



  
**SOUTHEAST AREA**  
TRANSPORTATION AND LAND USE STUDY

# EXISTING CONDITIONS & TRENDS REPORT

*Davidson/Rutherford/Williamson/Wilson Counties, Tennessee*

May 2014



Prepared for the Nashville Area  
Metropolitan Planning Organization



G R E S H A M  
S M I T H   A N D  
P A R T N E R S



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# EXISTING CONDITIONS AND TRENDS REPORT

## INTRODUCTION

Including all of Rutherford County and parts of Davidson, Williamson, and Wilson counties, the Southeast Area of the Nashville-Murfreesboro metropolitan area is a dynamic and fast growing section of the region. The purpose of this technical memorandum, the first report in the Southeast Area Transportation and Land Use Study (SE Study), is to document the existing conditions and trends within the Southeast Area and establish a baseline for evaluating future growth scenarios and potential transportation system improvements. This memorandum specifically addresses the following community elements or topics:

- Land use and development patterns
- Travel demand and transportation systems
- Demand for other public services
- Environmental resources
- Public health
- Economic and Market Conditions
- Fiscal Impact Analysis

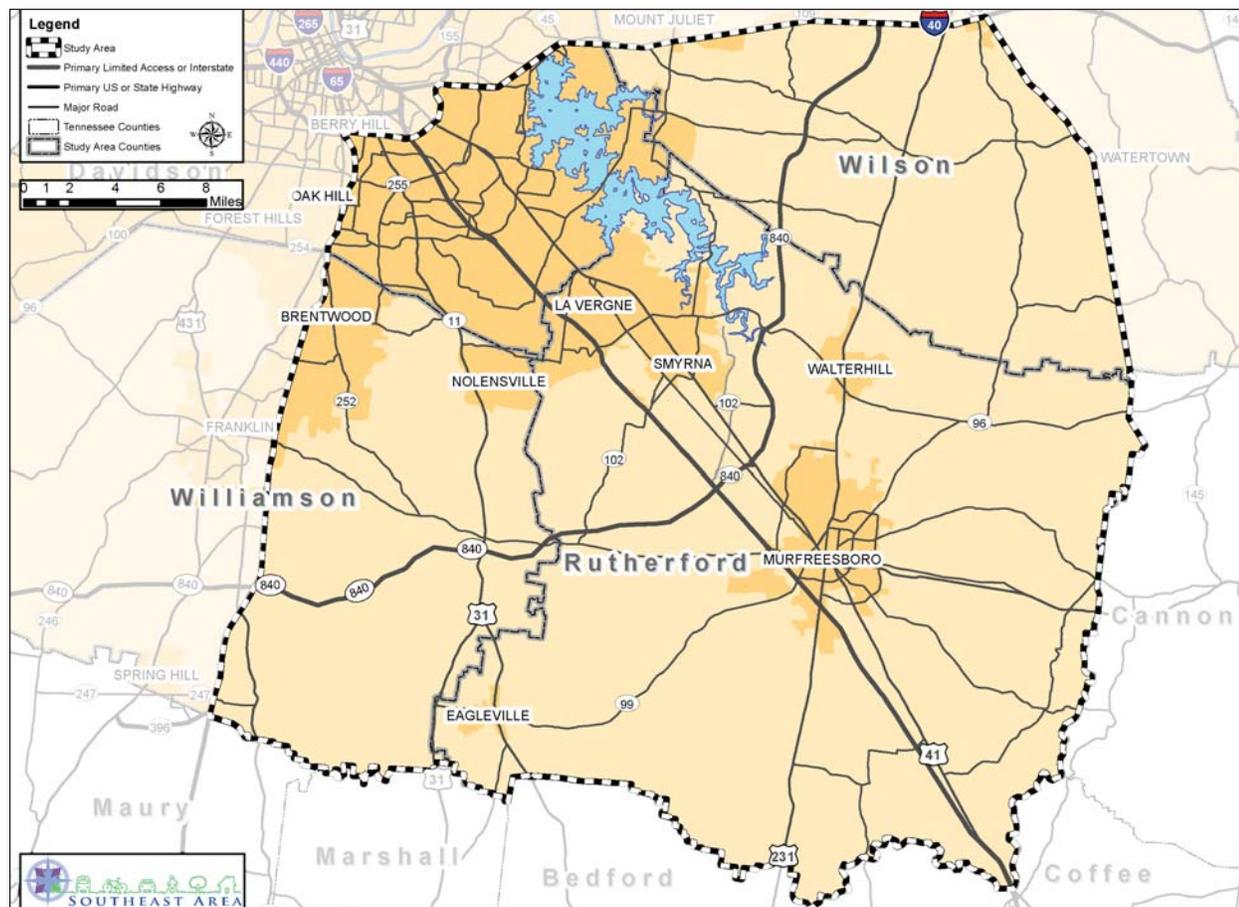
Taken together, the existing conditions and trends associated with each topic help to define the overall set of opportunities and challenges in the Southeast Area. For each topic, benchmark indicators have been established and existing and baseline trend metrics reported. Key findings can be found in the last section of this document. As the memorandum illustrates, though, the Southeast Area is poised to experience continued population and employment growth, and many important steps have already been taken to shape and support development in the area, either by individual jurisdictions and agencies or by the region collectively. Where future growth ultimately occurs and what it means for each jurisdiction will be the subject of the next round of technical analysis.

### Study Area

The Nashville Metropolitan Planning Organization region covers over 2,800 square miles and more than 1.5 million people throughout Davidson, Rutherford, Sumner, Wilson and parts of Maury and Robertson Counties. It is within this larger region that the study area for the Southeast Area Transportation and Land Use Study is located.



Figure I-1. Study Area



Paralleling the Interstate 24 (I-24) corridor between southeast Nashville and Rutherford County, the study area is defined as the entirety of Rutherford County along with the adjacent portions of southeastern Davidson County, eastern Williamson County, and southwestern Wilson County. The study area (Figure I-1) represents one of the most significant economic and cultural corridors in the Middle Tennessee region with a population of approximately 536,034 in 2010. Home to major activity and employment centers such as Middle Tennessee State University (MTSU), Nissan’s North American Headquarters and Smyrna assembly plant, and the Nashville International Airport, the Southeast Area covers approximately 1,187 square miles and includes 12 cities.

- Brentwood
- Eagleville
- Franklin
- LaVergne
- Lebanon
- Mount Juliet
- Murfreesboro
- Nashville – Davidson County
- Nolensville
- Oak Hill
- Smyrna
- Thompson’s Station

## Study Area Goals & Objectives

The area included in the Southeast Study has been the focus of numerous local, regional, and state plans and studies over the past ten years (Table I-1). To be clear, plans are a formally adopted set of policies, strategies, and actions that provide an agency or jurisdiction the necessary guidance for achieving their stated goals and objectives. Studies focus more on bringing together governments, citizens, and businesses to talk about growth and analyze trends and evaluate options. The SE Study offers an opportunity to integrate the various plans' and studies' goals and objectives into a cohesive vision for the multi-jurisdiction study area. In the context of this study, a common set of goals and objectives will serve as the foundation for defining performance measures or indicators that support the evaluation of alternative growth and development patterns.

The previous plans contain a significant amount of overlap with similar goals and objectives and shared themes. Based on the goals

Table I-1. Local Regional, and State Plans & Studies

	Jurisdiction	Plan Title/Scope	Year
Regional			
	MPO	2035 Nashville Area Regional Transportation Plan	2010
	MPO	Tri-County Transportation and Land Use Study	2011
	MPO	Southwest Area Transportation and Land Use Study	2012
	MPO	Nashville Southeast Corridor High-Performance Transit Alternatives Study	2007
	MPO	Regional Bicycle and Pedestrian Study	2009
	MPO	Regional Freight and Goods Movement Studies	2003/2010
Davidson			
	Metro Nashville	Nashville Major and Street Collector Plan	2012
	Metro Nashville	Antioch-Priest Lake Community Plan	2012
	Metro Nashville	Southeast Community Plan	2004
	Metro Nashville	Davidson County Strategic Plan for Sidewalks and Bikeways	2008
	Metro Nashville	Nashville Greenways Master Plan	2012
	Metro Nashville	Nashville Green Ribbon Committee Report	2009
Rutherford			
	Murfreesboro	Murfreesboro Major Thoroughfare Plan	2008
	Murfreesboro	Murfreesboro Greenways Blueways and Bikeways Master Plan	2013
	Rutherford County	Rutherford County Comprehensive Land Use Plan	2011
	Smyrna	Town of Smyrna Comprehensive Plan	2007
Williamson			
	Williamson County	Williamson County Comprehensive Land Use Plan	2007
	Franklin	Franklin Tomorrow Transportation Issues Survey	2013
Wilson			
	Wilson County	Wilson County Gateway Land Use Master Plan	2006
	Wilson County	Bicycle and Pedestrian Master Plan	2002



and objectives in the existing plans, the following six composite goals were developed for the SE Study.

- **Goal # 1** – Maintain and enhance existing community character while providing greater housing choices and connectivity
- **Goal # 2** – Enhance economic growth and competitiveness
- **Goal # 3** – Protect the natural environment and historic and cultural resources
- **Goal # 4** – Preserve and enhance the safety and efficiency of the existing transportation system while providing a wide range of transportation choices
- **Goal # 5** – Coordinate growth with necessary and efficient public infrastructure and facilities
- **Goal # 6** – Maintain and enhance community and regional partnerships

Complementing the study's goals are a series of objectives that describe in greater detail desired outcomes. For example, the goal of maintaining and enhancing housing choices is further defined as expanding housing options for a variety of household sizes and income levels. Indicators, in turn, are then paired with an objective or multiple objectives and function as metrics for evaluating the alternative growth scenarios. The study's complete set of goals, objectives, and indicators are summarized in Table I-2.

## Analyzing the Existing Conditions and Trend Scenario

The analysis of existing conditions was conducted using data provided by the Nashville Area Metropolitan Planning Organization (MPO), the participating jurisdictions, the Tennessee Department of Transportation (TDOT), and private firms. The information provided here is intended to serve as a baseline against which to compare alternative growth scenarios. The MPO's regional land use model, built using CommunityViz, a geographic information system (GIS) based software program, is the tool used to estimate the future development potential of each parcel of land throughout the region. This model allocates future land use and associated characteristics, such as households and jobs, across the region based on current land use policy and each parcel's ability to attract new growth.

Several inputs guide the model's allocation process. The model takes into account the existing growth and development plans and policies of each jurisdiction in the region. These policies are used to develop character areas and future land use designations for the region. Future land use describes the specific use of any given parcel, and the character area defines the density and intensity of that use. Additionally, market suitability is defined for each parcel to reflect its real-life attractiveness for development. Growth projections based on Woods & Poole data is used to determine the likely demand to arise by the study's horizon year of 2040.

