIDE DR
Bristol Motor Speedway
HWY 394
HWY 11E
Bethel Dr
Hwy 394
Blountville Blvd
Blountville Bypass
HWY 126
Blount-ville
BIG HOLLOW RD
Exit 69
HWY 75
Hwy 126
Hwy 394

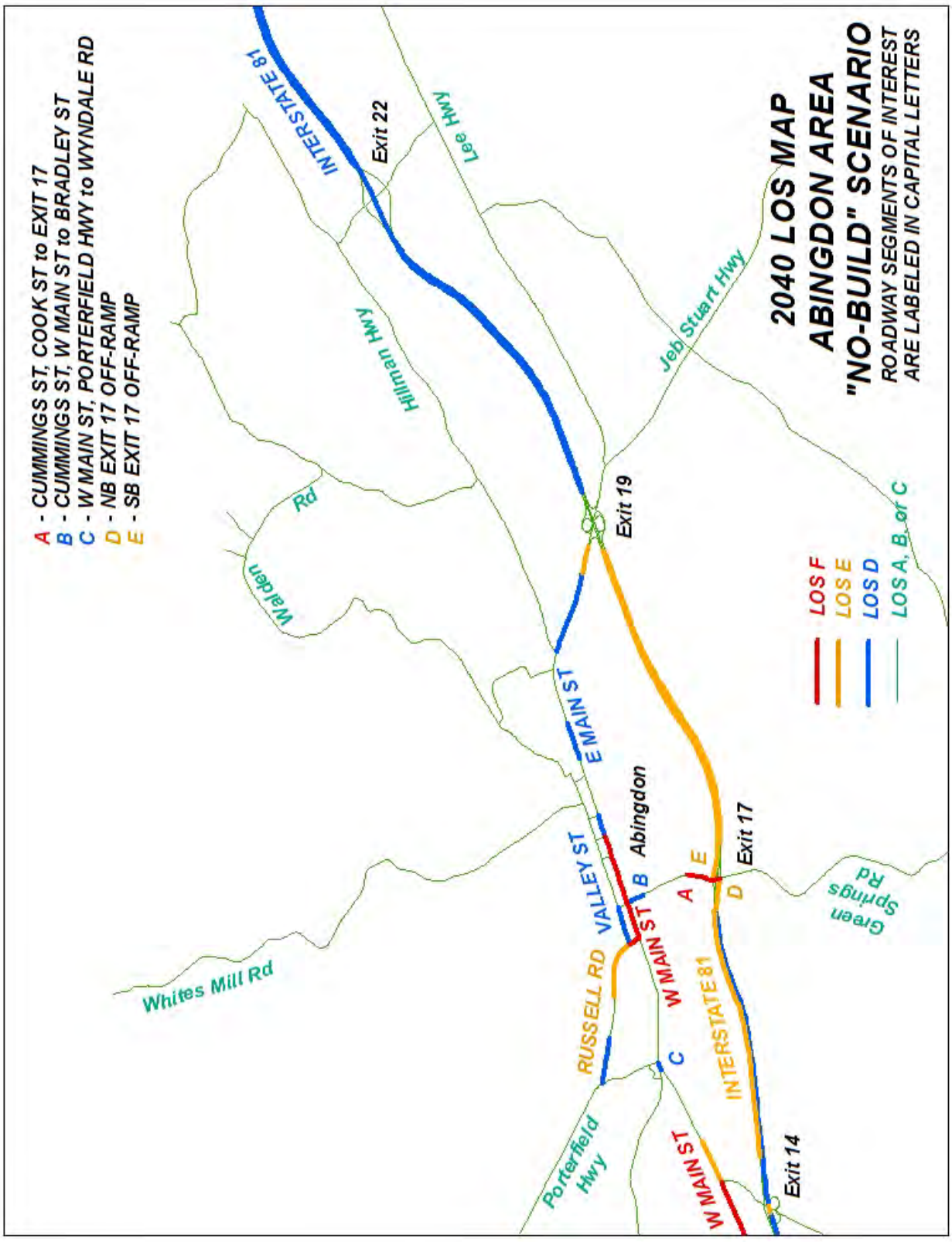
Map 6-2


2040 LOS MAP
CENTRAL BRISTOL AREA
"NO-BUILD" SCENARIO
ROADWAY SEGMENTS OF INTEREST ARE LABELED IN CAPITAL LETTERS
LOS F
LOS E
LOS D
LOS A, B, or C
A - NB EXIT 5 OFF-RAMP
B - SB EXIT 5 OFF-RAMP
C - NB EXIT 7 OFF-RAMP
D - LEE HWY, ALEXIS DR/TRAVALITE DR to BONHAM RD
E - OLD AIRPORT RD, LINDEN DR to LEE HWY
F - VOLUNTEER PKWY, WINDSOR AVE to HILL ST/HOLSTON AVE
G - COMMONWEALTH AVE, EUCLID AVE to SYCAMORE ST
H - CUMBERLAND ST, PIEDMONT AVE to MOORE ST
I - NB EXIT 1 OFF-RAMP
J - W STATE ST, CARSON LN to EUCLID AVE/GATE CITY HWY
K - VOLUNTEER PKWY, STATE ST/ W STATE ST to SHELBY ST
Virginia
Tennessee
Exit 1
Exit 3
Exit 5
Exit 7
INTERSTATE 81
I-381
LEE HWY
Bonham Rd
OLD AIRPORT RD
Mill
Kings
King College Rd
W MARY ST
PENN. AVE
VIRGINIA AVE
WEAVER PK
College Ave
Vance Talk Rd
EUCLID AVE
W STATE ST
GATE CITY HWY
Windsor Ave
17th St
Volunteer Pkwy
State St
BLOUNTVILLE HWY
HWY 126
MEDICAL PARK BLVD

Map 6-3


2040 LOS MAP
HIGHLANDS AIRPORT AREA
"NO-BUILD" SCENARIO
ROADWAY SEGMENTS OF INTEREST
ARE LABELED IN CAPITAL LETTERS
LOS F
LOS E
LOS D
LOS A, B, or C
A - SPRING CREEK RD, LEE HWY to EXIT 13
RUSSELL RD
Porterfield Hwy
W MAIN ST
W MAIN ST
Exit 14
INTERSTATE 81
Virginia Highlands Airport
A
HWY
Exit 13
LEE
Wyndale Rd
Halls Bottom Rd
Industrial Park Rd
Exit 10
MAJESTIC DR
Old Jonesboro
HWY
INTERSTATE 81
LEE
Exit 7
OLD AIRPORT RD

Map 6-4


2040 LOS MAP
ABINGDON AREA
"NO-BUILD" SCENARIO
ROADWAY SEGMENTS OF INTEREST
ARE LABELED IN CAPITAL LETTERS
LOS F
LOS E
LOS D
LOS A, B, or C
A - CUMMINGS ST, COOK ST to EXIT 17
B - CUMMINGS ST, W MAIN ST to BRADLEY ST
C - W MAIN ST, PORTERFIELD HWY to WYNDALE RD
D - NB EXIT 17 OFF-RAMP
E - SB EXIT 17 OFF-RAMP
INTERSTATE 81
Exit 22
Exit 19
Exit 17
Exit 14
Lee Hwy
Hillman Hwy
Jeb Stuart Hwy
Rd
Walden
E MAIN ST
Abingdon
VALLEY ST
W MAIN ST
RUSSELL RD
Whites Mill Rd
Porterfield Hwy
INTERSTATE 81
W MAIN ST
Green Springs Rd
A
B
C
D
E

Map 6-5

CONGESTION MANAGEMENT STRATEGIES

The previous listing of locations with higher V/C ratios is only one potential source for determining project needs for the long-range transportation plan. Transportation projects can also be developed to alleviate safety issues, develop a network of multi-lane roadways throughout a jurisdiction or region, or to add additional capacity for economic development and adjacent commercial/industrial activity. Thus, not every road project candidate will be on a location with a high V/C ratio, nor will every roadway with a predicted future high V/C ratio appear on the project list. Those locations with high V/C ratios resulting from lack of lane capacity, rather than capacity constraints induced only by traffic control devices, may become candidates for future projects under the system efficiency criterion. The relative need for projects under this criterion, when compared to system-wide project needs, is part of the balance required for development of a long-range transportation plan.

Operating deficiencies that are related to a high V/C ratio can be targeted, or mitigated, with the strategies discussed below. Non-recurring congestion is mainly caused by construction, accidents, broken down vehicles, and other incidents which temporarily and abruptly disrupt the normal flow of traffic. While there is an array of solutions available to relieve congestion, there is no easy cure-all solution. Since congestion is so closely tied into the growth of the economy and population, certain strategies that deal with land use policies and growth management can be effective in managing congestion although they are somewhat beyond the control of the MPO since land use decisions are made by local jurisdictions.

- Appropriate timing of traffic signals can decrease congestion, improve air quality, and reduce fuel consumption. To respond to changes in traffic demand, retiming of traffic signals should occur regularly. Those traffic signals that operate independently can sometimes work more efficiently with only minor investments in equipment and labor. Agencies can enhance efficiency of traffic signals by coordinating or interconnection of certain closely spaced traffic signals so they share a common time reference.
- Transportation systems management and operations strategies must be used to maximize the capacity of the existing infrastructure already in place. More efficient operation of the highway network can be a successful approach to addressing congestion.
- The number and design of access points can be a major factor in the operations of a roadway. Where access must be provided, access points should be spaced sufficiently apart in order for traffic control devices and turn lanes to operate effectively.
- Crashes and other non-recurring incidents can cause significant delays, especially if lanes are completely blocked. Incident management allows the roadway's available capacity to be restored by removing incidents as quickly as possible. Agency communication and coordination is essential for incident detection and response, work zone management, and media updates.
- Infrastructure improvements utilizing Intelligent Information Systems (ITS) technologies (i.e. closed circuit cameras, dynamic message signs, emergency vehicle signal preemption, HELP vehicle service expansion, etc.) can provide improved mitigation of both recurring and non-recurring congestion.

Projects identified in the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040* to address the problems associated with high LOS ratings include:

- Blountville Highway/Highway 126/Highway 75 widening (Bristol, Tennessee/ Sullivan County)
- Interstate 81 enhancements (Washington County)
- Lee Highway widening and traffic signal projects, multiple sections (Bristol, Virginia/Washington County)

Intelligent Transportation Systems. The implementation of Intelligent Transportation Systems (ITS) can be a strategic element in reducing congestion and incident management. ITS deployment refers to the use of advanced technologies to enhancement management and operation of transportation facilities. ITS program areas include many elements, some of which 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.

The current *Bristol Regional ITS Architecture and Deployment Plan* covers all of Washington County, Virginia, Bristol, Virginia; and that portion of Sullivan County within the Bristol MPO Study Area (but not the area east of South Holston Lake). The jurisdictions within the Bristol MPO Study Area are stakeholders in this ITS plan, the bounds of which were designed to complement the operational ITS characteristics of both TDOT and VDOT's pre-existing ITS operations. The ITS plan provides the guidelines and structure for the implementation and operation of ITS technology within the MPO Study Area, and defines the transportation needs, ITS solutions, agencies to be involved, and projects to be deployed. This document also supports the expansion of Interstate motorist service patrols into the Tri-Cities, including the Bristol area. Such expansion of service has been endorsed by the various communities in the Tri-Cities area.

The current ITS plan is scheduled to be updated to determine changes in project status, prioritization, or the addition of new projects. In addition any new stakeholders will be included and any changes to the National ITS Architecture will be evaluated.

Special Events. One of the common features of community special events is the traffic congestion that is often caused by the double impact of additional traffic generated by the event, and the loss of roadway capacity to accommodate the traffic needs and parking demands of the special event. In the Bristol Study Area, the most prominent of these events are the annual Rhythm and Roots Reunion music festival in downtown Bristol, the annual Virginia Highlands Festival in Abingdon, and the semi-annual visits by NASCAR to Bristol Motor Speedway.

For special events in downtown Bristol or Abingdon, congestion impacts the roadways to a localized level in the downtown areas, characterized by street closures and impacts on other nearby roadways because of added traffic demand and parking. For the NASCAR visits to Bristol Motor Speedway, the impacts to the roadway and transit systems are much larger. A Multi-Agency Command Center (MACC) is activated for race weekends, as well as the VDOT Bristol District temporary race traffic command center and the permanent regional Traffic Operations

Centers (TOCs) in Knoxville and Roanoke, serve to operate the roadway systems impacted by race traffic.

During race weekend periods, traffic volumes on roadways utilized for race traffic can reach up to 700,000 vehicles. This results in some short-term congestion issues as well as temporary countermeasures to accommodate traffic flows, which include, but are not limited to, the following techniques:

- Manual coordination of traffic signals through multiple jurisdictions
- Contraflow lanes (lane direction reassignment)
- Temporary median opening closures to eliminate left turns, U-turns, and remove intersection conflict points
- Interstate lane closures for merging traffic control
- Interchange ramp closure and left-turn prohibitions
- Special event-related messages on variable message boards, both overhead permanent and trailer-mounted temporary units
- Additional transit operations, both public and private

Since traffic generated for such events at Bristol Motor Speedway are not everyday flows, the traffic analysis to determine high-LOS locations did not include traffic generated by such events. However, it is a common practice for local transportation projects to include provisions to accommodate race traffic, such as the ability to manually advance phases for certain traffic signals.

CHAPTER 7: MULTI-MODAL TRANSPORTATION SYSTEM

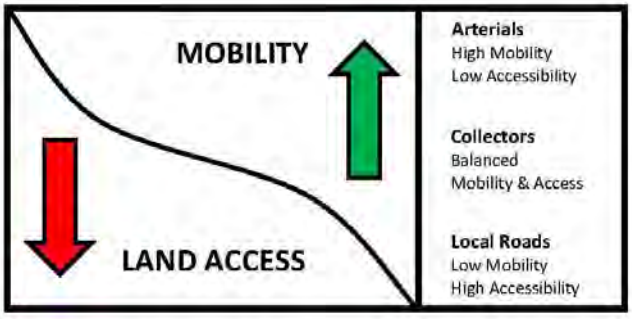
The Bristol Metropolitan Planning Area (MPA) lies astride the Tennessee/Virginia state line on both sides of one of the United States' major roadways, Interstate 81. It is located near the headwaters of the Tennessee River system, in the Holston River tributary watershed, above the head of navigation of that waterway. As such, it is not accessible to waterborne transportation systems. Both Bristols and Sullivan County, along with several other jurisdictions, are part owners through an airport authority of the Tri-Cities Regional Airport, located just outside of the study area to the southwest and centrally located site between the cities of Bristol, Kingsport, and Johnson City. Virginia Highlands Airport, a general aviation airport, is located between Bristol and Abingdon adjacent to Interstate 81 at Exit 13. The MPA is also located astride a major natural gas pipeline that runs from Texas to Pennsylvania roughly parallel to Interstate 81, and one of the major Class I railroad main lines (Norfolk Southern Railway) in the United States. Transit and paratransit services are provided by several public agencies in the Bristol/Abingdon area. There are also several greenways and bicycle/pedestrian routes in the Bristol and Abingdon areas, providing the study area with a variety of mode choices for some trips as well as recreation.

This chapter will discuss the existing transportation system for the various modes as well as specific projects proposed within the Bristol Metropolitan Planning Area.

PART A: STREETS AND HIGHWAYS ELEMENT

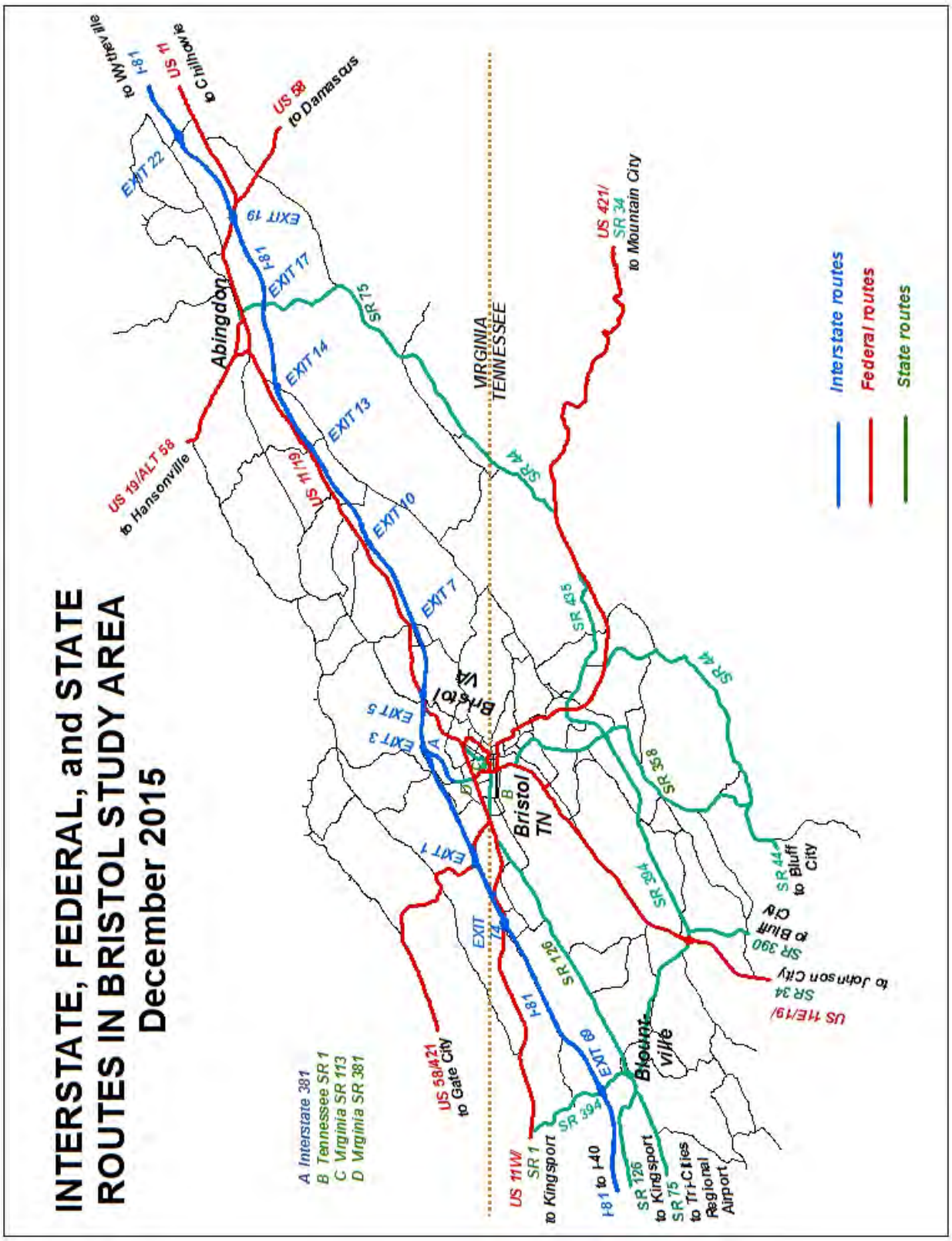
EXISTING CONDITIONS

Chart 7-1



Like all urbanized areas in the United States, the roadway system in the Bristol study area follows a hierarchy of functionality, based on an inverse relationship between accessibility and through traffic flow (Chart 7-1). At the top of the hierarchy are *Interstate* roadways, of which there are two in the Bristol area (Interstate 81 as a through route and Interstate 381 in Bristol, Virginia, as a spur route). *Arterials* primarily move through traffic, with ideally limited or no access available to adjacent pieces of property. Below arterials are *collector* roadways, which serve an intermediate function of collecting trips to and from the arterials and distributing them among the local streets. At the bottom of the public roadway hierarchy are the *local* streets, whose primary purpose are to allow access to adjacent properties and upon which through traffic is discouraged. As one moves up the hierarchy from local to collector to arterial to Interstate, speeds generally increase and access availability to adjacent properties decrease.

There are different classification systems for the roadways in the Bristol MPA for different purposes. The federal and state governments classify and identify certain roadways as Interstate routes, Federal (or U.S.) routes, and state routes (Map 7-1).


INTERSTATE, FEDERAL, and STATE
ROUTES IN BRISTOL STUDY AREA
December 2015
Interstate routes
Federal routes
State routes
A Interstate 381
B Tennessee SR 1
C Virginia SR 113
D Virginia SR 381
VIRGINIA
TENNESSEE
Abingdon
Bristol
VA
Bristol
TN
Bluff City
Johnson City
Blountville
to Wytheville
to Chilhowie
to Damascus
to Hansonville
to Gate City
to Kingsport
to Mountain City
to Bluff City
to Johnson City
to Kingsport
to Tri-Cities Regional Airport
I-81
US 11
US 58
US 19/ALT 58
US 11E/19/
US 58/421
US 11W
US 421/
SR 34
SR 75
SR 44
SR 358
SR 394
SR 126
SR 390
SR 34
I-81 to I-40
EXIT 22
EXIT 19
EXIT 17
EXIT 14
EXIT 13
EXIT 10
EXIT 7
EXIT 5
EXIT 3
EXIT 1
EXIT 69

Map 7-1

In Virginia, since there are no county roads *per se*, there is also a breakdown of state routes into primary and secondary routes. The Bristol MPO maintains a functional classification system for the purposes of identifying eligibility for funding from various federal and state sources. Local planning commissions, on the other hand, maintain highway classification systems as a requirement to determine the need for future right-of-way dedication as land is subdivided and developed, often in conjunction with local land use or comprehensive plans. It is not unheard of for a roadway to be classified in one class under one system and another class for another system.

As with most communities, the roadway network for both Bristols continued to grow as the cities grew. Part of that growth is the replacement of formerly major routes with upgraded (and in some cases realigned) facilities, and the older routes move down the hierarchy of streets. The best example of this is Interstate 81, which superseded the former major north/south routes in Bristol (US 11, US 11E, and US 11W); they, in turn, superseded Island Road—the first major wagon road in the State of Tennessee.

Other roadways were initially constructed as industrial access routes. Examples of this phenomenon are Exide Drive, Raytheon Road, and Industrial Drive on the Tennessee side, and Industrial Park Road and Westinghouse Road in Washington County. In Virginia, Linden Drive was built as a facilitator for commercial development, as was the early 1990s-realignment of Clear Creek Road just north of Lee Highway.

The current roadway network for the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan Year 2040* contains just over 1,100 lane-miles of roadway. This includes the 2015 existing plus committed (E+C) projects.

Traffic Signals. There are a total of 128 traffic signals in full operation in the Bristol Metropolitan Planning Area (Map 7-2). Of these, 50 (plus one in the engineering stage) are operated by the City of Bristol, Tennessee (through Bristol Tennessee Essential Services); 35 by the City of Bristol, Virginia (through Bristol Virginia Utilities); 19 by the Virginia Department of Transportation (five in Bristol, Virginia, two in Abingdon, and the balance in Washington County); 18 by the Town of Abingdon; and six by Sullivan County (five in the Blountville area and one on Highway 390 just outside of Bluff City, plus one under construction).

Of these 128 traffic signals, there are 17 coordinated operating systems (comprised of 45 traffic signals) of either physically interconnected or time-based coordinated traffic signals, as listed below. All of the traffic signals in operation have at least two of their approaches on roadways modeled in the long-range transportation plan network, except for the three traffic signals on Pinnacle Parkway north of Highway 11W in Bristol, Tennessee.

Coordinated Traffic Signals

Bristol, Virginia

- Commonwealth Avenue (at Keys Street, Spurgeon Lane, and Glenway Avenue)
- Gate City Highway (at Osborne Street, Catherine Street, and Midway Street)
- Lee Highway (at Bonham Road, Lee Highway shopping center entrance, Clear Creek Road/Old Airport Road, and Clear Creek Road shopping center entrance)

Bristol, Tennessee

- Northern Volunteer Parkway (at Broad Street/Anderson Street, Anderson Street [southern intersection], Windsor Avenue, and Hill Street/Holston Avenue)
- Central Volunteer Parkway (at Godsey Road [northern intersection] and Kennedy Road)
- West State Street (at Carson Lane, Euclid Avenue/Gate City Highway, and 24th Street)
- Western Highway 394 (at Blountville Boulevard, Feathers Chapel Road [western intersection], and Cox Farm/Crown Plaza shopping centers)
- Central Highway 394 (at Highway 11E western ramps, Highway 11E eastern ramps, and Highway 390)
- Pinnacle Parkway (at Stevens Trail, Bass Pro Drive, and a private commercial entrance; this is the only signal system in the Bristol study area that is not located on a modeled roadway)

Abingdon, Virginia

- Western West Main Street (at Porterfield Highway and Holston Street)
- Eastern West Main Street (at Cummings Street and Russell Road)
- Thompson Lane (at East Main Street and Baugh Lane)

Sullivan County, Tennessee

- Highway 394 in Blountville (at Highway 126 and Franklin Drive)
- Exit 69 interchange at Highway 394 (northbound off-ramp operational, southbound off-ramp under construction as of December 2015)

Virginia Department of Transportation in Bristol, Virginia

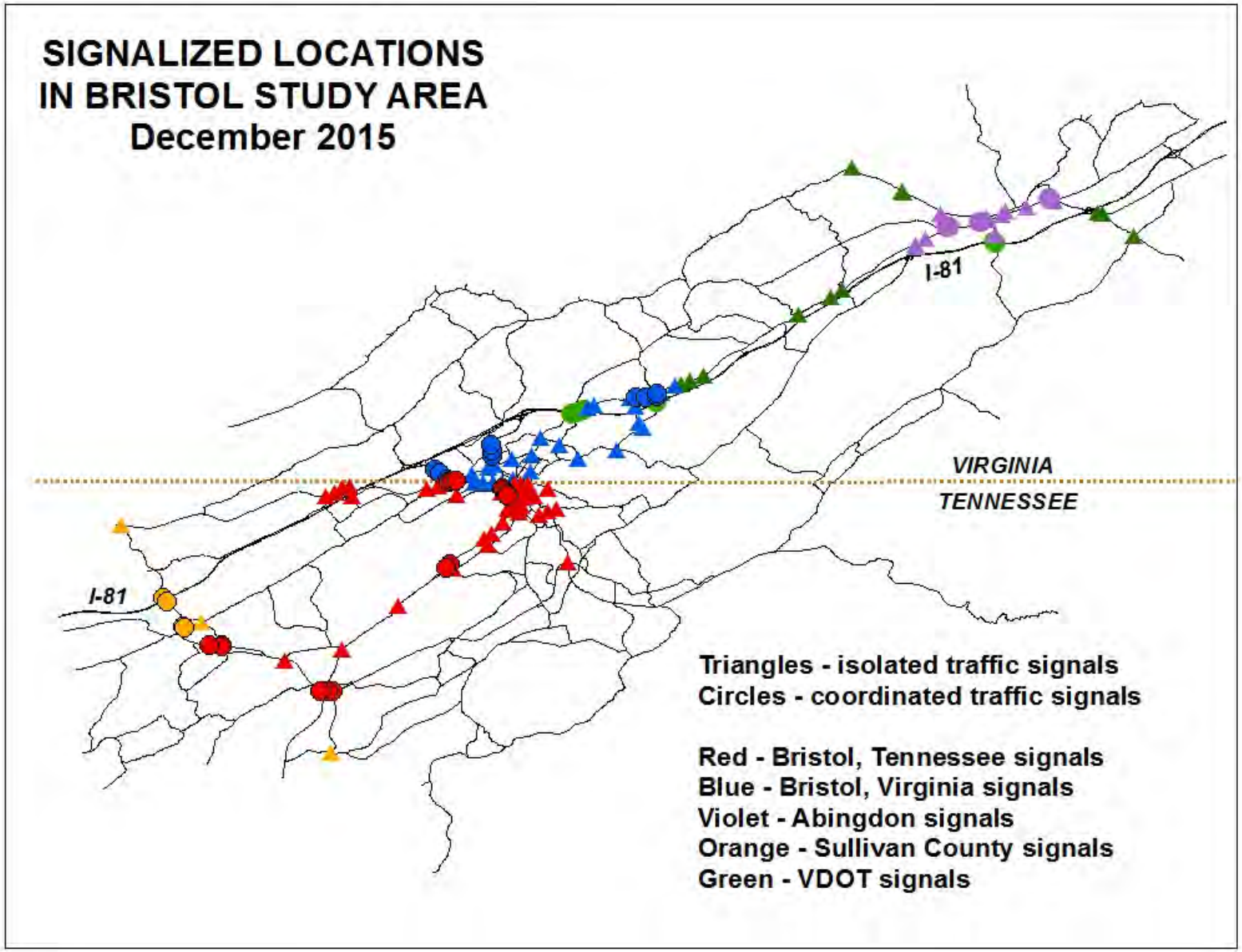
- Lee Highway (at Exit 5 northbound off-ramp, Exit 5 southbound off-ramp, and Old Abingdon Highway)
- Old Airport Road (at Exit 7 northbound and southbound off-ramps)

Virginia Department of Transportation in Abingdon

- Cummings Street (at Exit 17 northbound and southbound off-ramps)

The two Bristols long ago developed a protocol for the operation of traffic signals along the West State Street/State Street/East State Street corridor that spans across the state line. The two cities agreed that each city will operate certain signalized intersections in their entirety, so that Bristol, Virginia, is maintaining traffic signal equipment at a particular intersection on both sides of the state line, and likewise for Bristol, Tennessee, at other locations. Although this agreement functions well for the provision of municipal services and maintenance, this has been an issue along the state line corridor to interconnect signals powered by different utility systems.

Different jurisdictions have, in the recent past, followed a program of examining their traffic signals to determine if any of them can be removed. Since 1985, Bristol, Virginia, has removed eleven traffic signals from service (two temporarily), and Bristol, Tennessee, has removed nine traffic signals from service, for a total of 18 traffic signals permanently removed from service.


SIGNALIZED LOCATIONS
IN BRISTOL STUDY AREA
December 2015
I-81
VIRGINIA
TENNESSEE
I-81
Triangles - isolated traffic signals
Circles - coordinated traffic signals
Red - Bristol, Tennessee signals
Blue - Bristol, Virginia signals
Violet - Abingdon signals
Orange - Sullivan County signals
Green - VDOT signals

Map 7-2

***Interstate 81 Corridor Improvement Studies*.** For several years, the Virginia Department of Transportation has been studying improvements along the I-81 corridor in Virginia to address existing and future transportation deficiencies on the interstate facility. The Commonwealth Transportation Board (CTB) has approved the immediate need for safety and operational improvements along I-81, apart from possible long-term expansion. VDOT has been in the process of implementing short-term spot safety improvements including building dedicated truck climbing lanes and extending ramps at interchanges. In addition to widening of the ramps at Exit 7, a major interchange reconstruction is on-going at Exit 14 in Abingdon, Virginia.

The Tennessee Department of Transportation completed the *I-40/I-81 Corridor Feasibility Study* for Tennessee in 2008. The study identified improvement solutions to a variety of transportation issues and compiled a list of recommended projects. Projects encompass capacity, roadway operations and maintenance, safety, freight movement, inter-modal connections, and economic access opportunities along the interstate corridor. For the Bristol MPO, the widening and signalization of the north and southbound Exit 69 off-ramps to Highway 394 have been completed. No additional corridor improvements are identified in the study for the Bristol Metropolitan Planning Area.

PROGRAMMED AND PLANNED PROJECTS

The projects proposed for the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040* are from a variety of sources and address a variety of needs, from roadways with inadequate volume/capacity ratios to local governmental visions of roadway networks for economic development, to safety and maintenance issues. Some of these projects are "carry-overs" from previous long-range plans; however, some projects have not been carried forward, as the needs for those projects have been alleviated by other transportation network modifications or changes in land use. A number of projects included in previous long-range transportation do not appear in this document, as briefly discussed below.

<u>*Tennessee*</u>

- *Exit 69 Northbound Off-Ramp*. Project completed 2013.
- *Highway 11E and Highway 19E Interchange*. Project completed December 2015; project lies in area removed from Bristol MPO jurisdiction.
- *Cross-Bristol Thoroughfare, western portion*. Project removed from plan between Pennsylvania Avenue and Highway 126.
- *State Route 357 Extension from Tri-Cities Airport to Highway 11E.* Project lies in area removed from Bristol MPO jurisdiction.
- *Extension of Carden Hollow Road to Interstae 81.* Project removed from plan.
  Meadow View Road. Project removed from plan.

<u>*Virginia*</u>

- *Old Airport Road.* Project removed from plan.
- *Spring Creek Road.* Project completed in 2015.
- *East Valley Drive.* Project removed from plan.
- *Lee Highway, Old Airport Road, and Linden Drive.* Project removed from plan.
- *Exit 11 and Connector Road.* Project removed from plan.
- *West State Street.* Project completed in 2011.
- *"Eastern Beltway."* Project removed from plan.

Project Selection. It is important to understand that transportation projects originate with the development of the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan Year 2040* and for implementation they are programmed for funding in the MPO's four-year Transportation Improvement Program. For project development, the long-range transportation plan establishes criteria for transportation projects to be included into the plan by evaluating projects based on whether they meet the goals and objectives of the plan. Those goals and objectives include system efficiency and asset management, economic development, healthy and sustainable communities, mobility, user safety and security (Table 7-1).

In addition to these goals, local priorities for projects are also based on future land use and comprehensive plan implications as well as network connectivity. Project priorities are established by local governmental jurisdictions in cooperation with the Department(s) of Transportation and the MPO; however, the MPO is responsible for evaluating proposed projects for inclusion in the long-range transportation plan. This is accomplished with the technical staff's evaluation and project recommendations to the MPO Executive Board, which approves the final project selections for the long-range plan.

Table 7-1
Project Selection Criteria *

System Efficiency	**Points**
Improves Traffic Operations	10
Improves Access to Major Highways	5
Improves Freight Movement	5
Economic Development	
Improves Access to Commercial and Industrial Areas	10
Increases Accessibility Options for Freight	5
Promotes Revitalization and Infill Development	5
Healthy and Sustainable Communities	
Contributes to Maintaining or Improving Air Quality	5
Reduces Greenhouse Gas Emissions	5
Promotes Active Transportation Opportunities	5
Mobility	
Alternate Transportation Mode	5
Access Management	5
Transit Capital Project	5
User Safety and Security	
Addresses Safety/Functional Issues	10
Improves Security of the Transportation System	5

***15 Points for partially programmed in TIP**

Virginia House Bill 2 (HB2) was adopted in 2014 and requires the development of a prioritization and scoring process for project funding. The prioritization process evaluates projects as they relate to congestion, mitigation, economic development, accessibility, safety, environmental quality and land use coordination. Although HB2 provides a quantifiable process for making project funding decisions, projects still require inclusion in the MPO planning process and long-range transportation for HB2 eligibility.

Financial Constraint. Federal planning regulations require the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040* to be fiscally constrained. The fiscal constraint requirement is intended to ensure that metropolitan long-range transportation plans reflect realistic assumptions about future revenues, rather than merely being "wish lists" that include many more projects than could realistically be completed with available revenues. Unfortunately, all project needs identified in the transportation plan cannot be funded based on the current revenue projections. As a result, the plan includes "illustrative projects," which would be included in the adopted transportation plan if reasonable additional resources beyond those identified in the financial plan were available. Also, projects that are regional in nature and require separate state-level funding above and beyond the typical annual allocations are listed as illustrative. Although illustrative projects are not part of the fiscally constrained transportation plan, the inclusion of a listing of such projects presents an opportunity for the MPO to identify projects for future consideration in the event that additional funding sources were identified.

Roadway Projects. Proposed projects included in the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* are listed in Table 7-2 and identified on Map 7-3. For reference, a listing of Illustrative projects is also provided in Table 7-3. Detailed project descriptions are included in the following narrative for the 2016-2040 roadway projects as well as illustrative projects. For project level funding sources, see Appendix A.

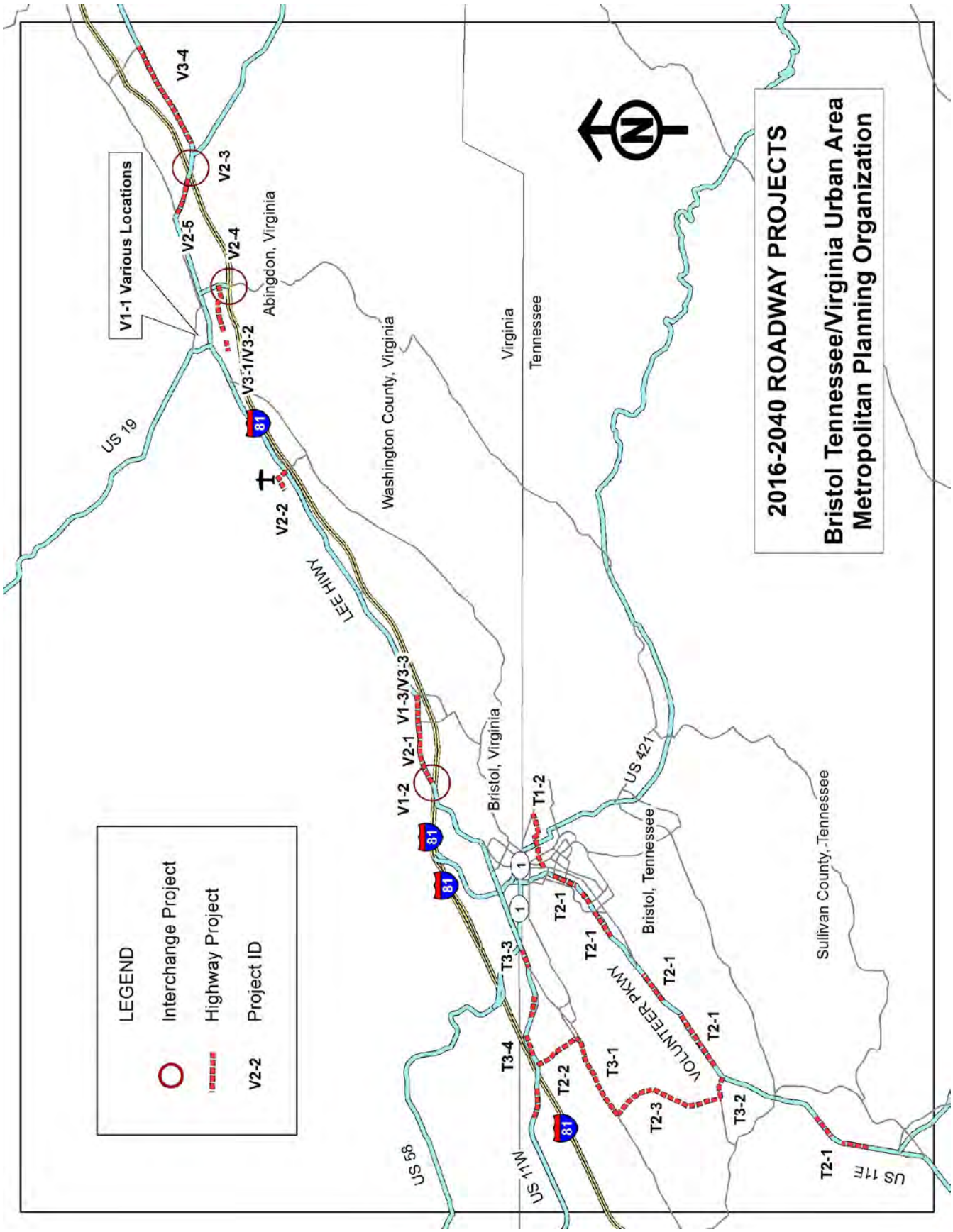
Table 7-2
2016-2040 Roadway Projects

Tennessee Roadway Projects 2016-2040

MPO Project #	Jurisdiction	Project	Termini	Length (miles)	Description	Horizon Year	Costs
T1-2	Bristol TN	East Cedar St.	5th St. to King College Rd.	1.2	Reconstruction/realignment of 2-lane facility	2016-2020	$ 6,650,000
T2-1	Bristol TN	Volunteer Parkway	Melrose St. to River Rd.	9.7	Median modifications at select intersections	2021-2030	$ 4,488,000
T2-2	Bristol TN	North-South Connecter Route (Medical Park Blvd. Extension)	Medical Park Blvd to SR 126	1.0	Construction new 4- lane roadway from Medical Park Blvd. to SR 126	2021-2030	$ 17,302,000
T2-3	Sullivan Co. TN	North-South Connecter Route (Carden Hollow Rd.)	SR 126 to Bethel Dr./Exide Dr.	2.8	Reconstruct 2-lane facility, improve horizontal alignment and add turn lanes.	2021-2030	$ 24,707,000
T3-1	Bristol TN Sullivan Co. TN	North-South Connecter Route (SR 126)	Carden Hollow Rd. to West State St.	3.5	Widen from 2-lane to a 4- lane facility with intersection improvements and turn lanes	2031-2040	$ 58,645,000
T3-2	Bristol TN	North-South Connecter Route (Exide Dr.)	Volunteer Pkwy to Bethel Dr.	0.3	Widen from a 2-lane to a 4-lane facility and intersection improvements	2031-2040	$ 5,872,000
T3-3	Bristol TN	West State St	At Memorial Dr./Kmart Dr.	n/a	Intersection reconstruction	2031-2040	$ 1,295,000
T3-4	Bristol TN	West State St	Sycamore St to Island Rd	2.8	Median modifications to include turn lanes at select median openings	2031-2040	$ 4,552,000

Virginia Roadway Projects 2016-2040

MPO Project #	Jurisdiction	Project	Termini	Length (miles)	Description	Horizon Year	Costs
V1-1	Abingdon VA	Intersection Modifications	Various (i.e. Main St. at Cummings St; Old Reedy Creek Rd; Colonial Rd; US 19; and Jonesboro Rd.)	n/a	Intersection modifications/turn lanes.	2016-2020	$ 5,152,000
V1-2	Bristol VA	Lee Highway	Exit 5	n/a	Improved turn lanes at Exit 5 on/off ramps at Exit 5. Widening Lee Hwy. from 5-lanes to 6-lanes at the interchange.	2016-2020	$ 5,850,000
V2-1	Bristol VA	Lee Highway	Cabelas Dr to Alexis Dr.	0.9	Widening Lee Hwy. from a 2-lane to a 4-lane facility with turn lanes, signalization and access management improvements.	2021-2030	$ 9,987,500
V2-2	Washington Co. VA	Providence Rd.	Lee Highway to Repass St.	1.0	Relocation for Virginia Highlands Airport runway extension (construct as 2-lane facility)	2021-2030	$ 14,241,000
V2-3	Abingdon VA Washington Co. VA	Interstate 81 Exit 19	Exit 19 and Lee Highway	n/a	Reconfiguration of southside ramps and relocate frontage road.	2021-2030	$ 9,736,000
V2-4	Abingdon VA Washington Co. VA	Interstate 81 Exit 17	Exit 17 and Cummings St.	n/a	Realign north and south bound lane on/off ramps and realign frontage road	2021-2030	$ 21,000,000
V2-5	Abingdon VA	East Main St.	Hillman Hwy. to Exit 19	0.7	Widening from a 3-lane to a 5-lane	2021-2030	$ 13,858,455
V3-1	Abingdon VA	Cook St./Lowry Dr.	Cummings St. to Stone Mill Rd.	0.8	2-lane extension of Cook St. to Lowry Dr. and 2-lane reconstruction of Lowry Dr. to Stone Mill Rd.	2031-2040	$ 16,802,000
V3-2	Abingdon VA	Dr. French Moore Jr. Blvd.	Dr. French Moore Jr. Blvd. to Stone Mill Rd.	0.8	New 2-lane construction to connect Dr. French Moore Jr. Blvd. to Stone Mill Rd.	2031-2040	$ 4,575,000
V3-3	Bristol VA	Lee Highway	Alexis Dr. to Old Airport Rd.	0.7	Reconstruction from a 3-lane to a 4-lane with turn lanes and intersection improvements at	2031-2040	$ 31,872,000
V3-4	Washington Co. VA	Route 11	Rt. 58 to Enterprize Dr.	2.6	Reconstruction to urban 2-lane.	2031-2040	$ 23,500,000


2016-2040 ROADWAY PROJECTS
Bristol Tennessee/Virginia Urban Area
Metropolitan Planning Organization
LEGEND
Interchange Project
Highway Project
V2-2 Project ID
V1-1 Various Locations
V3-4
V2-3
V2-5
V2-4
V3-1/V3-2
V2-2
V1-2
V2-1
V1-3/V3-3
T1-2
T2-1
T3-3
T3-4
T2-2
T3-1
T2-3
T3-2
Abingdon, Virginia
Washington County, Virginia
Virginia
Tennessee
Bristol, Virginia
Bristol, Tennessee
Sullivan County, Tennessee
US 19
LEE HIWY
US 421
VOLUNTEER PKWY
US 58
US 11W
US 11E
81
1
N

Map 7-3

- ***Project T1-2: East Cedar Street*** *(Bristol).* To enhance East Cedar Street's operation as a gateway to King University, this plan proposes improvements to East Cedar Street between 5th Street and King College Road. This will include the realignment of East Cedar Street between Georgia Avenue and Halverstadt Drive (an entrance roadway into the King University campus) to alleviate several sharp curves, and the modification of the intersection at Virginia Avenue (US 421/SR 34) with the installation of turn lanes, increased turning radii, and a modernized traffic signal. It is also proposed to install a northbound right-turn lane on 5th Street at East Cedar Street, increase the turning radii and modernize the traffic signal at this intersection as well. Sections of East Cedar Street east of Virginia Avenue are proposed to be reconstructed as a two-lane boulevard. In addition, the at-grade railroad crossing signal on East Cedar Street is proposed to be interconnected with the traffic signal at 5th Street and East Cedar Street. As part of this project, the potential removal of the traffic signal at East Cedar Street and Georgia Avenue is to be investigated.

- ***Project T1-3: Volunteer Parkway/Highway 11E*** *(US 11E-19/State Route 34) Median Modifications (Bristol).* This project involves installation of left turn lanes at selected median opening locations along Volunteer Parkway and Highway 11E from Melrose Street to River Road. Not every median along this portion of Volunteer Parkway/Highway 11E is included in this project; some median openings already have left-turn lanes, while others have little or no demand for left turns or U-turns because of the relationship between the median opening locations, driveway locations, topography, the proximity of Beaver Creek, and adjacent land uses. This project also includes the installation of second left-turn lanes on the southbound and westbound approaches at the Weaver Pike (SR 358) intersection with the associated traffic signal modifications; and modifications of side street approaches with median modifications at Avoca Road/Phillipswood Drive, Blue Bonnet Drive/Main Street, and consolidation of median openings north and south of Hilltop Street into a single median opening at Hilltop Street. Because this is a project consisting of work at a series of isolated locations, rather than a continuous work zone, this project lends itself to being broken into myriad combinations of small sections for dealing with fiscal and operational constraints.