The trend scenario is a representation of where people could live and work in 2040, the planning horizon year for the study. This report uses the set of indicators identified in Table I-2 to analyze both the existing conditions and trend scenario. Again, indicators are simply variables for quantifying community trends, and the same set of indicators will be used in a later phase of the study to compare the alternative growth scenarios against the trend scenario. For each of the five community elements or topics reviewed in this memorandum, the following information is provided:

- Topic overview
- Topic indicators
- Existing values
- Trend scenario values

In this report, “region” refers to the four county (Davidson, Rutherford, Williamson, and Wilson) region in which the study area is located. The study area is referred to as the “Southeast Area.”

Table I-2. Goals, Objectives and Indicators

GOALS & OBJECTIVES		INDICATORS	Access to Transit	Agricultural Land Consumed	Average Travel Time	Access to Greenways, Trails, & Parks	Congestion/Delay	Demand For Fire Protection	Demand for Police Protection	Demand for Water/Wastewater	Demand for Transportation	Employment Density	Encroachment on Protected Open Space	Fiscal Impact
Goal #1: Maintain and enhance existing community character while providing greater housing choices and connectivity														
Objectives	a. Expand housing options for a variety of household sizes and income levels													
	b. Encourage mixed-use development													
	c. Provide bicycle and pedestrian facilities and transit access within and among neighborhoods													
	d. Improve public health opportunities													
Goal #2: Enhance economic growth and competitiveness														
Objectives	a. Focus development in planned growth areas													
	b. Reduce percentage of income spent on transportation													
	c. Improve efficiency of freight movement													
Goal #3: Protect the natural environment and historic and cultural resources														
Objectives	a. Preserve and expand open space, coordinating with new development													
	b. Avoid development on agricultural lands													
	c. Minimize impervious surfaces													
	d. Improve regional air quality													

Greenhouse Gas Emissions	Growth In Floodplain	Housing Mix	Impervious Surface	Mode Split	Percent Income Spent on Transportation	Population Density	Proximity to Existing Schools	Reliability of I-24 (Smyrna to Downtown Nashville)	Systemwide Truck Delay	Transit Ridership	Truck VMT	Truck Volumes At High Crash Locations	Urban Footprint	Urban Parks	Vacant Land Consumed	Vehicle Hours Traveled	Vehicle Miles Traveled	Walkability/Intersection Density

Table I-2.Goals, Objectives and Indicators (continued)

GOALS & OBJECTIVES		INDICATORS	Access to Transit	Agricultural Land Consumed	Average Travel Time	Access to Greenways, Trails, & Parks	Congestion/Delay	Demand For Fire Protection	Demand for Police Protection	Demand for Water/Wastewater	Demand for Transportation	Employment Density	Encroachment on Protected Open Space	Fiscal Impact
Goal #4: Preserve and enhance the safety and efficiency of the existing transportation system while providing a wide range of transportation choices														
Objectives	a. Continue to improve safety of the transportation system													
	b. Maintain a "fix-it-first" approach and complete existing projects before pursuing new ones													
	c. Increase bicycle and pedestrian connectivity within and among communities													
	d. Expand existing transit services and explore feasibility of new ones													
	e. Preserve and enhance the efficiency of the roadway network													
Goal #5: Coordinate growth with necessary and efficient public infrastructure and services														
Objectives	a. Encourage infill development in areas served by existing public infrastructure and services													
Goal #6: Maintain and enhance community and regional partnerships														

Greenhouse Gas Emissions	Growth In Floodplain	Housing Mix	Impervious Surface	Mode Split	Percent Income Spent on Transportation	Population Density	Proximity to Existing Schools	Reliability of I-24 (Smyrna to Downtown Nashville)	Systemwide Truck Delay	Transit Ridership	Truck VMT	Truck Volumes At High Crash Locations	Urban Footprint	Urban Parks	Vacant Land Consumed	Vehicle Hours Traveled	Vehicle Miles Traveled	Walkability/Intersection Density
																		
																		
																		
																		
																		
																		



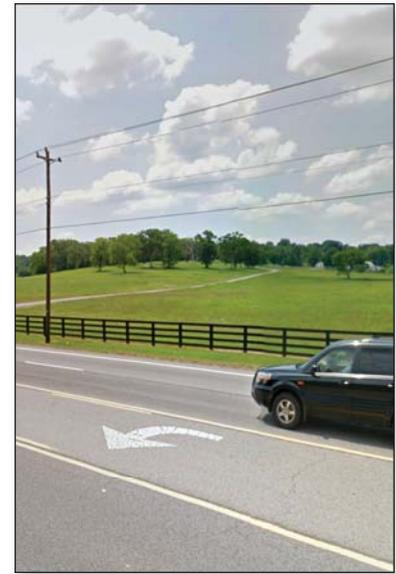
# 1. LAND USE AND DEVELOPMENT PATTERNS

## Existing Land Use

Because growth in the Southeast Area has accelerated over the past 20 years (Table 1-1), residential and commercial development patterns have largely relied on automobiles for personal travel and trucks for freight and goods movement. Accordingly, the Southeast Area today is characterized by a continuously evolving mix of rural land, suburban residences, and a strong presence of industrial and warehouse and distribution uses. More recently, large scale retail development has been introduced to or been the focus of redevelopment in the area. From a transportation perspective, commercial and industrial development has tended, not surprisingly, to cluster around a small number of major arterials, intersections, and interchanges, while residential subdivisions branch off and rely on those same arterials.

Existing land uses are generally consistent across the jurisdictions in the Southeast Area. In the north section of the Southeast Area, extending approximately from Briley Parkway to Old Hickory Boulevard in southeast Davidson County, single family residences on roughly quarter acre lots predominate with multifamily apartment complexes and commercial development concentrated along major corridors, especially near I-24 and Bell Road. Industrial and warehouse and distribution uses are primarily found southwest of Nashville International Airport and adjacent to I-24.

South of Old Hickory Boulevard in Rutherford County, the City of LaVergne contains heavy industrial uses to the west near I-24, low density commercial development along US 41/Murfreesboro Road, and low density, single family residential development throughout the city. The City of Smyrna also consists mostly of lower density single family residential development, with the highest concentrations between I-24 and US 41/Lowry Street. Relatively intense commercial development is located on Sam Ridley Parkway near I-24, and the Nissan Plant constitutes a major industrial land use in the city. Continuing south, low-density suburban development extends along major and minor arterials in the City of Murfreesboro. Relatively intense commercial and light industrial development is located between I-24 and Broad Street (particularly around Old Fort Parkway), and medium density suburban development is east of Broad Street. MTSU is a major institutional land use west of downtown Murfreesboro. In the southern limits of Murfreesboro, the areas adjacent to both the Joe B. Jackson Parkway and Epps Mill Road interchanges (Exits 83 and 89, respectively) are currently experiencing industrial development. The area is currently home to an Amazon redemption center, and is zoned for additional industrial growth.



*Open space along Murfreesboro Road in Antioch*

Table 1-1. Population Change, 1990-2010






Jurisdiction	1990	2000	2010	2012	Change +/-	% Change
Metropolitan Nashville-Davidson County	510,784	569,891	626,681	648,295	137,511	27%
Rutherford County*	52,124	68,487	80,683	92,163	40,039	77%
Williamson County*	37,287	45,916	45,847	54,861	17,574	47%
Wilson County*	45,828	54,850	62,655	66,165	20,337	44%
Brentwood	16,392	23,445	37,060	37,288	20,896	127%
Eagleville	378	464	604	543	165	44%
Franklin	20,098	41,842	62,487	63,117	43,019	214%
LaVergne	9,280	18,687	32,588	32,458	24,959	333%
Lebanon	15,208	20,235	26,190	26,510	11,302	74%
Mount Juliet	5,389	12,366	23,871	24,557	19,168	356%
Murfreesboro	44,922	68,816	109,048	109,172	64,250	143%
Nolensville	1,570	3,099	5,869	5,812	4,242	270%
Smyrna	13,647	25,569	39,974	40,118	26,471	194%

Source: US Census Bureau: Decennial Census 1990-2010, American Community Survey 2012 5-Year Estimates

\* Indicates population count of unincorporated county

In unincorporated Rutherford County, the predominant developed land use is low density single family homes. According to the County's current comprehensive plan, while many parcels of land are still vacant, the current zoning structure allows for future residential development at similar densities to the existing development. The two primary base zones in the county are RM (Residential Medium-Density, which allows a 15,000 s.f. lot) and RL (Residential Low-Density, which requires a one-acre minimum lot size). Of the unincorporated area, over 430 square miles of the total 480 are zoned for some level of residential use.

Eastern Williamson County is characterized mostly by rural land interspersed with low density residential and commercial development. Brentwood contains residential and commercial concentrations on either side of I-65, the study area's western boundary. Significant commercial and office densities occur between Franklin and Brentwood in Cool Springs, home to large corporate offices including Nissan's North American headquarters. Wilson County, south of Interstate 40 (I-40), is almost entirely agricultural with occasional rural residential development. Cedars of Lebanon State Park contains 900 acres of protected lands in south Wilson County. Closer to the Davidson County line, large scale retail development has recently

been developed, while the opening of State Route 840 (SR 840) has supported new warehouse and distribution facilities in addition to the Nashville Superspeedway.

## General Land Use Forecast

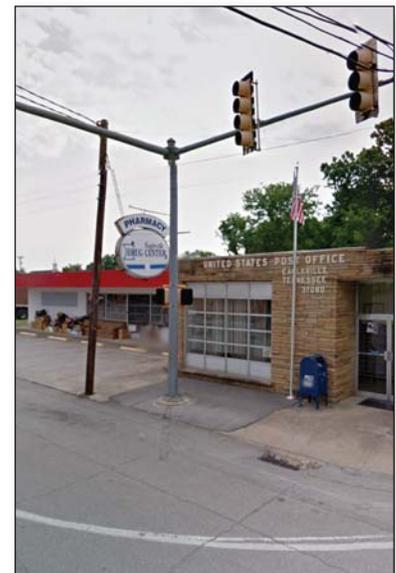
Land uses within the Southeast Area have been generalized both by their specific function (future land use) and character of context (character area). For example, a parcel containing office uses (future land use) will vary in terms of floor-area ratio and total employees depending on whether it is located in a downtown core or a suburban setting (character area). This generalization enables a simplified approach to the complex task of analyzing future land use across jurisdictions in the Southeast Area. Table 1-2 shows the available land and expected development for the four counties in the Southeast Area. The trend scenario land use allocation is used to calculate the trend indicators found in the remainder of this report.

## Trend Analysis

Along with their existing and trend scenario values, the indicators capturing land use and development conditions are described in Table 1-3. It is also important to highlight that each indicator is associated with one or more of the study's goals, as shown in the left hand column of Table 1-3. Figures 1-1 and 1-2 illustrate the generalized future land uses and character areas for the study.

The Southeast Area currently consists of primarily low-density, suburban style development. This development pattern will continue to be predominant through 2040. Net residential density in the region, that is households on residential acres, will remain low at approximately 187 per square mile in 2040. New housing construction will focus primarily on single family residential units. Less than one multi-family unit will be added for every ten single family units. Much of the growth is likely to occur outside of existing residential centers. Net employment density will remain constant, at approximately 98 employees per net acre of employment space.

A large amount of land in the Southeast Area is currently rural or undeveloped; only 30 percent of Southeast Area parcels are currently developed. Approximately 150,000 additional acres of land in the four county region will be consumed by new growth between now and 2040. This land consumption will threaten the rural character that exists in much of the Southeast Area, particularly in unincorporated Rutherford and Williamson Counties and small towns such as Eagleville. The trend development pattern will increase the size of the region's urban footprint by approximately 67,000 acres. Additionally, the land consumed will increase the demand for public services, and result in greater impacts on protected open space and environmental resources.



*Downtown Eagleville at SR 269 and US 41*

Figure 1-1. Future Land Use

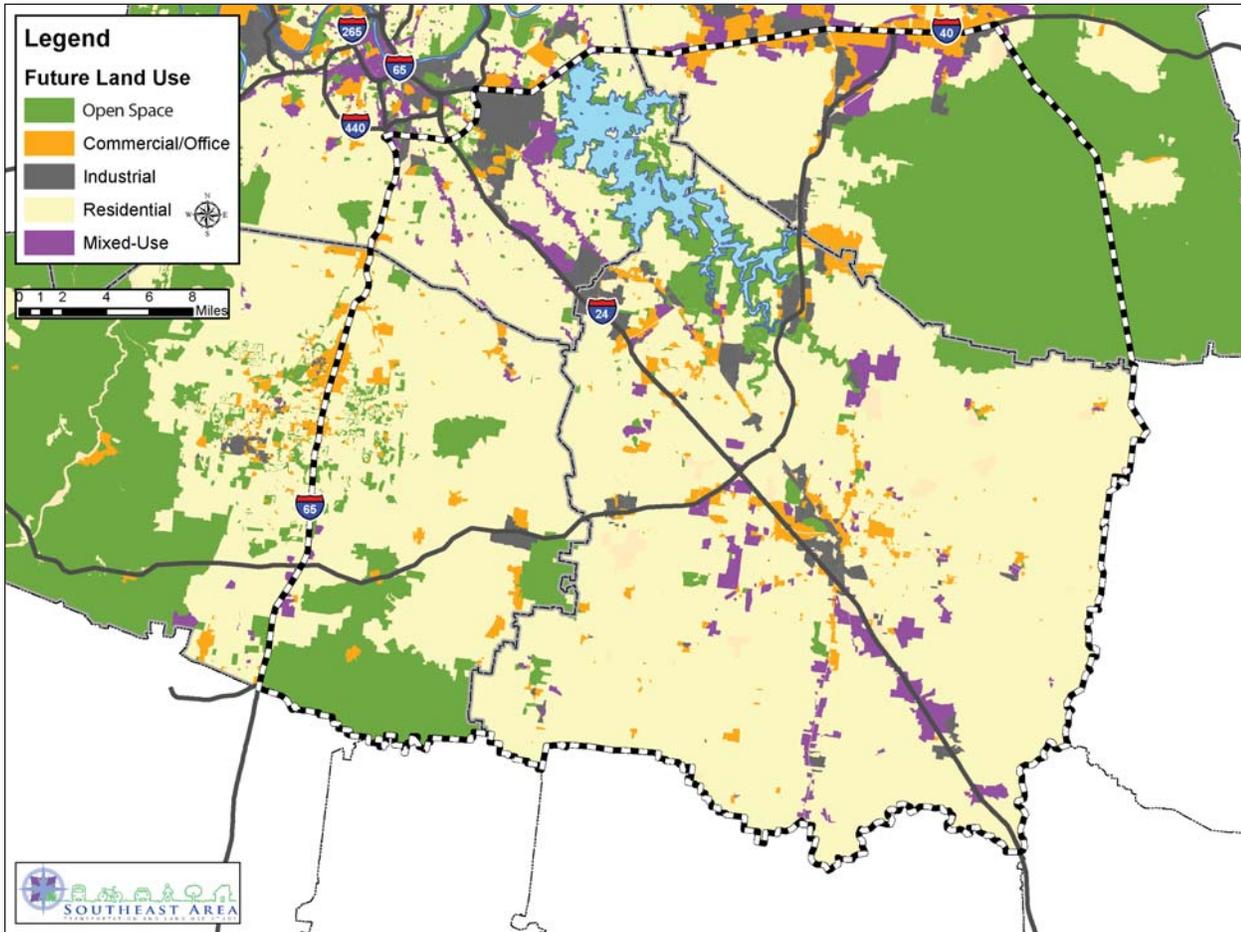


Table 1-2. Available Land and New Development Expected by 2040

County	Total Land Area (acres)	Land with Existing Development (acres, % of total)	New Development (2012 - 2040)			
			Households	Retail (s.f.)	Office (s.f.)	Industrial(s.f.)
Davidson	293,896	147,391 (50%)	68,688	10,512,145	21,097,500	11,357,000
Rutherford	376,938	110,600 (29%)	116,271	11,866,122	7,417,975	7,539,600
Williamson	355,696	76,718 (22%)	118,848	9,084,574	10,470,051	7,615,920
Wilson	349,037	72,730 (21%)	41,811	4,152,178	2,499,576	4,381,350
4-County Total	1,375,567	407,440 (30%)	345,618	35,615,019	41,485,102	30,893,870
Southeast Area	710,614	208,533 (29%)	140,780	17,043,419	18,197,717	18,242,769

Source: Nashville MPO 2040 Land Use Model

Figure 1-2. Character Areas

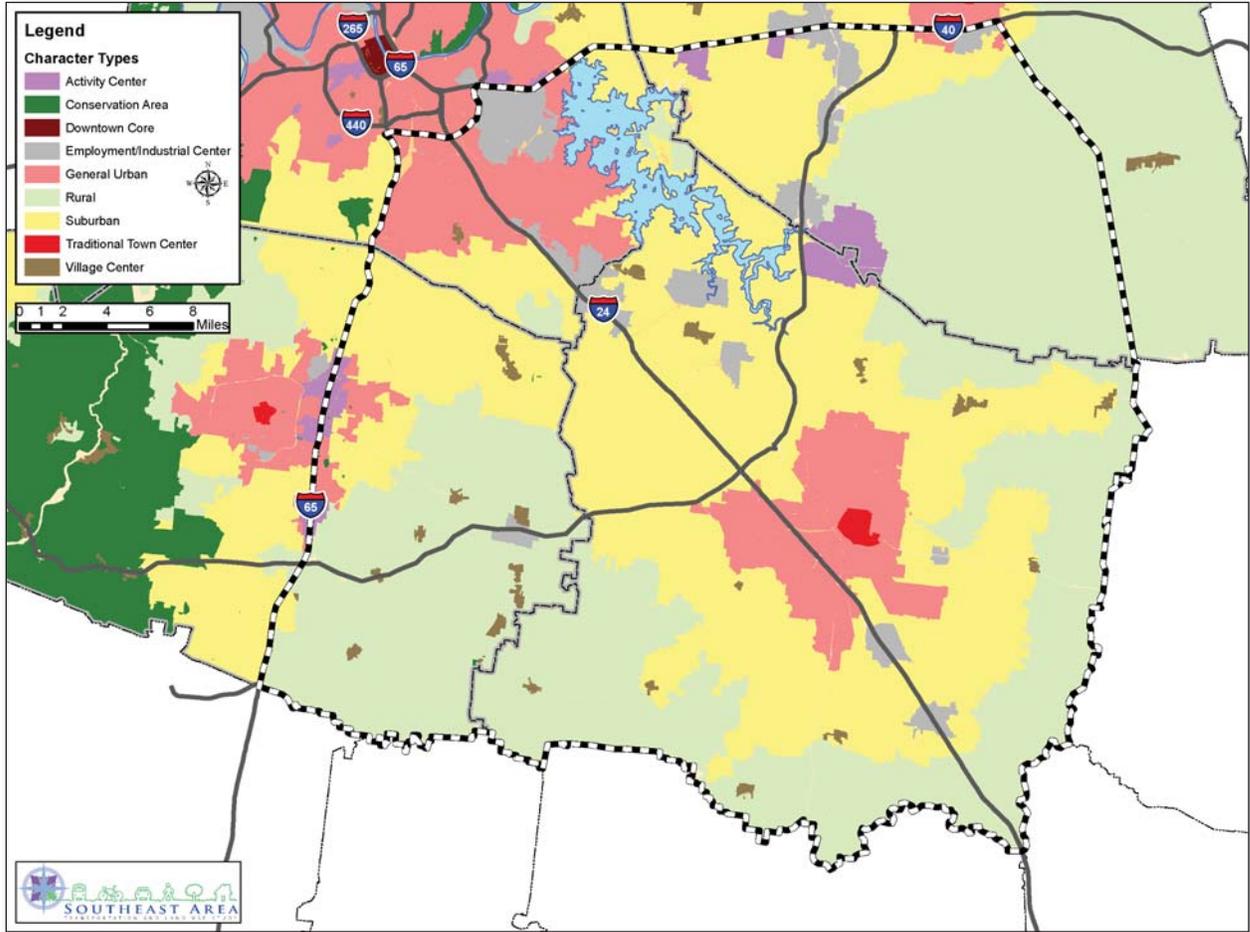


Table 1-3. Land Use and Development Indicators

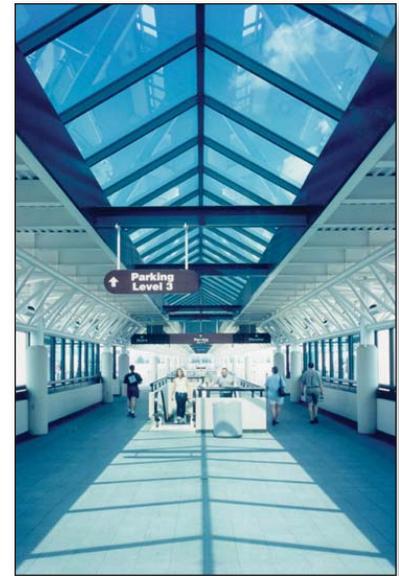
Goal	Indicator	Description	4-County Region		Southeast Area	
			Existing	Trend (2040)	Existing	Trend (2040)
1, 2	 Population Density	The number of residents per (gross) acre	0.822	1.423	0.745	1.457
4	 Employment Density	The number of employees per (gross) acre	0.592	1.046	0.387	0.798
2	 Housing Mix	Housing mix reflects the percentage of multi-family households within the Southeast Area for a specific planning horizon	0.344	0.170*	0.290	0.095*
3	 Urban Footprint	The total number of acres with development classified as urban (either residential or non-residential)	268,063	335,713	120,510	157,190

\* Trend values only cover allocated housing



## 2. TRAVEL DEMAND AND TRANSPORTATION SYSTEMS

The Nashville metropolitan region has a well-connected transportation network that lies at the crossroads of three interstate corridors, I-40, I-65, and I-24, and at the convergence of five Class 1 rail lines. Located in the Southeast Area, Nashville International Airport offers passenger and cargo service to national and international destinations, and the Smyrna Airport offers facilities for both general aviation and military use. This connectivity is an enormous asset for both interregional and intraregional travel and the commercial movement of freight and goods.