- ***North-South Connector Route*** *(Bristol/Sullivan County).* This project would provide a continuous roadway connecting The Pinnacle/Exit 74 area of western Bristol to the Bristol Motor Speedway area of southern Bristol. This could be accomplished in phases by the implementation of the (listed north to south) Medical Park Boulevard Extension (Project T2-2), Highway 126/Blountville Highway project (Project T3-1), Carden Hollow Road project (Project T2-3), and the Exide Drive project (Project T3-2). The nature of these stand-alone, independent projects also lends itself to phasing of the overall North-South Connector Route improvements.

- ***Project T2-2: Medical Park Boulevard Extension*** *(Bristol).* This is the northernmost portion of the proposed roadway connecting The Pinnacle/Exit 74 area with the Bristol Motor Speedway area (North-South Connector Route). Medical Park Boulevard exists as a four-lane roadway from West State Street to the main hospital entrance and as a two-

lane roadway from the main hospital entrance to Meadow View Road. In 2009, a joint committee consisting of officials from Bristol, Sullivan County, and the hospital worked together to study several alternative routes for the portion between Meadow View Road and Highway 126 (State Route 126). In the end, a route was selected that is reflected in the project map. Such a project would consist of three parts. Part (a) is the widening of Medical Park Boulevard from the main hospital entrance to Meadow View Road from two lanes to four lanes, and the lengthening of the westbound West State Street left-turn lane to Medical Park Boulevard or the addition of a second left-turn lane. Part (b) is the upgrading of a portion of Meadow View Road (two lanes to four lanes, vertical alignment modifications) from Medical Park Boulevard to point east of the Collingwood subdivision near Kinkead Drive. Part (c) is the construction of a new four-lane facility east of the Collingwood subdivision connecting Meadow View Road near Kinkead Drive to the intersection of Highway 126 at Steele Creek Drive and the installation of turn lanes at the latter intersection on the existing approaches as appropriate. All three parts would also include accommodation of bicycle facilities along its length.

- ***Project T2-3: Carden Hollow Road*** *(Sullivan County).* This is a central portion of the proposed roadway connecting The Pinnacle/Exit 74 area with the Bristol Motor Speedway area (North-South Connector Route). This project proposes to improve the horizontal alignment of the 2-lane facility (Carden Hollow Road) and add turn lanes at the intersections of Carden Hollow Road and Highway 126 *and* at Carden Hollow Road and Bethel Drive. The discontinuous nature of this project easily lends itself to implementation by phase.

- ***Project T3-1. Highway 126*** *(Bristol/Sullivan County)*. This is a central portion of the connector facility between The Pinnacle/Exit 74 and Bristol Motor Speedway areas (North-South Connector Route). This project involves the widening of this corridor from a 2-lane to a 4-lane from the current end of 4-lane roadway on Blountville Highway at Neal Drive (just southwest of its intersection with West State Street), to the intersection of Highway 126 and Carden Hollow Road. This would also involve a reconfiguration of the intersections at Walnut Hill Road and Paramount Drive from two three-leg intersections separated by a narrow bridge to a single four-leg intersection. Logical break points for widening of this roadway into phases for construction include Highway 126 at Collingwood Drive, Walnut Hill Road, and Carden Hollow Road.

- ***Project T3-2: Exide Drive*** *(Bristol).* This is the southernmost portion of the proposed roadway connecting The Pinnacle/Exit 74 area with the Bristol Motor Speedway area (North-South Connector Route). This project involves the widening of Exide Drive from a 2-lane to a 4-lane facility from the Volunteer Parkway/Highway 11E intersection to the intersection of Bethel Drive, with intersection improvements at each end (particularly the installation of dual left-turn lanes from eastbound Exide Drive to northbound Volunteer Parkway). Whether this is a single-phase project or a two-phase project (with the second phase being the replacement of the existing two-lane bridge over Back Creek with a four-lane bridge) may depend on the timing of the need for bridge replacement relative to the available funding for the widening the balance of this project. Signalization of the Bethel Drive intersection may also have to be investigated as part of this project.

- ***Project T3-3: West State Street and Memorial Drive/KMart Drive*** *(Bristol).* This project calls for the reconstruction of this signalized intersection to allow the currently prohibited northbound KMart Drive left turns and through movements, with traffic signal upgrades as appropriate.

- ***Project T3-4: West State Street/Highway 11W*** *Median Modifications (Bristol).* This project involves the installation (or lengthening at Medical Park Boulevard; see the discussion of the Medical Park Boulevard project) of left turn lanes at selected median opening locations on West State Street from Sycamore Street to Interstate 81, and on Highway 11W at its intersection with Stevens Trail/Island Road. As along Volunteer Parkway and Highway 11E, not every median opening requires modification as part of this project. Because this is a project consisting of work at a series of isolated locations, rather than a continuous work zone, this project lends itself to being broken into myriad combinations of small sections for dealing with fiscal and operational constraints.

VIRGINIA ROADWAY PROJECTS: 2016-2040

- ***Project V1-1: Abingdon Intersection Modifications*** *(Abingdon).* Under this project, certain intersections along major thoroughfares in Abingdon would be modified, including:

  (a) Install a second westbound Main Street left-turn lane at Cummings Street, and a left-turn lane on northbound Cummings Street at Main Street.
  (b) Reconstruct the Old Reedy Creek Road approach to West Main Street to allow only right turns to eastbound West Main Street; signalize the intersection of West Main Street and Colonial Road as the alternative route to Old Reedy Creek Road. This traffic signal could be interconnected with the existing traffic signal at West Main Street and Charwood Drive.
  (c) Reconfigure and reconstruct the US 11 (Main Street) and Route 140 (Jonesboro Road) intersection to align Main Street and Jonesboro Road as the major through movement at this intersection. Modify the traffic signal accordingly for the portion of Route 11 west of this intersection to become the minor 3-way junction.
  (d) Reconfigure and reconstruct the US 11 (Main Street) and US 19 (Porterfield Highway) intersection to align Route 11 and Route 19 to become the major through movement at this intersection. Thus, Main Street east of this intersection would be aligned to be the minor junction, with modifications to the traffic signal accordingly. An additional phase of the project would provide access management improves on Route 58 in Washington County.

- ***Project V1-2: Lee Highway/Exit 5*** *(US 11-19, Bristol).* The project involves Interstate 81 Exit 5 improvements by widening a 5-lane section of Lee Highway to a 6-lane urban typical section with pedestrian facilities and median to improved access management. The project will provide modifications at the Exit 5 interchange with the addition of turn lanes on the various interchange ramps and intersection approaches and traffic signal upgrades. In addition, the project includes development of a new Park and Ride lot.

- ***Project V2-1: Lee Highway*** *(US 11-19, Bristol).* This project would extend the multi-lane portions of Lee Highway from near the Blevins Boulevard/Cabela Drive intersection to

Alexis Drive and improves the existing 3-lane to a 4-lane facility with the addition of turn lanes at intersections, access management improvements, new signals for additional access to the Fall Development. In addition the project will include a multimodal shared use path. Bridge work (replacement and/or widening) integral to this project includes the Lee Highway bridge over a Beaver Creek tributary near Flanagan Drive. Major infrastructure improvements to the Norfolk Southern Railway overpass, east of Alexis Drive, are not anticipated due to the existing 4-lane highway section at this location.

- ***Project V2-2: Providence Road*** *Relocation (Route 611) (Washington County).* This project involves the relocation of a portion of Providence Road from Lee Highway to a point south of Repass Street in order to make room for an extension of a runway at the adjacent Virginia Highlands Airport, which is located immediately east of Providence Road. This project would cut this 2-lane roadway into two sections, with the section north of the runway being extended as a 2-lane facility westward to connect to Westinghouse Road north of Lee Highway, while the section south of the runway would be a dead-end section that still connects to Lee Highway adjacent to Exit 13.

- ***Project V2-3: Exit 19 Interchange*** *(Abingdon/Washington County).* Under this project, Exit 19 would be reconstructed to current Interstate standards in regard to ramp and Interstate configurations, with Interstate bridge replacements to accommodate a new alignment as necessary. This project would also include intersection modifications along East Main Street/Lee Highway at Empire Drive, Falcon Place Boulevard, and Jeb Stuart Highway, including turn lane additions and reconfigurations and interconnection of the traffic signals in Washington County along this portion of Lee Highway. Such a project could also be expanded to include intersection modifications and signalization of the intersection of Lee Highway and the primary entrance to Johnston Memorial Hospital, with signal interconnection to the other Lee Highway traffic signals referenced above.

- ***Project V2-4: Exit 17*** *(Abingdon/Washington County).* This project calls for the reconfiguration of Exit 17, which currently consists of a "standard" diamond interchange with very little distance between the two signalized ramp intersections, and only a three-lane passage on Cummings Street (State Route 75) under the Interstate 81 bridges. The new configuration would move the two northbound ramps and their Cummings Street intersections away from the bridges to new locations further south to provide queuing space and room for turn lanes in the interchange, as well as lane additions to the southbound ramps and appropriate traffic signal modifications. A second right-turn lane could be added to the southbound exit ramp with traffic signal modifications as well. Intersection modifications along Cummings Street in support of this project could also occur at Country Club Drive, Birdie Drive, Commerce Drive, Gravel Lake Road, and Vance Mill Road (Route 640) as these "side" streets are reconfigured away from the existing bridge structures as appropriate. Ultimately, as structural needs require, the Interstate 81 bridges would be replaced with longer structures to accommodate at least five lanes on Cummings Street under the Interstate.

- ***Project V2-5: East Main Street*** *(Abingdon).* This project calls for the widening of East Main Street between Hillman Highway and the Exit 19 interchange to four lanes with turn lanes as appropriate or a five-lane facility. Such a project may include signalization of the intersection of East Main Street and Old Eleven Drive.

- ***Project V3-1: Cook Street/Lowry Drive*** *(Abingdon).* This project would extend and modify Cook Street from Cummings Street to Lowry Drive, and Lowry Drive from Cook Street to Stone Mill Road as a two-lane facility. The intersection work at Cummings Street and Cook Street would also include the realignment of Green Spring Road so that it intersects Cummings Street at Cook Street, forming a four-leg intersection, rather than intersecting Cummings Street south of Cook Street as it does at present. Turn lanes would be added at the Cook Street and Cummings Street intersection as required and the traffic signal reconfigured as appropriate. Three project phases are envisioned: Green Spring Road portion, Cook Street portion, and Lowry Drive portion.

- ***Project V3-2: Dr. French Moore Jr. Boulevard/VHCC Drive*** *(Abingdon).* This project would extend Dr. French Moore, Jr. Boulevard (State Route 372) from its current eastern end to intersect Stone Mill Road at Lowry Drive, thus providing a connection between Cummings Street and Jonesboro Road away from than Main Street. A second portion of this project would widen Virginia Highlands Community College Drive to a 36-foot urban standard road width.

- ***Project V3-3: Lee Highway*** *(US 11-19, Bristol).* This project would extend the multi-lane portion of Lee Highway from Alexis Drive to the Clear Creek Road/Old Airport Road intersection, as well as possibly modify lane configurations between the latter intersection and the Beaver Creek bridge. This project involves widening of this 3-lane roadway to four through lanes with additional lanes at intersections, as appropriate; some short sections may have to be accommodated with a center two-way left-turn lane cross-section. Bridge work (replacement and/or widening) integral to this project include the Lee Highway bridge over Goose Creek, and the Bonham Road bridge over Beaver Creek that is immediately adjacent to Lee Highway; the latter bridge should be widened to at least six lanes for proper intersectional operation. At the intersection of Clear Creek Road/Old Airport Road and Lee Highway, the need for northbound Lee Highway dual left-turn lanes to Clear Creek Road has been obviated by subsequent construction; the section of Lee Highway between Clear Creek Road/Old Airport Road and Beaver Creek Road should be reconfigured to allow for southbound Lee Highway dual left-turn lanes to Old Airport Road while the second northbound Lee Highway left-turn lane to Clear Creek Road is eliminated.

  This project would also take the series of traffic signals along Lee Highway (US 11-19) between Alexis Drive and Resting Tree Drive/Mount Vernon Drive in Bristol, and the traffic signals at Clear Creek Road and the shopping center entrance as well as the two traffic signals at Old Airport Road and the Exit 7 interchange, and connect them into a single coordinated traffic signal system.

  Project V3-4: Lee Highway *(US 11, Washington County).* This project would increase capacity on Route 11 between Route 58 (Jeb Stuart Highway) to Enterprise Road. The project is intended to provide access improvement to Johnson Memorial Hospital would involve widening the existing 2-lane to a 3-4 lane facility.

Tennessee Illustrative Projects (Unfunded)

Project #	Jurisdiction	Project	Termini	Length (miles)	Description
T-IL-1	Bristol TN	Edgemont Ave/Bluff City Hwy	Queen St. to Volunteer Pkwy	2.8	Spot modifications for lane reconfiguration, realignments and traffic signal upgrades
T-IL-2	Bristol TN	King College Rd	Tadlock Rd to Old Jonesboro Rd	2.3	Spot modifications for turn lanes at various intersections including
T-IL-3	Bristol TN	Old Jonesboro Rd	Bristol Caverns Hwy to Kilcoote Way	3.2	Geometric modifications at various locations
T-IL-4	Bristol TN	Weaver Pike	Partnership Park Rd to Stonecraft Rd.	2.3	Construction new 4- lane roadway
T-IL-5	Bristol TN Sullivan Co. TN	Highway 126/Highway 75	Carden Hollow Rd (SR-126) to Adams Chapel Ro (SR-75)	4.8	Widening to 4- lane facility and turn lanes at various intersections
T-IL-6	Bristol TN	US 421	Anderson St. to US 394	2.5	Widening to 3-lanes with realignment at Maple St.

Virginia Illustrative Projects (unfunded)

Project #	Jurisdiction	Project	Termini	Length (miles)	Description
V-IL-1	Bristol VA	Kings Mill Pike	East Valley Dr. to Eastern Corporate Limits	1.3	Vertical and horizontal alignment modifications
V-IL-2	Bristol VA	Bonham Rd	Sincerest Dr to Lee Highway	0.4	Intersection modifications and pedestrian enhancements
V-IL-3	Washington Co. VA	Kings Mill Pike/Old Jonesboro Rd	Bristol Corporate Limit to Exit 14	8.3	reconstruction of 2-lane facility with horizontal and vertical curve modifications
V-IL-4	Bristol VA	Lee Highway	Euclid Ave/Moore St/Oakview Ave to Overhill Rd	1.1	Widening from 4 to 5-lane facility
V-IL-5	Bristol VA	Old Abingdon Hwy	Vicinity of Railroad Underpass	n/a	Various alternatives for realignment of the Railroad Underpass
V-IL-6	Bristol VA	Old Airport Rd	Kings Mill Pike to Bonham Rd	1.0	Extension of widening from 2-lane to 4/5-lane facility
V-IL-7	Bristol VA	West Mary St.	Bridge over Norfolk Southern Railway	0.1	Bridge replacement and widening
V-IL-8	Bristol VA	Piedmont Ave	Sycamore St to Tennessee State Line	0.3	Beaver Creek bridge replacement
V-IL-9	Abingdon VA	Bonnycastle Dr.	Jonesboro Rd to Stone Mill Rd	1.3	2-lane extension of Bonnycastle Dr from its western terminus
V-IL-10	Bristol VA Washington Co. VA	Gate City Hwy	Exit 1 to Scott County line	6.2	Widening to multi-lane facility
V-IL-11	Washington Co. VA	Lee Highway	West Highlands Blvd to Exit 10	1.9	Reconstruction as a 4-lane divided highway
V-IL-12	Washington Co. VA	Lee Highway	Exit 10 to Abingdon Town Limit	3.3	Reconstruction as a 4-lane divided highway
V-IL-13	Abingdon VA	Hillman Highway	East Main St to Old Saltworks Rd	1.3	Reconstruction as a 2-lane facility and modifications to realign Old Saltworks Rd railroad overpass
V-IL-14	Abingdon VA Washington Co. VA	Old Jonesboro Rd Extension	Main St northward to Porterfield Hwy	1.4	Construct new 4-lane divided highway
V-IL-15	Abingdon VA	Wyndale Rd.	West Main to East Town Limit	0.9	Reconstruction to urban 2-lane.

TENNESSEE ROADWAY PROJECTS ILLUSTRATIVE (UNFUNDED)

- ***Project T-IL-1: Edgemont Avenue/Bluff City Highway****, (Bristol).* This project calls for spot modifications along this corridor from Queen Street to Volunteer Parkway as a continuation to the previous improvements to Edgemont Avenue completed in the 1990s. Such modifications can be made at the intersections of Bluff City Highway and Edgemont Avenue; Bluff City Highway and Southside Avenue; Bluff City Highway in front of Haynesfield School; and at Bluff City Highway and Lavinder Lane, for lane reconfiguration and realignments as well as traffic signal upgrades. The discontinuous nature of this project easily lends itself to implementation by phase.

- ***Project T-IL-2: King College Road*** *(Bristol).* The plan identifies spot modifications along King College Road to add turn lanes at Old Jonesboro Road, Melody Lane/Holston View School, Trammel Road, and East Cedar Street. Included as well are safety widening of the Sinking Creek bridge and two culverts that carry King College Road over tributaries of Sinking Creek (one west of Kingsbridge and one south of Reserve Boulevard). Like Old Jonesboro Road, another facet of this project would be shoulder widening of King College Road from Tadlock Road to Trammel Road to accommodate an extension of the bicycle route system to eastern Bristol. Like other projects described above, the discontinuous nature of this project lends itself to different combinations of phasing for operational and fiscal considerations.

- ***Project T-IL-3: Old Jonesboro Road*** *(Bristol/Sullivan County).* The project calls for geometric modifications at specific locations along Old Jonesboro Road from Bristol Caverns Highway (SR 435) to Kilcoote Way. Vertical modifications also desired at the Carolina Avenue intersection. The addition of left-turn lanes are proposed at Trammel Road, Paperville Road, King College Road, Valley Pike Road, Carolina Avenue, and Bristol Caverns Highway. The section between Valley Pike Road and Carolina Avenue needs widening to provide additional two-lane width, and modifications to intersections to promote Old Jonesboro Road as the through movement. Like other projects described above, the isolated discontinuous nature of this project lends itself to being broken into various sections. A separate facet of the project is shoulder widening in Bristol between Trammel Road and Kilcoote Way for the accommodation of bicycle lanes in accordance with existing bicycle route plans. Modifications at King College Road, Trammel Road, part of the Paperville Road area, and the shoulder widening facet are currently within the corporate limits of Bristol.

- ***Project T-IL-4: Weaver Pike****, (Bristol).* This plan promotes a more limited approach to the wide-sweeping five-lane realigned roadway called for in previous long-range transportation plans. Instead, this plan calls for limited modifications at spot locations. These spot modifications include intersection modifications at Stonecroft Road/Stine Street, 5th Street, Cedar Valley Road, Industrial Drive, Bellebrook Road/Industrial Boulevard, Vance Tank Road/Ridgedale Drive, and Partnership Park Road in the form of adding left-turn lanes with curvature realignments and earthwork as required for proper intersection operation and sight distance. At the Vance Tank Road/Ridgedale Drive intersections, the proximity of the Weaver Pike railroad overpass precludes the installation of left-turn lanes on Weaver Pike and sight distance improvements without

replacement of the railroad bridge. Instead, it is proposed to relocate the Vance Tank Road intersection approximately 400 feet north of the railroad bridge and reconstruct it with left-turn lanes. This project also calls for the addition of shoulders from Bellebrook Road/Industrial Boulevard to Industrial Drive for bicycle lanes. Finally, this project would include modification of certain bridges (over Cedar Creek, Hogtown Creek, and Beeler Branch) for proper bridge and rail approach treatments. Like other projects described above, the discontinuous nature of this project lends itself to different combinations of phasing for operational and fiscal considerations.

- ***Project T-IL-5: Highway 126/Highway 75*** *(Sullivan County).* . This project involves the widening of this 2-lane corridor to a 4-lane facility from Carden Hollow Road to the intersection of Highway 126 and Highway 75 in Blountville, and then along Highway 75 to the western cordon line near Adams Chapel Road. This project would then extend beyond the Bristol study area into the Kingsport study area, eventually linking up with the multi-lane portion of Highway 75 proximate to Tri-Cities Regional Airport near State Route 357. This would also involve the widening of several bridges along the route as well as reconfiguration of major intersections in Blountville and the addition of turn lanes at various locations. Logical break points for widening of this roadway into phases for construction include Highway 126 at Bethel Drive, Blountville Boulevard/Blountville Bypass, Highway 394, and Highway 75. Along Highway 75, logical break points for widening phases could include Muddy Creek Road [northern intersection[1], and the Booher Creek bridge at the cordon line separating the Bristol and Kingsport study areas.

- ***Project T-IL-6: Highway 421*** *(Bristol).* This plan proposes the modification to the 2-lane section of the US 421 corridor east and south of the Anderson Street bridge over the Norfolk Southern Railway in eastern Bristol, with the other end at the north end of the existing four-lane portion of US 421 just north of Highway 394. Such a thoroughfare could include the following phased components:

  (a) Widening of Highway 421 and Virginia Avenue northward from the end of the current four-lane roadway just north of its signalized intersection with Bristol Caverns Highway/Highway 394. This would take the form of a three-lane roadway cross-section with bicycle lanes.
  (b) A realignment of the "shift" that now transfers the state route from Virginia Avenue to Pennsylvania Avenue via Maple Street and two 90° turns. This would involve a relocation of US 421 north of Lakeview Street along a new alignment that would tie into East Cedar Street at Pennsylvania Avenue. Design of such a roadway would have to account for the East Cedar Street railroad crossing as integral part of the design, with a possible new traffic signal at Pennsylvania Avenue and East Cedar Street. Another alternative "shift" location is in the vicinity of Chesnut Street so as to avoid interaction with the East Cedar Street railroad crossing. By keeping the "shift" south of Maple Street, this eliminates impacts on adjacent properties in the recently-designated Fairmount Historic District north of Maple Street. This could also be a three-lane cross-section with bicycle lanes.

[1] The southern intersection of Highway 75 and Muddy Creek Road is outside of the Bristol study area near Tri-Cities Regional Airport.

(c) Widening of Pennsylvania Avenue from the "shift" to Anderson Street (US 421-SR 34) to a three-lane section with bicycle lanes.
(d) Relocate both the Highway 421 left-turn lanes at the Bristol Caverns Highway (SR 435/Highway 394 intersection) to an offset configuration for improved sight distance and modify the traffic signal accordingly.

The Tennessee Department of Transportation has completed a Transportation Planning Report (TPR) for this portion of the US 421 corridor, which identified several alternatives for lane configurations and the location of the "shift" to transfer between Pennsylvania Avenue and Virginia Avenue.

VIRGINIA ROADWAY ILLUSTRATIVE PROJECTS (UNFUNDED):

- ***Project V-IL-1: Kings Mill Pike****, East Valley Drive to Bristol Eastern Corporate Limits (Bristol).* Vertical and horizontal alignment modifications to Kings Mill Pike from East Valley Drive to the eastern corporate limits of Bristol is proposed to enhance the recent widening of Kings Mill Pike at its signalized intersection with Old Airport Road/Pendergrass Road. The Old Airport Road/Pendergrass Road intersection is also a logical break point for splitting this project into two phases.

- ***Project V-IL-2: Bonham Road****, south of Suncrest Drive to Lee Highway (US 11-19) (Bristol).* This document calls for certain discreet modifications along this portion of Bonham Road, including pedestrian modifications from Suncrest Drive to Lee Highway; widening of Bonham Road up to six lanes at the Lee Highway intersection at the bridge over Beaver Creek (see the discussion of Project V2-1 above); and a potential traffic signal at Bonham Road and Suncrest Drive with turn lane modifications.

- ***Project V-IL-3: Kings Mill Pike/Old Jonesboro Road*** *(Route 647), Bristol Corporate Limits to Exit 14 (Washington County).* This project involves widening the roadway (while remaining a two-lane facility) with horizontal and vertical curve modifications, bridge upgrades, and left-turn lane installations at Sinking Springs Road (Route 648), Junction Drive (Route 649), High Point Road (Route 649), Mock Knob Road (Route 666), Halls Bottom Road (Route 808), and Spring Creek Road (Route 611). For multiple phases, any of these proposed left-turn lane installation locations could serve as a break point.

- ***Project V-IL-4: Lee Highway*** *(US 11-19), Euclid Avenue (US 11-19) to Overhill Road/Wendover Road (Bristol)* ***and Moore Street****.* This project includes widening of this portion of Lee Highway to four or five lanes, including intersection improvements and a traffic signal upgrade at East Valley Drive/West Valley Drive, as an extension of the existing five-lane portion north of Overhill Road/Wendover Drive. This could be done as a two-phase project split at the East Valley Drive/West Valley Drive intersection. Signalization of the Lee Highway/Moore Street and Euclid Avenue intersection and its interconnection with the traffic signal at Moore Street, Oakview Avenue, and Martin Luther King, Jr. Boulevard ("Five Points") to its south may have to be investigated, if desired, as part of the preliminary analysis. Alternatively, the signalized intersection at Moore Street, Oakview Avenue, and Martin Luther King, Jr. Boulevard ("Five Points") could be investigated for its replacement with a roundabout.

- ***Project V-IL-5: Old Abingdon Highway*** *Underpass Widening (Bristol).* Previous long-range plans have discussed the need for a wider passage for Old Abingdon Highway under the Norfolk Southern Railway (the current passage is 20 feet zero inches wide on this truck route serving multiple industrial sites). There are several alternative treatments that could provide relief to this problem, as discussed below.

  (a) Replace the underpass with an at-grade railroad crossing north of the bridge, coupled with a re-alignment of Old Abingdon Highway away from its current intersection with Lee Highway, instead intersecting Lee Highway at the Exit 5 northbound off-ramp signalized intersection, and thus eliminating a signalized intersection within the Exit 5 interchange, which would affect Lee Highway project at Exit 5 described above.
  (b) Eliminating the intersection of Lee Highway and Old Abingdon Highway, and replacing it with an extension of Old Abingdon Highway that would remain east of the railroad tracks, cross under Interstate 81 at its bridge over the railroad and Beaver Creek, and connect to Cabela Drive (which in turn, connects to Lee Highway at the Blevins Boulevard/Cabela Drive signalized intersection north of Exit 5).

- ***Project V-IL-6: Old Airport Road****, Kings Mill Pike to Bonham Road, southern intersection (Bristol).* This project is a logical extension of the widening of Old Airport Road north of this location that is already complete; this project would replace the existing two-lane section with a roadway with four through lanes (and either turn lanes as appropriate at intersections or a center two-way left-turn lane).

- ***Project V-IL-7: West Mary Street*** *(Bristol).* This project would replace the existing, nearly century-old West Mary Street bridge over the Norfolk Southern Railway yard in southern Bristol, Virginia, east of Martin Luther King, Jr. Boulevard (Truck US 11-19). The existing two-lane bridge (weight-posted as of December 2015 at 13 tons for two-axle vehicles and 18 tons for three-or-more-axle vehicles) should be replaced with a new structure at least four lanes wide to allow for operational improvements at the Martin Luther King, Jr. Boulevard intersection by allowing for turn lanes at that signalized intersection. The timing of this project is, in part, predicated on the deterioration rate of this structure and the need for replacement based on structural capacity.

- ***Project V-IL-8: Piedmont Avenue Bridge*** *(Bristol).* Unlike most bridges that cross water courses transversely, the Piedmont Avenue bridge over Beaver Creek in downtown Bristol, Virginia, crosses Beaver Creek longitudinally from just north of Sycamore Street to the Tennessee state line in the center of State Street, a distance of about one-quarter mile, with both businesses and the Bristol Public Library main branch facility along both sides of the structure (and thus along both banks of Beaver Creek). This same structure extends under State Street in Tennessee to the southerly right-of-way line of State Street, and is weight-posted as of December 2015 at 17 tons for two-axle vehicles and 26 tons for three-or-more-axle vehicles. However, the replacement of the portion of the structure under State Street should be considered separately from the balance of the structure under Piedmont Avenue in light of its two-state status and the differences in operational and fiscal environment.

- ***Project V-IL-9: Bonnycastle Drive*** *(Abingdon).* This project calls for the extension of Bonnycastle Drive from its existing western terminus to Jonesboro Road, constructed to a two-lane urban standard, thus providing a link between Jonesboro Road and Stone Mill Road south of Interstate 81.

- ***Project V-IL-10: Gate City Highway*** *(US 58/US 421) Modifications, Exit 1 interchange to Scott County line (Washington County).* The replacement of the existing 2-lane US 58 roadway between Weber City (in Scott County, Virginia, in the Kingsport study area) and Exit 1 with a 4-lane facility is proposed as part of the larger statewide initiative to provide a multi-lane continuous US 58 facility from Cumberland Gap to the Atlantic Ocean. Phasing for this project would be delineated with one portion extending from the eastern intersection with Reedy Creek Road (Route 633) to the Miller Hill Road intersection immediately north of the recently reconstructed Exit 1 interchange of Interstate 81, and the other portion being between the eastern Reedy Creek Road intersection and the Scott County line.

- ***Project V-IL-11: Lee Highway****, West Highlands Boulevards to just north of Majestic Drive (F-310) (US 11-19) (Washington County).* This project includes widening of Lee Highway from the West Highlands Boulevard at the Bristol corporate limits to Majestic Drive (the connector road between Lee Highway and Interstate 81's Exit 10) in Washington County to a four-lane divided highway cross-section, with additional lanes as required at selected intersections and bicycle facilities.

- ***Project V-IL-12: Lee Highway*** *(US 11-19), Majestic Drive (F-310) to Abingdon western corporate limits (Washington County).* This project would continue the widening of Lee Highway to a four-lane cross-section with turn lanes at intersections and bicycle facilities from Majestic Drive (the connector roadway to Interstate 81 at Exit 10) to the western corporate limits of Abingdon east of Virginia Highlands Airport.

- ***Project V-IL-13: Hillman Highway/Old Saltworks Road*** *(Abingdon).*This project calls for the widening of exiting 2-lane Hillman Highway from East Main Street to the eastern corporate limits to a typical two-lane urban section (36 feet wide) with curb-and-gutter and sidewalks. Another phase of this project would replace the one-lane under-height (clearance 12 feet 2 inches) semi-circular Norfolk Southern Railway mainline railroad overpass at Old Saltworks Road and reconstruct Old Saltworks Road to a two-lane urban-standard roadway from Hillman Highway to the corporate limits of Abingdon just north of the railroad.

- ***Project V-IL-14: Jonesboro Road Extension*** *(Abingdon/Washington County).* This is the largest new-roadway proposal for the Abingdon area. This project calls for the extension of Jonesboro Road (as State Route 140) from West Main Street northward as a four-lane divided highway, crossing the Norfolk Southern Railway main line, intersecting Wyndale Road near Woodland Hills Drive, and then connecting to Porterfield Highway near the southern Rustic Lane intersection in Washington County. This project could be completed in two phases, with Wyndale Road is the phase break point. Modifications to the intersection of West Main Street and Jonesboro Road may also be required, including but not limited to providing a dual right-turn arrangement from northbound Jonesboro Road to eastbound West Main Street.

- ***Project V-IL-14: Wyndale Road*** *(Abingdon).* This project would upgrade Wyndale Road from West Main Street to the western corporate limits near Woodland Hills Road to a 36-foot, two-lane urban roadway. Depending on how the different projects are constructed, this project has the potential to intersect the Jonesboro Road (SR 140) extension northward to Porterfield Highway.

PART B: PUBLIC TRANSPORTATION ELEMENT

As the years pass the need for transit services will continue. The elderly, children, people with disabilities, and the economically disadvantaged should not be confined without mobility options. The majority of public transportation riders in the Bristol region are transit dependent, and without that source of transportation they would be without access to essential services or potential employment.

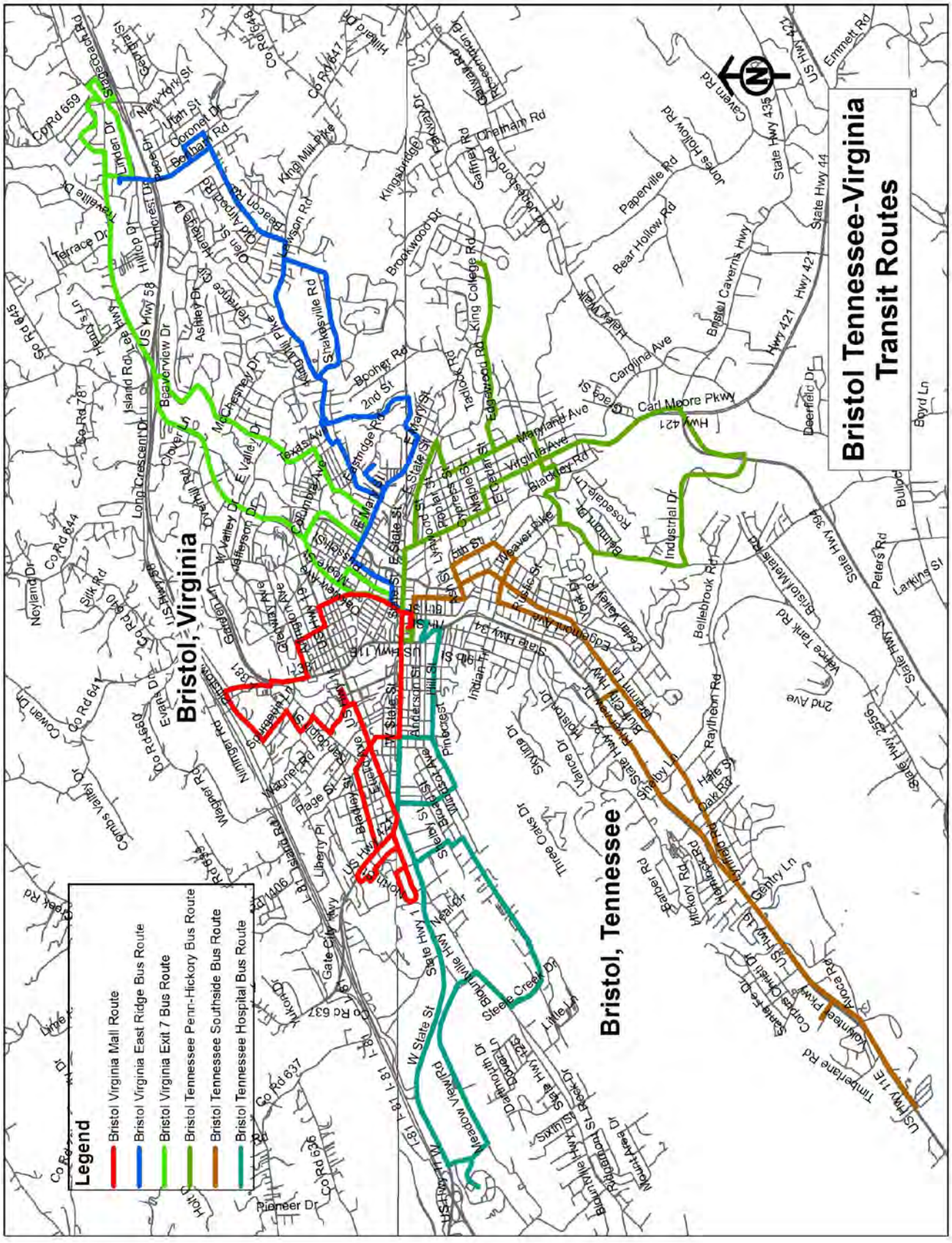
There are multiple agencies providing public transportation in the Bristol Study Area; however, despite a variety of alternative transportation options, there remains unfulfilled needs, gaps in services, and lack of coordination of services. The area has been reactionary instead of proactive towards alternative forms of transportation, but transit must also be a product which people will desire to use. Through the education of the general public and government officials, the acceptance of transit and its importance to the community can occur.

EXISTING CONDITIONS

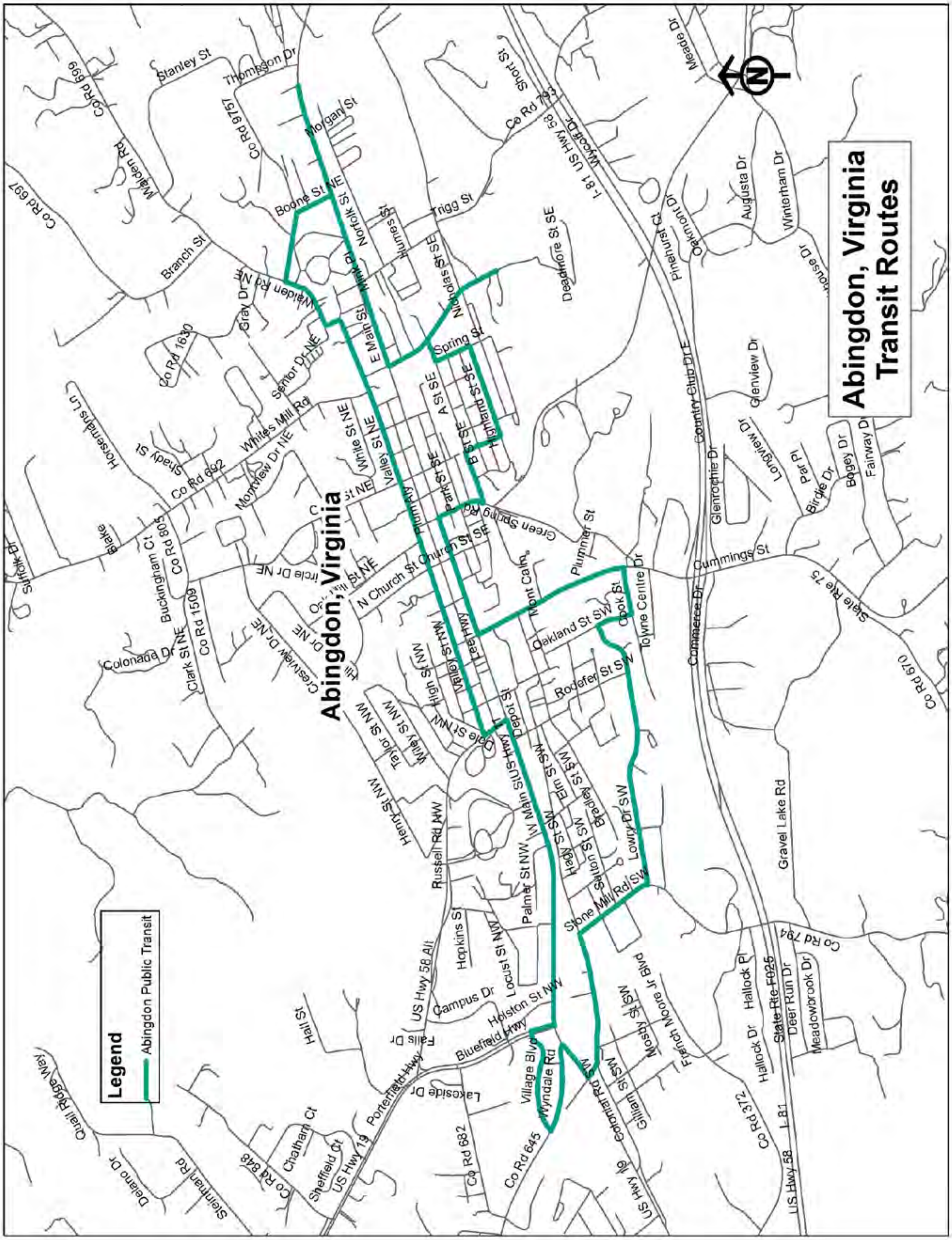
Bristol Transit. The cities of Bristol, Tennessee, and Bristol, Virginia, comprise a single small metropolitan area, but each entity has its own government and separate transit system. However, the two transit systems are integrated and operate on a pulse system from the downtown transfer center in the 800 block of State Street. Both Bristol Tennessee Transit and Bristol Virginia Transit operate a system of three fixed routes each, which provides service to commercial and residential areas as well as medical/hospital campuses and educational institutions (Map 7-4). Transit service is offered on weekdays from 6:15 a.m. to 6:15 p.m. During 2013, Bristol Tennessee Transit provided 70,711 annual trips and Bristol Virginia Transit 99,905 annual trips.

Bristol Tennessee Transit and Bristol Virginia Transit are required by Federal law to comply with the provisions of the Americans with Disabilities Act of 1990 (ADA) and provide paratransit service to those persons who are eligible. Public entities providing fixed-route systems must provide paratransit or other special service to individuals with disabilities that are comparable to the level of service provided to persons without disabilities who use the fixed-route systems. ADA transportation is provided by deviation of the fixed-route as well as point-to-point van service. ADA services are available during the same operating hours as fixed-route service.

Abingdon Transit. Public transportation for the Town of Abingdon is provided by Abingdon Transit, which is operated by the District Three Governmental Cooperative. The service includes the use of handicapped accessible vans and two trolley cars. From 8:00 am to 12:00 pm demand-response service is available by reservation only. From 12:00 pm to 5:00 pm a deviated fixed loop service is available (Map 7-5). During the fixed loop service passengers may catch the bus at a designated stop without making reservations. In 2015, Abingdon Public Transit had approximately 7,134 passenger trips.


Bristol Tennessee-Virginia
Transit Routes
Bristol, Virginia
Bristol, Tennessee
Legend
Bristol Virginia Mall Route
Bristol Virginia East Ridge Bus Route
Bristol Virginia Exit 7 Bus Route
Bristol Tennessee Penn-Hickory Bus Route
Bristol Tennessee Southside Bus Route
Bristol Tennessee Hospital Bus Route

Map 7-4


Abingdon, Virginia
Transit Routes
Legend
Abingdon Public Transit
Abingdon, Virginia
Thompson Dr
Morgan St
Boone St NE
Norfolk St
Walden Rd NE
Branch St
Stanley St
Co Rd 699
Co Rd 697
Walden Rd
Co Rd 9757
Humes St
Trigg St
Nicholas St SE
Deadmore St SE
Short St
Co Rd 793
Wyndale Dr
US Hwy 58
I-81
Meade Dr
Pinehurst Ct
Oakmont Dr
Augusta Dr
Winterham Dr
Country Club Dr E
Glenview Dr
Longview Dr
Glenrochie Dr
Par Pl
Birdie Dr
Bogey Dr
Fairway Dr
E Main St
Spring St
A St SE
Highland St SE
B St SE
Park St SE
Plumb Aly
Valley St NE
White St NE
Senior Dr NE
Co Rd 1630
Gray Dr NE
Whites Mill Rd
Montview Dr NE
Co Rd 692
Shady St
Horsemans Ln
Suffolk Dr
Blake
Buckingham Ct
Co Rd 805
Co Rd 1509
Clark St NE
Colonade Dr
Crestview Dr NE
N Church St
Church St SE
Green Spring Rd
Plumber St
Mont Calm
Cummings St
State Rte 75
Co Rd 670
Commerce Dr
Towne Centre Dr
Cook St
Oakland St SW
Rodefer St SW
Depot St
Lee Hwy
Valley St NW
High St NW
Dale St NW
Wiley St NW
Taylor St NW
Henry St NW
Russell Rd NW
W Main St
US Hwy 11
Elm St SW
Bradley St SW
Lowry Dr SW
Hagy St SW
Sutton St SW
Stone Mill Rd SW
Palmer St NW
Hopkins St
Locust St NW
US Hwy 58 Alt
Campus Dr
Holston St NW
Bluefield Hwy
Falls Dr
Hall St
Porterfield Hwy
Lakeside Dr
Village Blvd
Wyndale Rd
Colonial Rd SW
Gilliam St SW
Mosby St SW
French Moore Jr Blvd
Hallock Pl
Hallock Dr
State Rte F025
Deer Run Dr
Meadowbrook Dr
Co Rd 372
Co Rd 794
Gravel Lake Rd
Co Rd 682
Co Rd 645
US Hwy 19
Chatham Ct
Sheffield Ct
Co Rd 848
Steinman Rd
Delano Dr
Quail Ridge Way
N

Map 7-5

District Three Public Transit. The District Three Public Transit provides public transit services in Virginia for the counties of Bland, Carroll, Grayson, Smyth, Washington, and Wythe as well as the Towns of Abingdon, Marion, Wytheville, and the City of Galax. District Three Public Transit is operated as a Joint-Exercise of Powers entity by the localities of the Mount Rogers Planning District Commission. For transit services, various parts of each county are scheduled for service on select days of the week. Generally, service is provided on a first-come first-serve basis by reservation, but passengers may meet the vehicle at any scheduled stop along the route. Door-to-Door service is available for individuals with a disability as defined by the Americans with Disabilities Act (ADA) and all District Three vehicles are handicapped accessible. In 2013, District Three Public Transit provided 176,179 passenger trips district-wide.

District Three Public Transit also provides a weekly route from Bristol to Roanoke and Salem, Virginia. Various pick-up/drop-off locations are designated in the City of Bristol and Washington, Smyth, and Wythe counties along the Interstate 81 corridor.

NET Trans. The First Tennessee Human Resource Agency operates the rural public transportation service, NET Trans, in the Tennessee counties of Carter, Greene, Hancock, Hawkins, Johnson, Sullivan, Unicoi and Washington. The service provides door-to-door transportation on a first-come first-serve basis. While available to the general public in rural Northeast Tennessee, NET Trans provides specialized transportation for the physically challenged and the elderly. NET Trans provided 157,441 trips district-wide in 2015.

In addition to general public transportation, NET Trans operates the Access to Jobs Program to provide transportation to and from work for eligible clients. The service is designed for rural citizens to access employment centers, including child care centers, and can accommodate shift work and weekend schedules.

Section 5310 and Other Providers. Section 5310 refers to the FTA Transportation for Elderly Persons and Persons with Disabilities program. The program provides funding, typically to non-profits, to purchase vehicles for the specific purpose of assisting them with providing transportation services meeting the special needs of elderly persons and persons with disabilities for whom typical mass transportation services are unavailable, insufficient, or inappropriate. Individual medical or social service providers throughout the Metropolitan Planning Area contribute a valuable transportation service to persons who are unable to drive.

Passenger Rail Service. There is currently no passenger railroad service in the Bristol Study Area, apart from an occasional excursion trains. The closest Amtrak stations are Hinton, West Virginia, and Lynchburg, Virginia; however, the Virginia Department of Rail and Public Transportation is in the process of extending Amtrak service to Roanoke by 2017, with future service to Bristol in the planning stages.

Private Bus Lines. Greyhound Bus is the only provider of intercity bus service in the study area, providing bus connections to Johnson City, Kingsport, Abingdon, and points beyond. The Greyhound bus station is located on Shelby Street in Bristol, Tennessee, just a few feet from the Downtown Transit Center utilized by Bristol Tennessee Transit and Bristol Virginia Transit. Other private bus firms in the area provide charter services.

Taxicab Services. Several private firms provide taxicab and delivery service throughout the study area.

OPPORTUNITIES

Fixed-Route Services. The Metropolitan Planning Area for the MPO continues to grow and change while public transportation agencies in the region have struggled to match that growth and change. Much of the growth in Tennessee is westward in the Highway 11W and Highway 394 areas, while much of the Virginia growth has been along Lee Highway Exit 5 and Exit 7 area in Bristol, Virginia and the Exit 19 area of Abingdon and Washington County, Virginia. Much of this growth has occurred beyond the areas served by transit. When new developments were constructed, the urban fixed-route systems have extended service outward from the central business district to serve those needs when feasible; however, the potential for system growth to reach new outlying trip generators will be a continuing issue without additional capital and operating funding to provide service expansions.

Unknown at the date of this plan is the Urbanized Area FTA Section 5307 funding soon to be available to Abingdon, Virginia as a result of the 2010 Census as well as any subsequent public transit services provided. Coordination between the Town of Abingdon, District Three Public Transit, and the Virginia Department of Rail and Public Transportation will be required to develop specific recommendations and planning studies for public transportation within the Town of Abingdon. The implications of FTA Section 5307 funding for the Town of Abingdon requires further consideration and analysis beyond the scope of this document.

Demand-Response and Rural Transit Services. Most of the passengers representing demand-response and specialized transportation within the MPO's service area are senior citizens, disabled persons, or individuals with no other transportation alternatives. This service is absolutely essential for access to health care, nutrition sites, grocery shopping, and basic community services for persons who cannot access traditional fixed-route transit. While the rural transportation agencies focus services on residents that have no other source of transportation for medical and essential errands, their services are also available to the general public. The rural transit providers are facing new problems as travel needs in the rural areas become more diffuse. Improvements in health care and other community services for senior citizens, the disabled and the general public are generating new travel needs for the people who rely on rural transit for their basic mobility needs.

While these agencies provide public transportation for multi-county regions in northeast Tennessee and southwest Virginia, service availability for regional destinations has been very limited, with the exception of the District Three New Freedom Program. It should be noted that rural providers utilizing FTA Section 5311 funding are restricted from providing service when a trip origination and destination are within an urbanized area. As a result, Section 5311 funding requirements prohibit NET Trans from providing a feeder service between the Tri-Cities (Bristol, Kingsport, and Johnson City). However, optional funding sources for this service needs to be investigated to bridge this transportation gap as well as establishing service between Bristol, Virginia and the Town of Abingdon.

Coordinated Human Services Plan. Coordination between transit systems, service providers, and other human services agencies is essential in planning an efficient system that focuses services on the population in need of transit. Recognizing this need, the federal government established the requirement for a locally developed coordinated public transit-human services plan for areas to be eligible to receive FTA Section 5310 funding (Enhanced Mobility for Seniors and Individuals with Disabilities Program). The First Tennessee Human Resource Agency and Mount Rogers Planning District Commission have both developed a Coordinated Human Service Plan for their respective transit service areas. Each plan provides an assessment of available services, an assessment of transportation needs, strategies to address identified gaps, and priorities for implementation.

The Tennessee Department of Transportation is currently funding a regional Coordinated Human Services Plan for all the cities/counties in upper East Tennessee; however, the plan is in the initial phase of development.

Passenger Rail Service. The 2013 Tennessee Rail Plan identified the Bristol-Knoxville-Chattanooga rail corridor in the short list of potential intercity passenger rail for Tennessee. This corridor has even greater potential given Virginia's extension of Amtrak service to Roanoke and consideration of future service to Bristol. The ridership projections for the Chattanooga-Knoxville-Bristol corridor could have a significant impact on the cost-to-benefit ratio with connection to Virginia's extension of Amtrak service to Bristol. The 2015 Tennessee Rail Plan, currently under development, provides the opportunity for a multi-state effort, including Georgia, to connect the major population centers of Atlanta and Washington DC, and points beyond.

A new passenger rail service can only be instituted if there is demonstrable ridership to financially support system operations and to justify the infrastructure and rolling stock that would be required. It is important to note that investment in passenger rail can only be justified if freight movements are the primary purpose for the rail infrastructure enhancements.

PROGRAMMED AND PLANNED PROJECTS

It is anticipated that the cost of providing transit services will continue to grow. The major potentials for cost increases for operations and maintenance in the foreseeable future are due to national trend issues, such as insurance and fuel costs. Transit projects identified in the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* represent local transit agencies maintaining the existing system with no major service additions at this time. The decision to modify either fixed-route or paratransit services to serve currently un-served trip generators will ultimately be made by the local jurisdiction providing the service. Specific recommendations for transit service changes have not been identified in this plan, but could be included as feasibility studies are developed and projects implemented.

Due to the existing level of service remaining consistent, it is anticipated that capital expenditures in the near future will be for the replacement of rolling stock on a typical vehicle replacement cycle. Typically, vehicles are programmed for replacement using a normal vehicle replacement cycle of 4-5 years for vans and 7-10 years for buses. Although no major new facilities are identified for the life of this plan, it can be expected that some maintenance of

existing facilities would be required in the outlying years. The number of vehicles and estimated capital costs needed to provide the current level of service are shown in Table 7-4 for local transit agencies. Costs are based on current procurement standards with a 3.6 percent inflation rate projected for future expenditures. Table 7-4 also includes operating and maintenance costs based on a no growth scenario and a 3.6 percent annual inflation rate.

Table 7-4
Public Transportation
Operating and Capital Needs 2016-2040

Bristol Tennessee Transit

MPO Project #	Capital	#	2016-2020	#	2021-2030	#	2031-2040	TOTAL
BTT-1	O & M	n/a	$ 3,362,263	n/a	$ 8,416,390	n/a	$ 11,310,925	$ 23,089,578
BTT-2	Vehicles	10	$ 769,371	15	$ 1,263,817	15	$ 1,759,498	$ 3,792,686
BTT-3	Other Capital	n/a	$ 26,000	n/a	$ 65,696	n/a	$ 93,569	$ 185,265
Total			$ 4,157,634		$ 9,745,903		$ 13,163,992	$ 27,067,529

Bristol Virginia Transit

MPO Project #	Capital	#	2016-2020	#	2021-2030	#	2031-2040	TOTAL
BVT-1	O & M	n/a	$ 2,962,631	n/a	$ 7,416,028	n/a	$ 9,966,523	$ 20,345,182
BVT-2	Vehicles	5	$ 270,323	11	$ 790,076	11	$ 1,132,416	$ 2,192,815
BVT-3	Other Capital	n/a	$ 27,798	n/a	$ 72,768	n/a	$ 103,643	$ 204,209
Total			$ 3,260,752		$ 8,278,872		$ 11,202,582	$ 22,742,206

NET Trans (District-wide)

MPO Project #	Capital	#	2016-2020	#	2021-2030	#	2031-2040	TOTAL
NET-1	O & M	n/a	$ 21,819,600	n/a	$ 54,618,615	n/a	$ 73,402,854	$ 149,841,069
NET-2	Vehicles	88	$ 3,836,920	176	$ 10,043,994	176	$ 14,305,532	$ 28,186,446
NET-3	Other Capital	n/a	$ 406,563	n/a	$ 1,064,271	n/a	$ 1,515,828	$ 2,986,662
Total	Total		$ 26,063,083		$ 65,726,880		$ 89,224,214	$ 181,014,177

District Three (District-wide)

MPO Project #	Capital	#	2016-2020	#	2021-2030	#	2031-2040	TOTAL
D3-1	O & M	n/a	$ 10,807,992	n/a	$ 27,054,462	n/a	$ 36,358,934	$ 74,221,388
D3-2	Vehicles	35	$ 2,598,901	68	$ 6,790,768	55	$ 7,828,481	$ 17,218,150
D3-3	Other Capital	n/a	$ 195,500	n/a	$ 511,765	n/a	$ 728,890	$ 1,436,155
Total	Total		$ 13,602,393		$ 34,356,995		$ 44,916,305	$ 92,875,693

On various levels, investigations should be made to expand or realign transit service for either fixed-route or paratransit service, or both. There exists a potential for extension of service to outlying trip generators, especially the need for intercity services on a regional level. In addition, expanded hours of transit service for the evening hours and weekends have been an indentified need. The implications of extended transit service requires further consideration beyond the scope of this document because of the individual issues raised for each service expansion. Such issues include service demand only at shift-change times for basic industries; the need to develop strategies for outlying service expansion or realignment while maintaining system-wide pulse scheduling (perhaps through alternate-pulse service); and location of some trip generators outside of the jurisdictions that help to fund the service.

Future planning strategies for public transportation should include the role of transit in the concept of livable communities. Transit-oriented development provides mixed-use development within walking distance of public transportation and is a key element of livable and sustainable communities. Opportunities for transit to be incorporated in transportation and land use planning will provide local agencies additional tools to improve access to housing, jobs, commercial, and social activities. The integration of other transit planning methods, such as mixed-use, open-space, and transit-oriented developments, are all strategies for public transportation to assist in reducing sprawl, reduce automobile travel, and to help create healthier communities.

Typically designed for both bicycles and pedestrians, urban trails are a growing trend in communities around the country not only as a form of alternative transportation, but for promoting healthy lifestyles. Creating a regional pedestrian/bicycle system can supplement the typical transportation system when residential areas are connected to major trip generators. These types of linkages can reduce vehicle trips, improve air quality, provide mobility options, and improve public health.

A major obstacle to bicycle and pedestrian transportation has been current land use and development patterns. Major roads usually do not have facilities adequate for bicycle use and destinations in commercial developments are often separated from neighborhoods by long distances. Even where residential development is adjacent to activity centers, the lack of connectivity can make that area inaccessible and encourage driving. Many communities in the MPO's Metropolitan Planning Area have begun to assess these impediments by developing greenways and trail plans, and conducting pedestrian safety studies.

Transportation and Public Health. Public health considerations are increasingly being recognized in the transportation planning process. Where transportation infrastructure is designed to accommodate and encourage non-motorized transportation it can have positive effect on public health. According to the 2015 County Health Rankings, 30 to 33 percent of adults in the MPO Region are obese. Activities like walking and bicycling can help prevent weight gain and lower the risks of obesity, diabetes, and heart disease.

Incorporating public health into the metropolitan transportation planning process can include various degrees of strategies from transportation policy considerations to support activities, such as partnerships with public health agencies, schools and community organization. The Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization has identified several areas to support the link between public health and transportation planning.

- Promote planning and funding opportunities for active transportation that encourages walking or bicycling.
- Develop partnerships with local organizations with a health-related mission.
- Education and awareness that transportation programs and projects that provide public health benefits can also support other MPO goals such as safety, environmental sustainability and mobility options.

State Pedestrian/Bicycle Policy. Based on the Federal Highway Administration's policy statement that calls for bicycle and pedestrian facilities on all new roadways, both the Tennessee and Virginia Departments have developed policies for integrating bicycle and pedestrian accommodations (TDOT Multimodal Access Policy, July 31, 2015, VDOT Policy for Integrating Bicycle and Pedestrian Accommodations, March 18, 2004). The state policy documents provide procedures for incorporating bicycle and pedestrian accommodations in the construction, reconstruction, operation and maintenance of the state's transportation network. An accommodation is defined as any facility, design feature, operations change, or maintenance activity that improves the environment in which bicyclists and pedestrians travel. Examples of such accommodations include the provisions of bicycle lanes, sidewalks, signage, and the

addition of paved shoulders. Exceptions to the policies include facilities where bicyclists and pedestrians are prohibited by law, where safety would be compromised, where cost for bicycle and pedestrian facilities is excessively disproportionate to the need and probable use (costs associated with ADA requirement is not an exception), or where there is a demonstrated lack of need due to low population density.

Local Pedestrian/Bicycle Planning. The comprehensive plans for both Sullivan County, Tennessee and Washington County, Virginia include policy level recommendations for bicycle and pedestrian facilities. Given the relatively low density of county land use patterns, most pedestrian specific projects include trail systems such as the Virginia Creeper Trail, Overmountain Victory Trail, and Appalachian Trail.

The City of Bristol, Tennessee completed the City's *Bicycle and Pedestrian Plan* in 2009 to identify a potential network of facilities within the community. The primary focus of the plan was to establish a comprehensive city-wide network of routes that would connect various land uses and landmarks of interests. The City is currently in the process of developing a greenways master plan; however, this plan is in the initial phase of development.

The Town of Abingdon completed the 2002 *Pedestrian Safety and Movement Study* to improve pedestrian continuity, control vehicular patterns, and decrease conflicts between pedestrians and motorist in the downtown area. In addition, the Comprehensive Plan for Abingdon includes a recommended trails and greenway system that was identified in the *Abingdon Open Space, Parks, and Greenways Plan*.

The *Overmountain Victory National Historic Trail Plan* for Sullivan County proposes development of 22 miles of trail within the county as part of the National Trails system administered by the National Park Service. To be certified, the trail location must be within one-half mile of either side of the actual historic route of the Overmountain Victory Trail. A Master Plan for the OVT from Abingdon, Virginia to Sycamore Shoals (Elizabethton, Tennessee) is currently being considered by the Nation Park Service in partnership with local jurisdictions along the route.

The *Beaches to Bluegrass Trail Master Plan* was jointly developed by VDOT and the Virginia Department of Conservation and Recreation. The plan recommends a trail corridor from Virginia Beach to the Cumberland Gap and identifies existing trails, planned trails, and gap sections. As proposed the trail traverses the MPO's Metropolitan Planning Area.

Objectives of local MPO jurisdictions comprehensive plans should be followed as much as possible as many call for improved pedestrian facilities. Although local community plans address needs for bicycle and pedestrian facilities, currently no local subdivision regulations require the development of pedestrian facilities for new residential or commercial construction.

EXISTING CONDITIONS

Sidewalks. All of the incorporated cities/towns in the Bristol planning area (both Bristols and Abingdon) contain sidewalks in parts of the central cities, as well as in the unincorporated community of Blountville. For the most part, sidewalks are confined to the central business district, older residential districts, and near schools. Beyond these areas, sidewalks are sparse

and generally lack connectivity. Within Sullivan and Washington counties, sidewalks are limited to specific areas such as schools, courthouses, and public buildings.

Pedestrian Signals. Pedestrian signals are an important consideration in urban areas to provide guidance regarding the permitted signal interval to cross a street and to prohibit pedestrian crossings when conflicting traffic may impact pedestrian safety. Major trends that influence the use of pedestrian signals include the aging population, the desire to make communities more livable and walkable, and the number of pedestrian injuries or fatalities.

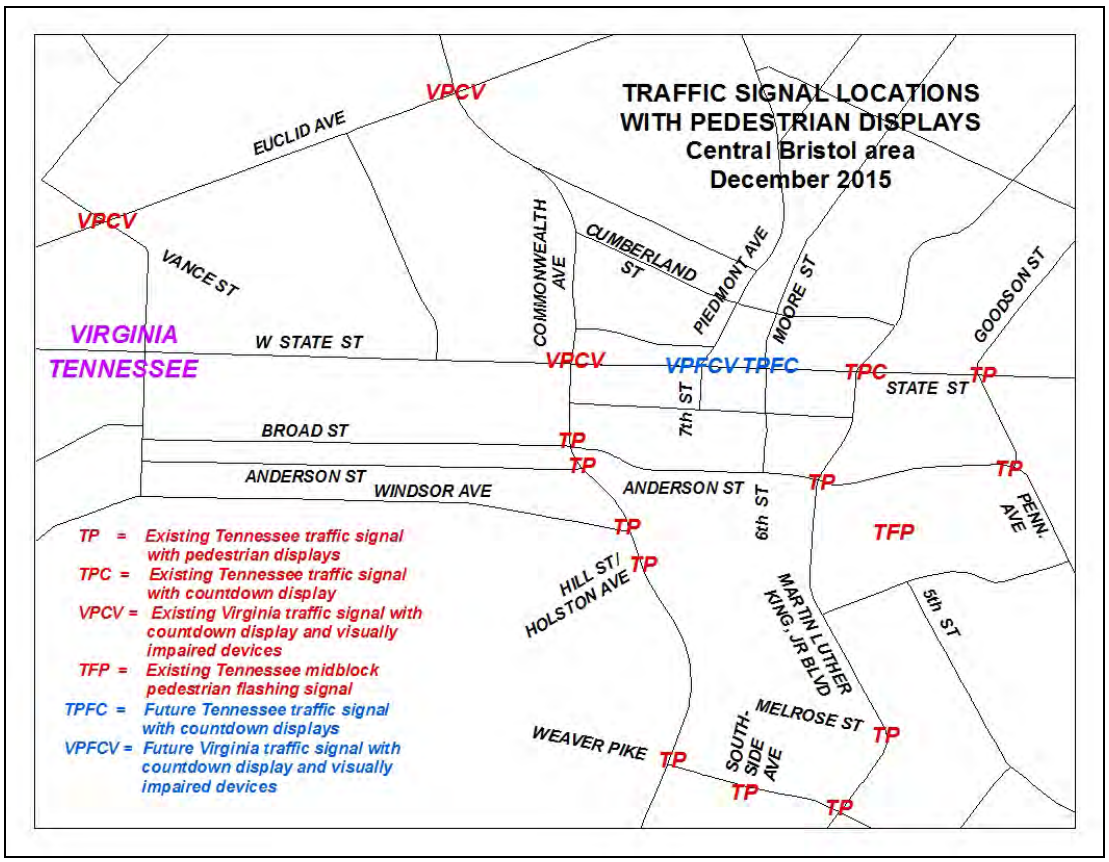
Twenty pedestrian signals are located within the Metropolitan Planning Area which are concentrated in the cities of Bristol Tennessee and Bristol, Virginia (Map 7-6) as well as the Town of Abingdon, Virginia (Map 7-7). Only two of these signals feature LEDs and countdown displays that meet the latest MUTCD standards; however, plans are on-going to upgrade other locations to meet the current MUTCD standard including two pedestrian signals which are in the design phase for Bristol, Virginia

Bicycle Routes and Greenways. There are several dedicated bicycle/walking trails in the Bristol Study Area. The first ones in place were within the Sugar Hollow and Steele Creek Parks in Virginia and Tennessee, respectively. The Virginia Creeper Trail was completed in 1984 and represents a premier 34 mile hiking and mountain biking trails beginning in Abingdon Virginia, and ultimately ending near the North Carolina State Line. The City of Bristol, Tennessee has installed the Wes Davis Greenway between Anderson Street and Melrose Street along the ex-Virginia and Southwestern Railway right-of-way, and the Mark Vance Memorial Greenway bicycle/walking trail connecting the Wes Davis Greenway and downtown area to Steele Creek Park in western Bristol. Bristol, Virginia has several blocks of an urban trail in downtown along Beaver Creek, which is the first phase of a citywide trail system designated in the City's comprehensive plan. In addition Abingdon, Virginia has two certified sections of the Overmountain Victory Trail consisting of 0.75 trail miles at the Historic Muster Grounds and the 1.0 mile Wolf Creek Trail.

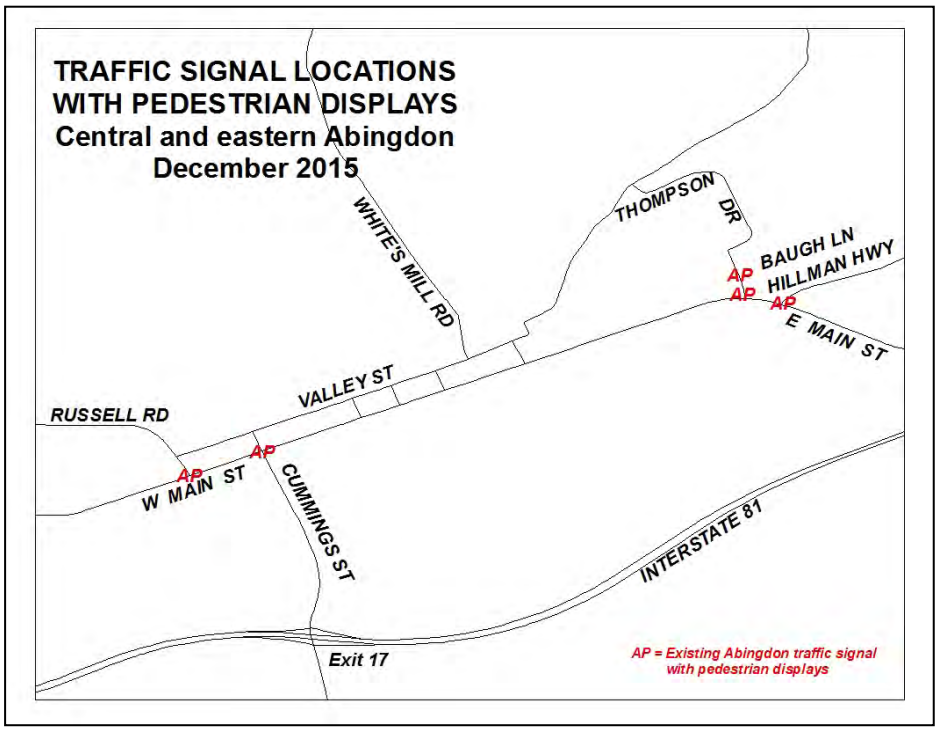
Bristol, Tennessee has bicycle route signage installed for those routes identified in the 2009 Bicycle and Pedestrian Plan for which no additional pavement construction was necessary. Likewise, Tennessee and Virginia both have State designated bicycle routes along major roadways, but these also take the form of signage and pavement markings along routes rather than separate facilities.

PROGRAMMED AND PLANNED PROJECTS

One of the goals of the MPO is promote livable communities to improve the quality of life in the Bristol metropolitan area by providing safe pedestrian and bicycling facilities as alternative forms of transportation. This will benefit our communities, commerce, tourism and the general public by promoting physical fitness and energy conservation. To assist in achieving this goal, the MPO encourages the incorporation of pedestrian and bicycle facilities and accommodations during reconstruction and/or new construction, based on current state policy.


TRAFFIC SIGNAL LOCATIONS
WITH PEDESTRIAN DISPLAYS
Central Bristol area
December 2015
EUCLID AVE
VPCV
VPCV
VANCE ST
VIRGINIA
TENNESSEE
W STATE ST
COMMONWEALTH AVE
CUMBERLAND ST
PIEDMONT AVE
MOORE ST
GOODSON ST
VPCV
VPFCV TPFC
TPC
TP
STATE ST
7th ST
BROAD ST
TP
TP
ANDERSON ST
WINDSOR AVE
ANDERSON ST
TP
TP
TP
6th ST
TFP
PENN. AVE
HILL ST/ HOLSTON AVE
TP
MARTIN LUTHER KING, JR BLVD
5th ST
MELROSE ST
TP
WEAVER PIKE
TP
SOUTH-SIDE AVE
TP
TP
TP = Existing Tennessee traffic signal with pedestrian displays
TPC = Existing Tennessee traffic signal with countdown display
VPCV = Existing Virginia traffic signal with countdown display and visually impaired devices
TFP = Existing Tennessee midblock pedestrian flashing signal
TPFC = Future Tennessee traffic signal with countdown displays
VPFCV = Future Virginia traffic signal with countdown display and visually impaired devices

Map 7-6


TRAFFIC SIGNAL LOCATIONS
WITH PEDESTRIAN DISPLAYS
Central and eastern Abingdon
December 2015
WHITE'S MILL RD
THOMPSON DR
AP
BAUGH LN
HILLMAN HWY
AP
AP
E MAIN ST
VALLEY ST
RUSSELL RD
AP
AP
W MAIN ST
CUMMINGS ST
INTERSTATE 81
Exit 17
AP = Existing Abingdon traffic signal with pedestrian displays

Map 7-7

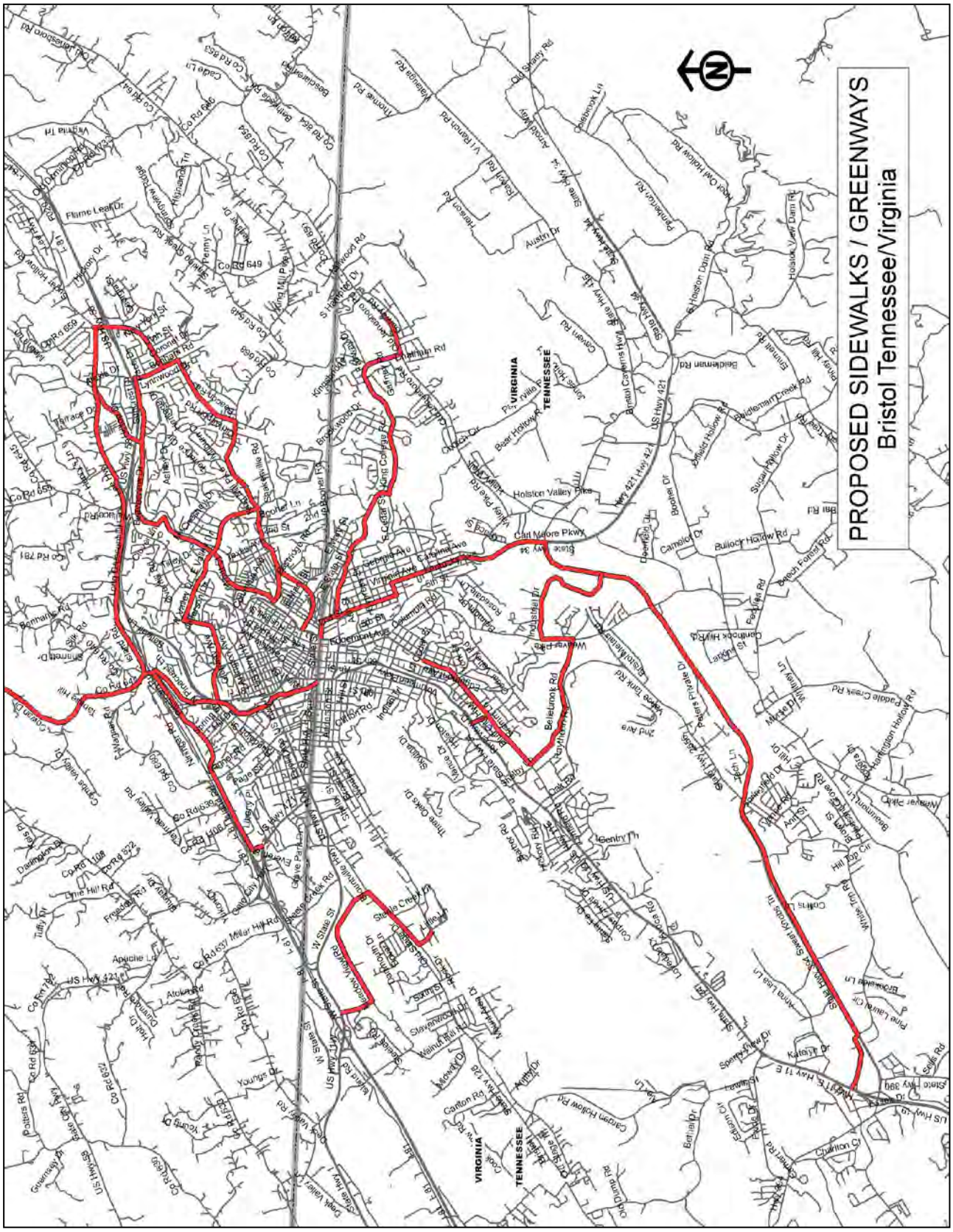
Both Bristol, Virginia, and Bristol, Tennessee, and the Town of Abingdon, Virginia plan to continue their current program of sidewalk repair, sidewalk reconstruction and expansion, and upgrades to pedestrian traffic signal displays. New roads should be constructed with adequate pedestrian facilities and proposed development plans should be reviewed to encourage sidewalks and pedestrian facilities. Landscaping standards should be consistent with local government policies and adequate sight distance should be maintained for pedestrian safety. All sidewalks must comply with federal, state and local laws concerning accessibility by persons with a disability. In addition to sidewalk maintenance, local community trails should receive routine maintenance to keep them clear and safe for pedestrian use.

As a follow-up to the last long-range transportation plan, several pedestrian projects have recently been completed. These include the pedestrian improvements along Highway 11E adjacent Bristol Motor Speedway; the Safe Routes to School sidewalk construction in the Bristol, Tennessee Fairmount neighborhood; the pedestrian safety improvement at the Barter Theatre in Abingdon, Virginia; the Solar Hill Historic District sidewalk reconstruction in Bristol, Virginia; and the recent pedestrian traffic signal pushbuttons and displays, and sidewalk construction at various locations within the City.

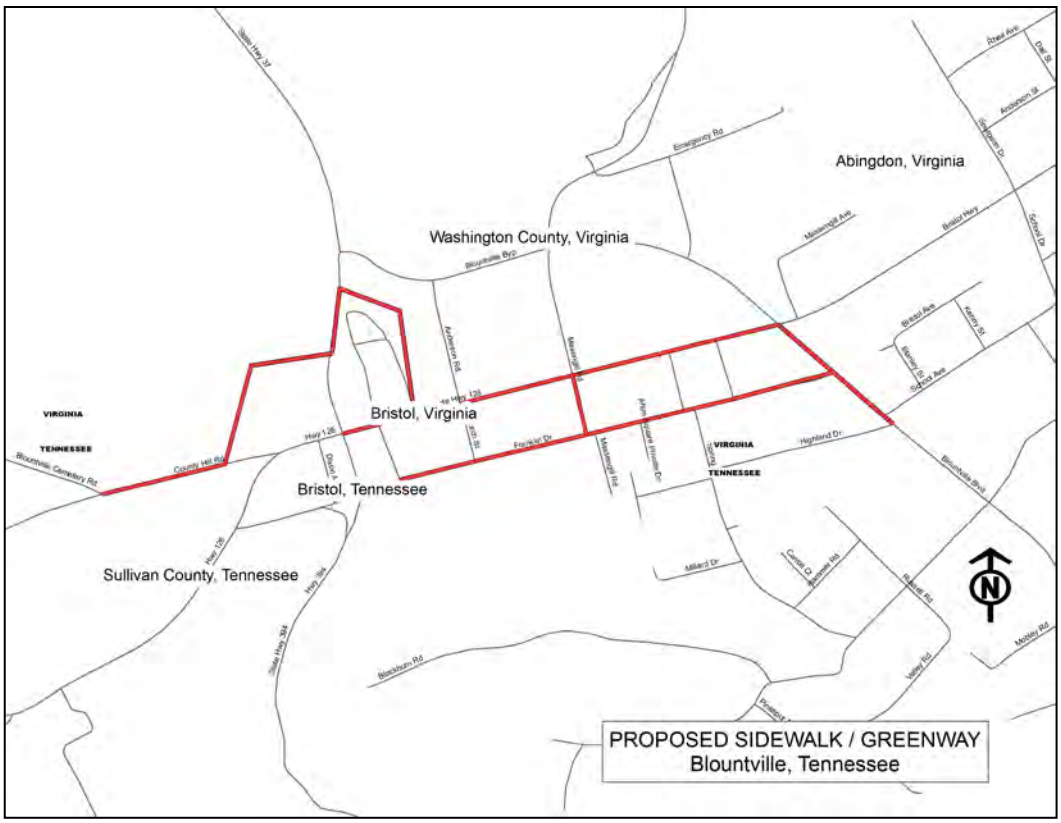
The following projects to improve bicycling and pedestrian conditions have been envisioned but are not yet funded.

- A proposed network of bicycle/pedestrian routes for the City of Bristol, Virginia. This would include sections along the railroad, connections to Sugar Hollow Park and the industrial areas in northeastern Bristol and the downtown area, and connections to the Bristol, Tennessee bicycle/pedestrian network (Map 7-8).
- Proposed additional bicycle/pedestrian routes to enhance the existing network of routes in Bristol, Tennessee. Such extensions of the system include routes eastward to connect to Holston View School and the Bristol Country Club, a route near the regional medical center at Exit 74, and sidewalks along Bluff City Highway and sections of Virginia Avenue. Several of these routes will not be constructed until shoulder widening takes place on several selected thoroughfares (Map 7-8).
- In Blountville, Tennessee, sidewalk construction and pedestrian enhancements are proposed along SR 126 (also known as The Great Stage Road) in the Blountville Historic District as well as Franklin Drive to connect residential areas to the schools (Map 7-9).
- In Abingdon, Virginia bike lanes and sidewalks are recommended connecting the Farmers Market to the Veterans Memorial Park, Depot Square to the William King Regional Arts Center, and Dubose-Foster Fields with Sinking Creek Cemetery, and designated connections to schools (Map 7-10).
- Part of the four-state Overmountain Victory National Historic Trail passes through eastern Sullivan County, Tennessee just east of the current Bristol corporate limits, and the Holston Valley area of Washington County, Virginia to its northern terminus in Abingdon. As designated by the National Park Service, one of the goals is to see the construction of the trail along its original historic path. In Sullivan County the Patriots Trail would be a branch of the Overmountain Victory Trail and is located between Bluff City and Sullivan East High School along Pleasant Grove Road (Map 7-11).

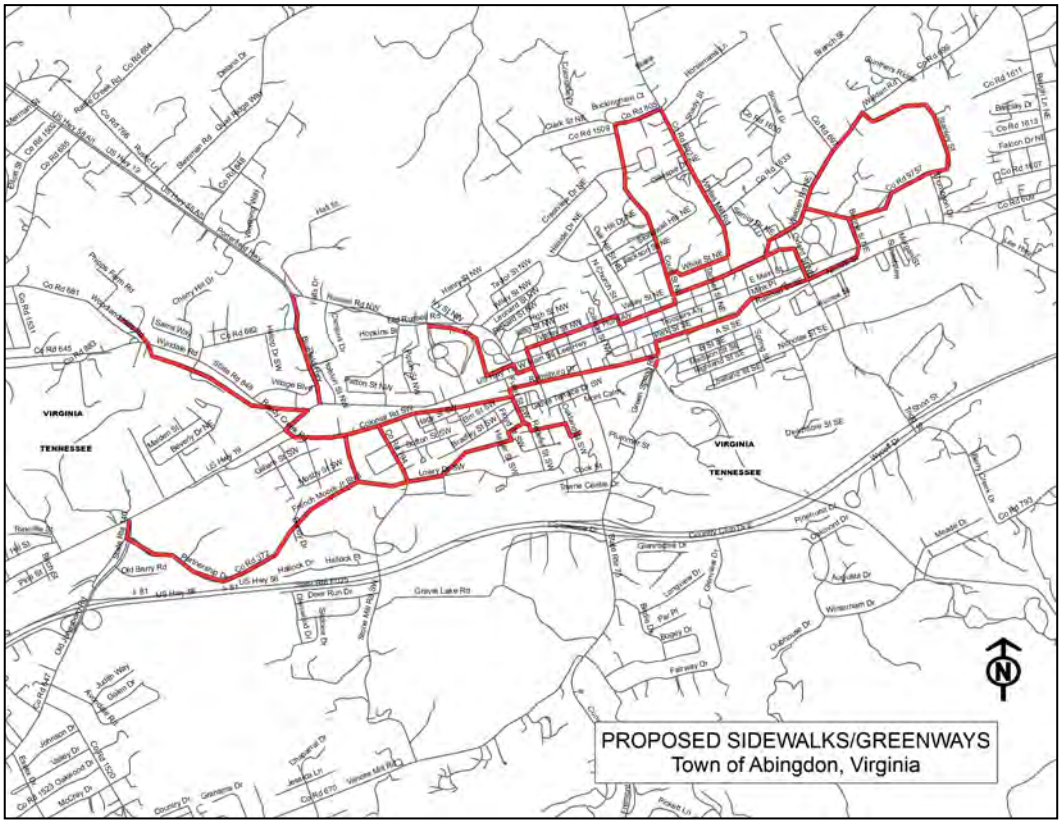
- In Sullivan County, Tennessee, a greenway is proposed along Reedy Creek from the existing Kingsport Greenbelt to the Exit 74 area of Bristol, Tennessee and ultimately to Steele Creek Park. This regional trail is currently conceptual in design and alignment (Map 7-11).
- The statewide Beaches to Bluegrass Trail in Virginia traverses the MPO's Metropolitan Planning Area. The Master Plan for the trail recommends an ideal off-road alignment as a long-term goal to develop multi-use trail along the entire corridor. The trail utilizes the existing Virginia Creeper Trail; however, from Abingdon to Bristol is an identified gap in the trail as well as the section from Bristol to Mendota. For the interim an on-road route has been recommended. Subsequent planning will address the gaps in the trail and potential trail extensions (Map 7-11).


PROPOSED SIDEWALKS / GREENWAYS
Bristol Tennessee/Virginia
VIRGINIA
TENNESSEE

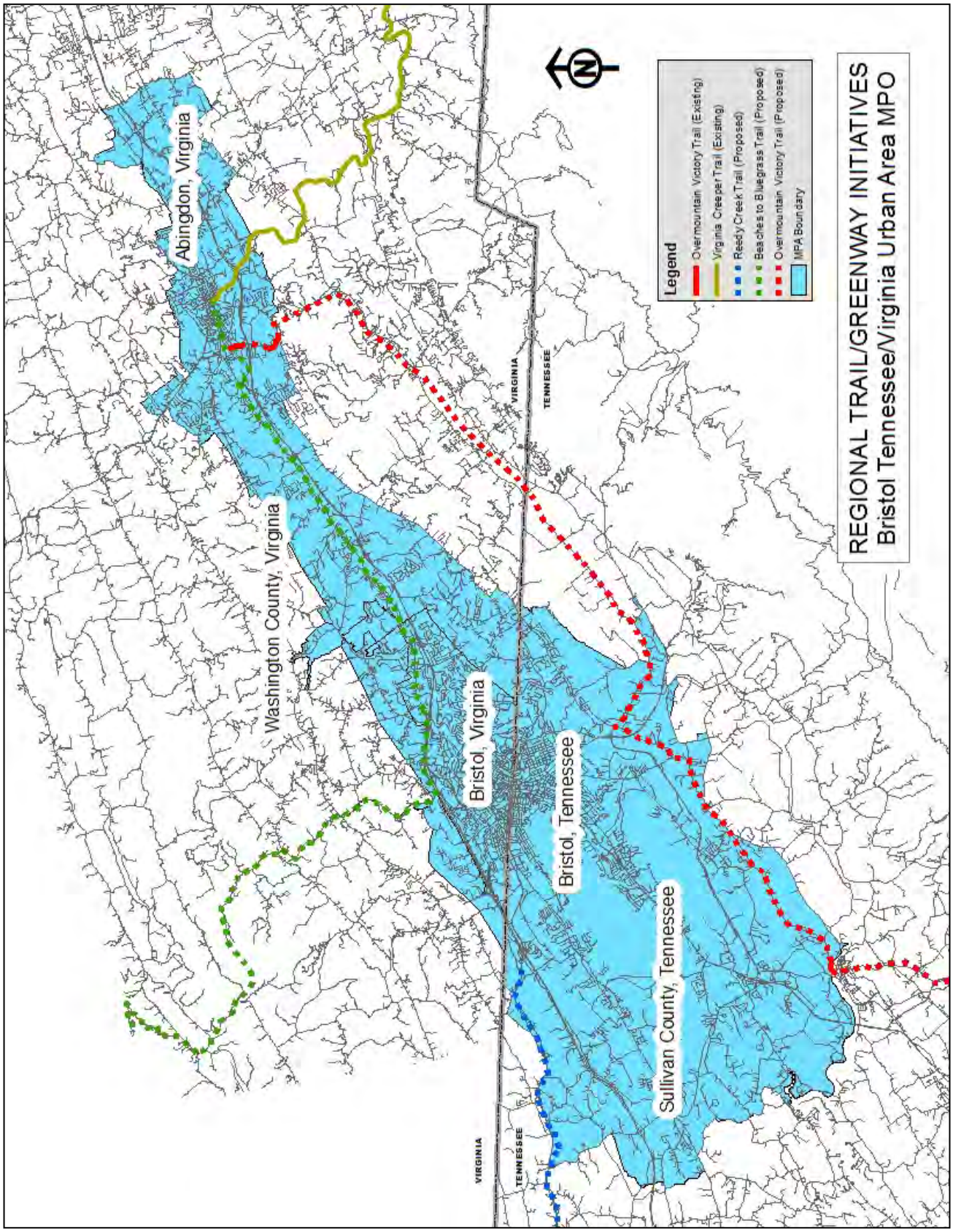
Map 7-8



Map 7-9



Map 7-10



Regional Trails
Map 7-11

PART D: GOODS MOVEMENT AND FREIGHT ELEMENT

The economy has always played a key role in determining the growth of the freight industry. As the demand for goods and services increases, the need for transporting these goods to customers increases. Today the continuing trend of companies minimizing inventories and providing just-in-time shipping has changed the dynamics of freight transportation. Freight can be moved from origin to destination by various modes; however, trucking has the greatest range of accessibility since they can operate on most roads (Table 7-5). Even when freight arrives by other modes, distribution to its final destination is usually by truck over the surface transportation system. Shipping freight by rail becomes feasible if there is a large quantity of the same commodity destined from a common location, the commodity is being shipped over a distance greater than 500 miles, or if the size or weight of the commodity exceeds the limitations of trucking. Shipping freight by air is expensive and is typically only done when the commodity has a high value or requires next-day delivery over a long distance.

The 2013 Freight Fact and Figures indicate the U.S. transportation system moved 53,846 thousand tons of freight each day in 2012. The Freight Analysis Framework estimates the tonnage will increase to 78,137 thousand tons per day by 2040.

Table 7-5
National Transportation System
Weight of Shipments by Transportation Mode
(Thousands of tons)

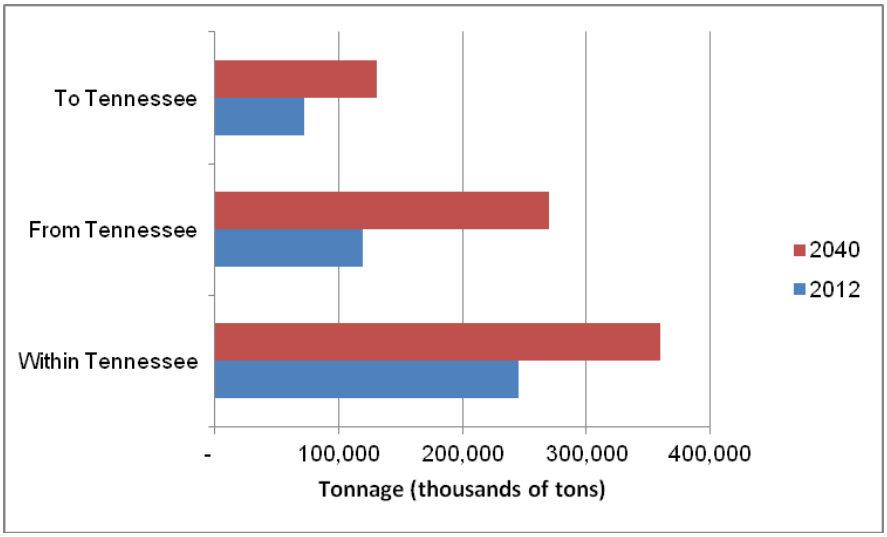
Transportation Mode	2012		2040	
	Tons	Percent	Tons	Percent
Truck	13,182,000	67.04%	18,786,000	65.87%
Rail	2,018,000	10.26%	2,770,000	9.71%
Water	975,000	4.96%	1,070,000	3.75%
Air (Air & Truck)	15,000	0.08%	53,000	0.19%
Multiple Modes & Mail	1,588,000	8.08%	3,575,000	12.54%
Pipeline	1,546,000	7.86%	1,740,000	6.10%
Other & Unknown	338,000	1.72%	526,000	1.84%
Total	19,662,000	100.00%	28,520,000	100.00%

Source: Freight Facts and Figures 2013, FHWA

EXISTING CONDITIONS

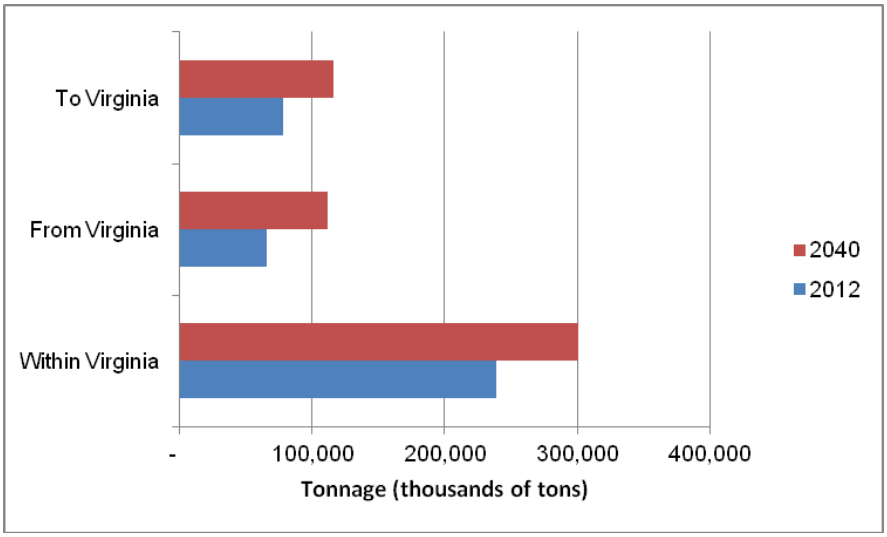
Trucking. On the National and State level, trucking represents the highest percentage of freight shipments by transportation mode. The Freight Analysis Framework (FAF) estimates that trucks carried about 79 percent of the total tonnage for commodity shipments into, out of, and thru Tennessee in 2012. In Virginia, trucking represented 70% of the total freight tonnage. The following graphics illustrate the 2012 and projected 2040 truck shipments to, from, and within Tennessee and Virginia.

Chart 7-2
2012-2040 Freight Shipments in Tennessee by Truck
(Thousands of tons)



Source: Freight Analysis Framework, Version 3.5 (2014)

Chart 7-3
2012-2040 Freight Shipments in Virginia by Truck
(Thousands of tons)

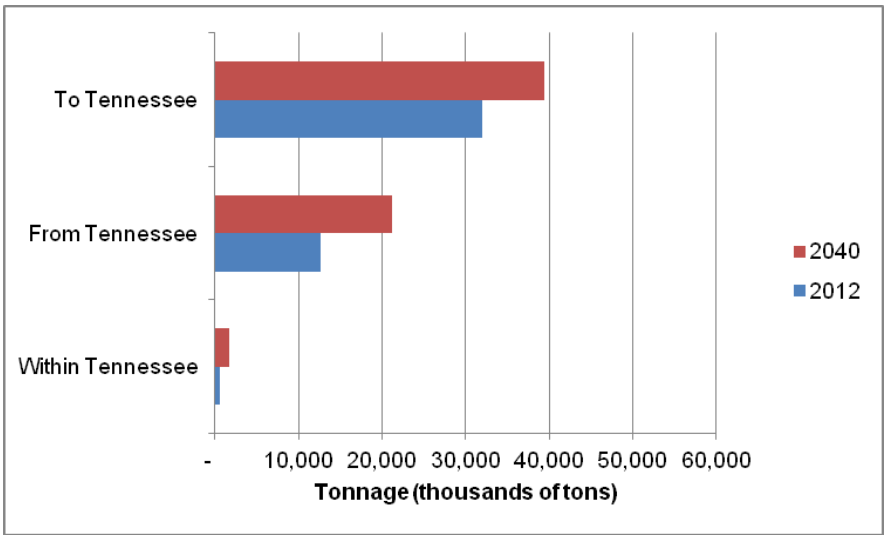


Source: Freight Analysis Framework, Version 3.5 (2014)

Much of the freight moving by truck uses the Interstate System. For the Bristol Study Area, Interstate 81 is a major corridor for the movement of goods within the region and passing through to other markets. The high degree of dependence on truck freight has given rise to several concerns, including road capacity, safety, accelerated damage to the highway infrastructure as well as air quality and noise.