Nashville International Airport

### Commuting Trends

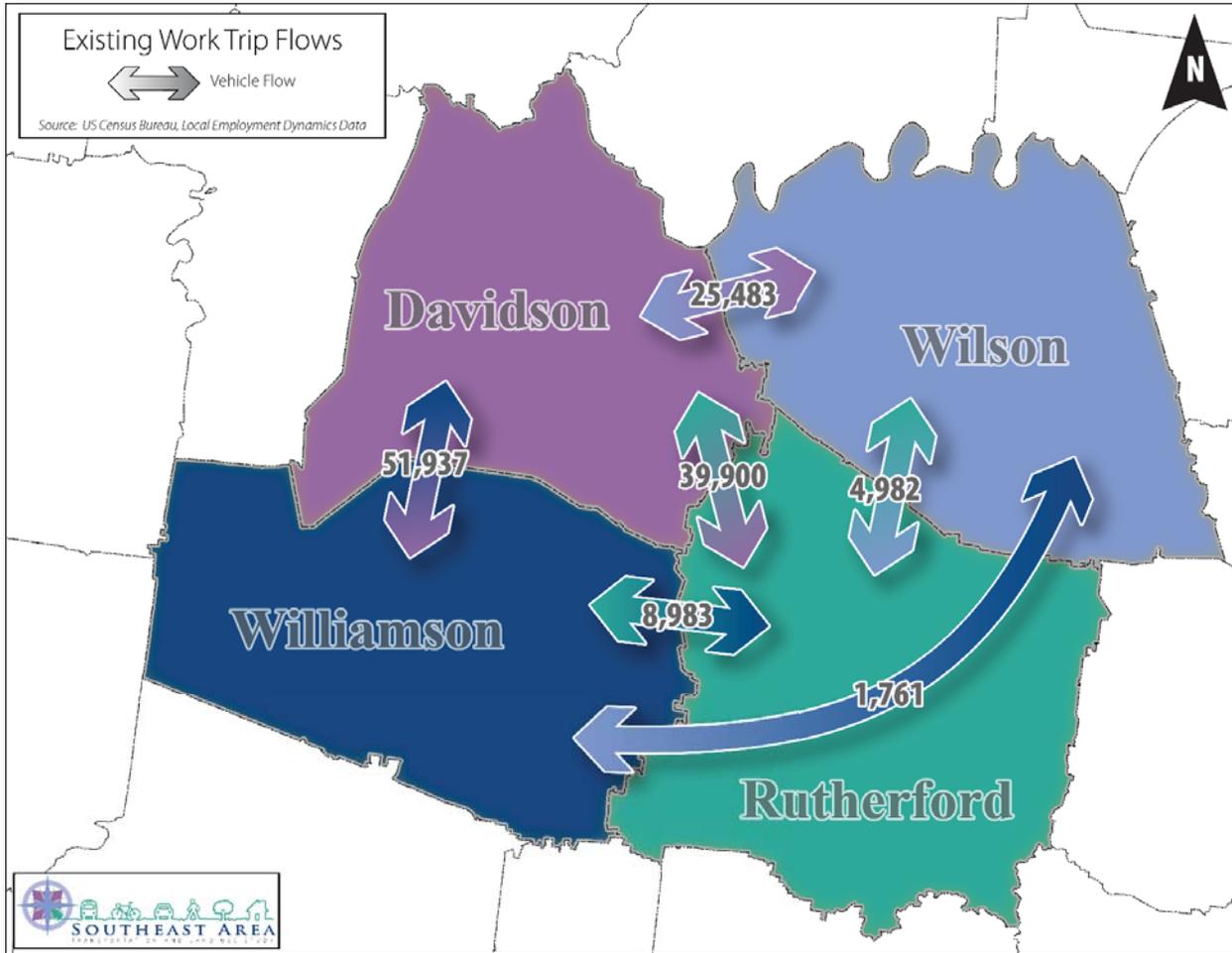
A significant amount of the travel demand in the Southeast Area is the result of intraregional travel. In 2010, the U.S. Census Bureau estimated that approximately 560,000 workers both lived and worked in the region, and one in five commuted from their counties of residence to another county in the immediate four-county region. Almost one-third of all work trips from Rutherford, Williamson, and Wilson Counties in 2010 were to Davidson County, while only 12

Table 2-1. Regional Commuting Patterns, 2010

	County In Which Employed				Total Workers	Percentage of Residents Commuting to Other Counties
	Davidson	Rutherford	Williamson	Wilson		
Davidson	254,084	10,055	23,027	3,664	301,508	12.19%
Rutherford	29,845	78,331	6,687	2,269	121,801	31.86%
Williamson	28,910	2,296	45,441	256	82,096	38.32%
Wilson	21,819	2,713	1,505	24,276	52,691	49.41%
Other County	79,980	10,423	10,591	5,823	106,817	NA
<b>Total Jobs</b>	<b>408,638</b>	<b>103,818</b>	<b>87,251</b>	<b>36,288</b>	<b>664,913</b>	<b>20.72%</b>
Percentage of Workers from Another County	19.29%	10.04%	12.14%	16.05%	NA	---

Source: U.S. Census Bureau, Local Employment Dynamics Data

Figure 2-1. County-to-County Traffic Flow: Existing Work Trips



percent of the work trips from Davidson County were to the three adjacent counties (Table 2-1 and Figure 2-1). Wilson County had the highest rate of commuting out-of-county with nearly one-half of its workers leaving the county each day for jobs primarily in Davidson County. In 2011, the Bureau of Labor Statistics reported that approximately 65 percent of the four-county region's jobs were located in Davidson County. The distance between employment centers and residences creates longer commutes for many residents.

According to 2011 Census Bureau estimates, commuters in the region overwhelmingly travel in single occupancy vehicles. In 2011, 82 percent of commuters drove alone to work, which is higher than the national average of 76 percent. Approximately nine percent of commuters carpooled with other individuals, while less than two percent used public transportation. According to the Center for Neighborhood Technology, residents in the Nashville Metropolitan Statistical Area (MSA) spend, on average, 29 percent of the regional median household income on transportation costs. Coupled with housing, the average resident spends 53 percent of the regional median household income on these two basic needs. For comparison, in the Charlotte MSA, residents spend 27 percent of their income on transportation costs, and a combined 52 percent on

housing and transportation. In the Austin MSA, the numbers are 25 and 52 percent, respectively. Household and transportation costs are considered “affordable” if they comprise less than 45 percent of the regional median household income.

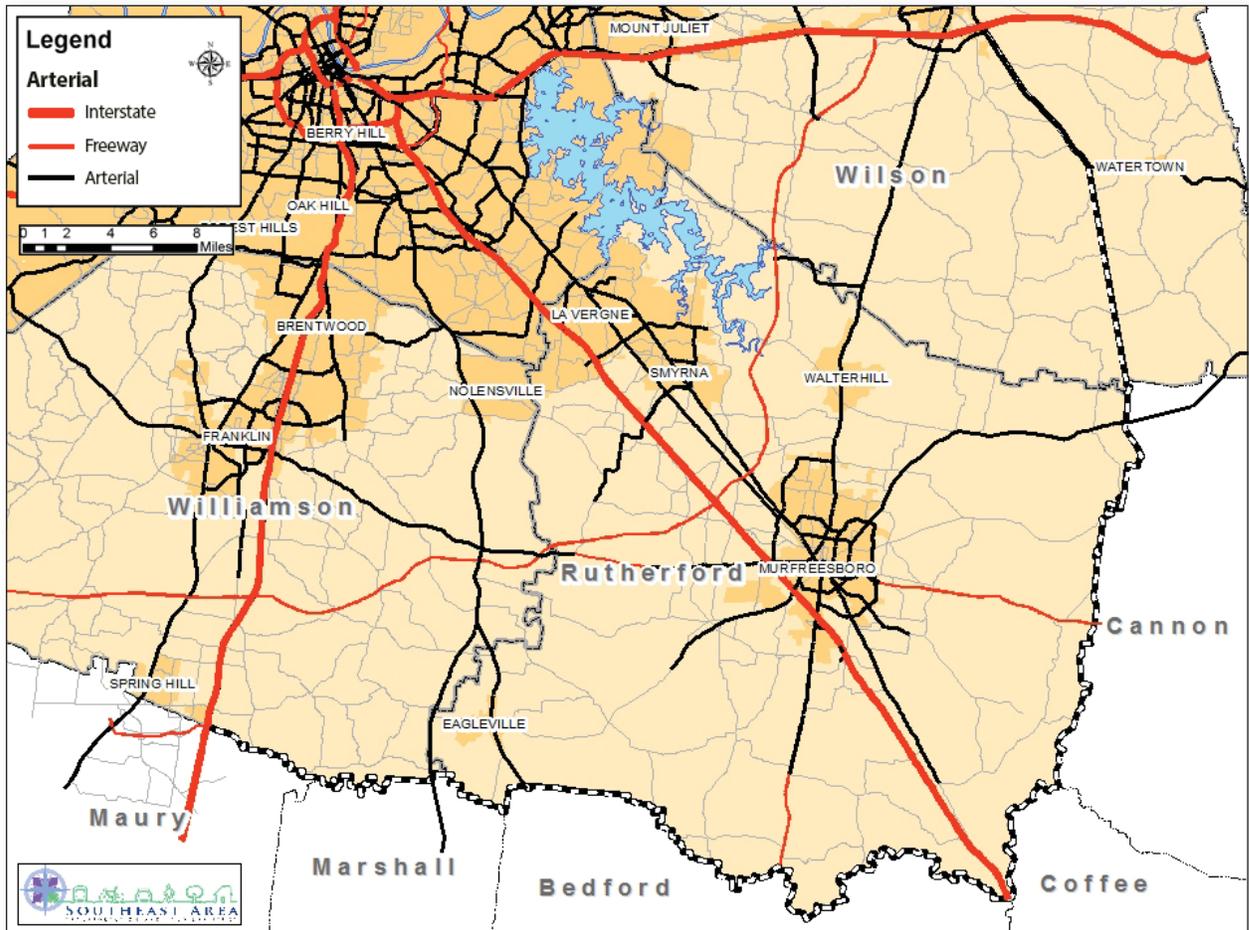
Travel by car is projected to increase significantly in the region by 2040. Vehicle miles traveled are projected to increase by approximately 50 percent. Vehicle hours traveled are projected to triple. Overall congestion delay will be seven times greater. Interstate 24 between Rutherford County and downtown Nashville will experience lower average speeds during peak hours.



## Roadway Network

Existing population and employment centers within the Southeast Area and metropolitan region are generally well-connected by major transportation corridors including interstates, freeways, and multi-lane, high mobility arterials (Figure 2-2). As shown in Table 2-2, the region is home to approximately 1,200 lane miles of interstates and freeways, as well as approximately 2,500 lane miles of arterial roadways. The Southeast Area has approximately 46 percent of

Figure 2-2. Existing Arterials, Interstates, and Freeways



*Note: New functional classes have been developed for MAP-21, but not yet approved*

Table 2-2. Lane Miles of Interstate/Freeway and Arterials

Roadway Class	4-County Region	Study Area	% of Region
Interstate/Freeway	1,197	550	46.0%
Principal Arterial	1,119	389	34.7%
Minor Arterial	1,394	515	36.9%
TOTALS	3,710	1,454	39.2%

Note: New functional classes have been developed for MAP-21, but not yet approved

the region’s interstate/freeway lane miles, though the region has a slightly lower share of the region’s principal and minor arterials (35 and 37 percent respectively). High levels of intraregional connectivity for automobiles and trucks have contributed, however, to dispersed, low-density residential and commercial growth across much of the Southeast Area. As a consequence, while the existing arterial system connects the area’s existing communities well, congestion is a persistent problem along major freeways and arterials during

Figure 2-3. Existing Congestion

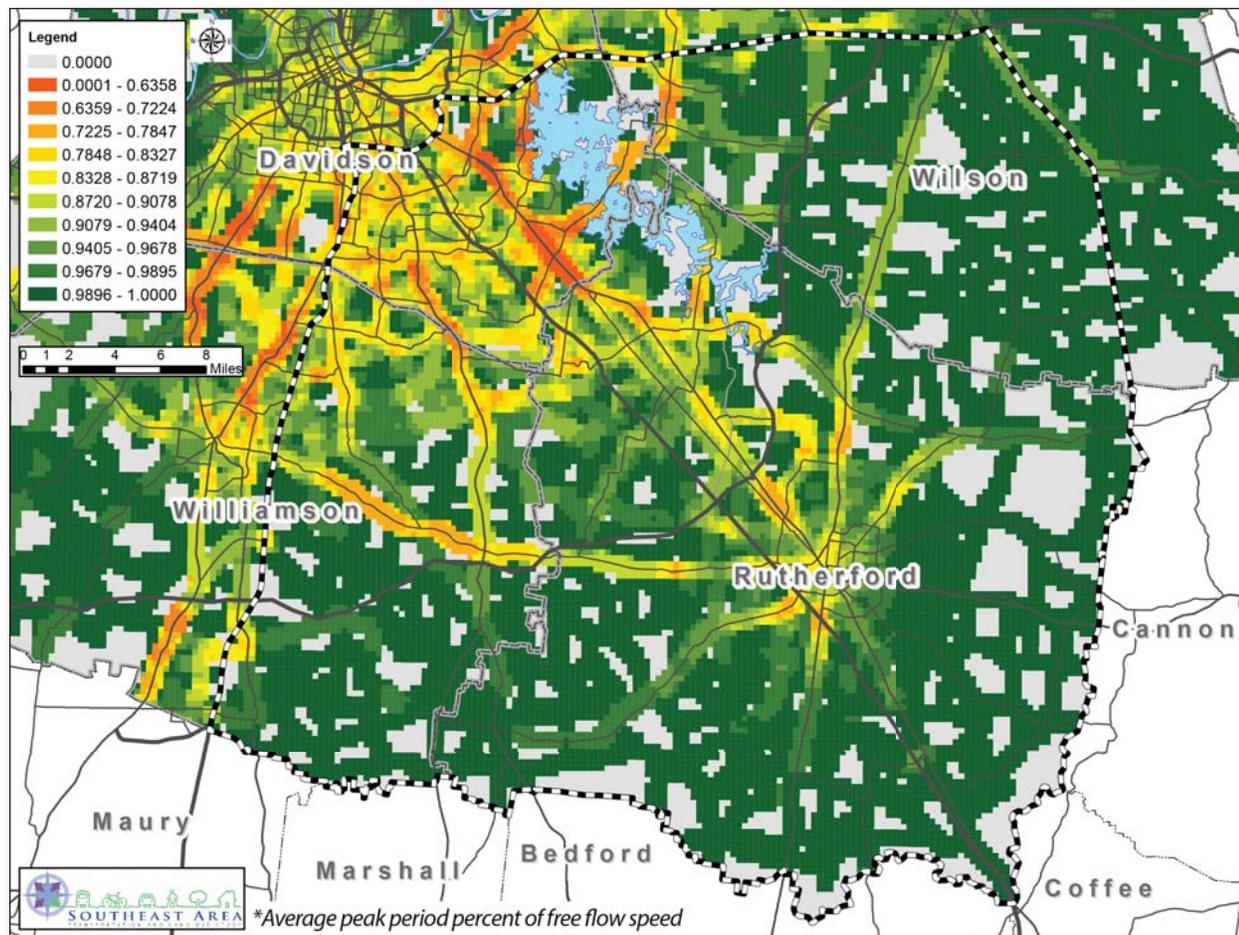
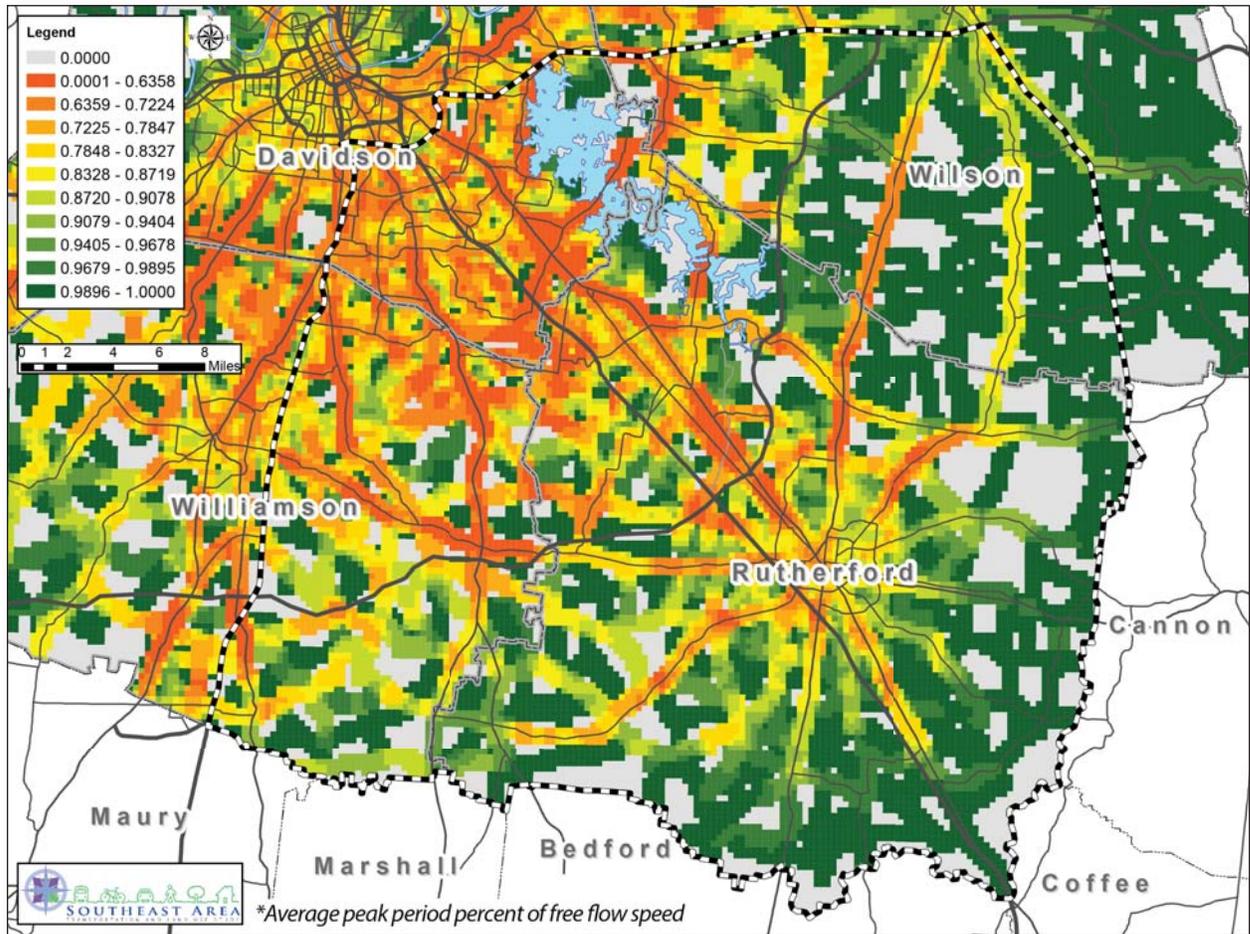


Figure 2-4. 2040 Congestion



peak hours (Figure 2-3). Future growth, particularly in currently-rural portions of Rutherford, Williamson, and Wilson Counties, are projected to strain the transportation system even further (Figure 2-4).

Additionally, future strain is likely to be exacerbated by the roadway network’s radial character. Major roadway connections exist among the region’s primary residential and employment centers (e.g., downtown Nashville and Murfreesboro), but arterial connectivity degrades in the more rural areas between centers. For example, with the exception of SR 840, existing connections between major centers in Rutherford and Williamson County are inadequate to accommodate any major job or housing growth in the area.