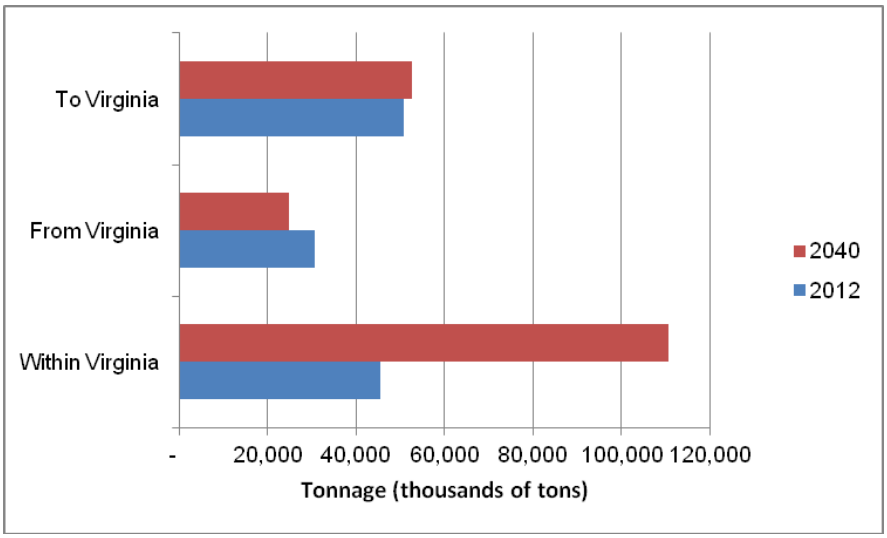
***Rail*.** In 2012, the FAF report estimated 45,287 thousand tons of freight was moved by rail in Tennessee, which represents 8% of the total freight tonnage. In Virginia, rail shipments represented 23% of the total freight tonnage at 126,785 thousand tons in 2012. A significant portion of the freight tonnage affecting the Virginia rail system is coal from the Appalachian Coalfields in Southwest Virginia to marine terminals at the Port of Virginia. The following graphics illustrate the 2012 and projected 2040 truck shipments to, from, and within Tennessee and Virginia.

Chart 7-4
2012-2040 Freight Shipments in Tennessee by Rail
(Thousands of tons)



Source: Freight Analysis Framework, Version 3.5 (2014)

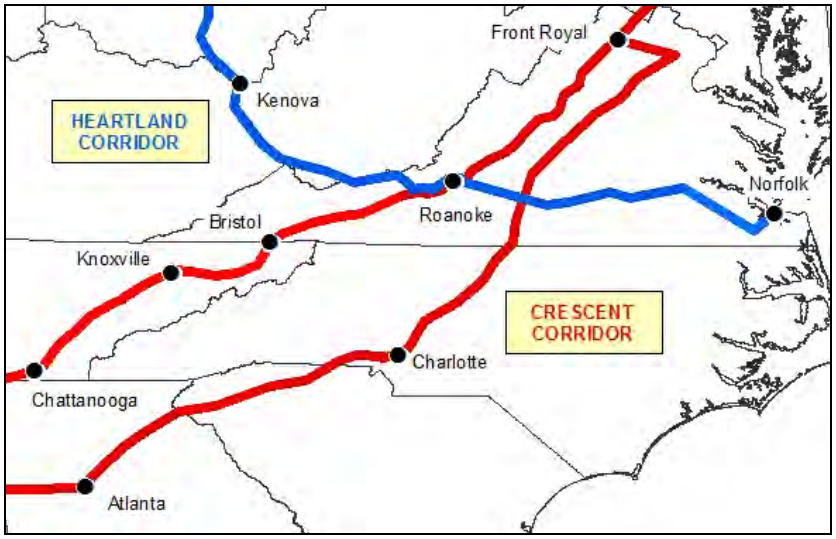
Chart 7-5
2012-2040 Freight Shipments in Virginia by Rail
(Thousands of tons)



Source: Freight Analysis Framework, Version 3.5 (2014)

The Bristol study area is crossed from southwest to northeast by one Class I railroad, the Norfolk Southern Railway (Map 7-12). Historically, the predecessor railroads of Norfolk Southern Railway served to help spur development in the area; the railroad first reached Bristol in 1856. The mainline of the railroad was in place before the Civil War, serving as part of the few east/west railroad links of the Confederacy, and was in and of itself a wartime target for military raids. In more recent history, this mainline served as one of the few railroads running inland from the Port of Norfolk with sufficient clearance height to allow for double-stack container trains; such trains ran from Norfolk to Knoxville, where they split into Atlanta-bound and Chicago-bound trains and vice versa. 2010 saw the completion of the Heartland Corridor by Norfolk Southern, which included modifications to bridges, tunnels, and structures to allow double-stack and oversize railroad rolling stock to pass between Norfolk and the Ohio-Chicago areas without passing through Knoxville. The completion of this corridor, as well as the Crescent Corridor improvements from New Orleans to New Jersey through Charlotte, North Carolina, has significantly reduced the amount of rail traffic through the Bristol Study Area.

Map 7-12
Norfolk Southern Railway Corridors



As for railroad industrial spurs, there are several located in the Bristol Study Area, some of which cross roadways on surface crossings (Industrial Park Road, Moore Street, Martin Luther King Jr. Boulevard, Commonwealth Avenue, Spurgeon Lane, Euclid Avenue, Keys Street) and on a bridge (Piedmont Avenue). Railroad spur train traffic is infrequent enough that capacity on the modeled roadways in the network is not an issue. Industries served by railroad spur service include a snack foods plant, an asphalt plant, and an agricultural products outlet in Bristol, Virginia; a natural gas tank farm and several plastics facilities in Bristol, Tennessee; and several industries in the Washington County Industrial Park in Virginia (Map 7-13).

Mainline railroad operations have a considerable impact on road travel in the Bristol Study Area. In both Virginia and Tennessee, the main line crosses roadways on surface crossings and on or under bridges, as listed below and shown on Map 7-10. Those bridge locations marked with an asterisk (*) represent modeled locations in which the roadway bridge over the railroad inhibits the flow of freight for various impediments including the bridge is weight-posted (West Mary Street); the passage underneath the railroad is either too narrow (Providence Road, Old Abingdon Highway) or too low (East Valley Drive, Columbia Avenue, Piedmont Avenue) to allow for the passage of trucks; or are too narrow to accommodate turn lanes at immediately adjacent intersections (Weaver Pike). Several of the projects proposed in this document address these bridge issues.

Virginia Bridged Crossings, Mainline (listed north to south):

- East Main Street, Abingdon
- Cummings Street, Abingdon
- West Main Street, Abingdon
- Providence Road, Washington County *
- Lee Highway, Bristol
- Interstate 81, Bristol
- Old Abingdon Highway, Bristol *
- East Valley Drive, Bristol *
- Columbia Avenue, Bristol *
- West Mary Street, Bristol *

Virginia Bridged Crossings, Spur (listed west to east):

- Piedmont Avenue, Bristol *

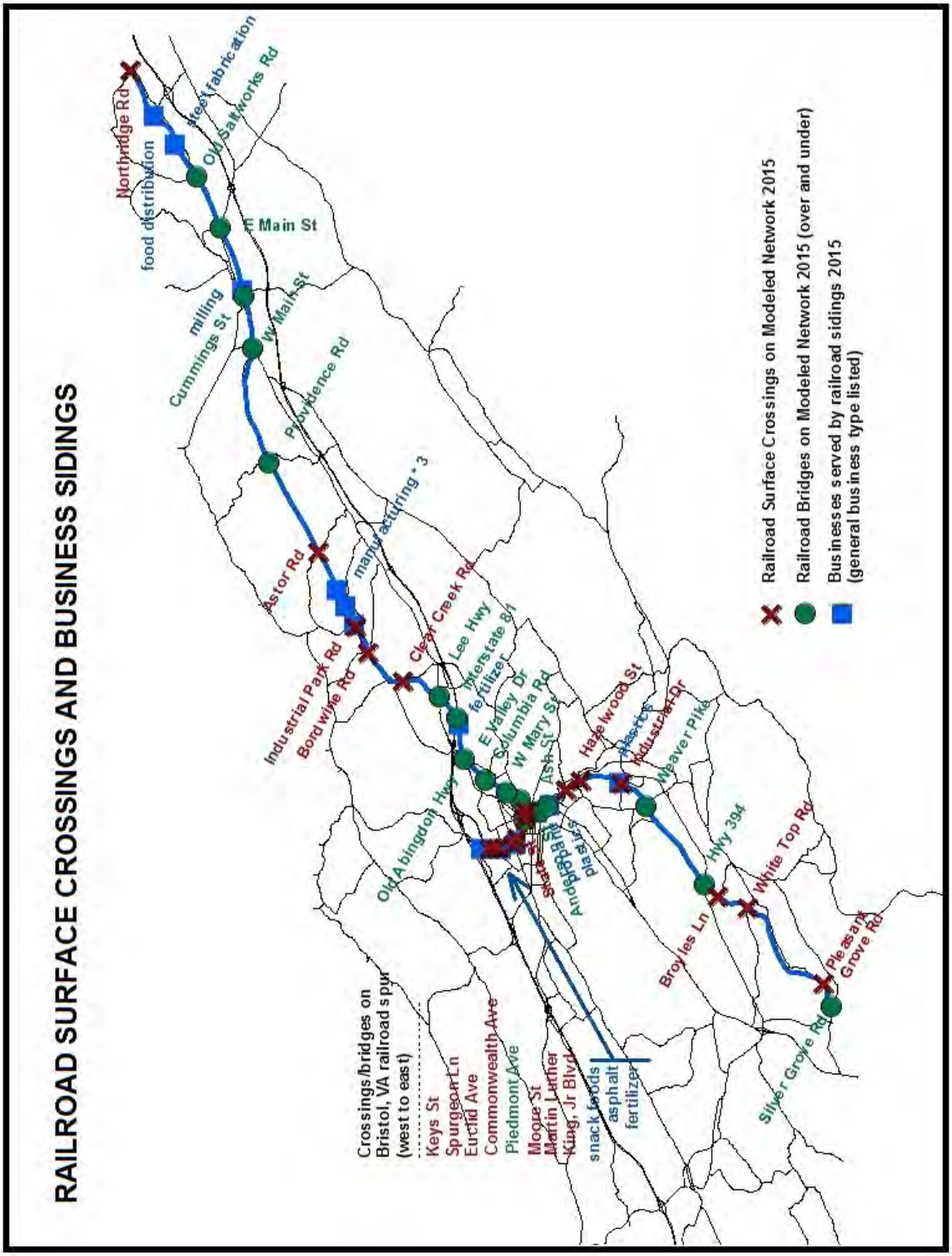
Tennessee Bridged Crossings, Mainline (listed north to south):

- Ash Street, Bristol
- Anderson Street, Bristol
- Weaver Pike, Bristol *
- Highway 394, Bristol
- Silver Grove Road, Sullivan County

Air. Tri-Cities Regional Airport is located just outside the Bristol study area and provides commercial passenger services as well as administration of the Tri-Cities Air Cargo Center and Foreign Trade Zone. Freight facilities at Tri-Cities Regional Airport include a 13,000 square foot air cargo center with an dedicated taxiway system and cargo ramp.

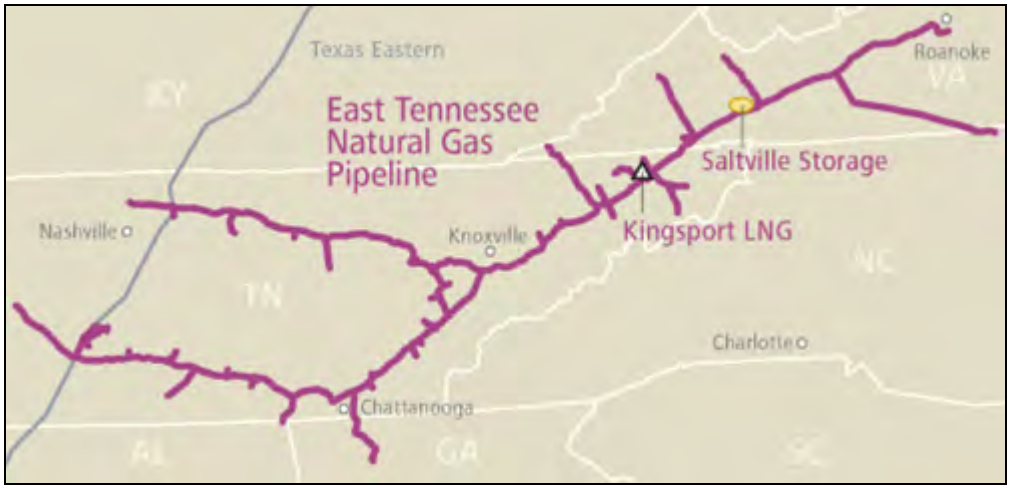
The Virginia Highlands Airport is a general aviation airport located west of Abingdon on U.S. Route 11. The airport is operated by an airport authority consisting of appointed members representing each election district in Washington County. In addition to private and corporate aviation facilities, the airport provides facilities for the U.S. Forest Service and the Virginia State Police. Although the airport provides aviation services for a substantial amount of business aircraft, Virginia Highlands Airport does not provide cargo services as a function of the airport's general aviation operations. A 2004 Air Freight Feasibility Study indicated Virginia Highlands Airport could potentially support an air freight center; however, the availability of competing services at Tri-Cities Regional Airport limits the practicability of such.

Map 7-13
Railroad Surface Crossings and Business Sidings



Waterways. The Bristol study area lies above the head of navigation of the Holston River system, which is a tributary of the Tennessee River. Prior to the conversion of the Holston River system to a series of reservoirs by the Tennessee Valley Authority, the head of navigation on the South Holston River was at Kingsport; commercial navigation above that point was not possible because of rapids in the river.

Pipeline. Outside of short industrial on-site usage, the only major pipeline in the Bristol Study Area is a natural gas pipeline running approximately parallel to Interstate 81. Pipelines in the region are operated by East Tennessee Natural Gas, a division of Spectra Energy (Map 7-14). East Tennessee Natural Gas has a capacity of 1.86 billion cubic feet per day and has interconnections with several major interstate pipelines, including the Texas Eastern Transmission.



Map 7-14
Natural Gas Pipelines in the MPO Region

PROGRAMMED AND PLANNED PROJECTS

Goods movement is recognized as a critical element in the transportation planning process, yet few localities have attempted to associate goods movement with economic development. Most improvements to correct existing network deficiencies are related to a desire to reduce impediments to passenger travel and any reciprocal benefits to local industries was secondary. Recently, governments are realizing that location decisions are increasingly based on the availability of an efficient and dependable transportation network.

Operational improvement projects as well as new construction projects are identified in the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan Year 2040* that will address freight movements primarily by improving turning movements and access improvements for trucking, but also the problems associated with several capacity issues on local roadways. With only a few exceptions on roadways with no-truck routes, freight movements will benefit from most projects proposed in this document.

I-81 Corridor Studies. Motivated by rising projections of highway congestion and truck traffic exceeding what the highways were designed to handle, both Tennessee and Virginia have developed freight diversion studies to evaluate strategies that could be used to assess the potential for diversion of truck trips to rail along the Interstate 81 corridor. The premise underscoring rail system improvements was that they would lead to cargo movement diversions from truck to rail and consequently reduce congestion on the interstate system. The overall conclusion of both studies was that because most freight currently shipped by truck either begins or has a destination outside the state, the potential to diverting goods from truck to rail is limited unless corridor-wide multi-state coalitions are developed to partnership with the railroads, which produces a higher volume of traffic diversions.

National Highway Freight Network. The Fixing America's Surface Transportation Act (FAST Act) directed the Federal Highway Administration to establish the National Highway Freight Network (NHFN) to strategically direct federal resources and policies toward improved performance of the U.S. highway system for freight transportation. In addition, the FAST Act included the following subsystems to the National Highway Freight Network.

- Primary Highway Freight System (PHFS): This is a network of highway identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data.
- Other Interstate portions not on the PHFS: These highways consist of the remaining portions not included on the Primary Highway Freight System. These routes provide continuity and access to freight transportation facilities.
- Critical Rural Freight Corridors (CRFCs): These are public roads not in an urbanized area which provide access and connection to the Primary Highway Freight System and to important ports, public transportation facilities, or other intermodal freight facilities.
- Critical Urban Freight Corridors (CUFCs): These are public roads in urbanized areas which provide access and connection to the Primary Highway Freight System and to important ports, public transportation facilities, or other intermodal freight facilities

Within the Bristol Metropolitan Planning Area, the NHFN includes Interstate 81.

CHAPTER 8: SAFETY AND SECURITY PLANNING

Safety must be considered as a key goal in the development of metropolitan and statewide transportation plans and is explicitly included as a transportation planning factor. In addition, security of the transportation system is also an important goal which must be addressed. Although the MPO is not directly involved in security or emergency planning, communication has been established with emergency management agencies, local law enforcement agencies, engineering officials, and emergency personnel on major transportation plans and projects with the intent of developing a transportation system that is safe and secure as possible.

PART A: SAFETY PLANNING

Both Tennessee and Virginia have undertaken efforts to increase statewide safety. Behavioral strategies such as seat belt laws, child restraint laws, laws governing the use of electronic devices by drivers, and DUI laws have been strengthened to improve safety on roadways. Safety planning, cooperation, education, and research are essential on the federal, state, and local level to meet the ultimate objective of reducing fatalities, injuries, and property damage.

Strategic Highway Safety Plan. Providing the most efficient and safest transportation facilities is of critical importance. The primary performance measures for transportation safety are reductions in the number of crashes that result in fatalities, injuries, property damage, and related economic losses. The State of Tennessee and Commonwealth of Virginia have both developed a statewide Strategic Highway Safety Plan (SHSP) to define a system, organization, and process for achieving the highest level of highway safety. Although the emphasis areas of each state's SHSP varies, both integrate the four-E approach of transportation safety; ***E***ngineering, ***E***ducation, ***E***nforcement, and ***E***mergency response services.

Tennessee's SHSP addresses the following safety emphasis areas to achieve the goal of reducing fatality rates statewide in reference to Tennessee's "Driving Down Fatalities" initiative.

- Data Collection and Analysis;
- Driver Behavior;
- Infrastructure Improvement;
- Vulnerable Road Users;
- Operational Improvement;
- Motor Carrier Safety.

Similar in scope, "Arrive Alive Virginia", Virginia's SHSP includes the following emphasis areas to reduce the annual number of injuries and deaths due to motor vehicle crashes:

- Speeding;
- Young Drivers;
- Occupant Protection;
- Impaired Driving;
- Roadway Departures;
- Intersections;
- Data Collection, Management, and Analysis.

Implementation of these strategies for Tennessee and Virginia are under the auspices of each state's Transportation Safety Committee and comprised of representatives from multiple disciplines, agencies, and organizations involved in highway safety.

Highway Safety Improvement Program. In March 2016, the Federal Highway Administration issued new guidance on the Highway Safety Improvement Program (HSIP) which is based on a performance-based planning process that was initiated in the Moving Ahead for Progress in the 21st Century (MAP-21) and continued under the Fixing America's Surface Transportation Act (FAST-Act). In order to obligate HSIP funds, each State must in effect a Highway System Improvement Program in which the State:

- Develops, implements and updates a {trategic Highway {afety Plan (SHSP) that identifies and analyzes highway safety problems and opportunities;
- Produces a program of projects or strategies to reduce identified safety problems; and
- Evaluates the SHSP on a regularly recurring basis to ensure the accuracy of data and priority of proposed strategies.

Specifically, the guidance addresses the SHSP in reference to; 1) features (including adoption of performance-based goals); 2) SHSP update cycle; 3) approval of the update process; and 4) penalty for failure to have an updated, approved plan. Tennessee and Virginia must have an updated SHSP by August 1, 2017, approved by FHWA, or they will not be eligible to receive the annual redistribution of certain Federal-Aid Highway Program funds.

Roadway Intersections. As with all transportation plans and operations, safety is a key component. However, oftentimes, it is found that modifications to traffic control devices or roadway operations end up being a dilemma of safety *vs*. efficiency. For instance, one potential solution for a traffic signal with significant left-turn collisions is to install a restrictive left-turn (left-turn-on-green-arrow-only) phase. While this may help alleviate left-turn collisions, the increase in cycle time and delay imposed by such an addition may be enough to drop the level of service for the intersection to an unacceptable level, which in turn would require additional remediation.

Historically, there have typically been five or less fatal collisions in the Bristol Study Area per year. Some of these fatal incidents have also involved pedestrians and bicyclists struck by vehicles. The role of the MPO in safety planning lies primarily with data collection and statistical analysis. Such data and analysis is made available to the various jurisdictions, which can themselves develop the appropriate countermeasures. In some instances, the desire to implement various countermeasures by the jurisdictions results in those jurisdictions working through the MPO process to program funding for safety improvements.

Currently, the Bristol MPO compiles crash statistics for a total of 644 intersections within the Bristol Study Area, broken down as follows:

- City of Bristol Virginia: 146 intersections
- City of Bristol Tennessee: 326 intersections
- Shared by both Bristols on the State Line: 27 intersections
- Unincorporated eastern Sullivan County: 105 intersections
- Unincorporated western Washington County[1]: 60 intersections

This compilation effort includes an annual review of crash reports, development of collision diagrams of each location, updates of traffic volume data, and an analysis of rates and trends, as well as before-and-after statistical comparisons for changed conditions. Analysis of crashes goes back a maximum of ten years' worth of data (or less if it is a newly added intersection or one in which the conditions have changed in that time period); however, in many locations, crash data has been compiled back to 1982 (in Tennessee) and 1988 (in Virginia). To qualify for MPO crash monitoring, an intersection has to meet one or more of the following criteria:

- Equipped with traffic signals;
- Equipped with flashing beacons;
- Equipped with multi-way STOP control;
- Intersection of modeled roadways in the travel demand model network;
- Locations of intersection modifications;
- Locations impacted by major land use changes (i.e., opening or closing of nearby shopping centers or manufacturing facilities);
- Intersections that are the subject of study by the local jurisdiction.

While knowing the total number of crashes at any given location is a useful tool for safety planning, it does not provide the entire story. Three crashes per year at the intersection of two 20,000 vehicles-per-day arterials does not represent the same safety impacts as three crashes per year at the intersection of two 300 vehicles-per-day residential subdivision streets. To account for different types of roads and different traffic volumes, *C*ritical *R*ate *F*actors (CRFs) are used. The CRF is a statistical measure of how many crashes are occurring at a given location at a given volume of traffic, compared to similar intersections across the State of Tennessee. For a given confidence level (the Bristol MPO uses a 95 percent confidence level), a CRF is calculated. Should the CRF value be less than one, it indicates that the number of crashes (but not necessarily the types of crashes) can be attributed to random chance at that confidence level. If the CRF is greater than one, it indicates that there is some factor, correctable or not, that is influencing the number of crashes at this location.

[1] The Town of Abingdon formally became a Bristol MPO member jurisdiction in September 2015 as this document was being developed. A protocol for crash monitoring in Abingdon, and for the MPO Study Area of Washington County east of Exit 13, has yet to be established.

The Commonwealth of Virginia does not compile the appropriate statewide statistics to develop CRFs. Some crash data is available for the Bristol District (twelve counties of southwestern Virginia), but it was felt that this was not a suitable control population of data, given that Bristol and Abingdon are among the largest cities in the largely rural Bristol District. For the Virginia jurisdictions, the crash rates are compiled as crashes per million entering vehicles. This gives an indication of high-crash locations when comparing one intersection against another, but does not indicate which of those locations are, by the number of crashes and traffic volumes present, being influenced by factors other than random chance.

The individual jurisdictions can then use this data to determine for themselves what resources, whether through state, federal, or local funding, require remedial action and in what priority. It also provides data for project development that can be used in the preliminary engineering and design phase.

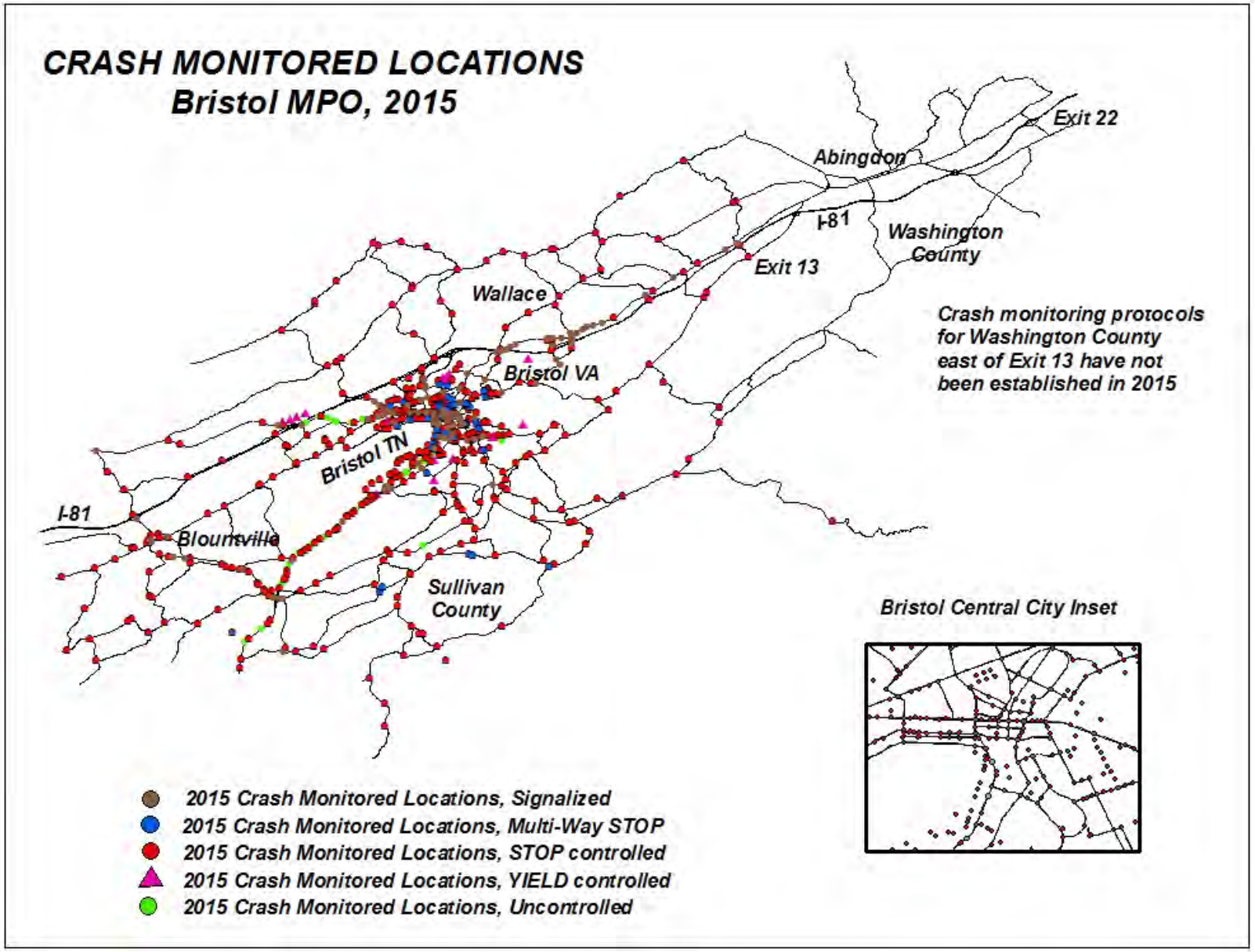
Map 8-1 illustrates those locations for which crash data was collected for the calendar year 2015.

Roadway and Lane Departure Crashes. Both TDOT and VDOT have identified roadway and lane departure crashes as a major concern in the Strategic Highway Safety Plan. This is due to the severity of this type of crash and the high rate of fatalities and injuries when vehicles leave the appropriate travel lanes or the roadway. The MPO will continue to coordinate with TDOT and VDOT, as well as local jurisdictions, to monitor locations with significant crash histories or potential roadway departures and identify effective strategies to reduce roadway and lane departure crashes through safety audits and roadway assessments.

Starting in 2008, the MPO has collected statistics on roadway and lane departure crashes as part of its annual data collection and analysis efforts. These include head-on collisions, sideswipes [both same-direction and opposite-direction], run-off-the-road incidents, and hitting parked vehicles. While they may not technically involve a lane departure maneuver, crashes in which a motorcyclist has “laid a motorcycle down” in the event of a crash or swerving to miss an obstruction are also included with the lane departure crashes in this analysis.

Public Transportation. Local transit agencies have always placed an emphasis in providing a safe, secure, and reliable service for its passengers and employees. These continuing efforts are an integral part of providing public transit services.

With the on-going prevalence of terrorist activity in the United States, the Federal Transit Administration has placed greater emphasis on safety and security for public transportation providers. As a department of local government, both Bristol Tennessee Transit and Bristol Virginia Transit are integrated into each city’s Disaster Preparedness Plan and Hazard Mitigation Plan. District Three Cooperative and Abingdon Transit has a Cooperative Continuation of Operations Plan in place that provides procedures should a disruptive event occur. While transit must be concerned about safety and security as it relates to the provision of providing service, transit also functions locally as a valuable resource to the community in providing rescue or evacuation services.


CRASH MONITORED LOCATIONS
Bristol MPO, 2015
Exit 22
Abingdon
I-81
Washington County
Exit 13
Wallace
Bristol VA
Bristol TN
I-81
Bloumville
Sullivan County
Crash monitoring protocols for Washington County east of Exit 13 have not been established in 2015
Bristol Central City Inset
2015 Crash Monitored Locations, Signalized
2015 Crash Monitored Locations, Multi-Way STOP
2015 Crash Monitored Locations, STOP controlled
2015 Crash Monitored Locations, YIELD controlled
2015 Crash Monitored Locations, Uncontrolled

Map 8-1

At the basic level, local transit agencies train drivers and supervisors on safety and security issues, conduct background checks for new employees, update security features on new vehicle procurements, screen employees for alcohol and drug use, and coordinate with local emergency management services. Public transit is responsible for being able to respond rapidly and effectively to natural and human-caused threats and disasters and to support the needs of emergency and public safety agencies.

Railroad Grade Crossings. One of the critical safety issues associated with rail service are at-grade crossings. At-grade crossings are a source of concern for both railroad companies and local jurisdictions in that safety and maintenance issues continually need addressing. Maintaining adequate sight distance and safety devices such as signs, pavement markings, gates, bells, and warning lights at existing at-grade crossings are very important and costly. Grade separation is one potential solution for safety issues involving automobiles at rail crossings; however, it is often unclear as to whose responsibility it is (railroad or local jurisdiction) to finance such capital-intensive improvements.

In both Virginia and Tennessee, the following modeled roadway locations in the MPO Study Area have at-grade crossings.

Table 8-1
At-Grade Rail Crossings

Virginia Railroad At-Grade Crossings, Mainline (listed north to south)

ROADWAY	JURISDICTION	ACTIVE SAFETY DEVICES
Northridge Road (Rte 694)	Washington County	Flashing Lights, Bells, Crossing Gates
Astor Road (Rte 869)	Washington County	Flashing Lights, Bells, Crossing Gates
Industrial Park Road (Rte 1717)	Washington County	Flashing Lights, Bells, Crossing Gates
Bordwine Road (Rte 625)	Washington County	Flashing Lights, Bells, Crossing Gates
Clear Creek Road (Rte 659)	Washington County	Flashing Lights, Bells, Crossing Gates
State Street[2]	Bristol	Flashing Lights, Bells, Crossing Gates

Virginia Railroad At-Grade Crossings, Spur (listed north to south)

ROADWAY	*JURISDICTION*	*CROSSING TYPE*
Industrial Park Road	Washington County	Passive (pavement markings/signage)
Keys Street	Bristol	Passive (pavement markings/signage)
Spurgeon Lane	Bristol	Passive (pavement markings/signage)
Euclid Avenue (US 11W/421) [3]	Bristol	Flashing Lights, Bells, Crossing Gates
Commonwealth Avenue (US 11E/19/421) [3]	Bristol	Flashing Lights, Bells
Moore Street	Bristol	Passive (pavement markings/signage)
Martin Luther King, Jr. Boulevard (Truck US 11/19)	Bristol	Passive (pavement markings/signage)

[2] There are multiple rail lines at this crossing that function as part of the Bristol railroad yard.
[3] This railroad spur is a two-track crossing.

Tennessee Railroad At-Grade Crossings, Mainline (listed north to south)

ROADWAY	JURISDICTION	CROSSING TYPE
State Street [1]	Bristol	Flashing Lights, Bells, Crossing Gates
East Cedar Street	Bristol	Flashing Lights, Bells, Crossing Gates
Hazelwood Street	Bristol	Flashing Lights, Bells
Industrial Drive	Bristol	Flashing Lights, Bells, Crossing Gates
Broyles Lane	Sullivan County	Flashing Lights
White Top Road	Sullivan County	Flashing Lights, Bells
Pleasant Grove Road	Sullivan County	Passive (pavement markings/signage)

There are no modeled roadways in Tennessee that cross a spur line without the mainline being adjacent to it.

The MPO provides administrative assistance to the local jurisdictions for the funding of railroad surface crossing projects. This includes "spot safety" projects for installation of flashing lights, gates, and bells for at-grade crossings, as well as major infrastructure projects such as construction of the Anderson Street bridge to remove US 421 from the State Street surface crossing.

***Pedestrian/Bicycle Projects*.** The automobile dominates transportation in the Bristol Region, as in most American communities. Often, the accommodation of cars in public spaces creates obstacles to safe, efficient, and pleasurable walking and biking. Safety is often a primary purpose for the development of bicycle and pedestrian enhancement projects.

Locally, pedestrian enhancement projects have included installation of pedestrian displays (including devices for visually impaired pedestrians) and handicapped ramps equipped with detectable surfaces for visually impaired pedestrians. There are very limited dedicated bike lanes in the MPO and many roads have narrow lanes and shoulders, with narrow bridges, which create barriers for safe bicycling. However, both TDOT and VDOT have adopted policies for integrating bicycle and pedestrian accommodations with construction and maintenance projects.

Greater awareness of the pedestrian and bicycle facilities has been incorporated into local jurisdictions planning processes and comprehensive plans. For pedestrian/bicycle routes recently developed, design has included traffic calming techniques, especially at street intersections for motor vehicle awareness and ADA (Americans with Disabilities Act) facilities.

The City of Bristol, Tennessee, has adopted a bicycle route network and plan for the development of a citywide system connecting points of interest and connecting to TDOT's statewide bicycle network. This has included completion of the Wes Davis and Mark Vance Greenways as well as several phases of sidewalk improvements or extensions near Fairmount Elementary School as part of Tennessee's Safe Routes to School program. The Town of Abingdon, Virginia has developed a pedestrian safety and movement study to improve pedestrian continuity, control vehicle patterns, and decrease conflicts between pedestrians and motorist. This has resulted in pedestrian improvements in the vicinity of the Barter Theatre, and continued maintenance and proposed improvements for the Virginia Creeper Trail in Abingdon and Washington County, Virginia.

In addition to pedestrian and bicycle infrastructure improvements, local jurisdictions promote educational activities for teaching pedestrians, bicyclists, and motorists to practice safe behavior while on the local streets, sidewalks and paths. For example, educating pedestrians to stop, and look before crossing the street or teaching bicyclists the proper hand signals when making maneuvers on the road may help increase and improve communication with motorists and reduce the chance of crashes.

LED Use in Traffic Signals. Several jurisdictions in the Bristol study area, including TDOT; Bristol, Tennessee; Bristol, Virginia; VDOT; Abingdon; and Sullivan County are in various stages in the process of converting incandescent traffic signals to LED displays. In all of these jurisdictions, new traffic signals are being installed with LED fixtures as well as efforts to upgrade older pedestrian signal displays to LEDs, including the installation of countdown displays. LED fixtures can provide greater visibility of displays than incandescent fixtures, in addition to a reduction in energy consumption and costs. The MPO has been tracking the LED conversion of traffic signals to determine before-and-after impacts on the crash history of these locations.

OBJECTIVES AND PROPOSED ACTIONS

To reduce transportation related crashes, injuries, and fatalities across all modes and to promote safety in the design and construction of transportation facilities, user safety is one of the primary goals of the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040.* Based on importance and public concern for a safe transportation system, safety has long been an evaluation criterion for the long range transportation plan and project selection process.

Since the MPO is involved in a regional planning analysis, it is not practical to address all local safety issues; however, one of the most appropriate safety activities of the MPO is to advocate safety conscious design principles into roadway improvements. As such, one of the single most important elements that can be addressed is access control. Access control consists primarily of limiting the number of driveways and conflict points on the roadway system and serves to both reduce the number of crashes as well as reduce congestion.

To be effective, safety-conscious planning must extend across all planning activities. For example, land use planning and decisions influence access management through the subdivision and site plan process. Safety planning requires multi-agency coordination and communication to develop policies and design practices to promote safety and security for all transportation modes. The safety and security objectives of the MPO include the following activities:

- Implementing design factors in new infrastructure that enhances the safety and extends the life of structures.
- Improving the safety of the transportation system at modal transfer points, such as bikeways that share or cross roadways, intersections with crosswalks, and railroad crossings.
- Improving the accessibility and safety of transit stops and transfer points.

PART B: SECURITY PLANNING

With the current enabling federal legislation, security is a separate goal which must be considered and addressed in the *Bristol Tennessee/Virginia Long Range Transportation Plan Year 2040*. Although the MPO is not directly involved in security or emergency planning, communication has been on-going with emergency management agencies, local law enforcement agencies, engineering officials, and emergency personnel on major transportation plans and projects.

The MPO's security role for the region is primarily to support existing federal, state, and local agencies in their efforts to enhance the transportation system for the region. Given the strong influence of public safety and emergency management agencies in dealing with security/disaster incidents, it is likely the most appropriate MPO activity would be promoting a coordinated planning process with the intent of developing a regional transportation system that is secure as possible. As a forum for cooperative decision making in the metropolitan area, and the responsibility for allocating financial resources for improving the performance of the transportation system, the MPO does function as a stakeholder in security planning.

MPO Roles Relating to Security. Security/disaster planning is divided into several components that reflect the different elements in dealing with such events, e.g., prevention, incident response, monitoring, system recovery, investigation, and institutional learning. In each case, the MPO would likely focus on some aspect of the transportation system that is part of the larger regional response to security/disaster incidents.

Given the MPO's responsibilities as a forum for cooperative decision-making, transportation funding, technical analysis and transportation planning, the actions that seem most appropriate for the MPO in the context of security planning are:[4]

- Providing a forum for security/safety agencies to coordinate surveillance and prevention strategies;
- Management of data related to transportation facilities;
- Funding regional surveillance and detection systems;
- Funding recovery strategies;
- Funding new strategies, technologies, and projects that can help prevent incidents;
- Conducting vulnerability analyses on regional transportation facilities and services;
- Analyzing the transportation network for redundancies in moving large number of people and materials, and strategies for dealing with "choke" points;
- Analyzing the transportation network for emergency route planning and strategic gaps in the network.

EXISTING CONDITIONS

Intelligent Transportation Systems. In many metropolitan areas, much of the Homeland Security and Emergency Preparedness activities revolve around the implementation of Intelligent Transportation Systems (ITS). This is in part a result of the similarities between the

[4] Source: Georgia Institute of Technology

need for functions such as surveillance, intrusion detection, and communications required for security, and the applications required for operation and management of the transportation system. In addition, deployment of ITS technologies has an impact on the institutional relationships, both formal and informal, that are established within the region between agencies.

ITS deployment refers to the use of advanced technologies to enhance management and operation of transportation facilities. ITS program areas include many elements, some of which include surveillance equipment to monitor roadways for congestion and incidents; variable message signs that display traffic information to motorists; vehicle detection devices that report speed and travel time; and motorist service patrols that respond to incidents in a timely manner.

A multi-jurisdictional task force developed and approved the *Bristol Regional ITS Architecture and Deployment Plan* in June 2008. This ITS plan covered all of Washington County, Virginia; Bristol, Virginia; and that portion of Sullivan County within the Bristol MPO Study Area (but not the area east of South Holston Lake)[5]. The current ITS plan was designed to complement the operational ITS characteristics of both TDOT and VDOT's pre-existing ITS operations. The plan provides the guidelines and structure for the implementation and operation of ITS technology within the metropolitan area, and defines the transportation needs, ITS solutions, agencies to be involved, and projects to be deployed. The 2008 *Bristol Regional ITS Architecture and Deployment Plan* is scheduled for a major update to determine changes in project status, prioritization, or the addition of new projects. In addition, any new stakeholders will be included and any changes to the National ITS Architecture will be evaluated.

ITS operations in the Bristol Study Area are currently confined to camera detection systems and variable message boards along Interstates 81 and 381, operated by both the Tennessee and Virginia Departments of Transportation. For large events at Bristol Motor Speedway, additional temporary ITS cameras and variable message boards are deployed by both Departments of Transportation; Bristol, Tennessee; and Sullivan County.

Various communities in the region have requested expansion of Interstate motorist service patrols into the Tri-Cities, including the Bristol area. As of December 2015, such services are provided only during Race Weekend operations by drawing equipment and personnel from the Knoxville (TDOT), Roanoke (VDOT), and the southwestern Virginia tunnels at East River and Big Walker Mountains (VDOT).

Evacuation Routes. No designated evacuation routes throughout the Bristol Study Area are identified, such as those found in other locations for hurricanes, tsunamis, industrial or nuclear incidents, or other similar events. In the event of emergency evacuations, such as for hazardous spills or natural disasters, local law enforcement will determine the best routes based on the characteristics and extent of the incident.

[5] When that 2008 document was developed, Bluff City was included as a stakeholder jurisdiction. In the next update of the ITS plan, Bluff City and surrounding portions of Sullivan County will be removed in recognition of the recent changes in the Bristol MPO study boundary.

Public Transportation. The Federal Transit Administration has undertaken a series of programs to help local transit providers prepare against a variety of threats. Although the transit providers within the Bristol Metropolitan Planning Area represent small urban and rural systems, it is important for local agencies to integrate security in transit programs.

To date, transit agencies within the region have not invested in significant capital improvements based on the level of security-related incidents, and potential threats do not appear to warrant further expense in this area. This does not imply that security has not been addressed as local agencies continue to train drivers and supervisors on security issues, conduct background checks for new employees, update security features on new vehicle procurements, and coordinate with local emergency management services. Transit security functions must be supported by an effective capability for emergency response, both to support resolution of those incidents that occur on transit property and those events that affect the surrounding community served by the transit agency. As such, local transit agencies are integrated into disaster preparedness and hazard mitigation plans.

Basic goals of transit agencies in regards to security include:

- Being prepared for security incidents;
- Being able to respond rapidly and effectively to natural and human-caused threats and disasters;
- Being able to appropriately support the needs of emergency management and public safety agencies; and,
- Being able to quickly and efficiently be restored to full capability.

Trucking. The Transportation Security Administration (TSA) administers the Hazmat Threat Assessment Program which obtains background and security checks on drivers of commercial vehicles transporting hazardous materials. The Federal Motor Carrier Safety Administration (FMCSA) is responsible for developing, maintaining, and enforcing Federal regulations that establish safe operating requirements for commercial vehicle drivers, carriers, vehicles and equipment. In addition, FMCSA enforces the Hazardous Materials Regulations to reduce security risks that could potentially harm the public and environment. FMCSA has initiated several programs aimed at protecting against terrorists utilizing commercial trucks as targets or weapons.

Currently, no routes within the MPO Study Area are restricted for hazardous material transportation with the exception of routes which are restricted to all commercial vehicles.

Rail. The Bristol Study Area is crossed by one Class I railroad, the Norfolk Southern Railway. Bristol Yard, located mostly on the Virginia side of the state line, serves as a crew change point for trains operating between Knoxville and Roanoke. Norfolk Southern Railway routinely monitors railroads for both safety and security purposes and maintains customized facility security systems, electronic surveillance, perimeter intrusion detection, and access control systems. These technology enhancements are centrally monitored at the railroad's Police Communication Center in Roanoke, Virginia.

The TSA plays an important role in securing railroads and conducts inspections and investigations to prevent attacks. TSA deploys inspectors, Visual Intermodal Protection and Response teams, canine teams and provides grants for activities to protect and support rail systems.

Pipelines. Outside of short industrial or medical on-site usage, the only major pipeline in the Bristol Study Area is a natural gas pipeline running approximately parallel to Interstate 81, with a pumping station off of Meadow View Road just east of Exit 74. East Tennessee Natural Gas, a division of Spectra Energy, employs a number of techniques to ensure pipelines are safe. This includes technical equipment to monitor and control the flow through the use of sensors that can identify an incident in the event of an emergency as well as routine foot patrols and aerial patrols of pipeline rights-of-way are conducted. To address terrorism concerns, they conduct regular drills and have a security response plan in place. Pipeline-specific safety training is also provided.

The federal Department of Transportation's Office of Pipeline Safety (OPS) administers the national regulatory program to assure the safe transportation of natural gas, petroleum, and other hazardous materials by pipeline. The OPS develops regulations and other approaches to risk management to assure safety in design, construction, testing, operation, maintenance, and emergency response of pipeline facilities.

Emergency Management Plans. Although the MPO Study Area encompasses two states, all of the MPO county-level jurisdictions have Emergency Operation Plans and/or equivalent mitigation plans that include measures for homeland security factors for this region. These documents identify various potential man-made and natural hazards that could occur in this region and identify agency responsibilities in the event of an incident. Typically, the content of a Hazard Mitigation Plan provides a risk and vulnerability assessment and establishes mitigation strategies. In addition, both the Tennessee and Virginia Departments of Transportation have developed Interstate 81 incident response plans, which define alternate routes if sections of the interstate are closed.

The Tennessee Department of Transportation was one of seven pilot projects funded by FHWA to assess the vulnerability of the state's transportation infrastructure to extreme weather. The statewide vulnerability assessment included all transportation infrastructures (roads, rivers, rail, transit, and aviation) and identified the associated impacts of extreme weather (i.e. flooding, drought, tornadoes, fog) on those transportation assets. As needed, the MPO will coordinate with TDOT to incorporate the findings of the Extreme Weather Vulnerability Assessment into its transportation planning process.

Because the geographic area that the Bristol MPO encompasses is relatively small, probable hazard risks are consistent throughout the planning region (Table 8-1). *Risks* define a known, identified hazard area within the region. *Vulnerability* establishes the impact of that hazard to the region and can be on quantified based on collected data such as the number of buildings that would be affected or location of critical community facilities (i.e., fire stations).