The lack of street network connectivity, transportation choices, and complementary land uses at the local level exacerbates regional peak period congestion as travelers rely on a limited number of options to travel relatively long distances for daily needs, including work, shopping, education, entertainment, medical, and recreation (Table 2-3). Even seemingly modest increases in daily travel times will result in significant annual impacts – e.g., a 10-minute increase for both AM and PM work trips translates to 83 additional commuting hours annually or more than three full days. Recently, employment center growth in suburban locations has led to increased travel

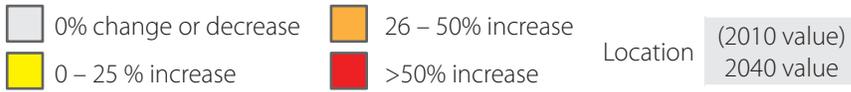


Public transit offers opportunities to multi-task

Table 2-3. PM Peak Period Travel Time Between Key Southeast Area Core Destinations, Years 2010 and 2040 (in minutes)

		TRAVELING TO:						
		Downtown Nashville	Vanderbilt/ West End	Nashville Int'l Airport	I-440/I-24 Interchange	Antioch	LaVergne	Smyrna
TRAVELING FROM:								
	Downtown Nashville	---	(6.2) 5.4	(13.7) 19.6	(9.4) 11.6	(18.0) 27.4	(26.1) 35.5	(30.6) 39.4
	Vanderbilt/ West End	(6.2) 5.6	---	(15.4) 22.1	(11.1) 14.7	(19.7) 28.2	(27.8) 36.3	(32.2) 40.1
	Nashville Int'l Airport	(13.5) 18.4	(15.6) 20.9	---	(8.8) 9.9	(14.5) 19.4	(18.5) 27.5	(27.1) 31.4
	I-440/I-24 Interchange	(9.1) 10.4	(11.1) 13.8	(8.2) 10.6	---	(11.7) 16.7	(19.8) 24.8	(24.2) 28.6
	Antioch	(17.5) 24.4	(19.5) 25.3	(14.5) 18.2	12.3 15.3	---	(10.8) 12.2	(15.5) 16.1
	LaVergne	(25.2) 32.1	(27.2) 33.0	(18.5) 25.9	(20.0) 23.0	(9.9) 10.6	---	(9.2) 13.2
	Smyrna	(29.8) 35.7	(31.9) 36.6	(26.8) 29.5	(24.7) 26.6	(14.6) 14.1	(9.2) 11.8	---
	Murfreesboro	(39.9) 44.0	(42.0) 44.9	(36.9) 37.8	(34.8) 34.9	(24.7) 22.4	(23.9) 22.8	(20.5) 20.7
	SR 840/I-40 Interchange	(32.4) 32.9	(34.5) 35.4	(23.1) 20.1	(27.7) 24.5	(33.3) 37.0	(32.2) 45.2	(32.0) 42.4
	Lebanon	(36.0) 35.2	(28.0) 37.7	(26.7) 22.3	(31.2) 26.8	(36.8) 39.3	(35.7) 47.4	(35.2) 44.7
	Mt. Juliet	(25.2) 28.0	(27.2) 30.5	(15.9) 15.1	(20.4) 19.5	(26.0) 32.1	(24.9) 40.2	(33.5) 44.0
	SR 840/I-65 Interchange	(30.1) 33.3	(32.0) 33.2	(34.2) 40.1	(30.4) 31.8	(33.0) 36.9	(36.3) 45.0	(34.1) 46.6
	Franklin	(27.4) 30.0	(29.2) 29.9	(31.5) 36.7	(27.7) 28.4	(30.3) 33.6	(37.2) 41.7	(39.3) 45.5
	Cool Springs	(19.0) 20.0	(20.8) 19.9	(23.1) 26.7	(19.2) 18.4	(21.9) 23.6	(29.3) 31.7	(33.6) 35.5
	Brentwood	(14.6) 16.9	(16.4) 16.9	(18.7) 23.7	(14.8) 15.4	(16.6) 20.5	(25.2) 28.7	(29.6) 32.5
	I-24 South	(54.4) 61.0	(56.5) 61.9	(51.4) 54.8	(49.3) 51.9	(39.2) 39.4	(38.4) 39.8	(36.6) 37.7

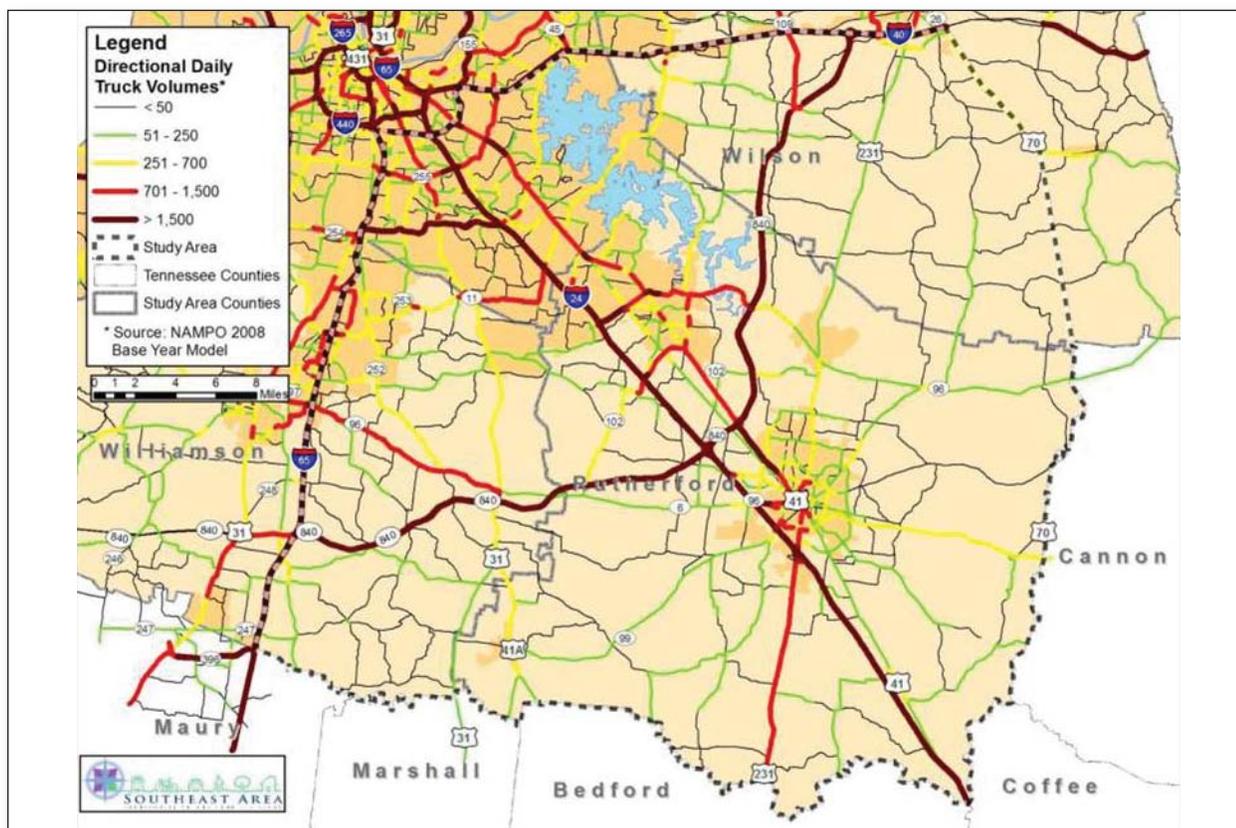
LEGEND



TRAVELING TO:

	Murfreesboro	SR 840/I-40 Interchange	Lebanon	Mt. Juliet	SR 840/I-65 Interchange	Franklin	Cool Springs	Brentwood	I-24 South
	(40.6) 52.7	(33.1) 35.7	(36.4) 37.8	(25.7) 31.2	(29.3) 35.6	(26.9) 29.9	(18.3) 21.6	(13.9) 17.9	(54.5) 69.6
	(42.2) 53.5	(34.8) 38.3	(38.1) 40.4	(27.4) 33.8	(31.0) 35.1	(28.6) 29.4	(19.9) 21.1	(15.5) 17.4	(56.2) 70.4
	(37.6) 44.7	(22.9) 20.4	(26.2) 22.6	(15.4) 16.0	(33.5) 40.4	(31.1) 34.6	(22.4) 26.4	(18.0) 22.7	(51.6) 61.6
	(34.2) 42.0	(27.6) 26.7	(30.9) 28.8	(20.2) 22.2	(28.9) 32.1	(26.5) 26.4	(17.8) 18.1	(13.4) 14.5	(48.2) 58.8
	(25.5) 29.4	(33.6) 36.2	(36.9) 38.3	(26.0) 31.7	(32.8) 37.4	(30.4) 31.68	(21.7) 23.4	(16.6) 19.7	(39.5) 46.3
	(24.2) 30.1	(32.5) 43.9	(35.9) 46.0	(24.9) 39.4	(36.3) 45.1	(37.2) 39.4	(29.2) 31.1	(24.6) 27.4	(38.1) 47.0
	(20.5) 27.6	(32.0) 42.6	(34.9) 44.7	(33.5) 43.0	(34.1) 48.7	(39.3) 42.9	(33.6) 34.7	(29.2) 31.0	(36.6) 44.4
	---	(33.9) 46.8	(36.8) 48.7	(41.5) 51.3	(32.9) 47.3	(41.2) 51.2	(41.3) 43.0	(39.3) 39.3	(21.8) 26.4
	(34.6) 50.2	---	(6.8) 6.9	(15.3) 15.4	(49.4) 54.9	(50.0) 49.2	(41.3) 40.9	(36.9) 37.3	(51.2) 72.1
	(37.8) 51.6	(6.8) 6.9	---	(19.5) 17.7	(52.6) 57.2	(53.5) 51.5	(44.8) 43.2	(40.4) 39.5	(54.3) 73.3
	(41.4) 57.4	(15.3) 16.3	(20.0) 18.4	---	(45.1) 50.0	(42.7) 44.2	(34.1) 36.0	(29.7) 32.3	(58.0) 74.2
	(32.3) 50.4	(48.9) 56.2	(51.7) 58.3	(46.2) 51.7	---	(14.1) 17.4	(14.4) 17.0	(19.7) 21.5	(46.3) 60.0
	(41.0) 58.9	(50.9) 52.8	(54.2) 55.0	(43.5) 48.3	(14.1) 18.3	---	(11.7) 13.6	(17.0) 18.1	(54.9) 74.5
	(40.4) 48.9	(42.5) 42.8	(45.8) 45.0	(35.1) 38.4	(13.1) 17.1	(10.6) 11.3	---	(8.6) 8.1	(54.3) 65.7
	(39.6) 45.8	(38.1) 39.8	(41.4) 41.9	(30.7) 35.3	(18.4) 21.8	(16.0) 16.1	(7.3) 7.9	---	(53.6) 62.7
	(21.8) 24.6	(50.4) 63.8	(53.3) 65.9	(58.1) 68.3	(47.4) 59.7	(55.7) 68.2	(55.8) 60.0	(53.8) 56.3	---

Figure 2-5. Existing Daily Truck Volumes



on circumferential routes within the cities in the Southeast Area. Additionally, large commercial clusters located along arterial roads have created conflicts between commercial traffic and routes intended to carry through-traffic at high speeds, including trucks (Figure 2-5). The primary needs and opportunities within the roadway network involve the reduction of congestion through several means, including improved arterial and collector spacing, enhanced transportation system management and operations, expanded multimodal options, and more efficient land use patterns.