Table 8-2
Summary of Probable Hazard Risk and Vulnerability

Hazard	Risk	Vulnerability
Dam Failure	High	Moderate
Flooding Hazards	High	Low
Geological Hazards	Low	Low
Infestations	Low	Low
Severe Weather-Drought	Low	Low
Severe Weather Hazards	Moderate	Moderate
Manmade Hazards	Moderate	Moderate

ISSUES

With the exception of severe storms, flooding, and forest fires, hazardous materials incidents are perhaps the most likely to affect the Bristol Study Area. Several industries within the Bristol MPO use, produce, store, or distribute hazardous materials. According to the EPA's Toxic Release Inventory, Bristol Metals, Strongwell Corporation, HAPCO, and Bristol Compressors are some of the larger facilities within the study area that handle hazardous materials. Formerly active facilities that also involved hazardous materials include the closed Raytheon and Exide industrial plans.

On a daily basis, hazardous materials are transported on many highways and on the railroad within the region. Hazardous materials incidents typically take two forms: fixed facility incidents and transportation incidents. Transportation incidents are substantially harder to prepare for because they can occur at any location, although the vast majority occurs on interstate highways or on major rail lines. Primary response to these events will be local police, fire, and emergency management personnel. In both Tennessee and Virginia, local jurisdictions have Emergency Disaster Preparedness Plans establishing agency responsibilities and response for various types of incidents.

Bristol Motor Speedway. Given the location of Bristol Motor Speedway and the large numbers of people in the area during race events, both Bristol, Tennessee, and Sullivan County have included the facility in their local Hazard Mitigation Plans. The vulnerability is directly related to the ability to evacuate people in the event of a disaster, whether weather-related or terrorism-related. BMS has an Emergency Operations Plan in accordance with guidance from NASCAR, and the multiple law enforcement, fire, medical, and emergency management agencies on local, state, and federal levels coordinate closely during events. A Multi-Agency Command Center (MACC) is established for major events for coordination of those activities.

OBJECTIVES AND PROPOSED ACTIONS

Although the MPO will play a supporting role in the efforts to mitigate security risks, it will continue to communicate with appropriate agencies to assist in their transportation system needs and to engage emergency and law enforcement personnel in transportation planning activities. An objective of the MPO is to ensure that the transportation system is capable of handling a response to an emergency. This can be achieved by providing multiple alternative

routes through road network connectivity in the case of highway closures, ensuring sufficient emergency personnel and equipment access along the transportation system, and utilizing ITS and other measures to effectively handle an evacuation.

In the development of the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040,* security projects are undifferentiated from other more traditional projects. For example, a highway improvement project may be classified primarily as reconstruction to a four-lane facility, but will also result in additional capacity for emergency evacuation. A case in point is the capability for manual phase advancement in all new traffic signals in the area for enhanced traffic movement during Race Weekends, which can also be utilized during evacuation activities.

The security objectives of the MPO include the following activities:

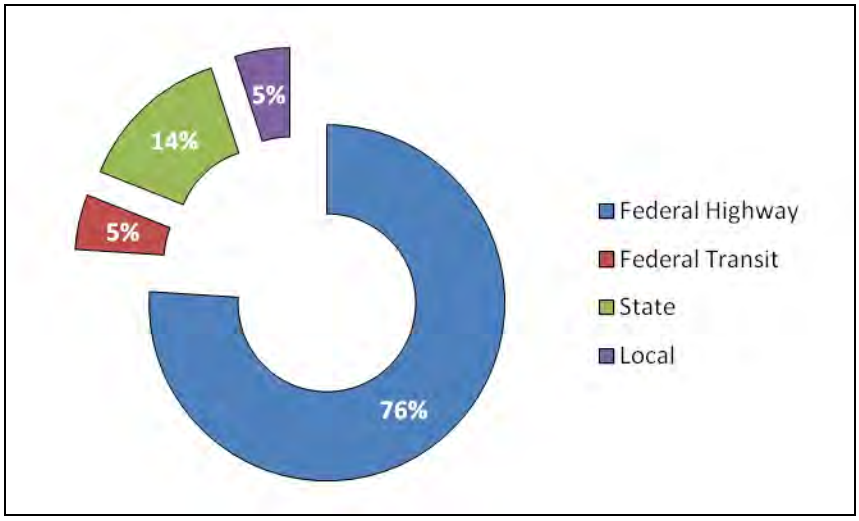
- Maintenance of an Intelligent Transportation System Plan for implementing and operating ITS technologies.
- Support programs for agencies involved in incident management and emergency situations to ensure safe, secure operations of the transportation system for motorized and non-motorized users.
- Encourage and support disaster, emergency and incident response preparedness and recovery.

CHAPTER 9: FINANCIAL ANALYSIS

The *Fixing Americas Surface Transportation Act*(FAST Act) legislation requires the preparation of a long-range transportation plan that is realistic, both from an implementation and a financial standpoint. The needs of highway users, transit users, pedestrians, and bicyclists, as well as all other modes of transportation will all need to be weighed against the other needs of the community. An adequate transportation infrastructure will allow the Metropolitan Planning Area to continue to grow as an economic center and enhance the quality of life for the community. The transportation plan is considered financially constrained when all the proposed project costs do not exceed projected revenues. Financially constraining the transportation plan provides a realistic account of what projects and programs can be accomplished.

Transportation projects are funded through many different sources. Most projects are funded with some combination of federal, state, and local funds. The greatest funding source for highway and road projects, as well as public transportation, is from the federal government (Chart 9-1).

Chart 9-1
Percent of Annual Funding by Source for the Metropolitan Planning Area



PART A: FINANCIAL RESOURCES

STREETS AND HIGHWAYS

Federal Funding. The Highway Trust Fund was established in 1956 by the Federal-Aid Highway Act and the Highway Revenue Act in order to create a financing mechanism for the interstate highway system. The largest funding source for street and highway projects is from the federal government. The funds come from motor fuel taxes and are administered by the Federal Highway Administration.

The Highway Trust Fund is not a permanent fund and must be extended by legislation. A description of the major federal funding programs applicable to the Bristol Tennessee/Virginia Urban Area MPO is outlined below.

National Highway Performance Program (NHPP) projects can be funded only if they are on the National Highway System (NHS). Roadways eligible for this funding include rural and urban roads serving major population centers, international border crossings, intermodal transportation centers, and major travel destinations. It includes the Interstate System, other urban and rural principal arterials, highways that provide motor vehicle access between the NHS and major intermodal transportation facilities, the defense strategic highway network, and strategic highway network connectors. The NHPP provides support for the condition and performance of the NHS and for construction of new facilities. NHPP projects must support progress toward the achievement of performance targets established by each states asset management plan. Funding distributed to each state is based on lane-miles of principal arterials (excluding Interstate), vehicle-miles traveled on those arterials, diesel fuel used on the state's highways, and per capita principal arterial lane-miles.

The Surface Transportation Block Grant Program (STBG) provides a flexible funding program for planning, construction, reconstruction, and rehabilitation that may be used by states and localities for projects on any Federal-Aid Highway, and bridge projects on any public road. These funds can also be used for non-highway projects such as transit capital projects and pedestrian/bicycle facilities. Eligible activities also include advanced truck stop electrification systems, improvements to high crash or high congestion intersections, and environmental restoration and pollution abatement. Generally, STBG funds cannot be utilized on local roads or rural minor collectors; however, a number of exceptions to this requirement are identified in the FAST Act. STBG funds are distributed to the states based on lane-miles of Federal-Aid highways, total vehicle-miles traveled on those highways, and contributions to the Highway Trust Fund. A proportionate share of each states STBG funds are set-aside for the Transportation Alternatives Program (TAP), which provides funding for alternative transportation projects such as facilities for pedestrians, bicyclists, and other non-motorized forms of transportation.

The Highway Safety Improvement Program (HSIP) provides funding to achieve a significant reduction in traffic fatalities and serious injuries on all public roads including non-state owned public roads. The program provides flexibility for states to target funds to their most critical safety needs. HSIP requires a data-driven, strategic approach to improving highway safety and projects must be consistent with the State Strategic Highway Safety Plan (SHSP).

The Nationally Significant Freight and Highway Projects Program is a new program established by the FAST Act that provided funding for highway, bridge, rail-grade crossing, intermodal and freight rail projects costing more than will improve movement of both freight and people, increase competiveness, reduce bottlenecks, and improve intermodal connectivity. Projects are awarded competitively and at least 25% of the funds are reserved for rural areas.

The National Highway Freight Program is a new funding category established by the FAST Act and expands the National Freight Policy provisions initiated by MAP-21. Funds are apportioned among states by formula for freight related highway improvements. Under the program, states will designate a national freight network comprised of the interstate system, and other roads, both

urban and rural, that are critical to the safe and efficient shipment of freight. States are required to establish a freight advisory committee and develop a state freight investment plan to be eligible for funding.

State Funding. In addition to the Federal Highway Trust Fund, the State of Tennessee and Commonwealth of Virginia provide funding to finance street and highway improvements.

The State of Tennessee has legislation that establishes funding for highways and public transportation through motor fuel taxes and vehicle registrations. A variety of programs exist for on-going maintenance and operations, resurfacing, bridges, major reconstruction, new construction, right-of-way purchases, and to match federal funds. Many major highways are on both the state and federal highway system and may qualify for improvements under either funding source depending upon resource availability. In 1986, the Tennessee General Assembly developed and authorized the 1986 Roads Program, which identified specific projects in the legislation for improvement. These projects were funded via a special tax per gallon of gasoline and motor fuel.

In 2013, the Commonwealth of Virginia passed legislation that established significant changes for revenue funding for highways and public transit programs. The legislation eliminated the per-gallon tax on motor fuels and replaced it with a percentage based tax for gasoline and diesel fuel. In addition, the state sales tax was increased with the additional revenue designated to the Commonwealth Transportation Fund. Additional funding is provided by revenue bonds for transportation projects as well as the revenue sharing program, which will match local transportation funding on a dollar for dollar basis.

Local Funding. At the local level, the two major sources of transportation revenues include general fund revenues and the issuance of bonds for major transportation improvements. The primary source of annual operation and maintenance funds for highways is the general fund of the local city or county. For utilization of general funds, transportation projects compete with all municipal or county services for limited funding availability. Bonds provide a longer-term payment period and a dedicated funding source for larger capital projects. Local jurisdictions also provide funding to match federal or state funds for local transportation projects.

PUBLIC TRANSPORTATION

Federal Funding. The Federal Transit Administration (FTA) administers several programs funding public transportation services within the MPO's Metropolitan Planning Area.

Section 5307 Formula Grants provide funding to urbanized areas for public transportation capital, planning, job access and reverse commute projects, as well as transit operating assistance. For urbanized areas (greater than 50,000 in population) the funding formula is based on population and population density, and the number of low-income individuals.

Section 5339 Bus and Bus Facilities allocates funding to states and subrecipients for capital funding to replace, rehabilitate and purchase buses and related equipment and to construct bus-related facilities.

Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities provides funding for programs to service the special needs of transit-dependent populations beyond the traditional public transportation services or the complementary paratransit services of the Americans with Disabilities Act (ADA). Eligible activities include capital and operating projects that assist seniors and individuals with disabilities. Funds are apportioned for urbanized and rural areas based on the number of seniors and individuals with disabilities.

Section 5311 Formula Grants are available rural areas (less than 50,000 in population) for public transportation capital, planning, and operating assistance. A majority of the funding formula is based on land area and population in rural areas with a small percentage apportioned based on revenue vehicle miles and number of low-income individuals.

State Funding. The State of Tennessee and the Commonwealth of Virginia provide additional funds for capital and operating assistance programs that are partially funded by the Federal Transit Administration. For Tennessee, most funding levels are based on formulas that consider local population and numbers of transit trips provided. Virginia distributes funds from the Commonwealth Mass Transit Fund based on the proportion that local transit expenses bear on the total statewide transit expenditures.

Local Funding. Local jurisdictions provide matching funds for capital and operating programs that are partially funded by federal and state transit monies. This local funding comes from the General Fund. Fare-box revenue and advertising displays on vehicles also provide additional financial support for transit revenue. The rural transportation agencies receive local funding support from the participating counties they serve.

OTHER MODES

Rail. The Federal Railroad Administration (FRA) administers the Railroad Rehabilitation and Investment Financing Program (RRIF) that offers various loan enhancements to public or private sponsors of intermodal and rail capital projects, including acquisition, development, improvement, or rehabilitation of intermodal or rail equipment and facilities. Because rail infrastructure is almost exclusively privately owned, railroads have traditionally been privately funded. Government programs do support some rail-related works such as at-grade crossings and railroad grade separations.

Bicycle and Pedestrian. The Transportation Alternatives Program (STBG Set-Aside) under the FAST Act, as well as the other previous federal highway acts, are major sources of funding for bicycle and pedestrian projects. Two percent of the amount authorized from the Highway Trust Fund for Federal-aid Highways is annually set aside for alternative transportation projects including bicycle and pedestrian projects, greenways, and pedestrian paths. The Transportation Alternatives Program also includes eligible activities previously funded by the recreational trails program and safe routes to school program. Most of the greenways and pedestrian/bicycle facilities within the MPO Study Area have been funded with the Transportation Alternatives Program.

The Virginia and Tennessee Departments of Transportation can expand construction projects to include sidewalks and increased shoulder widths for bicyclists. Incorporation of pedestrian and bicycle design into new roadways and roadway enhancements minimize the cost of having to incorporate these into existing roads. In addition, local governments provide funding for sidewalk construction and maintenance on an annual basis utilizing general funds and other grant funds such as the Housing and Urban Development (HUD) program.

Aviation. The Virginia Highlands Airport is provided financial support from Federal Aviation Administration's Airport Improvement Program and Commonwealth Airport Fund programs administrated by the state. The airport also receives funding from Washington County, Virginia as well as revenues from fuel sales and rental space.

POTENTIAL REVENUE SOURCES

Identification and utilization of user fees to support the transportation system can help guarantee a steady flow of funding for transportation improvements. Many revenue sources are utilized throughout the country and can include toll facilities, local fuel taxes, local motor vehicle taxes, and road improvement districts. Although a number of options are available, it is extremely difficult from a political standpoint to implement new revenue sources; any revenue source is perceived as an increase in taxes. Public acceptance is important when instituting taxes and user charges and can influence the feasibility of potential revenue sources or strategies. Additionally, some revenue sources require authorizing legislation and may require extensive legal research and analysis.

This information provides a basis for future dialogue on financing transportation improvement projects and none of these options are recommended at this time nor included in the financial forecast for the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040*.

PART B: PROJECTED REVENUE

STREETS AND HIGHWAYS

In spite of the importance of better highway system management, new construction is inevitable in order to accommodate the economic growth for the metropolitan area over the next twenty-five years. Highway needs ranging from new regional alternative routes to Interstate improvements to widening of existing arterial and collector systems are all transportation improvements which have been identified by area planners, engineers, and residents.

The Tennessee and Virginia Departments of Transportation serve as the pass-through agencies for the federal dollars that come to the Metropolitan Planning Organization for roadway improvements. The major identified sources of federal funding include the FAST-Act programs for the National Highway Performance Program and the Surface Transportation Block Grant Program. The motor fuel tax is the single largest source of revenue for transportation spending; however, federal fuel-efficiency standards and tax rates based on a per-gallon charge rather than a price percentage charge has a negative impact on the gas tax as a revenue stream. As such, greater fuel efficiency means that states will receive less revenue per vehicle-mile traveled.

Projected Revenue. To project future revenue for the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040*, an average funding per year was established based on historic funding levels for Tennessee and Virginia sources. In addition, the current balance of [Tennessee] local STBG funds was included in the first horizon tier. Based on the requirements of the FAST Act, metropolitan transportation plans must use an inflation rate to reflect "year of expenditure dollars." For the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040,* a three percent (3%) annual growth rate was utilized to project future revenues.

Given the long-term nature of the long-range transportation plan, and the degree of uncertainty in estimating both costs and revenues, projected funding may not be available in exactly the same amounts or mix of sources indicated in the Plan. Actual funding amounts depend on the federal, state, and local budget processes for any given year as well as federal and state legislation which may impact funding.

Utilizing this methodology, the Metropolitan Planning Area is estimated to receive approximately $282 million through the planning horizon year 2040. This is comprised of $124 million from Tennessee sources and $158 million from Virginia (Table 9-1). This estimate is based on a trend analysis of funding sources that are reasonably expected to be available and does not account for any new funding sources.

Table 9-1
Streets and Highways Projected Revenue

Tennessee Projected Revenue Sources

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
NHPP		$ 2,199,044	$ 5,504,626	$ 7,397,757	$ 15,101,427
STBG (State)		$ 2,183,117	$ 5,464,757	$ 7,344,176	$ 14,992,050
HSIP		$ 6,689,511	$ 16,745,120	$ 22,504,042	$ 45,938,673
STATE		$ 1,616,101	$ 4,045,408	$ 5,436,691	$ 11,098,200
STBG-L (Local)	$ 4,309,001	$ 2,867,995	$ 7,179,138	$ 9,648,161	$ 24,004,295
LOCAL		$ 1,937,091	$ 4,848,908	$ 6,516,527	$ 13,302,526
Total	$ 4,309,001	$ 17,492,859	$ 43,787,957	$ 58,847,354	$ 124,437,171

Virginia Projected Revenue Sources

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
NHPP		$ 2,027,055	$ 9,672,945	$ 2,220,330	$ 13,920,330
STBG (State)		$ 15,489,069	$ 38,772,090	$ 52,106,447	$ 106,367,606
HSIP		$ 1,834,349	$ 4,591,725	$ 6,170,894	$ 12,596,968
STATE		$ 3,064,752	$ 7,671,657	$ 10,310,066	$ 21,046,475
LOCAL		$ 571,613	$ 1,430,857	$ 1,922,952	$ 3,925,422
Total	$ -	$ 22,986,838	$ 62,139,274	$ 72,730,689	$ 157,856,801

OPERATIONS AND MAINTENANCE – STREETS AND HIGHWAYS

In order to maximize the efficiency of the street and highway system, local governments must maintain and make modifications to the existing system. If new improvements or existing roadways are not maintained properly, then the transportation system is not functioning at its capacity and new investments are not fully realized.

Both the Tennessee and Virginia Departments of Transportation anticipate maintenance costs to increase annually over the life of this plan. In Washington County, Virginia, all public roads are maintained by the Virginia Department of Transportation; however, the City of Bristol, Virginia and the Town of Abingdon, Virginia receive an annual allocation of maintenance funds from VDOT. In Tennessee, counties and municipalities receive an annual allocation of maintenance funds from the Tennessee Department of Transportation. For Tennessee counties to be eligible for state maintenance funds, they are required to annually allocate funds for road maintenance from local revenue sources in an amount not less that the average of the five preceding fiscal years.

Projected Revenue. To project future maintenance and operations revenue for the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040*, an average funding per year was established based on historic funding levels. This included review of local jurisdictions operating budgets as well as TDOT and VDOT budget information for operations and maintenance. Although maintenance and operations costs are projected to increase annually, the assumption is operations and maintenance revenues will continue to be available for the life of this plan as funding will be prioritized to maintain the existing infrastructure. Projected operations and maintenance revenues for the life of this plan is based on a three percent (3%) annual growth rate (Table 9-2)

Table 9-2
Projected Operating and Maintenance Revenue

Tennessee Projected O&M Revenue

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
STATE O&M		$ 28,550,042	$ 74,736,077	$ 106,445,633	$ 209,731,752
LOCAL O&M		$ 21,829,163	$ 57,142,685	$ 81,387,591	$ 160,359,439
Total	$ -	$ 50,379,205	$ 131,878,762	$ 187,833,224	$ 370,091,191

Virginia Projected O&M Revenue

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
STATE O&M		$ 61,893,349	$ 162,019,592	$ 230,762,422	$ 454,675,363
LOCAL O&M		$ 37,455,285	$ 98,047,529	$ 139,647,835	$ 275,150,649
Total	$ -	$ 99,348,634	$ 260,067,121	$ 370,410,257	$ 729,826,012

PUBLIC TRANSPORTATION

The cost of providing the current level of public transportation services is expected to rise at a moderate level over the period of this plan, based on inflation. Bristol Tennessee Transit and Bristol Virginia Transit have utilized federal and state operating assistance to support public transportation for the Bristol area, which have primarily been funds from the Federal Transit Administration 5307 Formula Program and state operating assistance program. Public transportation services for the rural areas of the Metropolitan Planning Area are provided by the NET Trans (operated by the First Tennessee Human Resource Agency) in Tennessee and the District III Government Cooperative in Virginia. The agencies are primarily supported by Federal Transit Administration Section 5311 funds. District III Government Cooperative also operates Abingdon Transit on a contractual basis.

At the federal level, the Federal Transit Administration is the primary source for transit funding available to transit operations in the Bristol Study Area. Section 5307 Formula Capital and Operating Grant programs make funds available to all urbanized areas to finance transit capital and operating expenses. Section 5339 Bus and Bus Facilities provides capital assistance to transit projects for bus-related construction projects, rolling stock, and equipment acquisition. The Section 5310 program allows the purchase of transit capital equipment and contracted services for private and non-private corporations and associations providing mass transportation services for the elderly and disabled, and the Section 5311 Program provides funding for the purchase of capital and operating expenses for transit services in rural areas. In addition, highway revenue (Surface Transportation Block Grant Program) is not specific only to highway related projects and can also be utilized for many types of public transportation projects. As long as these funding sources are available for operating and capital projects, the current level of service can be maintained for local communities within the Metropolitan Planning Area.

It should be noted, the newly designated urbanized area of Abingdon, Virginia is now eligible for FTA Section 5307 funding allocated for small urban transportation providers. As of this date, it is uncertain how this funding will be utilized for Abingdon Transit. As such, it is assumed the current level of service will be maintained regardless of the funding source.

Projected Revenue. Projections in transit operating and maintenance funds for public transportation represent maintenance of the existing system with no service additions. Salaries and fringe benefits are, and will continue, to be the greatest burden on transit agencies operating budgets. There are no problem areas anticipated locally with regard to changes in labor cost or maintenance expenses. The only major cost increases would be those associated with national economic trends, such as increases in fuel and insurance costs. Based on modest population and employment projects for the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040*, ridership and farebox revenues will continue to remain consistent with current trends. The demand for paratransit services will provide the most pressure on operating budgets in outlying years due to an increasing elderly population within the region.

For the existing level of service to remain consistent, it is anticipated that capital funds will primarily be required for replacement vehicles, which are budgeted using a normal vehicle replacement cycle of four to five years for vans and support vehicles, and seven to ten years for buses. Vehicle replacement will continue be funded with federal and state capital funds including local dollars. No major facilities are currently programmed; however, it can be expected that some rehabilitation and maintenance of facilities would be required in the outlying years.

Utilizing a five-year historical review of local transit budgets, an average per year was established for federal, state, and local transit funding for Bristol Tennessee Transit and Bristol Virginia Transit. Funding for the rural providers, including Abingdon Transit, is based on the current year budget and represents district-wide funding, with the understanding that an undetermined amount of the total funding would specifically be associated with the Bristol Metropolitan Planning Area. In each funding category, the base year funding was projected through the life of the plan utilizing a three percent annual growth rate for transit revenue. Table 9-3 provides estimated transit revenues for public transportation in the Metropolitan Planning Area for years 2016 through 2040.

Table 9-3
Projected Transit Revenue

Bristol Tennessee Transit Projected Revenue Sources

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
FTA 5307		$ 2,051,788	$ 4,657,267	$ 6,258,978	$ 12,968,033
FTA 5339		$ 358,898	$ 898,389	$ 1,207,360	$ 2,464,647
STATE		$ 1,559,251	$ 3,903,102	$ 5,245,442	$ 10,707,795
LOCAL		$ 946,704	$ 2,369,780	$ 3,184,786	$ 6,501,270
FARES		$ 153,710	$ 384,766	$ 517,093	$ 1,055,569
Total	$ -	$ 5,070,351	$ 12,213,304	$ 16,413,659	$ 33,697,314

Bristol Virginia Transit Projected Revenue Sources

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
FTA 5307		$ 1,193,494	$ 2,987,542	$ 4,015,007	$ 8,196,043
STP FLEX		$ 280,322	$ 701,700	$ 943,027	$ 1,925,049
STATE		$ 541,532	$ 1,355,557	$ 1,821,756	$ 3,718,845
LOCAL		$ 1,094,743	$ 2,740,352	$ 3,729,833	$ 7,564,928
FARES		$ 202,942	$ 508,002	$ 682,712	$ 1,393,656
Total	$ -	$ 3,313,033	$ 8,293,153	$ 11,192,335	$ 22,798,521

NET Trans Projected Revenue Sources (District-wide)

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
FTA 5311		$ 10,256,511	$ 25,674,001	$ 34,503,711	$ 70,434,223
FTA 5310		$ 430,769	$ 1,078,296	$ 1,449,139	$ 2,958,204
FTA 5339		$ 4,127,605	$ 10,332,181	$ 13,885,588	$ 28,345,374
STATE		$ 5,980,220	$ 14,969,630	$ 20,117,932	$ 41,067,782
LOCAL		$ 5,980,220	$ 14,969,630	$ 20,117,932	$ 41,067,782
FARES		$ 1,306,573	$ 3,270,600	$ 4,395,413	$ 8,972,586
Total	$ -	$ 28,081,898	$ 70,294,338	$ 94,469,715	$ 192,845,951

District Three Projected Revenue Sources (District-wide)

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
FTA 5311		$ 7,805,620	$ 19,538,953	$ 26,258,720	$ 53,603,293
STBG FLEX		$ 58,184	$ 145,645	$ 195,735	$ 399,564
STATE		$ 2,437,191	$ 6,100,756	$ 8,198,904	$ 16,736,851
LOCAL		$ 3,589,873	$ 8,986,137	$ 12,076,615	$ 24,652,625
FARES		$ 716,362	$ 1,793,190	$ 2,409,897	$ 4,919,449
Total	$ -	$ 14,607,230	$ 36,564,681	$ 49,139,871	$ 100,311,782

TRANSPORTATION ALTERNATIVES

Bicycle and pedestrian facilities have been primarily funded through the Transportation Enhancement Program, Safe Routes to School Program, and Recreational Trails Program. These programs were consolidated into the Transportation Alternatives Program (TAP) with the passage of the MAP-21 Act. Most recently, the FAST Act consolidated TAP into the Surface Transportation Block Program (STBG). Transportation Alternatives projects provide 80 percent federal funding and require a 20 percent local match. Although these funding options are competitive and not guaranteed annually, MPO jurisdictions have consistently received funds through these programs and expect to continue to receive Transportation Alternatives Program funds. The base year for this funding source was assumed to be the average of the last five years of grant awards and then projected at a three percent inflation rate (Table 9-4).

It is important to note that highway revenue (Surface Transportation Block Grant Program) is not specific only to highway related projects and can also be utilized for many types of projects including bicycle facilities, sidewalks, and greenways. Both TDOT and VDOT have incorporated bicycle and pedestrian facilities in highway construction improvements; however, calculating the portion of project funding devoted to alternative transportation is difficult.

Local jurisdictions provide funding for sidewalk maintenance and reconstruction within the urban areas; however, this funding has been limited due to competing street and highway maintenance activities.

Table 9-4
Projected Revenue for Other Modes

Tennessee Projected Revenue

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
TAP		$ 1,216,854	$ 3,046,017	$ 4,093,592	$ 8,356,463
LOCAL		$ 304,214	$ 761,504	$ 1,023,398	$ 2,089,116
Total	$ -	$ 1,521,068	$ 3,807,521	$ 5,116,990	$ 10,445,579

Virginia Projected Revenue

Funding Source	Carryover	2016-2020	2021-2030	2031-2040	TOTAL
TAP		$ 1,373,049	$ 3,437,002	$ 4,619,044	$ 9,429,095
LOCAL		$ 343,262	$ 859,250	$ 1,154,761	$ 2,357,273
Total	$ -	$ 1,716,311	$ 4,296,252	$ 5,773,805	$ 11,786,368

Part C: Project Cost

As with revenue projections, the FAST Act requires the metropolitan long-range transportation plan to utilize an inflation rate to project future cost for the "year of expenditure." Based on joint FTA/FHWA guidance on fiscal constraint, as well as input from TDOT and VDOT, the *Bristol Urban Area Tennessee/Virginia Long-Range Transportation Plan Year 2040* utilized a 3.6 percent annual inflation rate for construction costs for 2016 and beyond. This inflation rate was applied to highway as well as transit capital improvements. Transit operating expenditures were assumed to parallel available revenue as local agencies have more control to maintain costs. However, unanticipated program cost increases in the outlying years of this plan may require the redistribution of transit capital funds to operating assistance.

STREETS AND HIGHWAYS

In order to establish a financially constrained plan, highway projects and estimated costs were identified in Chapter 7 (Table 7-2). Existing planning studies, Transportation Planning Reports, and local jurisdiction engineering estimates were utilized to determine project costs. Each project cost was projected using to a future value with an inflation rate of 3.6 percent. The amount of years the future value was inflated to was the middle point of the horizon year. It is assumed that half of the projects will be funded before the middle of the network year and half will be funded after the middle of the network year. For example, it is assumed that for the horizon years 2021-2030, half of the projects will be funded before year 2025 and half after year 2025. Therefore, all project costs programmed for 2021-2030 were inflated to the year 2025.

Operations and Maintenance. Costs associated with operations and maintenance were derived from annual costs provided by the Tennessee and Virginia Departments of Transportation and local jurisdictions' annual budgets. For both Tennessee and Virginia, costs were inflated 3.6 percent annually to determine an annual operation and maintenance cost for outlying years in the plan. It is assumed that the same level of service will be maintained per year by each jurisdiction/agency in the future years. For the life of this plan, it is anticipated funds will be allocated to maintain the existing infrastructure prior to new capital investments. As a result, the assumption regarding operations and maintenance revenues is that sufficient funds will continue to be available.

PUBLIC TRANSPORTATION

Costs for public transportation were based on the current level of service being maintained with a 3.6 percent annual inflation rate to represent future year expenditures. This included operating as well as capital costs, as identified in Chapter 7 (Table 7-4). Capital needs were identified for the replacement of rolling stock on a typical vehicle replacement cycle as well as other associated capital maintenance items. Although no major new facilities are identified for the life of this plan, it can be expected that some maintenance of existing facilities would be required in the outlying years.

OTHER MODES

Bicycle and pedestrian facilities have traditionally been funded locally with Transportation Enhancement-type grant funds. Projects funded through these programs are awarded on an annual basis and are not programmed in the MPO Transportation Improvement Program unless funded. Because this funding is discretionary, costs for specific projects are not identified for this plan; however, Transportation Alternative Program grants and related enhancement funding programs should continue to be available to MPO jurisdictions.

PART D: FINANCIALLY CONSTRAINED PLAN

Federal legislation requires that long-range transportation plans include a financial analysis that demonstrates how the plan can be implemented and identifies funding reasonably expected to be available. As previously discussed in this document, there are a variety of funding sources available for transportation improvements in the Bristol Metropolitan Planning Area. The largest source of funding comes from federal and state resources over which the MPO does not have direct control. Typically, local funds are used to meet match requirements for federal and state funding sources. Many regional projects identified in this plan represent projects beyond the scope of funding available to the MPO or local jurisdictions and would require a specific appropriation of federal/state revenue for implementation. For this reason, illustrative projects are not incorporated in the financially constrained plan.

Utilizing past funding trends, as well as current programmed allocations and Departments of Transportation forecasts, funding projections have been estimated for the lifetime of this planning document. Revenues are then compared to the costs to demonstrate the plan is financially constrained.

While this financial analysis uses specific cost and revenue information, it provides only a planning level analysis. That analysis is subject to the following limitations:

- The financial projections are for a period of more that twenty years, during which time significant changes in travel behavior, local economies, and federal funding priorities are possible.
- Projections of federal funding involve uncertainty due to shifts in federal transportation policy, budget and deficit reduction plans, and because many funds are administered on a statewide basis.
- Cost estimates are general and based on a simplified methodology and may change upon the completion of specific design plans for construction.

The following tables display all projected revenues and expenditures for the *Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040* and demonstrate that the long-range transportation plan is financially constrained for highway construction, operations and maintenance, public transportation, and other alternative modes of transportation. For project level funding sources see Appendix A.

Table 9-5
Tennessee Highway Program Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ -	$ 2,199,044	$ 2,199,044	$ -	$ 2,199,044
STBG (State)	$ -	$ 2,183,117	$ 2,183,117	$ -	$ 2,183,117
HSIP	$ -	$ 6,689,511	$ 6,689,511	$ -	$ 6,689,511
STATE	$ -	$ 1,616,101	$ 1,616,101	$ -	$ 1,616,101
STBG-L (Local)	$ 4,309,001	$ 2,867,995	$ 7,176,996	$ 5,320,000	$ 1,856,996
LOCAL	$ -	$ 1,937,091	$ 1,937,091	$ 1,330,000	$ 607,091
Total	$ 4,309,001	$ 17,492,859	$ 21,801,860	$ 6,650,000	$ 15,151,860

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ 2,199,044	$ 5,504,626	$ 7,703,670	$ 5,000,000	$ 2,703,670
STBG (State)	$ 2,183,117	$ 5,464,757	$ 7,647,874	$ 6,907,000	$ 740,874
HSIP	$ 6,689,511	$ 16,745,120	$ 23,434,631	$ 15,000,000	$ 8,434,631
STATE	$ 1,616,101	$ 4,045,408	$ 5,661,509	$ 5,602,000	$ 59,509
STBG-L (Local)	$ 1,856,996	$ 7,179,138	$ 9,036,134	$ 8,584,000	$ 452,134
LOCAL	$ 607,091	$ 4,848,908	$ 5,455,999	$ 5,404,000	$ 51,999
Total	$ 15,151,860	$ 43,787,957	$ 58,939,817	$ 46,497,000	$ 12,442,817

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ 2,703,670	$ 7,397,757	$ 10,101,427	$ 10,059,950	$ 41,477
STBG (State)	$ 740,874	$ 7,344,176	$ 8,085,050	$ 8,085,050	$ -
HSIP	$ 8,434,631	$ 22,504,042	$ 30,938,673	$ 30,938,000	$ 673
STATE	$ 59,509	$ 5,436,691	$ 5,496,200	$ 5,450,000	$ 46,200
STBG-L (Local)	$ 452,134	$ 9,648,161	$ 10,100,295	$ 10,000,000	$ 100,295
LOCAL	$ 51,999	$ 6,516,527	$ 6,568,526	$ 5,831,000	$ 737,526
Total	$ 12,442,817	$ 58,847,354	$ 71,290,171	$ 70,364,000	$ 926,171

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
NHPP	$ -	$ 15,101,427	$ 15,101,427	$ 15,059,950	$ 41,477
STBG (State)	$ -	$ 14,992,050	$ 14,992,050	$ 14,992,050	$ -
HSIP	$ -	$ 45,938,673	$ 45,938,673	$ 45,938,000	$ 673
STATE	$ -	$ 11,098,200	$ 11,098,200	$ 11,052,000	$ 46,200
STBG-L (Local)	$ 4,309,001	$ 19,695,294	$ 24,004,295	$ 23,904,000	$ 100,295
LOCAL	$ -	$ 13,302,526	$ 13,302,526	$ 12,565,000	$ 737,526
Total	$ 4,309,001	$ 120,128,170	$ 124,437,171	$ 123,511,000	$ 926,171

Table 9-6
Virginia Highway Program Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ -	$ 2,027,055	$ 2,027,055	$ 2,000,000	$ 27,055
STBG (State)	$ -	$ 15,489,069	$ 15,489,069	$ 6,552,000	$ 8,937,069
HSIP	$ -	$ 1,834,349	$ 1,834,349	$ 1,500,000	$ 334,349
STATE	$ -	$ 3,064,752	$ 3,064,752	$ 850,000	$ 2,214,752
LOCAL	$ -	$ 571,613	$ 571,613	$ 100,000	$ 471,613
Total	$ -	$ 22,986,838	$ 22,986,838	$ 11,002,000	$ 11,984,838

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ 27,055	$ 9,672,945	$ 9,700,000	$ 9,700,000	$ -
STBG (State)	$ 8,937,069	$ 38,772,090	$ 47,709,159	$ 44,276,000	$ 3,433,159
HSIP	$ 334,349	$ 4,591,725	$ 4,926,074	$ 4,700,000	$ 226,074
STATE	$ 2,214,752	$ 7,671,657	$ 9,886,409	$ 9,646,955	$ 239,454
LOCAL	$ 471,613	$ 1,430,857	$ 1,902,470	$ 500,000	$ 1,402,470
Total	$ 11,984,838	$ 62,139,274	$ 74,124,112	$ 68,822,955	$ 5,301,157

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
NHPP	$ -	$ 2,220,330	$ 2,220,330	$ 2,000,000	$ 220,330
STBG (State)	$ 3,433,159	$ 52,106,447	$ 55,539,606	$ 55,474,000	$ 65,606
HSIP	$ 226,074	$ 6,170,894	$ 6,396,968	$ 6,110,000	$ 286,968
STATE	$ 239,454	$ 10,310,066	$ 10,549,520	$ 10,315,000	$ 234,520
LOCAL	$ 1,402,470	$ 1,922,952	$ 3,325,422	$ 2,850,000	$ 475,422
Total	$ 5,301,157	$ 72,730,689	$ 78,031,846	$ 76,749,000	$ 1,282,846

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
NHPP	$ -	$ 13,920,330	$ 13,920,330	$ 13,700,000	$ 220,330
STBG (State)	$ -	$ 106,367,606	$ 106,367,606	$ 106,302,000	$ 65,606
HSIP	$ -	$ 12,596,968	$ 12,596,968	$ 12,310,000	$ 286,968
STATE	$ -	$ 21,046,475	$ 21,046,475	$ 20,811,955	$ 234,520
LOCAL	$ -	$ 3,925,422	$ 3,925,422	$ 3,450,000	$ 475,422
Total	$ -	$ 157,856,801	$ 157,856,801	$ 156,573,955	$ 1,282,846

Table 9-7
Tennessee Operations and Maintenance (Highway)
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 28,550,042	$ 28,550,042	$ 28,550,042	$ -
LOCAL O&M	$ -	$ 21,829,163	$ 21,829,163	$ 21,829,163	$ -
Total	$ -	$ 50,379,205	$ 50,379,205	$ 50,379,205	$ -

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 74,736,077	$ 74,736,077	$ 74,736,077	$ -
LOCAL O&M	$ -	$ 57,142,685	$ 57,142,685	$ 57,142,685	$ -
Total	$ -	$ 131,878,762	$ 131,878,762	$ 131,878,762	$ -

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 106,445,633	$ 106,445,633	$ 106,445,633	$ -
LOCAL O&M	$ -	$ 81,387,591	$ 81,387,591	$ 81,387,591	$ -
Total	$ -	$ 187,833,224	$ 187,833,224	$ 187,833,224	$ -

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
STATE O&M	$ -	$ 209,731,752	$ 209,731,752	$ 209,731,752	$ -
LOCAL O&M	$ -	$ 160,359,439	$ 160,359,439	$ 160,359,439	$ -
Total	$ -	$ 370,091,191	$ 370,091,191	$ 370,091,191	$ -

Table 9-8
Virginia Operations and Maintenance (Highways)
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 61,893,349	$ 61,893,349	$ 61,893,349	$ -
LOCAL O&M	$ -	$ 37,455,285	$ 37,455,285	$ 37,455,285	$ -
Total	$ -	$ 99,348,634	$ 99,348,634	$ 99,348,634	$ -

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 162,019,592	$ 162,019,592	$ 162,019,592	$ -
LOCAL O&M	$ -	$ 98,047,529	$ 98,047,529	$ 98,047,529	$ -
Total	$ -	$ 260,067,121	$ 260,067,121	$ 260,067,121	$ -

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
STATE O&M	$ -	$ 230,762,422	$ 230,762,422	$ 230,762,422	$ -
LOCAL O&M	$ -	$ 139,647,835	$ 139,647,835	$ 139,647,835	$ -
Total	$ -	$ 370,410,257	$ 370,410,257	$ 370,410,257	$ -

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
STATE O&M	$ -	$ 454,675,363	$ 454,675,363	$ 454,675,363	$ -
LOCAL O&M	$ -	$ 275,150,649	$ 275,150,649	$ 275,150,649	$ -
Total	$ -	$ 729,826,012	$ 729,826,012	$ 729,826,012	$ -

Table 9-9
Bristol Tennessee Transit
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 2,051,788	$ 2,051,788	$ 2,051,788	$ -
FTA 5339	$ -	$ 358,898	$ 358,898	$ 188,785	$ 170,113
STATE	$ -	$ 1,559,251	$ 1,559,251	$ 881,676	$ 677,575
LOCAL	$ -	$ 946,704	$ 946,704	$ 881,675	$ 65,029
FARES	$ -	$ 153,710	$ 153,710	$ 153,710	$ -
Total	$ -	$ 5,070,351	$ 5,070,351	$ 4,157,634	$ 912,717

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 4,657,267	$ 4,657,267	$ 4,657,267	$ -
FTA 5339	$ 170,113	$ 898,389	$ 1,068,502	$ 422,155	$ 646,347
STATE	$ 677,575	$ 3,903,102	$ 4,580,677	$ 2,140,858	$ 2,439,819
LOCAL	$ 65,029	$ 2,369,780	$ 2,434,809	$ 2,140,857	$ 293,952
FARES	$ -	$ 384,766	$ 384,766	$ 384,766	$ -
Total	$ 912,717	$ 12,213,304	$ 13,126,021	$ 9,745,903	$ 3,380,118

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 6,258,978	$ 6,258,978	$ 5,672,010	$ 586,968
FTA 5339	$ 646,347	$ 1,207,360	$ 1,853,707	$ 1,207,360	$ 646,347
STATE	$ 2,439,819	$ 5,245,442	$ 7,685,261	$ 2,883,765	$ 4,801,496
LOCAL	$ 293,952	$ 3,184,786	$ 3,478,738	$ 2,883,764	$ 594,974
FARES	$ -	$ 517,093	$ 517,093	$ 517,093	$ -
Total	$ 3,380,118	$ 16,413,659	$ 19,793,777	$ 13,163,992	$ 6,629,785

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
FTA 5307	$ -	$ 12,968,033	$ 12,968,033	$ 12,381,065	$ 586,968
FTA 5339	$ -	$ 2,464,647	$ 2,464,647	$ 1,818,300	$ 646,347
STATE	$ -	$ 10,707,795	$ 10,707,795	$ 5,906,299	$ 4,801,496
LOCAL	$ -	$ 6,501,270	$ 6,501,270	$ 5,906,296	$ 594,974
FARES	$ -	$ 1,055,569	$ 1,055,569	$ 1,055,569	$ -
Total	$ -	$ 33,697,314	$ 33,697,314	$ 27,067,529	$ 6,629,785

Table 9-10
Bristol Virginia Transit
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 1,193,494	$ 1,193,494	$ 1,193,494	$ -
STP FLEX	$ -	$ 280,322	$ 280,322	$ 238,496	$ 41,826
STATE	$ -	$ 541,532	$ 541,532	$ 538,468	$ 3,064
LOCAL	$ -	$ 1,094,743	$ 1,094,743	$ 1,087,352	$ 7,391
FARES	$ -	$ 202,942	$ 202,942	$ 202,942	$ -
Total	$ -	$ 3,313,033	$ 3,313,033	$ 3,260,752	$ 52,281

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 2,987,542	$ 2,987,542	$ 2,987,542	$ -
STP FLEX	$ 41,826	$ 701,700	$ 743,526	$ 690,275	$ 53,251
STATE	$ 3,064	$ 1,355,557	$ 1,358,621	$ 1,355,557	$ 3,064
LOCAL	$ 7,391	$ 2,740,352	$ 2,747,743	$ 2,737,496	$ 10,247
FARES	$ -	$ 508,002	$ 508,002	$ 508,002	$ -
Total	$ 52,281	$ 8,293,153	$ 8,345,434	$ 8,278,872	$ 66,562

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5307	$ -	$ 4,015,007	$ 4,015,007	$ 4,015,007	$ -
STP FLEX	$ 53,251	$ 943,027	$ 996,278	$ 943,027	$ 53,251
STATE	$ 3,064	$ 1,821,756	$ 1,824,820	$ 1,821,756	$ 3,064
LOCAL	$ 10,247	$ 3,729,833	$ 3,740,080	$ 3,740,080	$ -
FARES	$ -	$ 682,712	$ 682,712	$ 682,712	$ -
Total	$ 66,562	$ 11,192,335	$ 11,258,897	$ 11,202,582	$ 56,315

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
FTA 5307	$ -	$ 8,196,043	$ 8,196,043	$ 8,196,043	$ -
STP FLEX	$ -	$ 1,925,049	$ 1,925,049	$ 1,871,798	$ 53,251
STATE	$ -	$ 3,718,845	$ 3,718,845	$ 3,715,781	$ 3,064
LOCAL	$ -	$ 7,564,928	$ 7,564,928	$ 7,564,928	$ -
FARES	$ -	$ 1,393,656	$ 1,393,656	$ 1,393,656	$ -
Total	$ -	$ 22,798,521	$ 22,798,521	$ 22,742,206	$ 56,315

Table 9-11
NET Trans Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ -	$ 10,256,511	$ 10,256,511	$ 10,256,511	$ -
FTA 5310	$ -	$ 430,769	$ 430,769	$ 430,769	$ -
FTA 5339	$ -	$ 4,127,605	$ 4,127,605	$ 2,964,018	$ 1,163,587
STATE	$ -	$ 5,980,220	$ 5,980,220	$ 5,552,606	$ 427,614
LOCAL	$ -	$ 5,980,220	$ 5,980,220	$ 5,552,606	$ 427,614
FARES	$ -	$ 1,306,573	$ 1,306,573	$ 1,306,573	$ -
Total	$ -	$ 28,081,898	$ 28,081,898	$ 21,073,083	$ 7,008,815

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ -	$ 25,674,001	$ 25,674,001	$ 25,674,001	$ -
FTA 5310	$ -	$ 1,078,296	$ 1,078,296	$ 1,078,296	$ -
FTA 5339	$ 1,163,587	$ 10,332,181	$ 11,495,768	$ 7,808,318	$ 3,687,450
STATE	$ 427,614	$ 14,969,630	$ 15,397,244	$ 13,947,833	$ 6,449,411
LOCAL	$ 427,614	$ 14,969,630	$ 15,397,244	$ 13,947,832	$ 1,449,412
FARES	$ -	$ 3,270,600	$ 3,270,600	$ 3,270,600	$ -
Total	$ 7,008,815	$ 70,294,338	$ 77,303,153	$ 65,726,880	$ 11,576,273

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ -	$ 34,503,711	$ 34,503,711	$ 34,503,711	$ -
FTA 5310	$ -	$ 1,449,139	$ 1,449,139	$ 1,449,139	$ -
FTA 5339	$ 3,687,450	$ 13,885,588	$ 17,573,038	$ 11,207,949	$ 6,365,089
STATE	$ 6,449,411	$ 20,117,932	$ 26,567,343	$ 18,834,001	$ 7,733,342
LOCAL	$ 1,449,412	$ 20,117,932	$ 21,567,344	$ 18,834,001	$ 2,733,343
FARES	$ -	$ 4,395,413	$ 4,395,413	$ 4,395,413	$ -
Total	$ 11,576,273	$ 94,469,715	$ 106,045,988	$ 89,224,214	$ 16,821,774

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
FTA 5311	$ -	$ 70,434,223	$ 70,434,223	$ 70,434,223	$ -
FTA 5310	$ -	$ 2,958,204	$ 2,958,204	$ 2,958,204	$ -
FTA 5339	$ -	$ 28,345,374	$ 28,345,374	$ 21,980,285	$ 6,365,089
STATE	$ -	$ 41,067,782	$ 41,067,782	$ 33,334,440	$ 7,733,342
LOCAL	$ -	$ 41,067,782	$ 41,067,782	$ 38,344,439	$ 2,723,343
FARES	$ -	$ 8,972,586	$ 8,972,586	$ 8,972,586	$ -
Total	$ -	$ 192,845,951	$ 192,845,951	$ 176,024,177	$ 16,821,774

Table 9-12
District Three Transit Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ -	$ 7,805,620	$ 7,805,620	$ 7,117,209	$ 688,411
STP FLEX	$ -	$ 58,184	$ 58,184	$ 58,184	$ -
STATE	$ -	$ 2,437,191	$ 2,437,191	$ 2,271,567	$ 165,624
LOCAL	$ -	$ 3,589,873	$ 3,589,873	$ 3,439,071	$ 150,802
FARES	$ -	$ 716,362	$ 716,362	$ 716,362	$ -
Total	$ -	$ 14,607,230	$ 14,607,230	$ 13,602,393	$ 1,004,837

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ 688,411	$ 19,538,953	$ 20,227,364	$ 17,916,175	$ 2,311,189
STP FLEX	$ -	$ 145,645	$ 145,645	$ 145,645	$ -
STATE	$ 165,624	$ 6,100,756	$ 6,266,380	$ 5,732,307	$ 534,073
LOCAL	$ 150,802	$ 8,986,137	$ 9,136,939	$ 8,769,678	$ 367,261
FARES	$ -	$ 1,793,190	$ 1,793,190	$ 1,793,190	$ -
Total	$ 1,004,837	$ 36,564,681	$ 37,569,518	$ 34,356,995	$ 3,212,523

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
FTA 5311	$ 2,311,189	$ 26,258,720	$ 28,569,909	$ 23,072,544	$ 5,497,365
STP FLEX	$ -	$ 195,735	$ 195,735	$ 195,735	$ -
STATE	$ 534,073	$ 8,198,904	$ 8,732,977	$ 7,515,249	$ 1,217,728
LOCAL	$ 367,261	$ 12,076,615	$ 12,443,876	$ 11,722,880	$ 720,996
FARES	$ -	$ 2,409,897	$ 2,409,897	$ 2,409,897	$ -
Total	$ 3,212,523	$ 49,139,871	$ 52,352,394	$ 44,916,305	$ 7,436,089

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
FTA 5311	$ -	$ 53,603,293	$ 53,603,293	$ 48,105,928	$ 5,497,365
STP FLEX	$ -	$ 399,564	$ 399,564	$ 399,564	$ -
STATE	$ -	$ 16,736,851	$ 16,736,851	$ 15,519,123	$ 1,217,728
LOCAL	$ -	$ 24,652,625	$ 24,652,625	$ 23,931,629	$ 720,996
FARES	$ -	$ 4,919,449	$ 4,919,449	$ 4,919,449	$ -
Total	$ -	$ 100,311,782	$ 100,311,782	$ 92,875,693	$ 7,436,089

Table 9-13
Tennessee Transportation Alternatives Program
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 1,216,854	$ 1,216,854	$ 1,216,854	$ -
LOCAL	$ -	$ 304,214	$ 304,214	$ 304,214	$ -
Total	$ -	$ 1,521,068	$ 1,521,068	$ 1,521,068	$ -

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 3,046,017	$ 3,046,017	$ 3,046,017	$ -
LOCAL	$ -	$ 761,504	$ 761,504	$ 761,504	$ -
Total	$ -	$ 3,807,521	$ 3,807,521	$ 3,807,521	$ -

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 4,093,592	$ 4,093,592	$ 4,093,592	$ -
LOCAL	$ -	$ 1,023,398	$ 1,023,398	$ 1,023,398	$ -
Total	$ -	$ 5,116,990	$ 5,116,990	$ 5,116,990	$ -

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
TAP	$ -	$ 8,356,463	$ 8,356,463	$ 8,356,463	$ -
LOCAL	$ -	$ 2,089,116	$ 2,089,116	$ 2,089,116	$ -
Total	$ -	$ 10,445,579	$ 10,445,579	$ 10,445,579	$ -

Table 9-14
Virginia Transportation Alternatives Program
Cost vs. Revenue

Funding Source	2016-2020				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 1,373,049	$ 1,373,049	$ 1,373,049	$ -
LOCAL	$ -	$ 343,262	$ 343,262	$ 343,262	$ -
Total	$ -	$ 1,716,311	$ 1,716,311	$ 1,716,311	$ -

Funding Source	2021-2030				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 3,437,002	$ 3,437,002	$ 3,437,002	$ -
LOCAL	$ -	$ 859,250	$ 859,250	$ 859,250	$ -
Total	$ -	$ 4,296,252	$ 4,296,252	$ 4,296,252	$ -

Funding Source	2031-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance (Carry Over)
TAP	$ -	$ 4,619,044	$ 4,619,044	$ 4,619,044	$ -
LOCAL	$ -	$ 1,154,761	$ 1,154,761	$ 1,154,761	$ -
Total	$ -	$ 5,773,805	$ 5,773,805	$ 5,773,805	$ -

Funding Source	Total 2016-2040				
	Carry Over	New Revenue	Total Revenue	Project Costs	Balance
TAP	$ -	$ 9,429,095	$ 9,429,095	$ 9,429,095	$ -
LOCAL	$ -	$ 2,357,273	$ 2,357,273	$ 2,357,273	$ -
Total	$ -	$ 11,786,368	$ 11,786,368	$ 11,786,368	$ -

CHAPTER 10: TITLE VI AND ENVIRONMENTAL JUSTICE ASSESSMENT

Title VI of the Civil Rights Act of 1964 states that "No person in the United State shall, on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." In 1994, President Clinton Issued Executive Order 12898 which states that "Each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." As part of the transportation planning process, the Bristol MPO must address Title VI and environmental justice to minimize disproportionately adverse effects on minority populations and low-income groups in the development and implementation of transportation projects.