## Walking and Bicycling

Walking and bicycling are transportation modes with significant potential. National research on transportation patterns shows that almost 50 percent of urban trips are three miles or less, and 30 percent of these trips are one mile or less. Walking and biking are viable alternatives to car travel for such trips, but a lack of appropriate infrastructure often discourages people from these options, resulting in increased car use for short trips. Walking and biking are especially viable in more compact centers and around major institutions, such as universities or hospital campuses.

While urban areas such as Nashville and Murfreesboro have relatively more robust bicycle and pedestrian facilities, the region as a whole does not have the level of infrastructure that would allow residents to take advantage of these shorter trips. Currently, the region offers less

Table 2-4. Bicycle and Pedestrian Infrastructure



	Davidson	Rutherford	Williamson	Wilson	TOTAL
Bicycle Facilities - Total	75.71	37.24	25.86	21.77	151.04
Bike Lane	29.44	21.7	12.36	2.12	56.08
Bike Route	46.27	15.54	10.41	19.65	91.87
Multi-Purpose Path	0	0	3.09	0	3.09
Sidewalks	317.82	72.78	60.33	18.39	469.32

Source: 2009 Nashville MPO Bicycle and Pedestrian Study

than one foot of bicycle facilities per capita, and just over two feet of pedestrian facilities per capita. A summary of the existing bicycle and pedestrian infrastructure in the region is shown in Table 2-4.

In the 2009 Regional Bicycle and Pedestrian Study, the Nashville MPO identified two primary categories of pedestrian and bicycle facilities: (1) On-road facilities that include shared roadways, wide outside lanes, paved shoulders, signed bike routes, bike lanes, and sidewalks; and (2) off-road facilities that include shared use paths and greenways. The recommended regional bicycle network is shown in Figure 2-6. Figures 2-7 through 2-10 show the concentration of bicycling and pedestrian facilities and demand across the study area. While on and off-road bicycle and pedestrian facilities exist in every Southeast Area county, Davidson County has the highest concentration of bike lanes, bike routes, and greenway facilities. Since the adoption of the Nashville-Davidson County Strategic Plan for Sidewalks & Bikeways in 2003 (updated in 2008), Metro Nashville has consistently made bicycle and pedestrian facilities part of road projects as well as requiring sidewalks in the construction of new multifamily and nonresidential developments. Finally, Metro Nashville adopted a Complete Streets policy in 2010 that will, “Give full consideration to the accommodation of the transportation needs of all users, regardless of age or ability, including those traveling by private vehicle, mass transit, foot, and bicycle” (Metro Nashville, Executive Order No. 40).

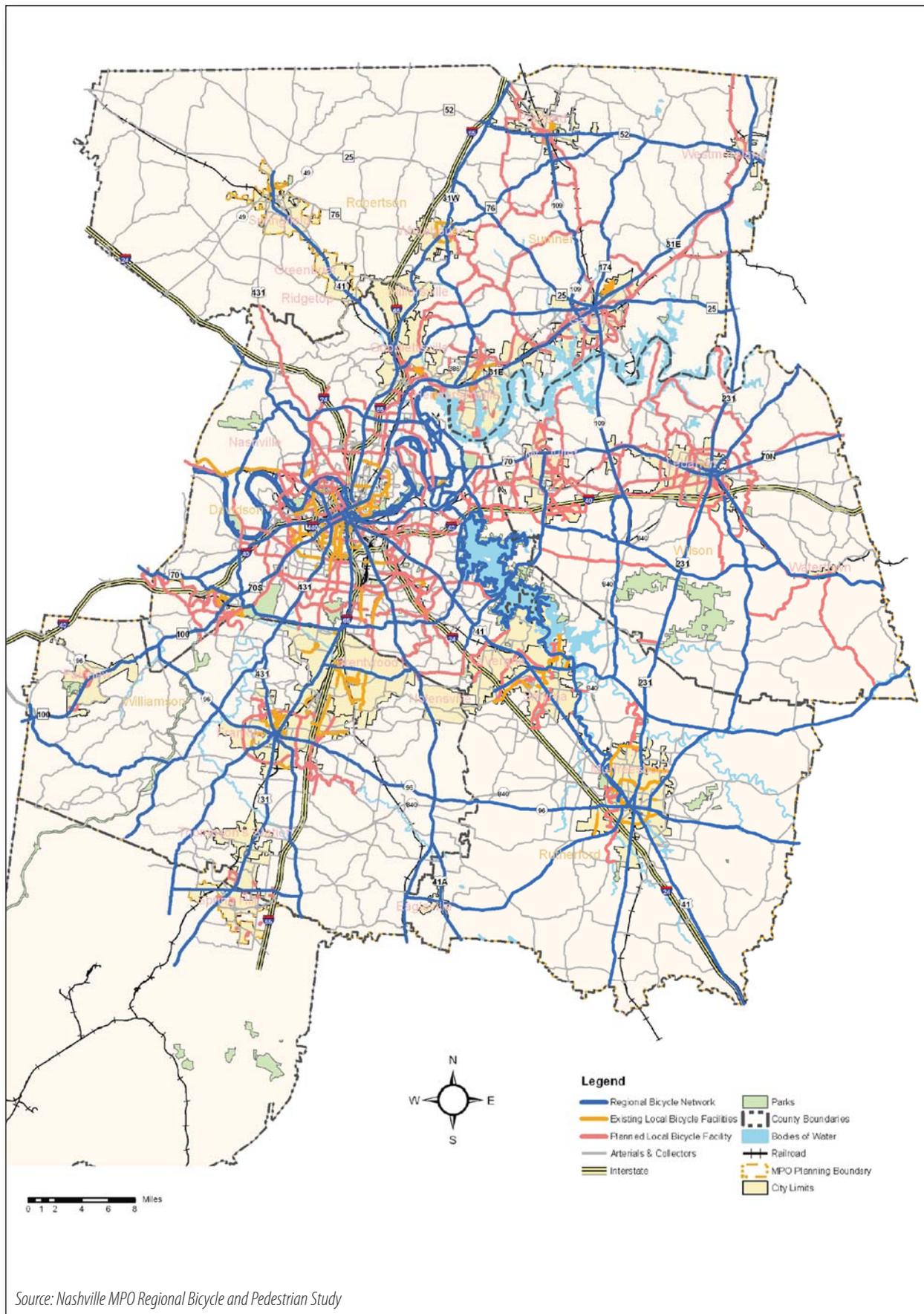
Rutherford County has approximately 16 miles of signed bike routes and 12 miles of bike lanes. All of the bike lanes are located within the City of Murfreesboro. The county also has approximately 30 miles of trails, nearly all of which are located within Murfreesboro and Smyrna. Sidewalks in Rutherford County are concentrated within the county’s major municipalities. Portions of the unincorporated county have sidewalk coverage as well. Each of these cities has prepared a comprehensive plan that includes a goal to provide increased bicycle and pedestrian facilities. Additionally, the Rutherford County Comprehensive Plan has goals emphasizing non-motorized connections, as well as calling for a county-wide bicycle and pedestrian plan.

In the eastern portion of Williamson County, bicycle and pedestrian facilities are located primarily in the cities of Brentwood and Franklin. Both cities have bicycle and pedestrian plans and the City of Franklin



Greenway along the Cumberland River

Figure 2-6. Recommended Regional Bikeway Network with Local Existing & Planned



Source: Nashville MPO Regional Bicycle and Pedestrian Study

Figure 2-7. Existing Sidewalk Facilities (Linear Miles)

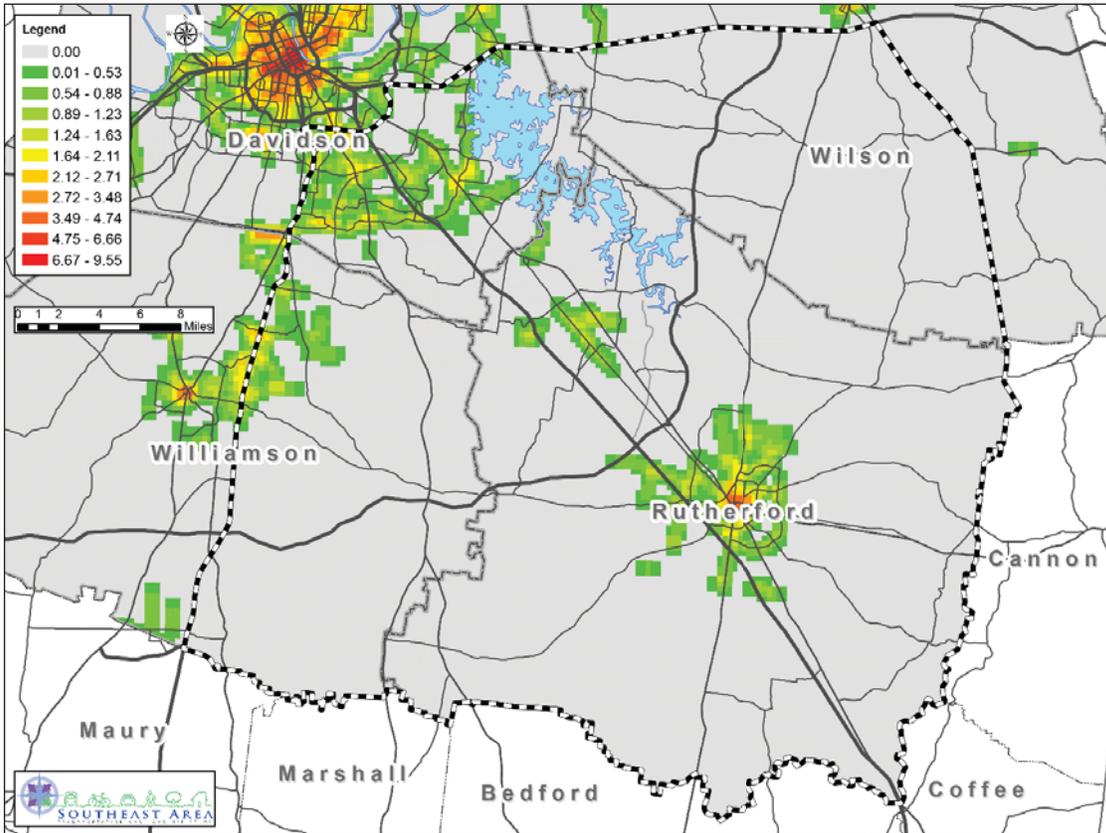


Figure 2-8. Pedestrian Latent Demand (Daily Trips)