BACKGROUND

The first step in analyzing Title VI and environmental justice issues is to identify the population areas of traditionally under-represented groups, specifically low-income and minority populations. To make this determination, calculations of minority and low-income population proportions at a Census Tract level were made, based on 2010 Census and the American Community Survey data. For the purposes of this Title VI Assessment, the geographic boundary for the analysis was defined as all census tracts that are either entirely or partially within the MPO study area; thus, it is larger than the Metropolitan Planning Area to account for census tracts that are only partially in the MPO.

Minorities consist of 5.1 percent of the total population of the MPO region (Table 10-1). Utilizing a threshold-type of analysis, any census tract whose percentage is greater than the regional average is designated a minority census tract for Title VI purposes. Since the MPO regional long-range plan includes partial counties and is bi-state, utilizing state or county level averages to determine threshold levels would not accurately reflect the protected population groups within the study area.

The MPO recognizes that Title VI opportunities and concerns can exist outside of these defined areas and the definition of a Title VI minority census tract is for MPO analysis only. Assessing data for project level purposes requires using smaller scale spatial data where a high degree of demographic resolution is needed.

Although the Hispanic population in the MPO area is not significantly high, representing 1.5 percent of the population, monitoring the growth of the Hispanic population will be necessary based on national and state growth trends, which indicate a rising Hispanic population. In the event that the Hispanic population, as well as other ethnic groups, reaches five percent of the total population, the MPO will need to comply with Executive Order 13166, which requires "improved access to services for persons with Limited English Proficiency" (LEP).

Persons below poverty level represent 17.0 percent of the population for the MPO region. This is consistent with poverty levels for the State of Tennessee, but slightly higher than the state-wide average for Virginia.

Table 10-1
Regional Demographics

Jurisdiction	Percent Minority	Percent Hispanic	Percent Below Poverty Level
Abingdon, Virginia	6.2%	2.6%	17.9%
Bristol, Tennessee	6.7%	1.9%	18.5%
Bristol, Virginia	9.1%	1.2%	21.0%
Sullivan County, Tennessee (part)	2.3%	1.0%	19.5%
Washington County, Virginia (part)	2.2%	1.2%	8.3%
Regional Total	*5.1%*	*1.5%*	*17.0%*
Tennessee (state-wide)	22.4%	4.6%	17.6%
Virginia (state-wide)	29.0%	7.9%	11.3%

Source: U.S. Census Bureau, Census 2010
2009-2013 American Community Survey

ANALYSIS

Concentrations of minority and low-income populations are defined by this analysis to be census tracts with percentages greater than the regional average. Using the threshold level of 5.1 percent minority population for the total region, if a census tract has greater than the established threshold value, then the level of concern can be assumed to be higher than in areas where the value is lower than the threshold. It is important to understand that all census tracts include members of protected populations and this technique is being utilized for categorizing census tracts based on the proportion of protected populations they contain. Of the twenty-three census tracts that are partially or entirely within the MPO area, eight are designated as minority tracts (Table 10-2 and Map 10-1). Three of these census tracts are in the urban area of Bristol, Virginia; four are located in the urban area of Bristol, Tennessee; and one in Abingdon, Virginia.

Utilizing the same methodology, 17.0 percent of the population in the region had income below poverty level based on the U.S. Census 2009-2013 American Community Survey data. Of the twenty-three census tracts that are partially or entirely within the planning area, nine census tracts have a higher level of environmental justice concerns (Table 10-3 and Map 10-2). These tracts generally correspond with the minority census tracts with one tract in Abingdon, Virginia; two tracts in Bristol, Virginia; three tracts in Bristol, Tennessee; and three tracts in Sullivan County, Tennessee.

ALLOCATION OF FUNDS TO GEOGRAPHIC AREAS

An analysis was performed in conjunction with the spatial analysis identifying traditionally disadvantaged groups to determine what level of investment these areas would receive in terms of transportation spending as part of the *Bristol Urban Area Long-Range Transportation Plan 2040*. Approximately $270 million in highway projects are programmed throughout the study area in the plan. Of these, approximately $108 million are totally or partially in Title VI areas. This represents 40 percent of the total dollars to be invested in highway projects. The projects proposed in this plan (not including illustrative and regional projects for which funding has not been identified for implementation) within minority and/or low-income areas include:

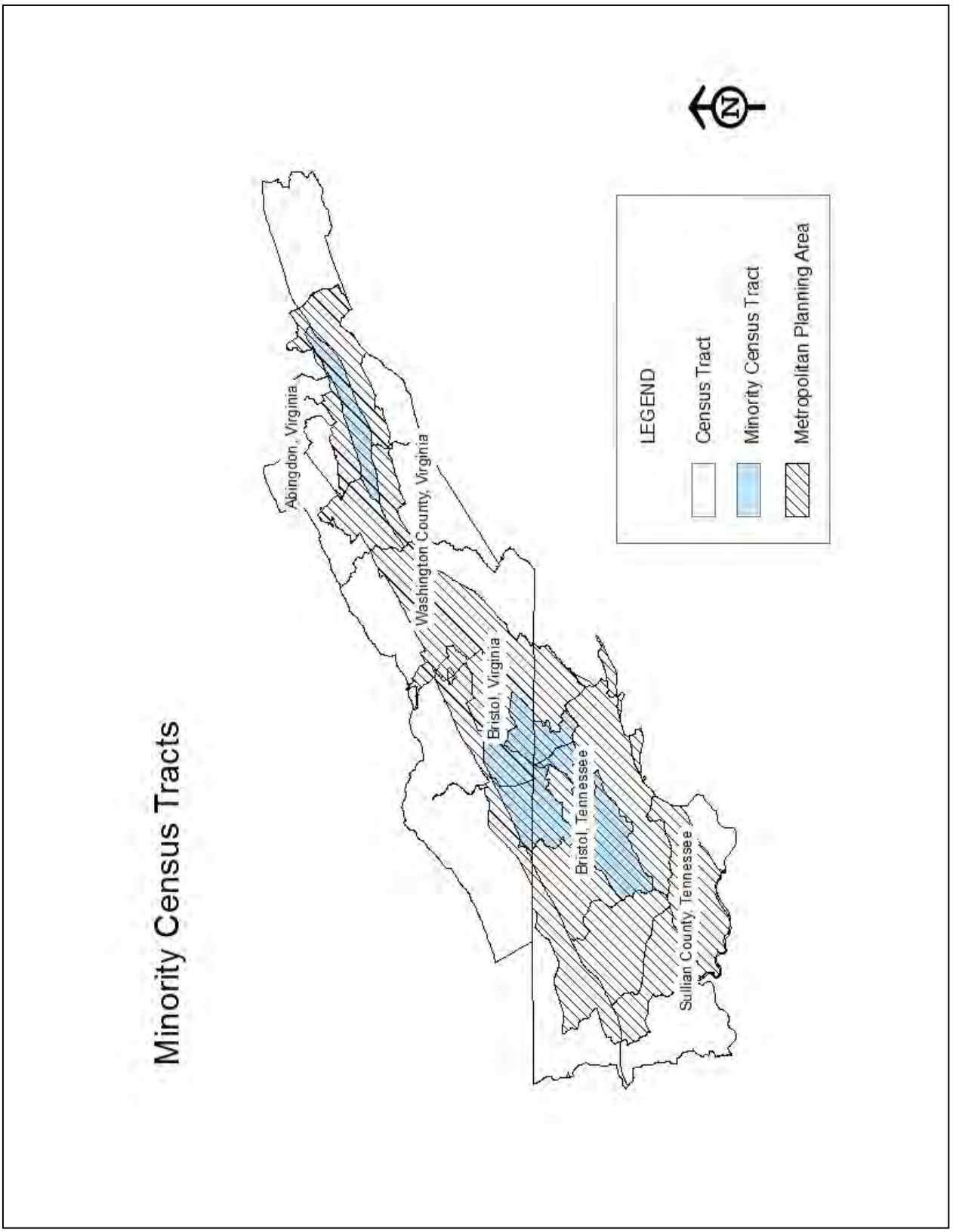
- East Cedar Street (Bristol, Tennessee)
- Volunteer Parkway Medians (Bristol, Tennessee)
- Carden Hollow Road (Sullivan County, Tennessee)
- Exide Drive (Bristol, Tennessee)
- Exit 19 (Washington County, Virginia
- Exit 17 (Abingdon, Virginia)
- East Main Street (Abingdon, Virginia)
- Cook Street/Lowry Drive (Abingdon, Virginia)
- Dr. French Moore Jr. Boulevard (Abingdon, Virginia)

Additionally, both Bristol Tennessee Transit and Bristol Virginia Transit serve in minority and low income defined areas within the urban area. This plan identifies $50 million programmed for transit operating and capital expenditures which benefits traditionally disadvantaged groups.

Table 10-2
Minority Population

Census Tract	Total	Minority		Relative Level of Concern
Tract 101	6,906	148	2.1%	Lower
Tract 102	5,180	64	1.2%	Lower
Tract 104.01	2,381	37	1.6%	Lower
Tract 104.02	3,238	118	3.6%	Lower
Tract 105.01	3,812	144	3.8%	Lower
Tract 105.02	4,120	328	8.0%	Higher
Tract 106.01	4,280	150	3.5%	Lower
Tract 201	3,853	301	7.8%	Higher
Tract 202	5,331	628	11.8%	Higher
Tract 203	2,864	400	14.0%	Higher
Tract 204	5,787	292	5.0%	Lower
Tract 424	3,415	90	2.6%	Lower
Tract 425	3,529	127	3.6%	Lower
Tract 426	4,112	248	6.0%	Higher
Tract 427.01	4,948	386	7.8%	Higher
Tract 427.02	2,103	64	3.0%	Lower
Tract 428.01	2,657	217	8.2%	Higher
Tract 428.02	4,813	462	9.6%	Higher
Tract 429	4,069	197	4.8%	Lower
Tract 430	4,692	153	3.3%	Lower
Tract 432.01	4,102	77	1.9%	Lower
Tract 434.01	5,142	113	2.2%	Lower
Tract 434.02	4,668	157	3.4%	Lower
Total	96,002	4,901	5.1%	n/a

Source: U.S. Census Bureau, Census 2010

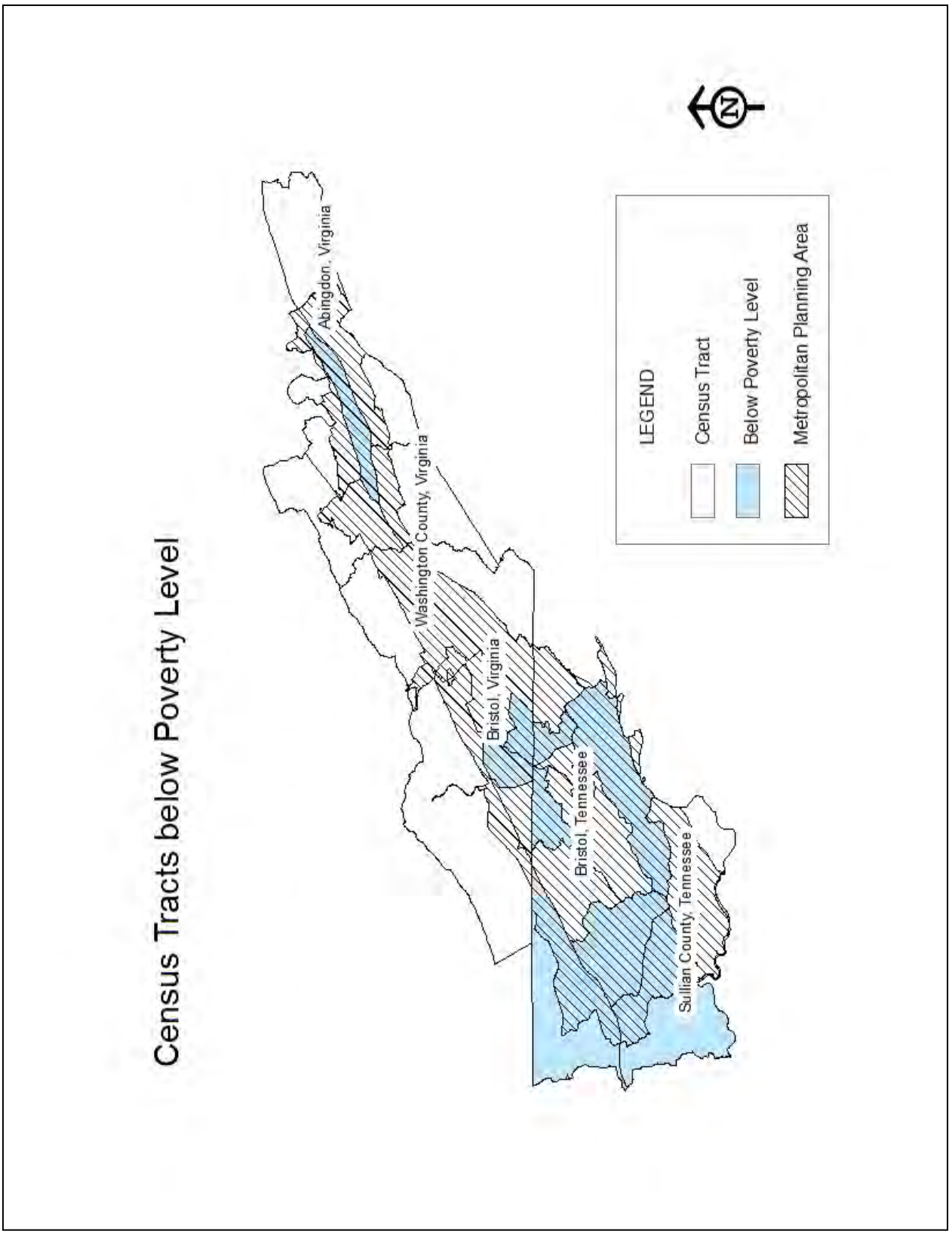

Minority Census Tracts
LEGEND
Census Tract
Minority Census Tract
Metropolitan Planning Area
N
Abingdon, Virginia
Washington County, Virginia
Bristol, Virginia
Bristol, Tennessee
Sullian County, Tennessee

Map 10-1

Table 10-3
Population Below Poverty Level

Census Tract	Population for whom poverty status is determined	Below Poverty Level		Relative Level of Concern
Tract 101	6,711	740	11.0%	Lower
Tract 102	5,667	163	2.9%	Lower
Tract 104.01	2,075	93	4.5%	Lower
Tract 104.02	2,935	327	11.1%	Lower
Tract 105.01	3,981	558	14.0%	Lower
Tract 105.02	3,094	987	31.9%	Higher
Tract 106.01	4,413	459	10.4%	Lower
Tract 201	3,897	662	17.0%	Lower
Tract 202	4,769	1,343	28.2%	Higher
Tract 203	2,896	1,140	39.4%	Higher
Tract 204	5,720	480	8.4%	Lower
Tract 424	3,206	823	25.7%	Higher
Tract 425	3,477	393	11.3%	Lower
Tract 426	4,235	584	13.8%	Lower
Tract 427.01	5,178	1,512	29.2%	Higher
Tract 427.02	2,160	345	16.0%	Lower
Tract 428.01	2,385	355	14.9%	Lower
Tract 428.02	3,734	997	26.7%	Higher
Tract 429	4,026	187	4.6%	Lower
Tract 430	4,305	787	18.3%	Higher
Tract 432.01	4,560	224	4.9%	Lower
Tract 434.01	5,405	1,611	29.8%	Higher
Tract 434.02	4,084	991	24.3%	Higher
Total	92,913	15,761	17.0%	n/a

Source: U.S. Census Bureau, 2009-2013 American Community Survey


Census Tracts below Poverty Level
LEGEND
Census Tract
Below Poverty Level
Metropolitan Planning Area
Abingdon, Virginia
Washington County, Virginia
Bristol, Virginia
Bristol, Tennessee
Sullian County, Tennessee
N

Map 10-2

CHAPTER 11: ENVIRONMENTAL MITIGATION

The *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040* identifies and recommends a capital investment strategy to meet the existing and future transportation needs for the region. These considerations and recommendations made during the planning process are preliminary in nature and detailed environmental analysis conducted through the National Environmental Policy Act (NEPA) is not required for the long range transportation plan. While detailed environmental analysis is not required, the MAP-21 and FAST Act legislation does require the MPO to consult with Federal and State environmental and natural resource agencies to develop a general discussion on possible environmental mitigation activities that should be incorporated and considered in the development of the transportation plan.

Transportation planning activities of the MPO are regional in scope. As a result, environmental mitigation activities identified in the long range transportation plan do not focus on each individual project but offers a summary of the environmentally sensitive areas to be aware of region-wide and potential mitigation strategies that should be considered to reduce the impact of projects. Detailed environmental analysis of individual transportation projects occurs later in the project development process as the improvement approaches the preliminary engineering phase. At this phase, project features may be narrowed and refined, and the environmental impacts and mitigation strategies can be appropriately ascertained.

Climate change is rising in importance as a multi-faceted concern all over the world; however, much controversy and debate has occurred over the actual causes of global climate change. Many scientists and environmental advocates contend that climate change is the result of human factors, such as greenhouse gas emissions from automobiles and factors, while others suggests the climate change is part of a natural cycle. Although there is no clear federal policy on climate change, the MPO promotes a multimodal transportation system that reduces the kinds of greenhouse gases that may be the underlying cause of climate change. Expanding multimodal choices, from increased transit availability to more greenways, bicycle, and sidewalk facilities provide alternatives to the possible causes of climate change as well as supporting a healthier lifestyle.

The MPO is in attainment with the requirements of the Clean Air Act in reference to the National Ambient Air Quality Standards for ozone and particulate matter. In 2015, the Environmental Protection Agency revised the ozone standard from 0.075 parts per million to 0.070. The two ozone monitors in Sullivan County, Tennessee currently have a 3-year average of 0.64 and 0.63 (no monitors are located in Bristol or Washington County, Virginia). To insure continuing compliance with air quality standards, the Tri-Cities Ozone Action Partnership coordinates activities with regard to ozone public education and maintains the Ozone Action Day program to encourage local business and residents to delay open burning, lawn mowing and paving, and to reduce driving on days forecasted for elevated ozone levels.

ENVIRONMENTAL CONSULTATION PROCESS

The Bristol MPO utilized an environmental consultation process recommended by the Tennessee Department of Transportation and Virginia Department of Transportation and identified in the MPO's Public Participation Plan to coordinate with agencies regarding land use management, natural resources, environmental protection, conservation, and historic preservation. To access potential environmental impacts and develop possible environmental mitigation activities, the following processes were incorporated in the development of the *Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan 2040.*

- Proposed transportation improvements were compared to available natural and historic references to assess potential environmental impacts and identify potential mitigation areas or activities.
- The MPO provided affected agencies opportunities to review and comment on identification of sensitive areas and draft potential mitigation activities.
- As part of the final document, the MPO will incorporate a summary analysis and report on the disposition of comments, enhancements, or modifications identified by affected agencies.

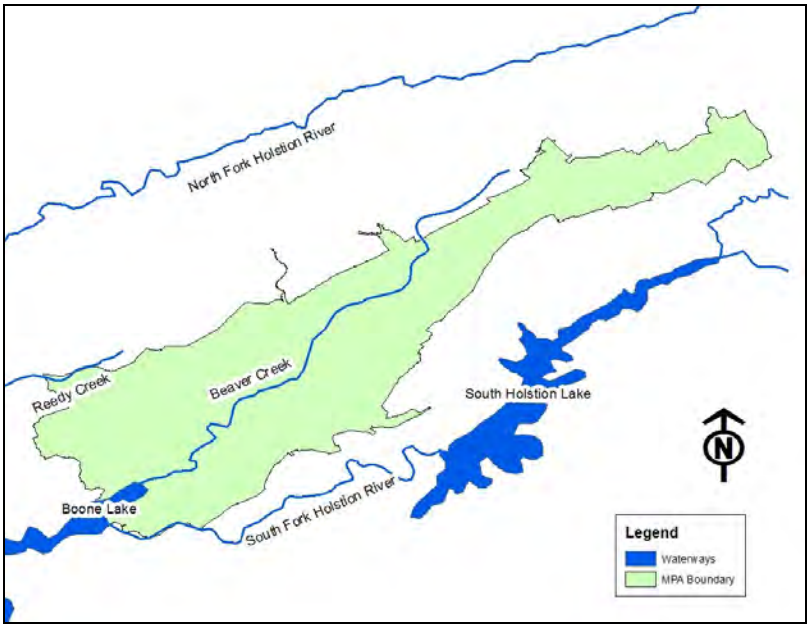
ENVIRONMENTALLY SENSITIVE AREAS

The Bristol Region consists of numerous environmentally sensitive areas, many too small or too numerous to map at a regional level and can only be accurately identified through a project-level analysis. When a project is ready to move from the long-range transportation plan into the engineering and design phases, a comprehensive analysis will be needed to determine the type and location of environmentally sensitive areas. The following discussion provides a general overview of the key areas in which environmental mitigation activities are focused.

Wetlands and Floodplains. In the development of a federally funded project, special requirements are imposed by Executive Order 11988 when the project will entail a significant floodplain encroachment. Floodplain management establishes corrective and preventative measures to avoid the adverse impacts associated with the occupancy and modification of floodplains. To the extent practicable, transportation agencies are required by Executive Order 11990, Protection of Wetlands, to first avoid and then minimize impacts to wetlands in the development of projects. Unavoidable impacts are mitigated by way of wetland compensation through either restoration or creation of wetlands.

The 2004 flood study conducted by the Federal Emergency Management Agency and the Army Corps of Engineers re-defined the floodplain and floodways of the largest waterway in the MPO Region, Beaver Creek, and several of its tributaries. This waterway flows from Washington County, Virginia through downtown Bristol and empties into the South Holston River northwest of Bluff City (Map 11-1). Beaver Creek is surrounded by developed properties for most of its length, and defines the valley between the Beaver Creek Knobs and White Top Knobs in Tennessee; thus, many of the transportation elements within the metropolitan area are historically influenced by its course.

Map 11-1
Major Stream Network



Cultural and Historic Sites. Historic and natural resources are important to identify as part of the decision-making process for transportation projects due to their unique and irreplaceable nature. Section 106 of the National Historic Preservation Act requires a historical review process to determine the effects of a project on all properties on or eligible for inclusion on the national Register of Historic Places. Where such properties will be affected, coordination with the State Historic Preservation Officer and Advisory Council are required prior to project approval. It should be noted the following table of historic places represents the listing on the National Register and many other historic sites have been designated by the State of Tennessee and/or the Commonwealth of Virginia.

Table 11-1
National Register of Historic Places

Historic Place	Location
Abingdon Bank	225 E. Main St., Abingdon, VA
Abingdon Historic District	Main St., Abingdon, VA
Baker-St. John House	Providence Rd., Washington Co., VA
Blountville Historic District	Center of Blountville TN
Bristol Commercial Historic District	Center of Downtown Bristol TN/VA
Bristol Municipal Stadium	Edgemont Ave., Bristol TN
Bristol Railroad Station	Martin Luther King Jr. Blvd., Bristol VA
Bristol Tennessee-Virginia Sign	State St., Bristol TN/VA

Historic Place	Location
Bristol Warehouse Historic District	Scott/Lee St., Bristol, VA
Brook Hall	Byars Ln., Washington Co, VA
Douglass School	Oakview Ave., Bristol VA
East Hill Cemetery	East State St., Bristol,TN
Euclid Avenue Historic District	Euclid Ave., Bristol VA
Fairmount Historic District	Fairmount area, Bristol TN
First National Bank of Bristol	State St., Bristol TN
Gammon House	324 6th St., Bristol, TN
Holston Ave. Historic District	Bristol, TN
King, Edward Washington, House	7th St., Bristol TN
King/Lancaster/McCoy Mitchell House	54 King St., Bristol, VA
Mont Calm	Cummings St., Abingdon, VA
Moonlite Theatre	Lee Hwy., Washington Co., VA
Old Deery Inn	SR 126, Blountville TN
Paramount Theatre	State St., Bristol TN
Parlett House	Georgia Ave., Bristol TN
Pemberton Mansion and Oak	Pemberton Rd, Sullivan Co. TN
Pitts House	Main St., Abingdon, VA
Steel-Seneker Houses	SR 126, Sullivan Co. TN
Shelby Street Station Post Office	Shelby St., Bristol TN
The Grove	Lee Hwy., Washington Co. VA
Solar Hill Historic District	Solar St., Bristol VA
Virginia Hill Historic District	Moore St., Bristol VA
Virginia Intermont College	Moore St., Bristol VA
Virginia Middle School	Piedmont Ave., Bristol, VA
Walnut Grove	Lee Hwy., Washington Co. VA
Whites Mill	Washington Co., VA

Endangered Species and Natural Areas. In the development of a project, special studies and coordination are required when the action may affect Federal- or State-listed threatened or endangered species. This includes fish, wildlife, and plants facing extinction as well as actions that result in destruction or modification of critical habitat. The Endangered Species Act of 1973 establishes processes for avoiding and/or mitigating impacts on endangered or threatened species and Natural Areas including consultation with Fish and Wildlife agencies and Natural Resource agencies. Table 11-2 includes the federal status of endangered species within the MPO region; however, other species have received endangered or threatened designation at the state level.

Table 11-2
Federally Endangered Species*

Species	Federal Status
Amphibians	
Hellbender	Endangered
Arachrids	
Spruce-fir Moss spider	Endangered
Claims	
Cumberland Bean	Endangered
Purple Bean	Endangered
Green Blossom	Endangered
Appalachian Monkeyface	Endangered
Cumberland Monkeyface	Endangered
Pink Mucket	Endangered
Birdwing Pearlymussel	Endangered
Dromedary Pearlymussel	Endangered
Littlewing Pearlymussel	Endangered
Finerayed Pigtoe	Endangered
Rough Pigtoe	Endangered
Shinny Pigtoe	Endangered
Rough Rabbitsfoot	Endangered
Spectaclecase	Endangered
Tan Riffleshell	Endangered
Cumberlandian Combshell	Endangered
Oyster (mussel)	Endangered
Cracking Pearlymussel	Endangered
Slabside Pearlymussel	Endangered
Fanshell	Endangered
Snuffbox Mussel	Endangered
Fluted Kidneyshell	Endangered
Sheepnose Mussel	Endangered
Fishes	
Spotfin Chub	Threatened
Slender Chub	Threatened
Yellowfin Madtorn	Threatened
Blackside Dace	Threatened
Duskytail Darter	Endangered
Mammals	
Indiana Bat	Endangered
Gray Bat	Endangered
Virginia Big-Eared Bat	Endangered
Carolina Northern Flying Squirrel	Endangered
Northern Long-Eared Bat	Threatened

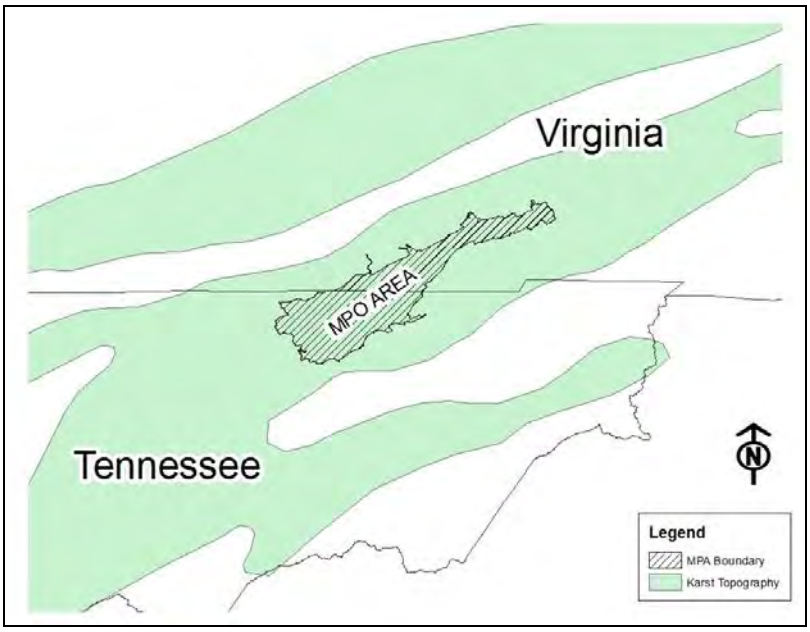
*Source: U.S. Fish and Wildlife Service

Parks and Recreational Areas. Section 4(f) of the USDOT Act of 1966 applies to any federally funded project which involves the use of any significant publicly owned park, recreation area, wildlife and waterfowl refuge, and land from an historic site of national, state or local significance. Special environmental analyses are required to determine if there is a feasible or prudent alternative to taking the proposed action involving the use of such property.

Other Considerations. Other legal and regulatory requirements relating to the human and natural environment need to be considered in the development of transportation projects that pertain to neighborhoods and communities, homes and businesses, noise abatement, air quality, farmland and agricultural areas, and forested areas. Topography should also be a consideration in environmental analysis due to the karst regions of Northeast Tennessee and Southwest Virginia, which are characterized by caves, sinkholes and depressions. The entire Metropolitan Planning Area for the MPO is subject to karst activity (Map 11-2)

Streets, roads, and highways are the primary source of stormwater runoff, carrying pollutants from the adjacent land and from vehicles including heavy metals from tires, brakes, and engine wear, and hydrocarbons from lubricating fluids. If the pollutants are not properly controlled, they can impair local waterways causing them to no longer support the water's designated uses and biotic communities. Mitigation of stormwater runoff is a required element of highway design, construction, and post construction in order to minimize and manage the effects of stormwater runoff.

Map 11-2
Karst Topography



ENVIRONMENTAL MITIGATION

Due to the hilly terrain, presence of karst topography, floodplains, neighborhoods, businesses, and government-preserved lands in the Bristol Region, the majority of projects in this plan may require some type of mitigation efforts. With the numerous environmentally sensitive areas in the region, the MPO consulted with natural resource and environmental agencies when developing the *Long-Range Transportation Plan Year 2040.* Detailed environmental analyses of the recommended projects should occur as projects enter the preliminary development phase, when more specific environmental impacts and mitigation strategies can be better determined on a project-by-project basis.

While mitigation efforts need to be included in any project that has an impact on an environmentally sensitive area, it should be recognized that not every project will have the same level of impact. Some projects involve major construction with considerable earth disturbance, such as new roadways and roadway widening projects. Other projects involve minor construction and minimal earth disturbance, such as signalization, installation of streetlights, and resurfacing projects. The mitigation efforts used for a project should be dependent upon how severe the impact on environmentally sensitive areas will be.

Mitigation is the attempt to offset potential adverse effects of human activity on the environment. Potential environmental mitigation activities may include, but are not limited to: avoiding impacts altogether, minimizing a proposed project's size, abatement measures to reduce construction impacts, and compensating for environmental impacts by providing suitable, replacement or substitute environmental resources on- or off-site (Table 11-3). In determining which mitigation strategies to utilize, each project identified as having an impact on an environmentally sensitive area should follow a mitigation planning process prior to construction, consisting of:

1. Identification of all environmentally sensitive areas throughout the project study area;
2. Determination of how and to what extent the project will impact these areas; and
3. Development of appropriate mitigation strategies to lessen the impact of projects on the environmentally sensitive areas.

Context Sensitive Solutions. Many transportation agencies, including the Tennessee Department of Transportation have utilized a Context Sensitive Solutions (CSS) process for major construction projects. Context Sensitive Solutions balance safety and mobility and the preservation of scenic, aesthetic, historic, environmental and other community values. The CSS process strives to provide transportation projects designed to improve the quality of life for the community by developing a consensus with a full range of stakeholders for solutions to transportation needs. The process involves considerable public participation and the flexibility to consider alternative designs to lessen the impact of the project on the community. Context Sensitive Solutions can be a valuable tool to ensure that appropriate environmental mitigation activities are considered.

Table 11-3
Potential Environmental Mitigation Activities

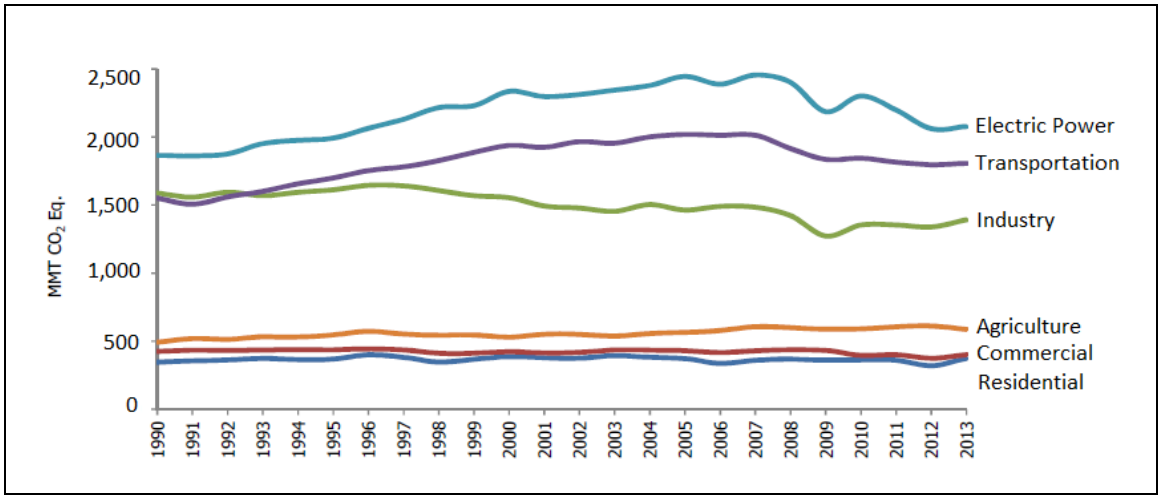
Resource	Potential Mitigation Activities
Wetlands or Water Resources	Mitigation sequencing requirements involving avoidance, minimization, compensation (preservation, creation, restoration); design exceptions; and environmental compliance monitoring
Stormwater Runoff	Physical, structural, and managerial practices to prevent or reduce runoff damage including green infrastructure.
Forested and Natural Areas	Avoidance, minimization; replacement property for open space easements; design exceptions and variance; environmental compliance monitoring
Agricultural Areas	Avoidance, minimization; design exceptions and variance; environmental compliance monitoring
Endangered and Threatened Species	Avoidance, minimization; time of year restriction; construction sequencing; design exceptions; species research; Memoranda of Agreements for species management; environmental compliance monitoring.
Air Quality	Transportation control measures, transportation emission reduction measures
Neighborhoods, Communities and Businesses	Impact avoidance or minimization; context sensitive solutions
Cultural Resources	Avoidance, minimization; preservation in place or excavation for archeological sites; Memoranda of Agreement with Department of Historic Resources; design exceptions and variances; environmental compliance monitoring
Parks and Recreation Areas	Avoidance, minimization, mitigation; design exceptions and variance; environmental compliance monitoring

CLIMATE CHANGE

Climate change refers to any significant change in measures of climate (such as temperature, precipitation or wind) lasting for an extended period (decades or longer). Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Naturally occurring greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Greenhouse gases prevent heat from escaping to the atmosphere and contribute to an increase in global average temperature and related climate changes. During the past century, energy-related activities have substantially added to the amount of greenhouse gases in the atmosphere in the form of carbon dioxide emissions from burning fossil fuels.

Existing Conditions. Based on the Inventory of U.S. Greenhouse Gas Emission and Sinks (EPA) the primary greenhouse gas emitted by human activities in the U.S. is CO_2, representing approximately 77 percent of total greenhouse gases in 2013. The largest source of CO_2 is fossil fuel combustion, with the electric power industry, accounting for 31 percent of GHG emissions. In 2013, transportation activities accounted for 27 percent of the CO_2 emissions from fossil fuel combustion (Chart 11-1).

Chart 11-1
U.S. Greenhouse Gas Emissions Allocated to Economic Sectors
Metric tons of CO_2 Equivalent (millions)



Source: *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, EPA

In terms of overall trends, from 1990 to 2013, total transportation emissions rose by 16.5 percent. Almost all of the energy consumed for transportation is supplied by petroleum-based products, with more than half being related to gasoline consumption in highway vehicles. Other fuel uses, especially diesel fuel for locomotives and trucks, and jet fuel for aircraft, account for the remainder. In 2013, the largest sources of transportation greenhouse gases were passenger cars (42.2 percent), freight trucks (22.5 percent), light duty trucks (17.9 percent), commercial aircraft (6.4 percent), rail (2.6 percent), pipelines (2.6 percent), and ships/boats (2.2 percent).

POTENTIAL GHG MITIGATION ACTIONS

The goal of minimizing fuel consumption and air pollution can be interpreted as a direct link to climate change and justification for metropolitan transportation planning to consider climate change mitigation strategies. Transportation GHG emissions are related to numerous decisions by government, businesses, and individuals. These decisions can range from the choice of vehicle type to land use activities. Mitigation of climate change means the reduction of GHG emissions released by human activities. For the transportation sector, provisions that relate to efficient management and operation of the transportation system, coordination with land use plans, and congestion mitigation can all relate to reducing GHG emissions.

The Commonwealth of Virginia has a *Climate Change Action Plan* in place, which outlines recommendations for Virginia to reduce GHG emissions and includes transportation and land use strategies. In 2014, the Governor created, via Executive Order, the Governor's Climate Change and Resiliency Update Commission to update and prioritize the recommendations in the *Climate Change Action Plan.* The State of Tennessee doesn't have a formal climate mitigation plan, but has enacted a variety of Energy Efficiency Policies including incentives for high-efficiency vehicles and the Clean Tennessee Energy Grant Program.

The potential mitigation actions to reduce GHG for the Bristol Tenness/Virginia Urban Area MPO (Table 11-4) are drawn from a larger group of stakeholder-recommended options in states with climate action plans as well as the Southern Governors' Association policy strategies.

Table 11-4
Potential Climate Mitigation Strategies

Climate Mitigation Strategies	Potential Actions
New Vehicle Standards	Improve fuel economy Vehicle technology improvements
Anti-Idling Practices	Truck stop electrification Vehicle idling restrictions Traffic signal optimization
Mode Shift from Truck to Rail	Improve railroad infrastructure Increase rail capacity Intermodal terminal development
Renewable Fuels	Biodiesel expansion Low-carbon fuel standards
Transportation System Management	Traffic signal synchronization Intelligent transportation systems
Smart Growth/Land Use	Establish energy efficient land-use patterns Promote redevelopment projects
Other Modes	Expand public transit infrastructure Develop pedestrian/bicycle facilities Promote carpools, vanpools, telecommuting

CHAPTER 12: PUBLIC INVOLVEMENT

Public participation in the Metropolitan Planning Organization's planning process is an integral part of regional transportation activities as well as a requirement of the FAST Act. The Bristol MPO encourages the distribution of information related to transportation decisions throughout the region. It is the policy of the MPO to take all public comments into account in the development and adoption of plans and programs, specifically the Transportation Improvement Program and long-range transportation plan.

PUBLIC PARTICIPATION PLAN

The Bristol MPO's *Public Participation Plan* reflects the current policies for developing transportation planning programs in accordance with the provisions of the FAST Act. The following excerpt from the *Public Participation Plan* is specifically related to the MPO's policy for development of the long-range transportation plan.

(1) Reasonable opportunities for public participation and comment during the development of the LRTP will be provided to interested parties by utilizing public notification and outreach tools to gain early and continuing input and interaction with the public on transportation issues.
(2) To provide opportunity for public comment from traditionally underserved groups, special effort will be made to provide MPO announcements and information to local social service agencies, neighborhood groups and minority organizations.
(3) Development of the LRTP shall include consultation with interested parties, other related Federal, State, and local planning agencies affected by transportation, including resource agencies responsible for natural resource management and historic preservation.
(4) Public review and comment opportunities shall be provided when the plan is originally adopted, for amendments to the plan, and during the plan update cycle.
(5) There shall be at least a 30-day comment period on the draft LRTP prior to adoption. The public comment period begins with public notice.
(6) A summary of all comments received, either verbally or in writing, will be made available to the Executive Board prior to adoption, and incorporated into the final LRTP. Before approval by the Executive Board, the public shall be afforded the opportunity to comment on the draft LRTP.
(7) After evaluation of comments received on the draft LRTP, the Executive Board may defer the adoption of the plan if there are significant unresolved comments. The MPO staff will prepare written response to the comments to be incorporated into the document, or suggest amendments to the draft document. Should the amendments be significant, another 30-day review period shall be provided.
(8) Amendments to the long-range transportation plan must follow the same process with the exception of projects deemed to be generally local in nature and scale.

Consultation with Interested Parties and Other Public Agencies. As with previous federal transportation legislation, the FAST-Act requires the MPO's public participation process to provide citizens, affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties with reasonable opportunities to be involved in the metropolitan planning process. This process also includes consultation and coordination, as appropriate, with agencies and official responsible for other planning activities with the metropolitan planning area. In order to facilitate this process, the MPO developed a contact list of interested parties, which were provided notice of the *Bristol Urban Area Long-Range Transportation Plan Year 2040* review process. The contact list of stakeholders is included as an appendix to the MPO's *Public Participation Plan* documentation.

Meeting Announcements. Meeting announcements related to the long-range plan are distributed throughout the community, including press releases. In addition to the press notices, flyers are sent to various locations and organizations including those representing underserved populations as listed below.

- Bristol Virginia Senior Center
- Bristol Tennessee Community Center
- Bristol Tennessee/Virginia Public Library
- Bristol, Tennessee Community Development
- Bristol, Virginia Community Development
- Appalachian Independence Center
- Bristol, Tennessee Housing and Redevelopment Authority
- Bristol, Virginia Housing and Redevelopment Authority
- Local public transportation agencies (Bristol Transit, Abingdon Transit, NET Trans, District Three Transit)

Public Comment Period. A 30-day public review period for the *Bristol Urban Area Long-Range Transportation Plan Year 2040* was published in the *Bristol Herald Courier* on August 17, 2016. In addition to the above referenced agencies, the public comment notice was distributed to an expanded list of interested parties and organizations, public agencies, and environmental agencies.

The *Bristol Urban Area Long-Range Transportation Plan Year 2040* was made available on the MPO website and at the office of MPO staff (City of Bristol, Tennessee) located at 104 8th Street, Bristol, Tennessee, during normal working hours. Copies of draft plan update were also placed at the following locations for public access, in addition to appearing electronically on the MPO's website:

- Bristol, Virginia Department of Community Development.
- Sullivan County Tennessee Department of Planning and Zoning.
- Town of Abingdon Virginia, Department of Planning
- Washington County Virginia Department of Planning and Zoning.
- Bristol Tennessee/Virginia Public Library.

- Community centers and agencies serving low income and minority areas.

PUBLIC COMMENTS

Transportation Survey: A survey (via surveymonkey) was on-going during the development of the long-range plan update. The survey link was provided to local jurisdictions for webpage postings and media notices published. To date, the following survey results and written comments have been received.

city of bristol News Release

FOR IMMEDIATE RELEASE
Monday, April 4, 2016

CONTACT: Rex Montgomery
Department of Transportation
Phone: 423-989-5591
E-Mail: rmontgomery@bristoltn.org

Urban Area MPO seeking citizen input for new transportation plan

The Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization (MPO) is asking for citizen input to help set future transportation needs of the community and establish priorities for funding those improvements. "The survey should take no more than three minutes to complete," said Rex Montgomery, Transportation Planning Manager. "This input is vital in recognizing what is important to our community in the area of transportation." To participate in the survey go to www.bristoltn.org click on "Surveys" or go to https://www.surveymonkey.com/r/BRISTOLMPO.

"A major role of our MPO's work is to produce the regional long-range transportation plan which summarizes the multimodal transportation plan that includes highways, transit, bicycle and pedestrian. This plan will reflect needs for the next 25 years," continued Montgomery. The MPO is working on an update that will extend the current plan through 2040.

The MPO is a federally mandated agency responsible for the transportation processes that allows the MPO region to receive federal and state transportation funding. The Bristol Tennessee/Virginia Urban Area MPO is comprised of representatives from local governments and includes the City of Bristol, Tennessee, City of Bristol, Virginia, the Town of Abingdon, Virginia, and Sullivan County, Tennessee and Washington County, Virginia.

For more information on the MPO's work or the survey, please contact Rex Montgomery at 423-989-5591 or email rmontgomery@bristoltn.org.

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Briefly

Bristol Urban Planning seeks public input

Have an idea for improving transportation routes in Bristol? The Bristol Tennessee/Virginia Urban Area Metropolitan Planning Organization wants to know about it.

The organization is seeking public input before establishing future transportation project priorities, and assigning possible funding. So planners have created a survey of questions for residents to answer.

A federally mandated agency, the planning organization is responsible for managing processes that allow the region to receive federal and state funding for transportation projects. The local organization is comprised of representatives from the cities of Bristol, Tennessee, and Bristol, Virginia, the town of Abingdon, Virginia, and the counties of Sullivan County in Tennessee and Washington County in Virginia.

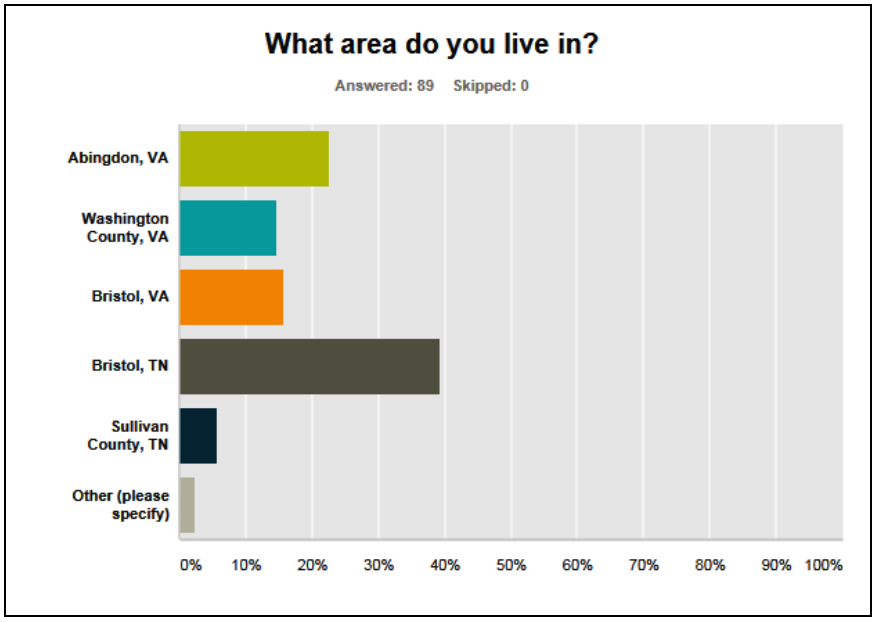
"The survey should take no more than three minutes to complete," Rex Montgomery, transportation planning manager said. "This input is vital in recognizing what is important to our community in the area of transportation."

To participate in the survey go to www.bristoltn.org, click on surveys or go to https://www.surveymonkey.com/r/BRISTOLMPO.

For more information on the organization's work or the survey, contact Rex Montgomery at 423-989-5591 or email rmontgomery@bristoltn.org.

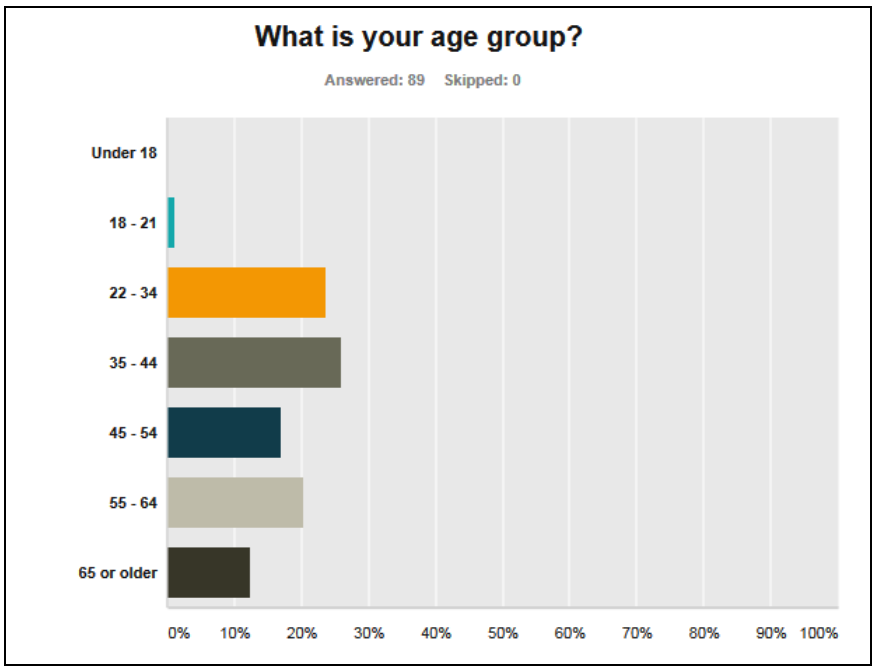
From staff reports

Question 1



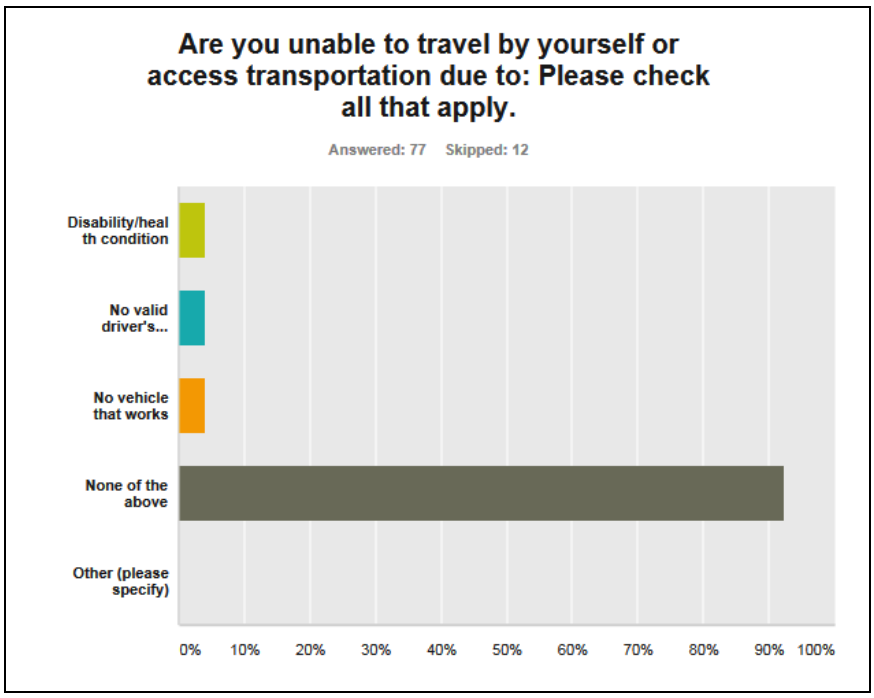
Answer Choices	Responses	
Abingdon, VA	**22.47%**	20
Washington County, VA	**14.61%**	13
Bristol, VA	**15.73%**	14
Bristol, TN	**39.33%**	35
Sullivan County, TN	**5.62%**	5
Other (please specify)	**2.25%**	2
Total		89

Question 2



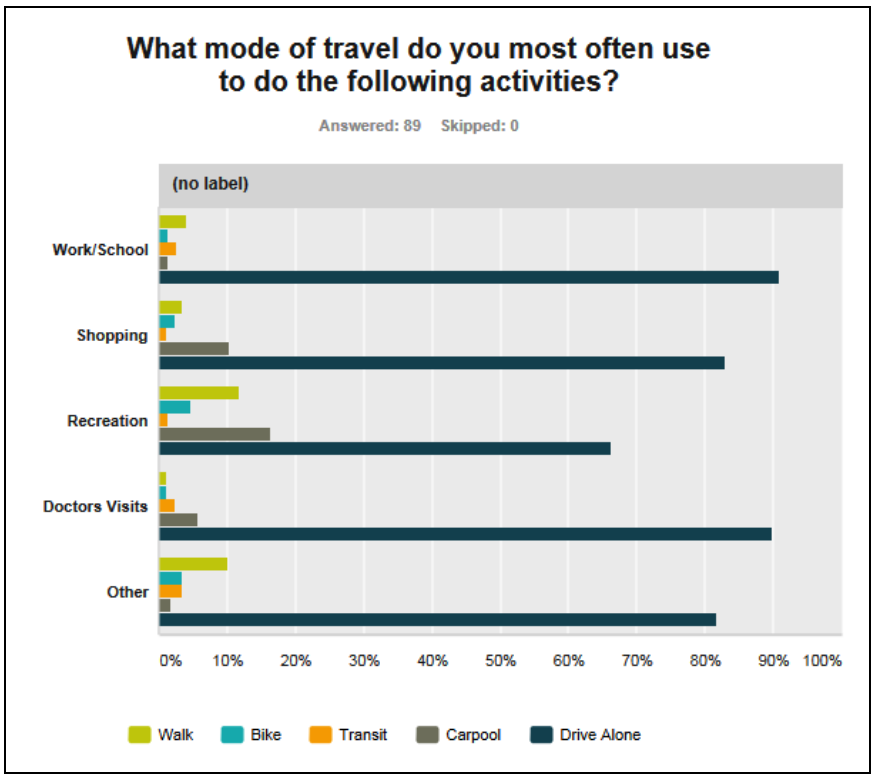
Answer Choices	Responses	
Under 18	**0.00%**	0
18 - 21	**1.12%**	1
22 - 34	**23.60%**	21
35 - 44	**25.84%**	23
45 - 54	**16.85%**	15
55 - 64	**20.22%**	18
65 or older	**12.36%**	11
Total		89

Question 3



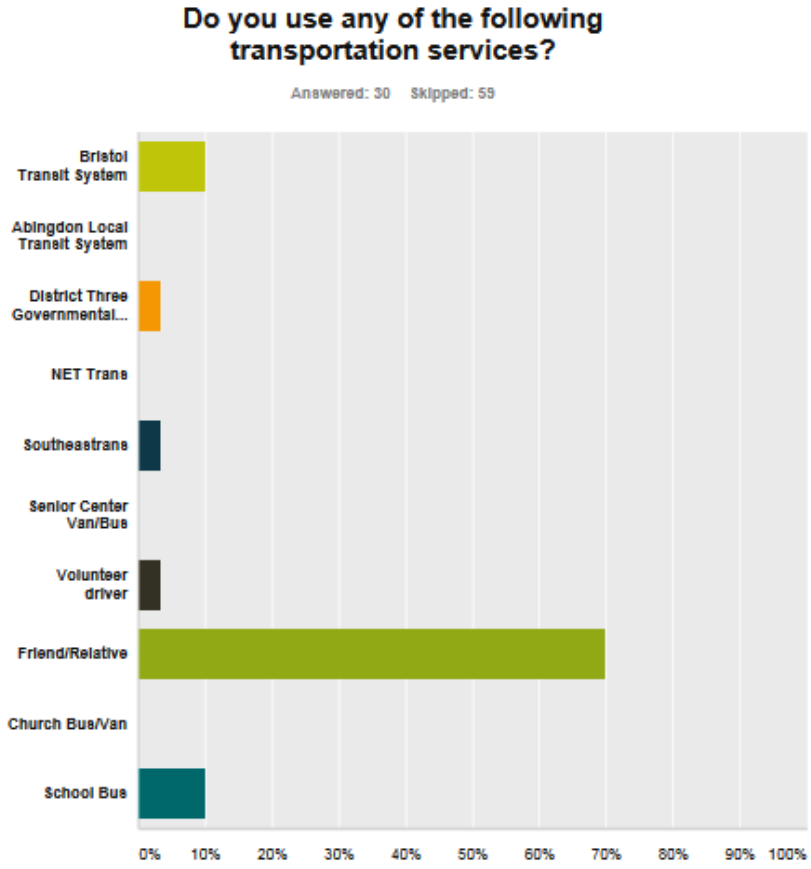
Answer Choices	Responses	
Disability/health condition	**3.90%**	3
No valid driver's license	**3.90%**	3
No vehicle that works	**3.90%**	3
None of the above	**92.21%**	71
Other (please specify)	**0.00%**	0
Total Respondents: 77		

Question 4



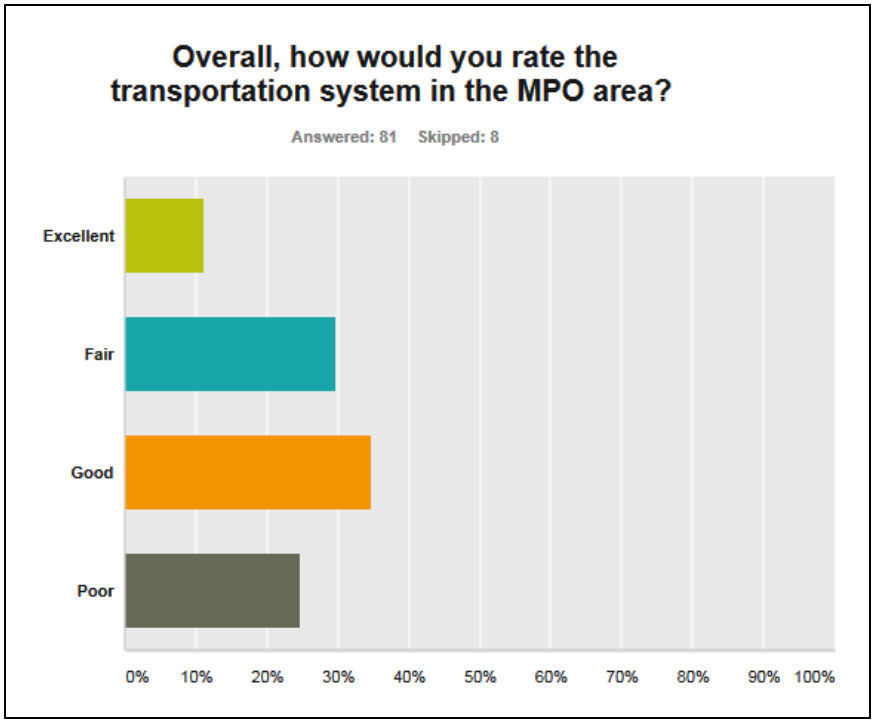
(no label)	Walk	Bike	Transit	Carpool	Drive Alone	Total
Work/School	3.90% 3	1.30% 1	2.60% 2	1.30% 1	90.91% 70	77
Shopping	3.41% 3	2.27% 2	1.14% 1	10.23% 9	82.95% 73	88
Recreation	11.63% 10	4.65% 4	1.16% 1	16.28% 14	66.28% 57	86
Doctors Visits	1.14% 1	1.14% 1	2.27% 2	5.68% 5	89.77% 79	88
Other	10.00% 6	3.33% 2	3.33% 2	1.67% 1	81.67% 49	60

Question 5



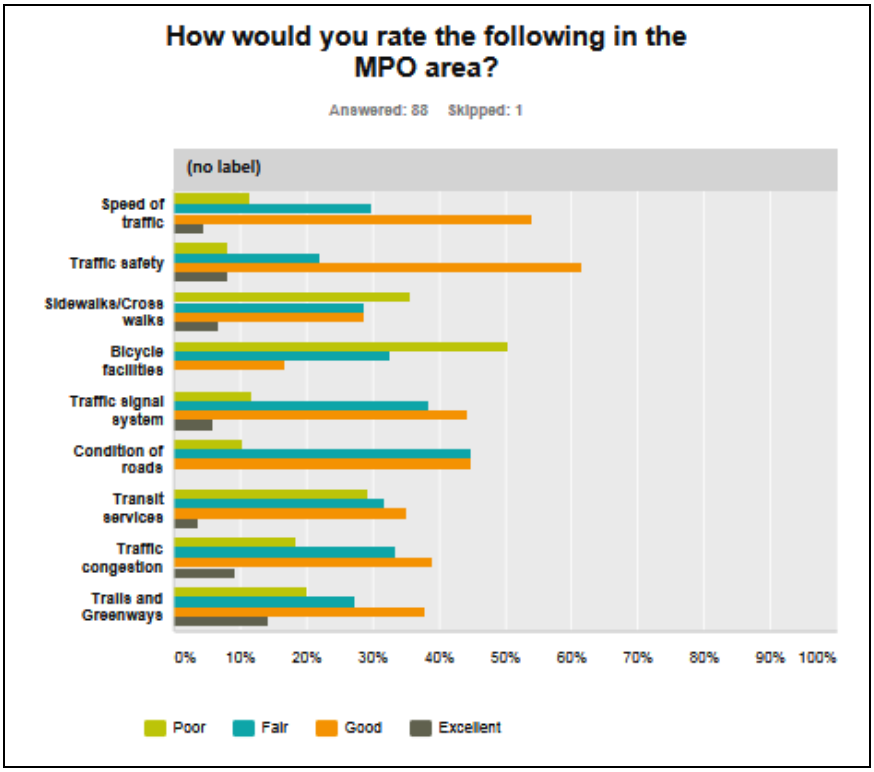
Answer Choices	Responses	
Bristol Transit System	10.00%	3
Abingdon Local Transit System	0.00%	0
District Three Governmental Cooperative Transit	3.33%	1
NET Trans	0.00%	0
Southeastrans	3.33%	1
Senior Center Van/Bus	0.00%	0
Volunteer driver	3.33%	1
Friend/Relative	70.00%	21
Church Bus/Van	0.00%	0
School Bus	10.00%	3
Total		30

Question 6



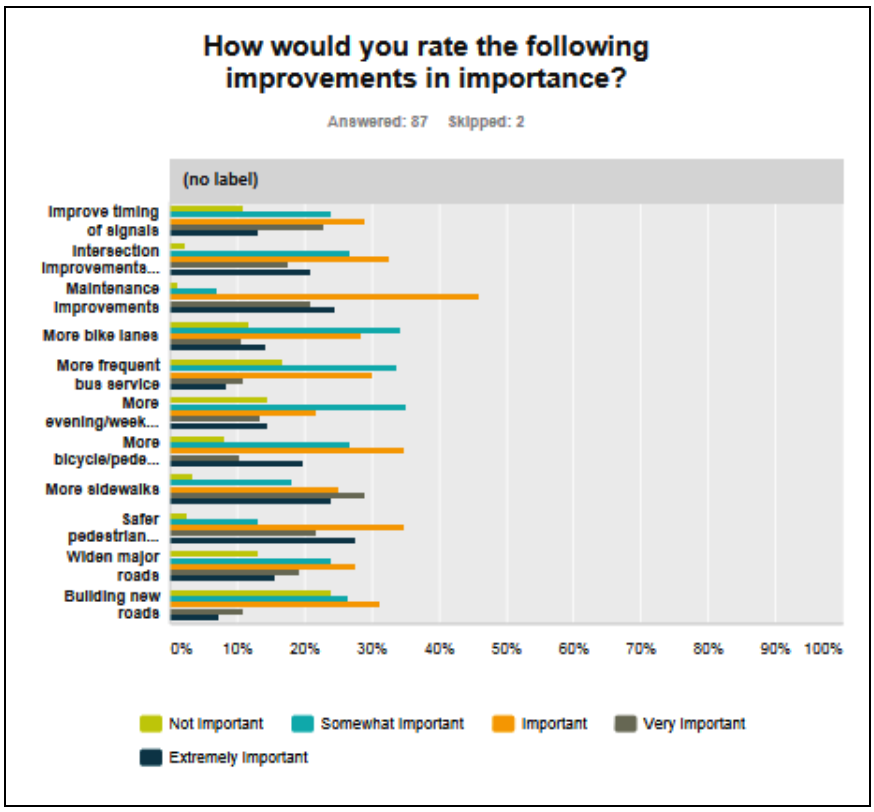
Answer Choices	Responses	
Excellent	**11.11%**	9
Fair	**29.63%**	24
Good	**34.57%**	28
Poor	**24.69%**	20
Total		81

Question 7



(no label)	Poor	Fair	Good	Excellent	Total
Speed of traffic	11.49% 10	29.89% 26	54.02% 47	4.60% 4	87
Traffic safety	8.14% 7	22.09% 19	61.63% 53	8.14% 7	86
Sidewalks/Crosswalks	35.63% 31	28.74% 25	28.74% 25	6.90% 6	87
Bicycle facilities	50.60% 42	32.53% 27	16.87% 14	0.00% 0	83
Traffic signal system	11.63% 10	38.37% 33	44.19% 38	5.81% 5	86
Condition of roads	10.34% 9	44.83% 39	44.83% 39	0.00% 0	87
Transit services	29.27% 24	31.71% 26	35.37% 29	3.66% 3	82
Traffic congestion	18.39% 16	33.33% 29	39.08% 34	9.20% 8	87
Trails and Greenways	20.24% 17	27.38% 23	38.10% 32	14.29% 12	84

Question 8



(no label)

	Not Important	Somewhat Important	Important	Very Important	Extremely Important	Total
Improve timing of signals	10.84% 9	24.10% 20	28.92% 24	22.89% 19	13.25% 11	83
Intersection improvements with pedestrian accommodations	2.33% 2	26.74% 23	32.56% 28	17.44% 15	20.93% 18	86
Maintenance improvements	1.18% 1	7.06% 6	45.88% 39	21.18% 18	24.71% 21	85
More bike lanes	11.90% 10	34.52% 29	28.57% 24	10.71% 9	14.29% 12	84
More frequent bus service	16.87% 14	33.73% 28	30.12% 25	10.84% 9	8.43% 7	83
More evening/weekend bus service	14.63% 12	35.37% 29	21.95% 18	13.41% 11	14.63% 12	82
More bicycle/pedestrian trails	8.14% 7	26.74% 23	34.88% 30	10.47% 9	19.77% 17	86
More sidewalks	3.61% 3	18.07% 15	25.30% 21	28.92% 24	24.10% 20	83
Safer pedestrian crosswalks	2.41% 2	13.25% 11	34.94% 29	21.69% 18	27.71% 23	83
Widen major roads	13.25% 11	24.10% 20	27.71% 23	19.28% 16	15.66% 13	83
Building new roads	24.10% 20	26.51% 22	31.33% 26	10.84% 9	7.23% 6	83

Q9 What are some specific locations with traffic problems that you encounter throughout your day?

#	Responses
1	Exit 14, Exit 17 & Exit 19
2	Speeding and unsafe driving in residential area's including police cruisers making the area unsafe for our children and animals. Specifically the Hunter Hills / Tulip Grove area. Speed limit signs, children at play signs, and most importantly speed humps would greatly improve the safety of the area.
3	Exit 14 area is very congested during rush hours.
4	E. Cedar, Bristol Tn
5	Speeders on Georgia Ave.
6	Traffic on Taylor Street is terrible. People constantly speed at high rates. We have children and pets on the street and it is very dangerous. Police park for maybe 10 minutes at a stretch in the wide open where they can be seen, which does nothing to deter the speeding.
7	Corner 5th and Ash Sts - should be 4 way stop. Not enough traffic for a stop light since Anderson St bridge was built. The only use for the red light might be when the drug manufacturer starts and ends work. (Bristol, TN)
8	Intersection of Old Jonesboro Road and VHCC Drive. Intersection of Main Street and Porterfield Highway.
9	Congestion at Exit 17! It's a bottleneck under the interstate.
10	Interstate and exit ramps
11	Exit 17 and Cummings Street.
12	E-cedar street Virginia ave. intersection
13	State St @ Commonwealth Ave/Volunteer Pky (2) VolunteerPky @ Godsey Rd (3) W. State St @ Euclid Ave/GateCity Hwy (4) Weaver Pike @ Volunterr Pky
14	Elementary School areas should have more side walks
15	Exit 7 is almost always an issue, but I would think that would decrease once all the roadway improvements are completed. There might need to be a traffic light regulated crosswalk at the intersection MLK and Shelby St, where the Salvation Army is located (Bristol TN). The pedestrians who go there don't have a safe way of crossing over in that area and I have witnessed several people in motorized wheelchairs ride on the road as they are heading to the Salvation Army or toward the Dollar General, and other people with baby carriages trying to negotiating the curb median as they try to cross near that location.
16	Exit 19 there is an accident each week and its hard for people that live off empire road to get out and in each day
17	None
18	Speed for these children walking through the Fairmount area and Taylor street. I live on the corner of Spruce and Maryland. They run the stop signs. People walk their dogs all hours of the night. Rightfully so! Maybe when a child is killed they will listen. I don't even allow my children to play in my yard. Because of the drugs on Taylor street. They are high driving throw this part of the neighborhood. My son is deaf. The city officials and the police chief doesn't care. We will move out of this city as soon as we can. We wish we never moved here. We were told what a great place it was to live. Their sign is a lie! We have kids that saturate this sidewalk. They do not care how fast they speed through here. The kids get out of school and run the stop signs. The stop signs are useless. I personally stop them and tell them to slow down when I am outside working. I wanted to purchase our old historic house and fix it up. No longer!!! My children won't grow up in this Motor Speedway neighborhood. I was raised in Bluff City. I'm making a copy of this survey to have when one of our pedestrians or children are ran over by a druggie from Taylor street. Or hit by one of the speeders down Maryland. I hope they sue the hell out of the city because we have all kept record of how we have complained and complained and NO ONE CARES!!!!!
19	Exit 17 at Cummings Street is really rough at 5:00pm. Pedestrian crossings at Cummings and Main are frightening.

20	Speeding in the Fairmount District
21	In my neighborhood corner of Kentucky and Cypress, really all crossings around the Fairmount School
22	Exit 7 & Exit 5 and all traffic signal in the MPO area. Poor timings and no coordination.
23	Exit 19 area near interstate on and off ramps; Exit 17 entire area surrounding the interstate exchange
24	Exit 5 and 7 congestion.. Also, Taylor street laden with parked trucks/cars..with nowhere else to park.
25	Exit 17 I-81 at Cummings Street in Abingdon is a massive congestion and needs improving for traffic safety and flow. East Main Street Abingdon, VA needs improving to connect the two five lane road widths between Hillman Highway and Exit 19 I-81. With the recent development in this area traffic is only going to continue to grow.
26	Taylor Street is a disgrace to this community on the National Register of Historical places! I have lived here 27 years and it has been patched so many times it looks like a getto. Traffic has increased 100 times since reworking of intersection on Pennsylvania and Taylor. Large trucks, cars, everything comes through our neighborhood now. Concrete trucks too. It is a shame Bristol does not keep up these streets. It should be called patchwork city. It is so ugly, they wasted ugly on our streets. I am so upset with the city for this and also traffic zones designed to catch people speeding. 25 mph was great in horse and buggy days. Come on Bristol! This has almost forced me to move out of this city! It is ugly because of our streets!
27	RR crossings both at State Street & Cedar Street all neighborhood "stop signs", kids on bikes rarely acknowledge them. AND Speed limits in neighborhoods are ignored making for dangerous situations. A ALSO parking on the street too close to an intersection blocking clear site line to on coming traffic--specifically spruce st & florida & Kentucky at Ash st
28	There are some people who travel down Taylor St way too fast.
29	I walk a lot in my own neighborhood and with better/safer sidewalks would enjoy walking even more. I think cars running or rolling through stop signs is a big issue and needs to be addressed with enforcement.
30	Exits 73, 7, 14, 17, and 19. Euclid and Commonwealth, all of Volunteer Pkwy.
31	volunteer parkway state street weaver pike I-81
32	Exit 19 and Exit 17 areas. East Main street area
33	Crossing Volunteer PKWY/ Commonwealth AVE and State Street No sidewalks or bike lanes between King College and Old Jonesboro frequently used by walkers and bikers
34	Exit 17 red light needs to be fixed. The timing usually holds north bound exits for too long and late at night it's very difficult to get them to change. Main Street and Empire drive at exit 19 need adjustments or a light especially with Walmart bringing in more traffic.
35	Congestion in the following areas: Exit 19 South bound exit ramp and East Main Street. 7:20am-9:00am & 2pm-7pm. Exit 17 Northbound exit ramp. 3pm-7pm. East Main Street in Abingdon 4-7pm evenings. Tractor Trailers using Exit 17 south bound ramp and traveling thru town to access Porterfield Highway causing traffic delays due to narrow turns. Delays on Hillman Highway and Route 80 due to narrow roads and no lanes for bike riders during the warmer months due to popularity of the road. West Main Street and Colonial road intersection and West Main Street and Porterfield Highway intersection.
36	Abingdon: Exit 17, Cummings Street.
37	Cummings and Main Street and exit 17. Exit 19 and where the new Walmart is planned and Lowes exists already.
38	11W at the intersection of 394 (Blountville). Elem. school is located on the hill away from the main road. Traffic has been reduced to 25mph when lights are flashing or 45 otherwise. The slowing of traffic is extremely hazardous and will cause more accidents as this is a 4 lane highway. The 25mph is ridiculous and not needed. This is a speed trap and police monitor this area heavily. There is no obvious reason for the speed limit to be 25mph on this hwy. other than to generate revenue.
39	Cummings Street, Old Jonesboro Road, AHS
40	Exit 17, I81 area.

41	When walking unable to safely cross Cummings St even at crosswalks
42	Cummings Street/Exit 17 area of Abingdon. I-81 needs to be widened to three lanes.
43	Pennsylvania Ave - Bristol, TN Road surface conditions in Fairmount neighborhood - Bristol, TN Continue sidewalk improvements in Fairmount neighborhood - Bristol, TN Road conditions/traffic patterns/congestion around Exit 5 and Exit 7 - Bristol, VA
44	Commonwealth & Volunteer are always congested.
45	Turning left at major intersections without a left-turn arrow shouldn't be allowed. Specifically, the intersection at Virginia Avenue and Cedar Street gets backed up from cars waiting for oncoming traffic to clear for them to turn left.
46	All interstate exits because the state has failed to widen the overpasses at exits 14, 17 and 19 and to complete the cloverleafs and to correct major safety issues
47	King College and Old Jonesborough
48	The speed on volunteer parkway should be raised to 45mph instead of 35mph. This cause traffic congestion and it's a 4 lanes highway.
49	Bristol TN/VA has done a decent job in street traffic control other than interchanges Bonham Road to 5 Exit 7 / Lee Hwy (under construction). City of Bristol, TN for safety issue needs to eliminate left hand turn off south bound Hi-way 11W across median and onto Island Road. Allow Island Road traffic to U-Turn on signal at Pinnacle 11-W traffic light.
50	Cummings St.; Main St.; Valley St. and each of the three major exits into Abingdon (exits 14, 17 & 19).
51	Lee Highway Bristol, VA
52	Lee Hwy and Valley Drive intersection signal should stay green longer on Lee Hwy in the morning.
53	We need better/safer pedestrian crosswalk facilities.
54	King College Road needs pedestrian and bicycle trails.
55	VOLUNTEER PARKWAY,PENN AVE. EAST CEDAR STREET,
56	No direct route from Pinnacle to Downtown Bristol to BMS
57	Places where sidewalks stop and none pick up like near east hill cemetery and King University
58	The train blocking State Street!!
59	No clearly identified bicycle lanes anywhere in the city despite a high frequency of fatalities and accidents. Travel across Southeast and Northeast section of Bristol takes to long because there is no main road to provide travel.

Q9 Please use the space below for additional comments regarding transportation improvement needs in the MPO area.

#	Responses
1	Completion of Widening Interstate 81 and State Route 11 to Exit 10.
2	See above
3	After 10 stop lights on secondary roads should blink yellow due to decreased traffic.
4	Traffic lights should revert to blinking lights after 10 or 11 PM.
5	It would be very helpful if cameras were installed in the stoplights. At least one vehicle runs a red light during my morning and afternoon commutes. This is especially truck for tractor trailers and work vehicles. Most of the vehicles that end up running the red lights have more than enough time to stop, which blatantly endagers the safety of other drivers on the road. Having cameras in the stoplights would prevent accidents, which in turn would prevent serious injuries and property damage.
6	Won't do any good as this town is Almost a """"Communistic State"""""
7	need bus to come down East State Street to King College road
8	Don't worry about transportation. Except for the elderly. Hell! Worry about slowing down the damn ones you have in this area that are going to kill the pedestrians in the Fairmount area. You know how many kids walk on these nasty Fairmount sidewalks? They are so narrow, they can't get away from a car of it looses control. I just hope all our neighbors do what they say they will do and band together when we loose a pedestrian or a child because the city officials and police didn't listen.
9	While I would be thrilled to see more public transit in our area, I understand that it's hard to justify with such a spread out population. For me, improving safety and accessibility for pedestrians is an easy first step. I live off of Baugh Lane, and our neighborhood is totally isolated from downtown for pedestrians, because there are no sidewalks and it's a dangerous road. I see people all the time walking to CVS and the shopping center, with small children sometimes, and I am terrified for them. I would certainly walk more places if I felt safe to do so.
10	In working with people who DO NOT have their own transporation it is a REAL ISSUE for people looking for jobs but can only work around when the bus can take them. The times need to be extended.
11	More trails connecting different parts of the town would be wonderful. Exit 17 has a terrible time with traffic as is and if/when Food City makes their upgrades that area will be even worse than it was before.
12	Almost all of the old residential areas need sidewalks replaced, or created in some cases. (some walks just stop with a corner or empty lot, then continue farther on.. The streets may have never had a complete sidewalk in past 50 or 100 years!
13	I would love a safer path to allow my son and I access to the bike path at Steele creek without having to worry about the traffic on Martin Luther King and Anderson St. We are coming from Taylor St.
14	Please increase the connection of bike pathways and pedestrian pathways connecting the great historic neighborhoods and between our cities. A nice path that combined walking/hiking and biking from Abingdon to Bristol would be a great tourist attraction (something from Steele Creek Park through downtown Bristol and up to the Creeper trail in abingdon) sidewalk repair and improvement everywhere would also be really nice and encourage people to walk where they can
15	Needs to run more routes more often. Look at other cities schedules for example. I basically can't use public transportation for this very reason. A Dr's appointment should not entail a days time using public transportation. Nor should grocery shopping.
16	why isn't passenger rail service from Bristol via AMTRAK on your improvement list? I would rate that extremely important.
17	Sidewalks should be required for all commercial and residential development.
18	i would not spend extra money on side walks as people do not use the ones we have.

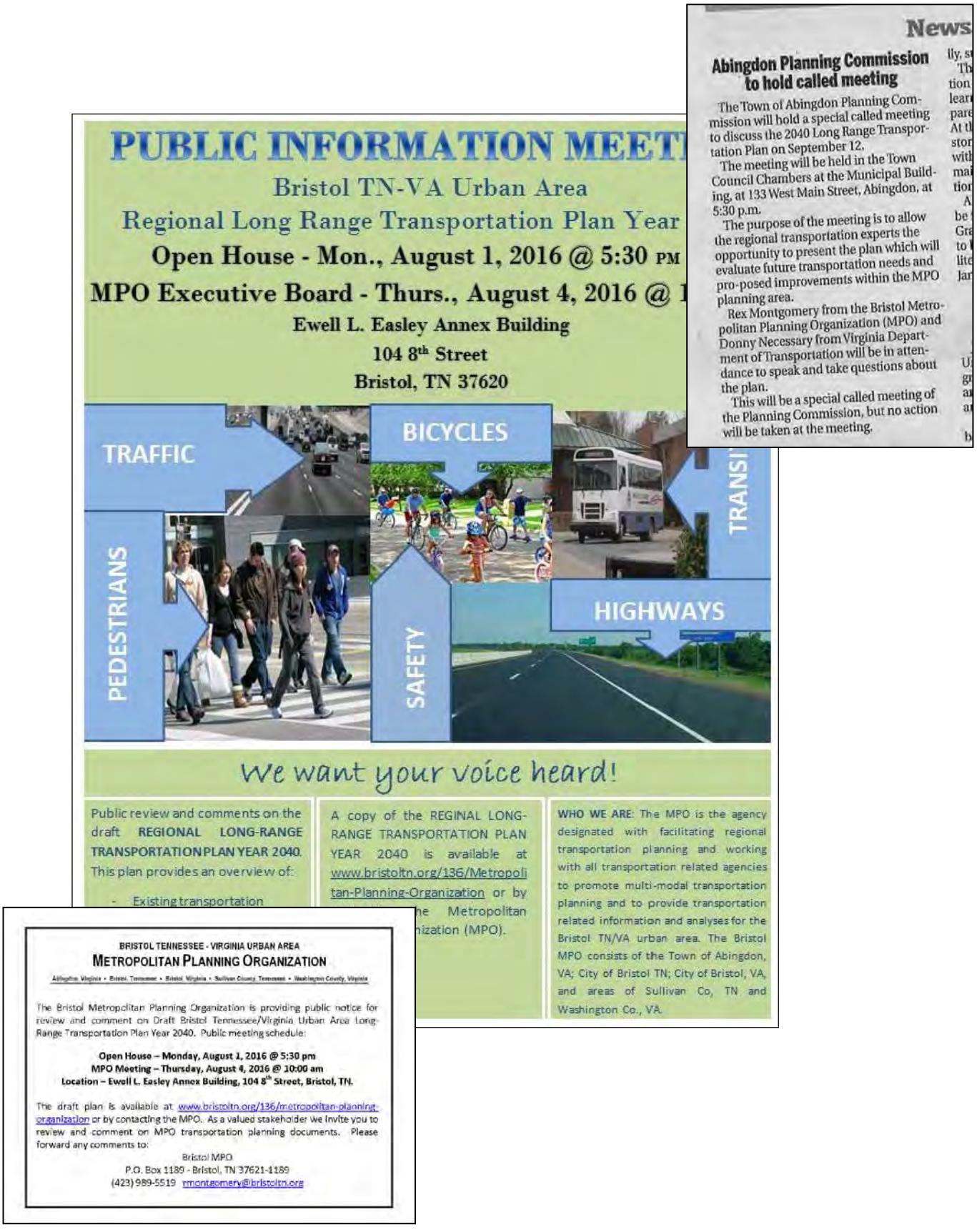
19	More sidewalk access in Abingdon. Better maintenance of Route 80 with a wider road and bike lane. Better signs for restricting exits and roads for large trucks.
20	17 and Abingdon should be given a top priority.
21	Jonesboro road in Abingdon beyond the Westwood subdivision goes from 35 to 40mph in less than a 1/2 mile. This is a speed trap as police sit on side roads to catch speeders. Their time could be utilized for more important issues. The speed limit should be 40mph.
22	Please repave the roads instead of filling in the holes left from winter/salt damage.
23	Timing of traffic lights seems off. Would love to see some improvements and the addition of a trail system from State Street out to the Falls & Pinnacle areas.
24	Sidewalks downtown are adequate and nicely kept. I would like to see more sidewalks in neighborhoods for families to walk their children to school or in the evening. A bike lane around Steele's Creek would be nice.
25	After interstate exit improvements, highway 11 from Abingdon to Bristol is in very poor condition...as are many roads in Washington County.
26	Bike/walk paths are only along the north/west part of town with nothing south of Windsor Ave.
27	State Street has too many traffic lights (acting as "stop" lights) for efficient flow. As a Civil Eng. PE I highly recommend eliminating lights at 13th St., Carson Lane and possibly others.
28	Would like to see greater improvement to existing infrastructure and multi-modal investments before new roads are built.
29	We generally have adequate roads for traffic loads that are for the most part reasonably maintained, but we lack public transportation, sidewalks in some areas and bike lanes which may be more beneficial in the future.
30	Transit buses and other behicles used for passenger tranportation should be replaced at least every four years of use. Older Transit vehicles require a rigid maintenance schedule, not just something on paper to satisfy the.the FTA.
31	More bicycle and pedestrian compatible areas in all parts of the city, but primarily in the Eastern portion.
32	I am a full time student at King with no vehicle. By the time I catch the bus in the morning to attend classes and catch it again to come home in the evening, I'm left to walk or bike during the weekends to do my shopping. I think one or two rounds during a Saturday afternoon would be beneficial for those folks not able to do it during the weekday...on a side note...Gene as well as Bradey are pure professionals and I enjoy their company when I am riding the bus. Thanks to you two specifically....
33	Neighborhood sidewalks and lighting on the trail at Steele Creek Park and Roosterfront Park. Not safe at dawn or dusk.
34	Speed limits are too low on main arterial roads.

Public Meetings:

September 3, 2015	MPO meeting – Travel demand model and planning assumptions.
May 5, 2016	MPO meeting on transportation survey results.
August 1, 2016	Public information meeting on draft plan at Bristol, Tennessee.
August 4, 2016	MPO meeting – Presentation on draft long-range plan.
August 16, 2016	Draft long-range plan presentation at Sullivan County, Tennessee.
September 12, 2016	Draft long-range plan presentation at Abingdon, Virginia.
September 27, 2016	MPO meeting – Plan adoption

Virginia Secretary of Transportation, Aubrey Layne Jr. discusses VDOT transportation priorities and proposed HB2 projects. March 28, 2016.

Bristol MPO meeting - Overmountain Victory Trail Master Plan. May 5, 2016.



Postcard Notice

Notice of 30-Day Comment Period

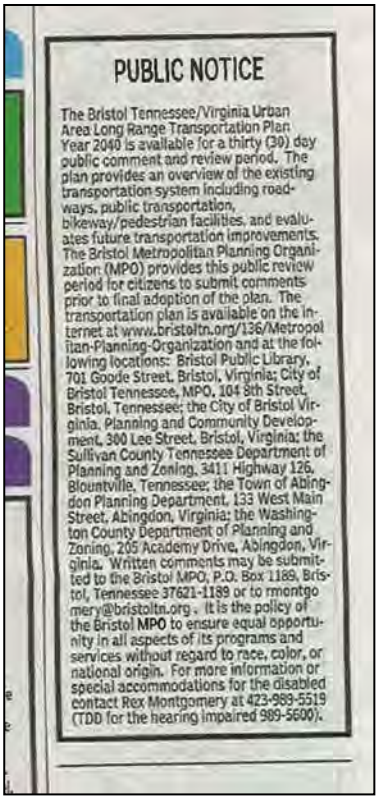
BRISTOL TENNESSEE - VIRGINIA URBAN AREA

METROPOLITAN PLANNING ORGANIZATION

Abingdon, Virginia • Bristol, Tennessee • Bristol, Virginia • Sullivan County, Tennessee • Washington County, Virginia

The Bristol Metropolitan Planning Organization is providing public notice for review and comment on Draft Bristol Tennessee/Virginia Urban Area Long-Range Transportation Plan Year 2040. The regional transportation plan provides an overview of the existing transportation system, including roadways, bicycle/pedestrian facilities, and public transportation services, and evaluates future transportation needs and proposed improvements within the Metropolitan Planning Area. The draft plan and MPO meeting notices can be found on our website at www.bristoltn.org/136/metropolitan-planning-organization or by contacting the MPO. As a valued stakeholder we invite you to review and comment on MPO transportation planning documents. Please forward any comments to:

Rex Montgomery - Bristol MPO
104 8th Street - P.O. Box 1189 - Bristol, TN 37621-1189
(423) 989-5519 Rmontgomery@bristoltn.org



PUBLIC NOTICE

The Bristol Tennessee/Virginia Urban Area Long Range Transportation Plan Year 2040 is available for a thirty (30) day public comment and review period. The plan provides an overview of the existing transportation system including roadways, public transportation, bikeway/pedestrian facilities, and evaluates future transportation improvements. The Bristol Metropolitan Planning Organization (MPO) provides this public review period for citizens to submit comments prior to final adoption of the plan. The transportation plan is available on the internet at www.bristoltn.org/136/Metropolitan-Planning-Organization and at the following locations: Bristol Public Library, 701 Goode Street, Bristol, Virginia; City of Bristol Tennessee, MPO, 104 8th Street, Bristol, Tennessee; the City of Bristol Virginia, Planning and Community Development, 300 Lee Street, Bristol, Virginia; the Sullivan County Tennessee Department of Planning and Zoning, 3411 Highway 126, Blountville, Tennessee; the Town of Abingdon Planning Department, 133 West Main Street, Abingdon, Virginia; the Washington County Department of Planning and Zoning, 205 Academy Drive, Abingdon, Virginia. Written comments may be submitted to the Bristol MPO, P.O. Box 1189, Bristol, Tennessee 37621-1189 or to rmontgomery@bristoltn.org. It is the policy of the Bristol MPO to ensure equal opportunity in all aspects of its programs and services without regard to race, color, or national origin. For more information or special accommodations for the disabled contact Rex Montgomery at 423-989-5519 (TDD for the hearing impaired 989-5600).

Comments from public meetings:

#	Public Comments
1	Could Ubers be used for public transportation? *Response-Not sure of the legality of Uber but it could be researched. I don't think they would be eligible for federal funding due to Federal Transit Administration regulations.*
2	What about bike lanes on 394? *Response-Highway 394 is signed as a bike route but doesn't have a designated bike lane.* I think the shoulder [SR 394] is wide enough for designated lane. *Response-Both TDOT and VDOT have a policy to include bike lanes with repaving projects, if feasible.*
3	Kingsport removed lanes [downtown] to provide bike lanes. *Response-This is called a road diet. The MPO proposed this on West State Street in Bristol, but due to the lack of off-street parking for several business the project didn't move forward.*
4	How does funding for trails (reference to Overmountain Victory Trail) work between Tennessee and Virginia? *Response-Each state has the same funding sources for federal funds, but those funds would only be eligible for use "in-state".*
5	What kind of temporary solutions for congestion at Exit 19 will be put in-place prior to the interchange improvements? *Response-I'm not aware of anything other than a proposed temporary signal.*
6	I'm not opposed to the designed improvements for Exit 19, just the time frame. *Response-Exit 19 is a fully funded project, but due to federal requirements it takes time to advance a project to construction.* (Note: Numerous comments and concerns for safety on Route 58 and the I-81 Exit 19 project were expressed.)
7	What is the 30-day comment period? What do we comment on? *Response-You can comment on anything in the plan. This can be done by written comments or through the web-page survey.*

Tennessee Roadway Projects by Funding Source

MPO Project #	Jurisdiction	Project	Cost	NHPP	STBG	HSIP	STATE	STBG-L	LOCAL	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	2,199,044	2,183,117	6,689,511	1,616,101	7,176,996	1,937,091	21,801,860
T1-2	Bristol TN	East Cedar St.	$ 6,650,000	-	-	-	-	5,320,000	1,330,000	6,650,000
			Total Costs	-	-	-	-	5,320,000	1,330,000	6,650,000
			Balance (Carryover)	2,199,044	2,183,117	6,689,511	1,616,101	1,856,996	607,091	15,151,860
Horizon Year 2021-2030			**New Revenue**	5,504,626	5,464,757	16,745,120	4,045,408	7,179,138	4,848,908	43,787,957
			Total Funds Available	7,703,670	7,647,874	23,434,631	5,661,509	9,036,134	5,455,999	58,939,817
T2-1	Bristol TN	Volunteer Parkway	$ 4,488,000	-	-	-	-	3,584,000	904,000	4,488,000
T2-2	Bristol TN	North-South Connecter Route (Medical Park Blvd. Extension)	$ 17,302,000	5,000,000	5,000,000	-	3,302,000	2,000,000	2,000,000	17,302,000
T2-3	Sullivan Co. TN	North-South Connecter Route (Carden Hollow Rd.)	$ 24,707,000	-	1,907,000	15,000,000	2,300,000	3,000,000	2,500,000	24,707,000
			Total Costs	5,000,000	6,907,000	15,000,000	5,602,000	8,584,000	5,404,000	46,497,000
			Balance (Carryover)	2,703,670	740,874	8,434,631	59,509	452,134	51,999	12,442,817
Horizon Year 2031-2040			**New Revenue**	7,397,757	7,344,176	22,504,042	5,436,691	9,648,161	6,516,527	58,847,354
			Total Funds Available	10,101,427	8,085,050	30,938,673	5,496,200	10,100,295	6,568,526	71,290,171
T3-1	Bristol TN Sullivan Co. TN	North-South Connecter Route (SR 126)	$ 58,645,000	9,559,950	8,085,050	25,000,000	5,000,000	8,000,000	3,000,000	58,645,000
T3-2	Bristol TN	North-South Connecter Route (Exide Dr.)	$ 5,872,000			2,672,000	-	2,000,000	1,200,000	5,872,000
T3-3	Bristol TN	West State Street/Kmart Dr	$ 1,295,000			1,036,000	-	-	259,000	1,295,000
T3-4	Bristol TN	West State Street	$ 4,552,000	500,000		2,230,000	450,000	-	1,372,000	4,552,000
			Total Costs	10,059,950	8,085,050	30,938,000	5,450,000	10,000,000	5,831,000	70,364,000
			Balance	41,477	-	673	46,200	100,295	737,526	926,171
Horizon Year 2016-2040			**Total Revenue**	15,101,427	14,992,050	45,938,673	11,098,200	24,004,295	13,302,526	124,437,171
			Total Costs	15,059,950	14,992,050	45,938,000	11,052,000	23,904,000	12,565,000	123,511,000
			Balance	41,477	-	673	46,200	100,295	737,526	926,171

Virginia Roadway Projects by Funding Source

MPO Project #	Jurisdiction	Project	Costs	NHPP	STBG	HSIP	STATE	LOCAL	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	2,027,055	15,489,069	1,834,349	3,064,752	571,613	22,986,838
V1-1	Abingdon VA	Main St.	$ 5,152,000	-	3,552,000	1,500,000	-	100,000	5,152,000
V1-2	Bristol VA	Lee Highway Exit 5	$ 5,850,000	2,000,000	3,000,000	-	850,000	-	5,850,000
			Total Costs	2,000,000	6,552,000	1,500,000	850,000	100,000	11,002,000
			Balance (Carryover)	27,055	8,937,069	334,349	2,214,752	471,613	11,984,838
Horizon Year 2021-2030			**New Revenue**	9,672,945	38,772,090	4,591,725	7,671,657	1,430,857	62,139,274
			Total Funds Available	9,700,000	47,709,159	4,926,074	9,886,409	1,902,470	74,124,112
V2-1	Bristol VA	Lee Highway	$ 9,987,500	-	7,990,000	-	1,797,500	200,000	9,987,500
V2-2	Washington Co. VA	Providence Rd.	$ 14,241,000	-	12,000,000	-	2,241,000	-	14,241,000
V2-3	Abingdon VA Washington Co. VA	Interstate 81 Exit 19	$ 9,736,000	2,500,000	5,286,000	-	1,950,000	-	9,736,000
V2-4	Abingdon VA Washington Co. VA	Interstate 81 Exit 17	$ 21,000,000	7,200,000	9,000,000	3,000,000	1,800,000	-	21,000,000
V2-5	Abingdon VA	East Main St.	$ 13,858,455	-	10,000,000	1,700,000	1,858,455	300,000	13,858,455
			Total Costs	9,700,000	44,276,000	4,700,000	9,646,955	500,000	68,822,955
			Balance (Carryover)	-	3,433,159	226,074	239,454	1,402,470	5,301,157
Horizon Year 2031-2040			**New Revenue**	2,220,330	52,106,447	6,170,894	10,310,066	1,922,952	72,730,689
			Total Funds Available	$ 2,220,330	$55,539,606	$ 6,396,968	$10,549,520	$ 3,325,422	$ 78,031,846
V3-1	Abingdon VA	Cook St./Lowry Dr.	$ 16,802,000	-	13,442,000	610,000	2,500,000	250,000	16,802,000
V3-2	Abingdon VA	Dr. French Moore Jr. Blvd.	$ 4,575,000	-	3,660,000		815,000	100,000	4,575,000
V3-3	Bristol VA	Lee Highway	$ 31,872,000	-	20,372,000	3,500,000	6,000,000	2,000,000	31,872,000
V3-4	Washington Co. VA	Route 11 (Hospital)	$ 23,500,000	2,000,000	18,000,000	2,000,000	1,000,000	500,000	23,500,000
			Total Costs	2,000,000	55,474,000	6,110,000	10,315,000	2,850,000	76,749,000
			Balance	220,330	65,606	286,968	234,520	475,422	1,282,846
Horizon Year 2016-2040			**Total Revenue**	13,920,330	106,367,606	12,596,968	21,046,475	3,925,422	157,856,801
			Total Costs	13,700,000	106,302,000	12,310,000	20,811,955	3,450,000	156,573,955
			Balance	220,330	65,606	286,968	234,520	475,422	1,282,846

Bristol Tennessee Transit Projects by Funding Source

MPO Project #	Jurisdiction	Project	Cost	FTA 5307	FTA 5339	STATE	LOCAL	FARES	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	2,051,788	358,898	1,559,251	946,704	153,710	5,070,351
BTT-1	Bristol TN	Operating	$ 3,362,263	1,604,277	-	802,138	802,138	153,710	3,362,263
BTT-2	Bristol TN	Vehicles	$ 769,371	447,511	167,986	76,937	76,937	-	769,371
BTT-3	Bristol TN	Other Capital	$ 26,000	-	20,800	2,600	2,600	-	26,000
			Total Costs	2,051,788	188,786	881,675	881,675	153,710	4,157,634
			Balance (Carryover)	-	170,112	677,576	65,029	-	912,717
Horizon Year 2021-2030			**New Revenue**	4,657,267	898,389	3,903,102	2,369,780	384,766	12,213,304
			Total Funds Available	4,657,267	1,068,501	4,580,678	2,434,809	384,766	13,126,021
BTT-1	Bristol TN	Operating	$ 8,416,390	4,015,812	-	2,007,906	2,007,906	384,766	8,416,390
BTT-2	Bristol TN	Vehicles	$ 1,263,817	641,455	369,598	126,382	126,382	-	1,263,817
BTT-3	Bristol TN	Other Capital	$ 65,696	-	52,556	6,570	6,570	-	65,696
			Total Costs	4,657,267	422,154	2,140,858	2,140,858	384,766	9,745,903
			Balance (Carryover)	-	646,347	2,439,820	293,951	-	3,380,118
Horizon Year 2031-2040			**New Revenue**	6,258,978	1,207,360	5,245,442	3,184,786	517,093	16,413,659
			Total Funds Available	6,258,978	1,853,707	7,685,262	3,478,737	517,093	19,793,777
BTT-1	Bristol TN	Operating	$ 11,310,925	5,396,916	-	2,698,458	2,698,458	517,093	11,310,925
BTT-2	Bristol TN	Vehicles	$ 1,759,498	275,094	1,132,504	175,950	175,950	-	1,759,498
BTT-3	Bristol TN	Other Capital	$ 93,569	-	74,855	9,357	9,357	-	93,569
			Total Costs	5,672,010	1,207,359	2,883,765	2,883,765	517,093	13,163,992
			Balance (Carryover)	586,968	646,348	4,801,497	594,972	-	6,629,785
Horizon Year 2016-2040			**Total Revenue**	12,968,033	2,464,647	10,707,795	6,501,270	1,055,569	33,697,314
			Total Costs	12,381,065	1,818,299	5,906,298	5,906,298	1,055,569	27,067,529
			Balance	586,968	646,348	4,801,497	594,972	-	6,629,785

NET Trans Projects by Funding Source (District-wide)

MPO Project #	Jurisdiction	Project	Cost	FTA 5311	FTA 5310	FTA 5339	STATE	LOCAL	FARES	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	10,256,511	430,769	4,127,605	5,980,220	5,980,220	1,306,573	28,081,898
NET-1	District-wide TN	Operating	$ 21,819,600	10,256,511	-	-	5,128,258	5,128,258	1,306,573	21,819,600
NET-2	District-wide TN	Vehicles	$ 3,836,920	-	430,769	2,638,767	383,692	383,692	-	3,836,920
NET-3	District-wide TN	Other Capital	$ 406,563	-	-	325,251	40,656	40,656	-	406,563
			Total Costs	10,256,511	430,769	2,964,018	5,552,606	5,552,606	1,306,573	26,063,083
			Balance (Carryover)	-	-	1,163,587	427,614	427,614	-	2,018,815
Horizon Year 2021-2030			**New Revenue**	25,674,001	1,078,296	10,332,181	14,969,630	14,969,630	3,270,600	70,294,338
			Total Funds Available	25,674,001	1,078,296	11,495,768	15,397,244	15,397,244	3,270,600	72,313,153
NET-1	District-wide TN	Operating	$ 54,618,615	25,674,001	-		12,837,007	12,837,007	3,270,600	54,618,615
NET-2	District-wide TN	Vehicles	$ 10,043,994	-	1,078,296	6,956,900	1,004,399	1,004,399	-	10,043,994
NET-3	District-wide TN	Other Capital	$ 1,064,271	-	-	851,418	106,427	106,426	-	1,064,271
			Total Costs	25,674,001	1,078,296	7,808,318	13,947,833	13,947,832	3,270,600	65,726,880
			Balance (Carryover)	-	-	3,687,450	1,449,411	1,449,412	-	6,586,273
Horizon Year 2031-2040			**New Revenue**	34,503,711	1,449,139	13,885,588	20,117,932	20,117,932	4,395,413	94,469,715
			Total Funds Available	34,503,711	1,449,139	17,573,038	21,567,343	21,567,344	4,395,413	101,055,988
NET-1	District-wide TN	Operating	$ 73,402,854	34,503,711	-	-	17,251,865	17,251,865	4,395,413	73,402,854
NET-2	District-wide TN	Vehicles	$ 14,305,532	-	1,449,139	9,995,287	1,430,553	1,430,553	-	14,305,532
NET-3	District-wide TN	Other Capital	$ 1,515,828	-	-	1,212,662	151,583	151,583	-	1,515,828
			Total Costs	34,503,711	1,449,139	11,207,949	18,834,001	18,834,001	4,395,413	89,224,214
			Balance (Carryover)	-	-		2,733,342	2,733,343	-	11,831,774
Horizon Year 2016-2040			**Total Revenue**	70,434,223	2,958,204	28,345,374	41,067,782	41,067,782	8,972,586	192,845,951
			Total Costs	70,434,223	2,958,204	21,980,285	38,334,440	38,334,439	8,972,586	181,014,177
			Balance	-	-	6,365,089	2,733,342	2,733,343	-	11,831,774

Bristol Virginia Transit Projects by Funding Source

MPO Project #	Jurisdiction	Project	Cost	FTA 5307	STBG FLEX	STATE	LOCAL	FARES	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	1,193,494	280,322	541,532	1,094,743	202,942	3,313,033
BVT-1	Bristol VA	Operating	$ 2,962,631	1,193,494	-	493,750	1,072,445	202,942	2,962,631
BVT-2	Bristol VA	Vehicles	$ 270,323	-	216,258	40,548	13,517	-	270,323
BVT-3	Bristol VA	Other Capital	$ 27,798		22,238	4,170	1,390	-	27,798
			Total Costs	1,193,494	238,496	538,468	1,087,352	202,942	3,260,752
			Balance (Carryover)	-	41,826	3,064	7,391	-	52,281
Horizon Year 2021-2030			**New Revenue**	2,987,542	701,700	1,355,557	2,740,352	508,002	8,293,153
			Total Funds Available	2,987,542	743,526	1,358,621	2,747,743	508,002	8,345,434
BVT-1	Bristol VA	Operating	$ 7,416,028	2,987,542	-	1,235,949	2,684,535	508,002	7,416,028
BVT-2	Bristol VA	Vehicles	$ 790,076	-	632,061	112,331	45,684	-	790,076
BVT-3	Bristol VA	Other Capital	$ 72,768	-	58,214	7,277	7,277	-	72,768
			Total Costs	2,987,542	690,275	1,355,557	2,737,496	508,002	8,278,872
			Balance (Carryover)	-	53,251	3,064	10,247	-	66,562
Horizon Year 2031-2040			**New Revenue**	4,015,007	943,027	1,821,756	3,729,833	682,712	11,192,335
			Total Funds Available	4,015,007	996,278	1,824,820	3,740,080	682,712	11,258,897
BVT-1	Bristol VA	Operating	$ 9,966,523	4,015,007	-	1,661,013	3,607,791	682,712	9,966,523
BVT-2	Bristol VA	Vehicles	$ 1,132,416	-	905,933	113,242	113,241	-	1,132,416
BVT-3	Bristol VA	Other Capital	$ 103,643	-	37,094	47,501	19,048	-	103,643
			Total Costs	4,015,007	943,027	1,821,756	3,740,080	682,712	11,202,582
			Balance (Carryover)	-	53,251	3,064	-	-	56,315
Horizon Year 2016-2040			**Total Revenue**	8,196,043	1,925,049	3,718,845	7,564,928	1,393,656	22,798,521
			Total Costs	8,196,043	1,871,798	3,715,781	7,564,928	1,393,656	22,742,206
			Balance	-	53,251	3,064	-	-	56,315

District Three Public Transit Projects by Funding Source (District-wide)

MPO Project #	Jurisdiction	Project	Cost	FTA 5311	STBG FLEX	STATE	LOCAL	FARES	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	7,805,620	58,184	2,437,191	3,589,873	716,362	14,607,230
D3-1	District-wide VA	Operating	$ 10,807,992	4,881,688	-	1,852,407	3,357,535	716,362	10,807,992
D3-2	District-wide VA	Vehicles	$ 2,598,901	2,079,121	58,184	389,835	71,761	-	2,598,901
D3-3	District-wide VA	Other Capital	$ 195,500	156,400	-	29,325	9,775	-	195,500
			Total Costs	7,117,209	58,184	2,271,567	3,439,071	716,362	13,602,393
			Balance (Carryover)	688,411	-	165,624	150,802	-	1,004,837
Horizon Year 2021-2030			**New Revenue**	19,538,953	145,645	6,100,756	8,986,137	1,793,190	36,564,681
			Total Funds Available	20,227,364	145,645	6,266,380	9,136,939	1,793,190	37,569,518
D3-1	District-wide VA	Operating	$ 27,054,462	12,219,794	-	4,636,929	8,404,549	1,793,190	27,054,462
D3-2	District-wide VA	Vehicles	$ 6,790,768	5,286,969	145,645	1,018,614	339,540	-	6,790,768
D3-3	District-wide VA	Other Capital	$ 511,765	409,412	-	76,764	25,589	-	511,765
			Total Costs	17,916,175	145,645	5,732,307	8,769,678	1,793,190	34,356,995
			Balance (Carryover)	2,311,189	-	534,073	367,261	-	3,212,523
Horizon Year 2031-2040			**New Revenue**	26,258,720	195,735	8,198,904	12,076,615	2,409,897	49,139,871
			Total Funds Available	28,569,909	195,735	8,732,977	12,443,876	2,409,897	52,352,394
D3-1	District-wide VA	Operating	$ 36,358,934	16,422,382	-	6,231,644	11,295,011	2,409,897	36,358,934
D3-2	District-wide VA	Vehicles	$ 7,828,481	6,067,050	195,735	1,174,272	391,424	-	7,828,481
D3-3	District-wide VA	Other Capital	$ 728,890	583,112	-	109,333	36,445	-	728,890
			Total Costs	23,072,544	195,735	7,515,249	11,722,880	2,409,897	44,916,305
			Balance (Carryover)	5,497,365	-	1,217,728	720,996	-	7,436,089
Horizon Year 2016-2040			**Total Revenue**	53,603,293	399,564	16,736,851	24,652,625	4,919,449	100,311,782
			Total Costs	48,105,928	399,564	15,519,123	23,931,629	4,919,449	92,875,693
			Balance	5,497,365	-	1,217,728	720,996	-	7,436,089

Tennessee Non-Highway/Transportation Alternative Projects by Funding Source

MPO Project #	Jurisdiction	Project	Cost	TAP	LOCAL	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	1,216,854	304,214	1,521,068
N/A	Bristol/Sullivan Co. TN	Active Transportation Projects	$ 1,521,068	1,216,854	304,214	1,521,068
			Total Costs	1,216,854	304,214	1,521,068
			Balance (Carryover)	-	-	-
Horizon Year 2021-2030			**New Revenue**	3,046,017	761,504	3,807,521
			Total Funds Available	3,046,017	761,504	3,807,521
N/A	Bristol/Sullivan Co. TN	Active Transportation Projects	$ 3,807,521	3,046,017	761,504	3,807,521
			Total Costs	3,046,017	761,504	3,807,521
			Balance (Carryover)	-	-	-
Horizon Year 2031-2040			**New Revenue**	4,093,592	1,023,398	5,116,990
			Total Funds Available	4,093,592	1,023,398	5,116,990
N/A	Bristol/Sullivan Co. TN	Active Transportation Projects	$ 5,116,990	4,093,592	1,023,398	5,116,990
			Total Costs	4,093,592	1,023,398	5,116,990
			Balance (Carryover)	-	-	-
Horizon Year 2016-2040			**Total Revenue**	8,356,463	2,089,116	10,445,579
			Total Costs	8,356,463	2,089,116	10,445,579
			Balance	-	-	-

Virginia Non-Highway/Transportation Alternative Projects by Funding Source

MPO Project #	Jurisdiction	Project	Cost	TAP	LOCAL	TOTAL
Horizon Year 2016-2020			**Total Funds Available**	1,373,049	343,262	1,716,311
N/A	Bristol/Washington Co. TN	Active Transportation Projects	$ 1,716,311	1,373,049	343,262	1,716,311
			Total Costs	1,373,049	343,262	1,716,311
			Balance (Carryover)	-	-	-
Horizon Year 2021-2030			**New Revenue**	3,437,002	859,250	4,296,252
			Total Funds Available	3,437,002	859,250	4,296,252
N/A	Bristol/Washington Co. TN	Active Transportation Projects	$ 4,296,252	3,437,002	859,250	4,296,252
			Total Costs	3,437,002	859,250	4,296,252
			Balance (Carryover)	-	-	-
Horizon Year 2031-2040			**New Revenue**	4,619,044	1,154,761	5,773,805
			Total Funds Available	4,619,044	1,154,761	5,773,805
N/A	Bristol/Washington Co. TN	Active Transportation Projects	$ 5,773,805	4,619,044	1,154,761	5,773,805
			Total Costs	4,619,044	1,154,761	5,773,805
			Balance (Carryover)	-	-	-
Horizon Year 2016-2040			**Total Revenue**	9,429,095	2,357,273	11,786,368
			Total Costs	9,429,095	2,357,273	11,786,368
			Balance	-	-	-

FEDERAL AND STATE PRIMARY ROUTES IN THE BRISTOL STUDY AREA: December 31, 2015

ROUTE	ENTERS STUDY AREA, WEST OR SOUTH	ENTERS STUDY AREA, EAST OR NORTH	NEAREST SERVED COMMMUNITY OUTSIDE STUDY AREA, WEST OR SOUTH	NEAREST SERVED COMMMUNITY OUTSIDE STUDY AREA, EAST OR NORTH	ULTIMATE ROUTE END, WEST OR SOUTH	ULTIMATE ROUTE END, EAST OR NORTH
I-81	cordon line west	cordon line east	Kingsport, Tennessee	Meadowview, Virginia	I-40 in Jefferson County, Tennessee	Canadian border near Lake Ontario, New York
I-381	contained entirely within the Bristol study area		Bristol, Virginia (end of route)	Bristol, Virginia (end of route)	Church St/Keys St in Bristol, Virginia	I-81 at Exit 3 in Bristol, Virginia
US 11	does not reach cordon line west	cordon line east (Lee Highway)	Bristol, Virginia (end of route)	Meadowview, Virginia	Commonwealth Ave and Euclid Ave in Bristol, Virginia	Lake Champlain, New York
Truck US 11	contained entirely within the Bristol study area		Bristol, Virginia (end of route)	Bristol, Virginia (end of route)	Commonwealth Ave and Goode St in Bristol, Virginia	Euclid Ave and Lee Hwy/ Moore St in Bristol, Virginia
US 11E	cordon line south (Highway 11E)	does not reach cordon line	Bluff City, Tennessee	Bristol, Virginia (end of route)	Knoxville, Tennessee	Commonwealth Ave and Euclid Ave in Bristol, Virginia
US 11W	cordon line west (Highway 11W)	does not reach cordon line	Kingsport, Tennessee	Bristol, Virginia (end of route)	Knoxville, Tennessee	Commonwealth Ave and Euclid Ave in Bristol, Virginia
US 19	cordon line south (Highway 11E)	cordon line east (Lee Highway)	Bluff City, Tennessee (end of route)	Lebanon, Virginia	Bluff City, Tennessee	Erie, Pennsylvania
Truck US 19	contained entirely within the Bristol study area		Bristol, Virginia (end of route)	Bristol, Virginia (end of route)	Commonwealth Ave and Goode St in Bristol, Virginia	Euclid Ave and Lee Hwy/ Moore St in Bristol, Virginia
US 58	cordon line west (Gate City Hwy)	cordon line east (Jeb Stuart Hwy)	Weber City, Virginia	Damascus, Virginia	Cumberland Gap, Tennessee	Virginia Beach, Virginia
Alt US 58	cordon line north (Porterfield Hwy)	does not reach cordon line	Lebanon, Virginia	Abingdon, Virginia (end of route)	Jonesville, Virginia	Interstate 81 at Virginia Exit 17
US 421	cordon line west (Gate City Hwy)	cordon line east (Highway 421)	Weber City, Virginia	Shady Valley, Tennessee	Carolina Beach, North Carolina	Michigan City, Indiana
Tennessee SR 1	cordon line west (Highway 11W)	does not reach cordon line	Kingsport, Tennessee	Bristol, Tennessee (end of route)	Memphis, Tennessee	Volunteer Pkwy and Broad St in Bristol, Tennessee
Tennessee SR 34	cordon line south (Highway 11E)	cordon line east (Highway 421)	Bluff City, Tennessee	Shady Valley, Tennessee	Knoxville, Tennessee	North Carolina border south of Trade, Tennessee
Tennessee SR 44	codon line west (Dry Branch Rd)	does not reach cordon line	Bluff City, Tennessee	Holston Valley area of Sullivan County, Tenn	Bluff City, Tennessee	Green Springs Rd at Virginia state line
Tennessee SR 75	cordon line west (Highway 75)	does not reach cordon line	Tri-Cities Regional Airport	Blountville, Tennessee (end of route)	US 11E/US 321 in Greene County, Tennessee	SR 126 in Blountville, Tennessee
Tennessee SR 126	cordon line west (Highway 126)	does not reach cordon line	Kingsport, Tennessee	Bristol, Tennessee (end of route)	Kingsport, Tennessee	W State St in Bristol, Tennessee
Tennessee SR 358	contained entirely within the Bristol study area		rural Sullivan County (end of route)	Bristol, Tennessee (end of route)	Rockhold Rd in Sullivan County, Tennessee	Volunteer Pkwy in Bristol, Tennessee
Tennessee SR 390	cordon line south (Highway 390)	does not reach cordon line	Bluff City, Tennessee (end of route)	Bristol, Tennessee (end of route)	Fleming Dr in Bluff City, Tennessee	Highway 394 in Bristol, Tennessee

FEDERAL AND STATE PRIMARY ROUTES IN THE BRISTOL STUDY AREA: December 31, 2015

ROUTE	ENTERS STUDY AREA, WEST OR SOUTH	ENTERS STUDY AREA, EAST OR NORTH	NEAREST SERVED COMMMUNITY OUTSIDE STUDY AREA, WEST OR SOUTH	NEAREST SERVED COMMMUNITY OUTSIDE STUDY AREA, EAST OR NORTH	ULTIMATE ROUTE END, WEST OR SOUTH	ULTIMATE ROUTE END, EAST OR NORTH
Tennessee SR 394	contained entirely within the Bristol study area		rural Sullivan County (end of route)	Bristol, Tennessee (end of route)	Highway 11W north of Blountville, Tennessee	Highway 421 in Bristol, Tennessee
Tennessee SR 435	contained entirely within the Bristol study area		Bristol, Tennessee (end of route)	Holston Valley area of Sullivan County, Tenn	Highway 421 (W) in Bristol, Tennessee	Highway 421 (E) in rural Sullivan County, Tenn
Virginia SR 75	contained entirely within the Bristol study area		rural Sullivan County (end of route)	Abingdon, Virginia (end of route)	Tennessee state line in Holston Valley, Tennessee	Russell St in Abingdon, Virginia
Virginia SR 113	contained entirely within the Bristol study area		Bristol, Virginia (end of route)	Bristol, Virginia (end of route)	Commonwealth Ave in Bristol, Virginia	Euclid Ave and Lee Hwy/ Moore St in Bristol, Virginia
Virginia SR 381	contained entirely within the Bristol study area		Bristol, Virginia (end of route)	Bristol, Virginia (end of route)	Euclid Ave in Bristol, Virginia	Church St/Keys St in Bristol, Virginia

LISTING OF MODELED ROADWAYS, BRISTOL TRAVEL DEMAND MODEL (954 total links)

SULLIVAN COUNTY, TENNESSEE (427 total links)

ROADWAY	TERMINUS A	TERMINUS B	No. of LINKS
5th St	Weaver Pike	Melrose St	5
6th St	Anderson St	State St	2
7th St	Shelby St	State St	1
17th St	Windsor Ave	W State St	4
24th St	Windsor Ave	W State St	3
Anderson St	24th St	Pennsylvania Ave	6
Ash St	5th St	Pennsylvania Ave	2
Beaver Creek Rd/Enterprise Rd	cordon line south	Hwy 394	4
Beidleman Creek Rd	Hickory Tree Rd/River Bend Rd	Emmett Rd	1
Bellebrook Rd	Wessex Dr	Weaver Pike	1
Bethel Dr	Exide Dr	Hwy 126	5
Big Hollow Rd	Buffalo Rd	Hwy 394	6
Blackley Rd	Hazelwood St	5th St	1
Blountville Blvd	Hwy 394	Hwy 126	3
Blountville Bypass	Hwy 126	Hwy 394	2
Blountville Hwy	Hwy 126	W State St	2
Bluff City Hwy	Volunteer Pkwy	Edgemont Ave	8
Bristol Caverns Hwy	Hwy 421 (W)	Hwy 421 (E)	6
Broad St/Steele Creek Dr	Steele Creek Park Rd/Douglas Ln	Volunteer Pkwy	7
Broyles Ln	Weaver Pike	Vance Tank Rd	2
Buffalo Rd	Fairview School Rd	Beaver Creek Rd	2
Bullock Hollow Rd	Sugar Hollow Dr	Weaver Pike	2
Buncombe Rd	Buffalo Rd	Feathers Chapel Rd	1
Carden Hollow Rd	Bethel Dr	Hwy 126	4
Carolina Ave	Bristol Caverns Hwy	Hazelwood St	4
Cedar Valley Rd	Lavinder Ln	Weaver Pike	3
Chinquapin Grove Rd	Big Arm Rd (E)	Dry Branch Rd/Rockhold Rd	3
College Ave	Weaver Pike	5th St	1
Craig Dr (private roadway)	Bluff City Hwy	Volunteer Pkwy	2
DeVault Bridge Rd	cordon line south	Muddy Creek Rd	3
Dry Branch Rd	cordon line west	Chinquapin Grove Rd/Rockhold Rd	1
E Cedar St	5th St	King College Rd	5
E State St	Sullivan Ln	King College Rd (W)	2
Edgemont Ave	Bluff City Hwy	Melrose St	3
Egypt Rd	Hwy 11E	Hwy 390	2
Emmett Rd	Beidleman Creek Rd	Hwy 421	3
Emmett Way	Hwy 421	Bristol Caverns Hwy	1
Exide Dr	Hwy 394	Hwy 11E/Volunteer Pkwy	3
Fairview School Rd	Sugar Hollow Rd	Ethel Beard Rd/Ridge Dr	1
Feathers Chapel Rd	Hwy 394 (W)	Hwy 394 (E)	3
Franklin Dr	Hwy 126	Blountville Blvd	2
Hazelwood St	Blackley Rd	Carolina Ave	2
Hickory Tree Rd	Old Weaver Pike/Possum Creek Rd	Bristol Caverns Hwy	11
Hwy 11E	cordon line south	Exide Dr	6
Hwy 11E ramps at Hwy 394			4
Hwy 11W	cordon line west	Interstate 81	12
Hwy 44	Hwy 421	Virginia state line	4
Hwy 75	cordon line west	Hwy 126	4
Hwy 126	cordon line west	Blountville Hwy	20
Hwy 390	cordon line south	Hwy 394	3
Hwy 394	Hwy 11W	Hwy 421	25
Hwy 421	Hogtown Creek bridge	cordon line east	15
Industrial Dr	Weaver Pike	Hwy 394	3
Interstate 81, northbound	cordon line west	Virginia state line	10
Interstate 81, northbound	cordon line west	Virginia state line	10
Interstate 81 Exit 69 ramps			4
Interstate Exit 74 ramps			8
Island Rd	cordon line west	Hwy 11W	8
King College Rd	E State St (W)	Old Jonesboro Rd	7

LISTING OF MODELED ROADWAYS, BRISTOL TRAVEL DEMAND MODEL (954 total links)

SULLIVAN COUNTY, TENNESSEE (427 total links)

ROADWAY	TERMINUS A	TERMINUS B	No. of LINKS
Lavinder Ln	Volunteer Pkwy	Cedar Valley Rd	2
Maple St	Pennsylvania Ave	Virginia Ave	1
Martin Luther King, Jr Blvd	Melrose St	Virginia state line	4
Medical Park Blvd	Meadow View Rd	W State St	2
Meadow View Rd	Walnut Hill Rd	Hwy 126	3
Muddy Creek Rd	cordon line west	Hwy 75	3
Old Jonesboro Rd	Weaver Pike	Virginia state line	12
Old Weaver Pike	Hickory Tree Rd/Rockhold Rd	Weaver Pike	2
Painter Rd	Virginia state line	Hwy 44	1
Paperville Rd	Old Jonesboro Rd	Bristol Caverns Hwy	3
Pennsylvania Ave	Maple St	E State St/State St	3
Peoples Rd	Weaver Pike	Bullock Hollow Rd	2
Pleasant Grove Rd	Silver Grove Rd	Weaver Pike	3
Raytheon Rd	Bluff City Hwy	Vance Tank Rd	2
Reedy Creek Rd	Seneker Rd	Virginia state line	1
Ridge Dr	DeVault Bridge Rd	Ethel Beard Rd/Fairview School Rd	2
Rockhold Rd	Chinquapin Grove Rd/Dry Branch Rd	Old Weaver Pike/Possum Creek Rd	2
Seneker Rd	Hwy 11W	Reedy Creek Rd	1
Shelby St	Volunteer Pkwy	Martin Luther King, Jr. Blvd	3
Silver Grove Rd	Hwy 390	Weaver Pike	4
Steele Creek Dr	Hwy 126	Steele Creek Park Rd/Douglas Ln	1
Sugar Hollow Dr	Bullock Hollow Rd	Hickory Tree Rd	2
Sugar Hollow Rd	DeVault Bridge Rd	Buffalo Rd/Fairview School Rd	2
Sweet Knbos Trl	Vance Tank Rd	Hwy 394	1
Trammel Rd	Old Jonesboro Rd	King College Rd	2
Valley Pike Rd	Carolina Ave	Old Jonesboro Rd	1
Vance Tank Rd	White Top Rd	Weaver Pike	6
Virginia Ave	Hwy 421	Maple St	3
Volunteer Pkwy	Exide Dr	State St/W State St	22
Walnut Hill Rd	Hwy 126	Island Rd	3
Weaver Pike	Rockhold Rd	Volunteer Pkwy	24
Weaver Pike ramp	Hwy 394	Weaver Pike	1
Wessex Dr	Raytheon Rd	Bellebrook Rd	1
W State St	Interstate 81	Euclid Ave/Gate City Hwy	15
White Top Rd	Hwy 11E	Vance Tank Rd	5
Windsor Ave	24th St	Volunteer Pkwy	4
ALONG TENNESSEE/VIRGINIA STATE LINE (9 total links)			
E State St	Pennsylvania Ave	Sullivan Ln	1
State St	Volunteer Pkwy/Commonwealth Ave	Pennsylvania Ave	4
W State St	Euclid Ave/Gate City Hwy	Volunteer Pkwy/Commonwealth Ave	4
BRISTOL, VIRGINIA (204 total links)			
Bob Morrison Bvld	W State St	Euclid Ave	2
Bonham Rd	Old Airport Rd (S)	Lee Hwy	4
Campground Rd	Island Rd	Benhams Rd	1
Clear Creek Rd	Lee Hwy	Bristol corporate limits	1
Columbia Rd/Montpelier Ave	Martin Luther King, Jr Blvd	Massachusetts Ave	1
Commonwealth Ave	State St/W State St	Church St/Keys St	8
Commonwealth Ave Ext	Keys St	Island Rd	2
Cumberland St	Commonwealth Ave	Martin Luther King, Jr. Blvd	5
E Mary St	Goodson St	Fairview St	1
E Valley Dr	Lee Hwy	Kings Mill Pike	4
Euclid Ave	Gate City Hwy/W State St	Lee Hwy/Moore St	9
Fairview St	E Mary St	Massachusetts Ave	2
Gate City Hwy	Bristol corporate limits	Euclid Ave/W State St	13
Glenway Ave	Commonwealth Ave	Piedmont Ave	2
Goode St	Commonwealth Ave	Piedmont Ave	2
Goodson St	E State St/State St	E Mary St/W Mary St	2
Harleywood Rd	Reedy Creek Rd (E)	Wallace Pike	2
Hillside Ave	Kings Mill Pike	Massachusetts Ave	1

LISTING OF MODELED ROADWAYS, BRISTOL TRAVEL DEMAND MODEL (954 total links)

SULLIVAN COUNTY, TENNESSEE (427 total links)

ROADWAY	TERMINUS A	TERMINUS B	No. of LINKS
Interstate 81, northbound	Tennessee state line	Bristol corporate limits	8
Interstate 81, southbound	Tennessee state line	Bristol corporate limits	9
Interstate 81 Exit 1 ramps			9
Interstate 81 Exit 3 ramps			4
Interstate 81 Exit 5 ramps			8
Interstate 81 Exit 7 ramps			4
Interstate 381, northbound	Church St/Keys St	Exit 3 ramps	1
Interstate 381, southbound	Church St/Keys St	Exit 3 ramps	1
Island Rd	Tennessee state line	Lee Hwy	9
Keys St	Commonwealth Ave Ext	Commonwealth Ave/Interstate 381	1
Kings Mill Pike	Hillside Ave	Bristol corporate limits	5
Lee Hwy	Euclid Ave/Euclid Ave Ext	Bristol corporate limits	18
Linden Dr	Bonham Rd	Old Airport Rd	2
Martin Luther King, Jr Blvd	State St	Moore St/Oakview Ave	5
Massachusetts Ave	Fairview St	Hillside Ave	3
Moore St	State St	Martin Luther King, Jr. Blvd/Oakview Ave	6
Oakview Ave	Piedmont Ave	Moore St/Martin Luther King, Jr Bvd	3
Old Abingdon Hwy	E Valley Dr	Lee Hwy	3
Old Airport Rd	Kings Mill Pike	Lee Hwy	8
Peters St	W State St	Vance St	1
Piedmont Ave	State St	W Valley Dr	9
Pittstown Rd	Commonwealth Ave Ext	Island Rd	1
Randolph St	Vance St	Spurgeon Ln	2
Reedy Creek Rd	Harleywood Rd (W)	Harleywood Rd (E)	1
Spurgeon Ln	Randolph St	Commonwealth Ave	1
Sycamore St	Commonwealth Ave	Piedmont Ave	2
Texas Ave	Massachusetts Ave	E Valley Dr	2
Vance St	Peters St	Randolph St	2
Wallace Pike	Bristol corporate limits far east	Bordwine Rd	2
Wallace Pike	Island Rd	Bristol corporate limits north	1
Wagner Rd	Randolph St	Bristol corporate limits	3
Wagner St	W State St	Euclid Ave	1
W Mary St	Piedmont Ave	Goodson St	5
W Valley Dr	Piedmont Ave	Lee Hwy	2
WASHINGTON COUNTY, VIRGINIA (314 total links)			
Abrams Falls Rd	Rich Valley Rd	cordon line north	1
Astor Rd	Lee Hwy	Wallace Pike/Wyndale Rd	2
Benhams Rd	Campground Rd	Rich Valley Rd	7
Black Hollow Rd	Wallace Pike	Porterfield Hwy	7
Bordwine Rd	Lee Hwy	Wallace Pike	2
Buffalo Pond Rd	Reedy Creek Rd	cordon line north	1
Campground Rd	Benhams Rd	Reedy Creek Rd	4
Clear Creek Rd	Bristol corporate limits	Wallace Pike	2
Cleveland Rd	Tennessee state line	Green Springs Rd	5
Court St	E Main St/W Main St	Valley St	1
Cummings St	Exit 17 south ramps	Valley St	5
E Main St	Court St	Empire Dr	8
Enterprise Rd	Hillman Hwy	Lee Hwy	5
Gate City Hwy	cordon line west	Bristol corporate limits	8
Green Springs Church Rd	Green Springs Rd	cordon line east	2
Green Springs Rd	Tennessee state line	Exit 17 south ramps	10
Halls Bottom Rd	Lee Hwy	Old Jonesboro Rd	2
Haskell Station Rd	Cowan Dr	Rich Valley Rd	3
Hillman Hwy	E Main St	cordon line north	7
Hutton St	E Main St	Valley St	1
Industrial Park Rd	Wallace Pike	Lee Hwy	4
Interstate 81, northbound	Tennessee state line	Bristol corporate limits west	1
Interstate 81, northbound	Bristol corporate limits east	cordon line north	14
Interstate 81, southbound	Tennessee state line	Bristol corporate limits west	1

LISTING OF MODELED ROADWAYS, BRISTOL TRAVEL DEMAND MODEL (954 total links)

SULLIVAN COUNTY, TENNESSEE (427 total links)

ROADWAY	TERMINUS A	TERMINUS B	No. of LINKS
Interstate 81, southbound	Bristol corporate limits east	cordon line north	13
Interstate 81, Exit 10 ramps			4
Interstate 81, Exit 13 ramps			4
Interstate 81, Exit 14 ramps			8
Interstate 81, Exit 17 ramps			4
Interstate 81, Exit 19 ramps			6
Interstate 81, Exit 22 ramps			4
Jeb Stuart Hwy	Lee Hwy	cordon line east	4
Jonesboro Rd	Old Jonesboro Rd	W Main St	5
Junction Dr	Kings Mill Pike	Old Jonesboro Rd	1
Kings Mill Pike	Bristol corporate limits	Old Jonesboro Rd	4
Lee Hwy	Bristol corporate limits	Forest Hills Cemetery entrance	11
Lee Hwy	Empire Dr	cordon line east	11
Litchfield Rd	cordon line north	Walden Rd	1
Livingston Creek Rd	cordon line north	Rich Valley Rd	1
Majestic Dr	Exit 10 south ramps	Lee Hwy	3
Mallicote Dr	cordon line north	Walden Rd	1
Mock Knob Rd	Old Jonesboro Rd	Cleveland Rd	3
Musick Dr	cordon line north	Reedy Creek Rd	1
Nordyke Rd	cordon line north	Benhams Rd	1
Northridge Rd	Old Saltworks Rd	Hillman Hwy	2
Old Jonesboro Rd	Tennessee state line	Junction Dr	1
Old Jonesboro Rd	Kings Mill Pike	Jonesboro Rd	9
Old Saltworks Rd	cordon line north	Hillman Hwy	5
Pairgin Rd	Reedy Creek Rd	Wallace Pike	2
Pecan St	E Main St	Valley St	1
Porterfield Hwy	W Main St	cordon line north	8
Providence Rd	Lee Hwy	cordon line north	6
Reedy Creek Rd	Tennessee state line	Black Hollow Rd	15
Rich Valley Rd	Gate City Hwy	cordon line north	7
Russell Rd	Porterfield Hwy	W Main St	4
Shell Rd	Cleveland Rd	Green Springs Rd	1
Smith Creek Rd	cordon line north	Black Hollow Rd	1
Spring Creek Rd	Lee Hwy	Old Jonesboro Rd	3
Stanley St	Thompson Dr	Walden Rd	1
Tanner St	E Main St	Valley St	1
Thompson Dr	E Main St	Stanley St	1
Valley St	Russell Rd	Walden Rd	7
Village Blvd	Wyndale Rd	Porterfield Hwy	1
Walden Rd	Valley St	Old Saltworks Rd	5
Wallace Pike	Bristol corporate limits	Astor Rd	11
Watauga Rd	Green Springs Rd	Lee Hwy	5
W Main St	Forest Hills Cemetery entrance	Court St	10
Whites Mill Rd	Valley St	Rich Valley Rd	4
Wolf Run Rd	cordon line north	Benhams Rd	1
Wyndale Rd	Astor Rd	W Main St	9

Appendix D

List of Acronyms

BTT	Bristol Tennessee Transit
BVT	Bristol Virginia Transit
DBE	Disadvantaged Business Enterprise
DOT	Department of Transportation
DRPT	(Virginia) Department of Rail and Public Transportation
DTPT	District Three Public Transit
EPA	Environmental Protection Agency
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTDD	First Tennessee Development District
FTHRA	First Tennessee Human Resource Agency
FY	Fiscal Year
GIS	Geographic Information System
INVEST	Infrastructure Voluntary Evaluation Sustainability Tool
ITS	Intelligent Transportation System
LRTP	Long Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MOA	Memorandum of Agreement
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
PL	Metropolitan Planning Funds (Section 112 of the Federal-Aid Highway Act)
PPP	Public Participation Plan
RPO	Rural Planning Organization
Section 5303	Transit Planning Funds (U.S. Title 49, Section 5303)
SPR	State Planning and Research Funds
TAZ	Traffic Analysis Zone
TDEC	Tennessee Department of Environment and Conservation
TDM	Travel Demand Model
TDOT	Tennessee Department of Transportation
TDP	Transit Development Plan
TIP	Transportation Improvement Program
TMPD	(Virginia) Transportation and Mobility Planning Division
TN	Tennessee
TNMUG	Tennessee Model Users Group
TRIMS	Tennessee Roadway Information and Management System
TSM	Transportation Systems Management
UPWP	Unified Planning Work Program
USDOT	United States Department of Transportation
UZA	Urbanized Area
VA	Virginia
VDOT	Virginia Department of Transportation