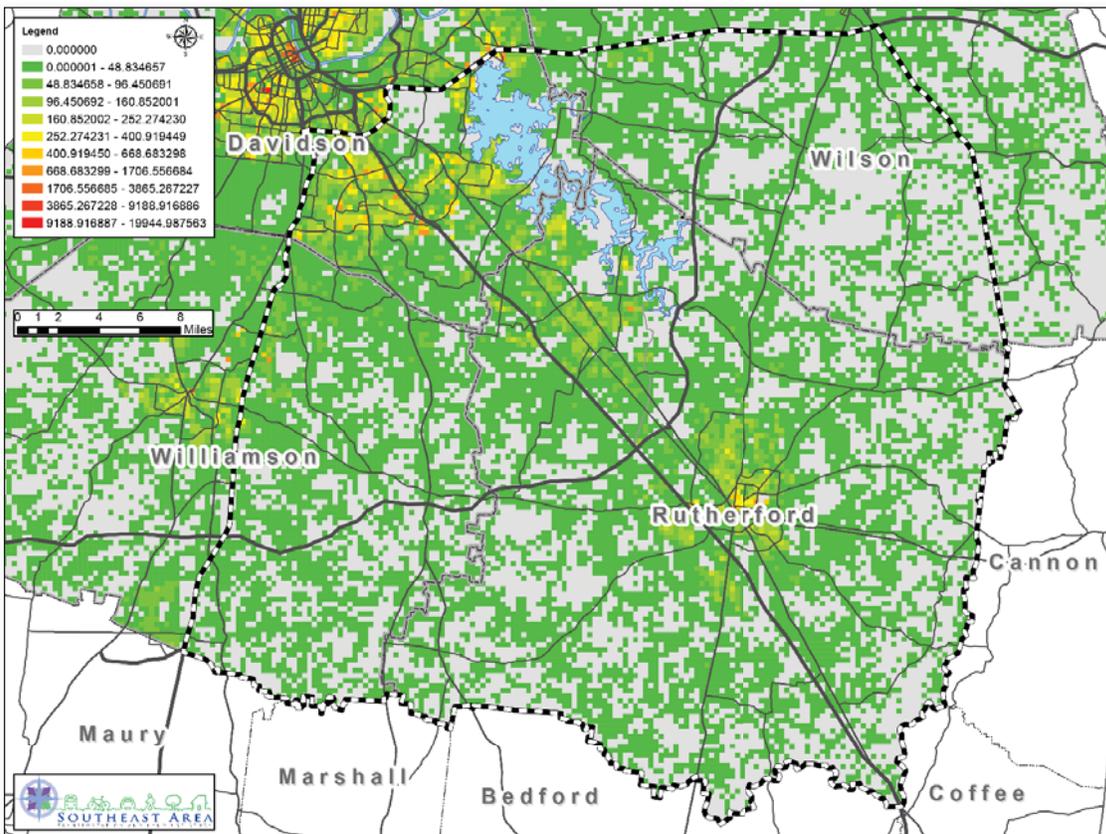


Figure 2-9. Existing Bicycle Facilities (Linear Miles)

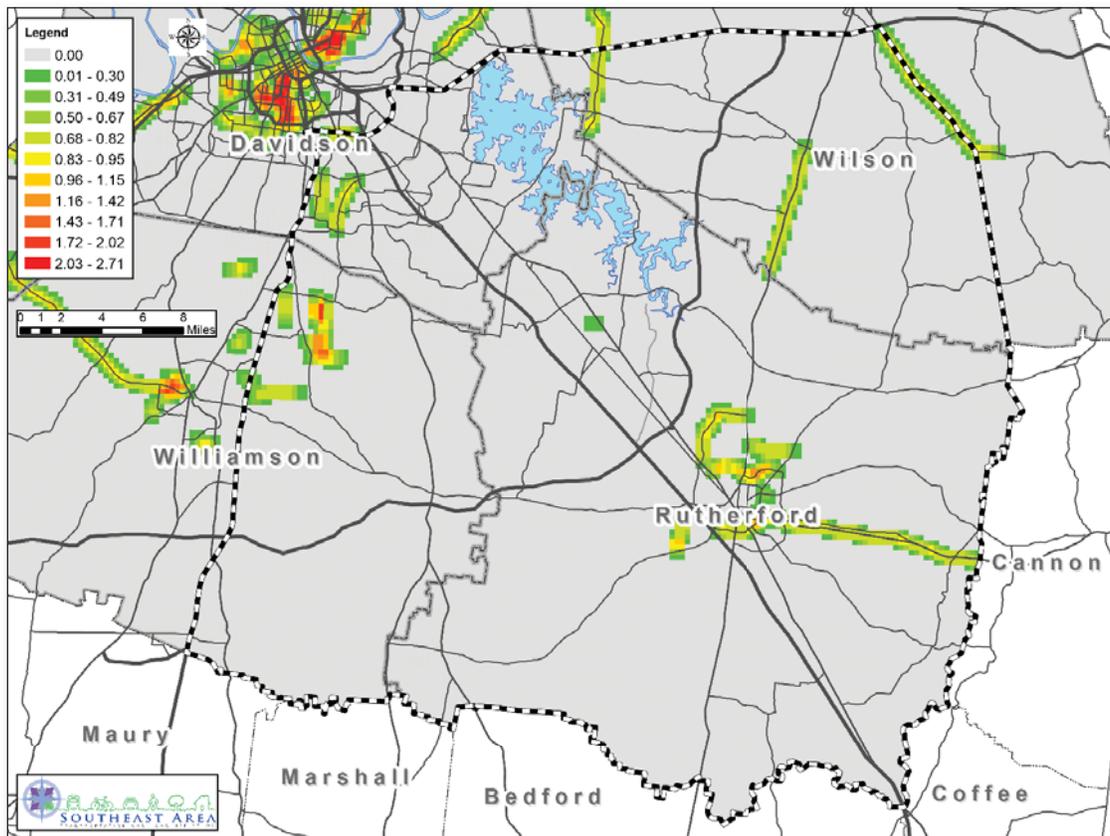
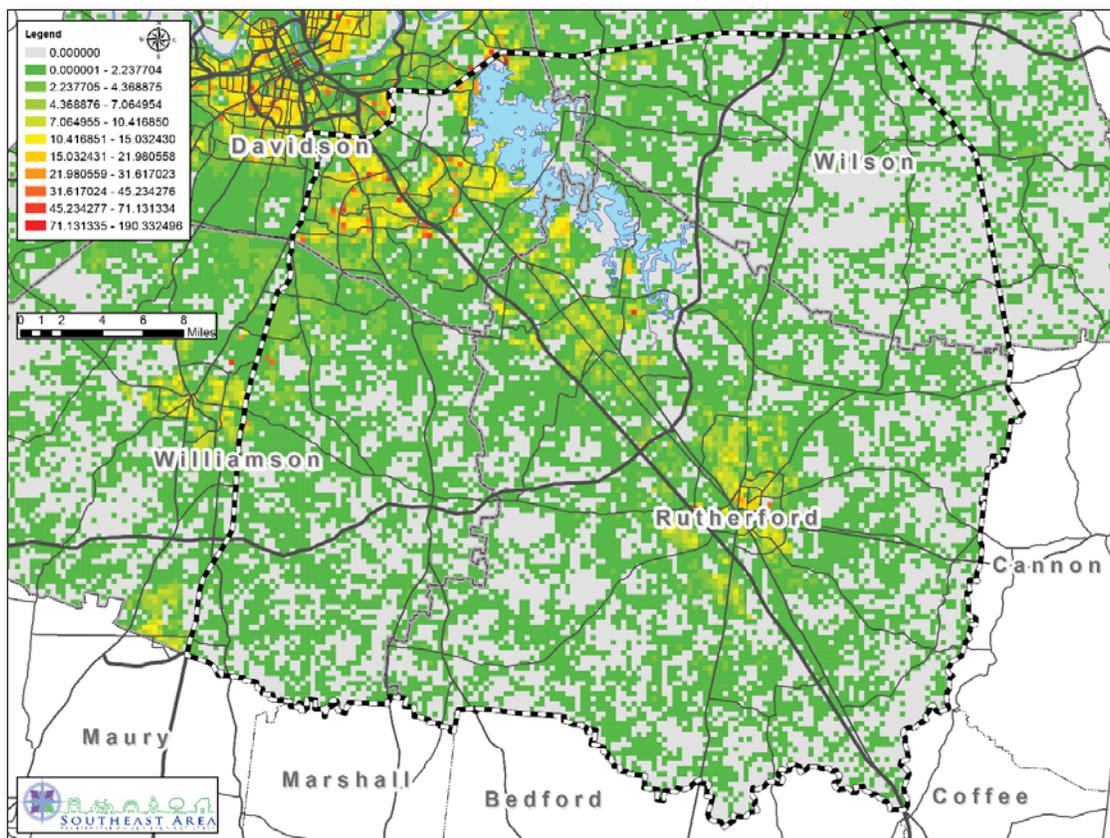


Figure 2-10. Bicycle Latent Demand (Daily Trips)



completed a greenway and open space master plan in 2010. The City of Brentwood updated their 2020 comprehensive plan in 2006, which includes a bicycle and pedestrian facilities inventory and review. The plan emphasizes the importance of including bicycle and pedestrian accommodations in future development as well as in redevelopment projects. Both Brentwood and Franklin have an extensive greenway system that is complemented with on-road bicycle facilities.

With the exception of the recent Providence development in Mt. Juliet, Wilson County south of I-40 is predominantly rural and does not have a significant number of bicycle or pedestrian facilities. An existing state bicycle route is located on SR 265/US 70 and a number of arterials have paved shoulders greater than four feet. Based on the Bicycle and Pedestrian Master Plan for Wilson County, however, bike routes will be added to the major roads in the southeastern part of the county, most notably the remainder of US 231, Stewart's Ferry Pike, and Cainsville Road. A greenway facility is planned along Sparta Pike south of Lebanon.

The 2011 update of the Tennessee Department of Transportation's (TDOT) Bicycle and Pedestrian Plan measures varying bicycle levels of service on state highways throughout the Southeast Area. The plan identifies a number of proposed statewide bicycle routes, roadways that will support cyclists by removing or modifying typical obstacles (e.g., rumble strips and narrow shoulders) and provide logical connections to destinations. Three highways in the Southeast Area are identified as such: SR 1 from Nashville south to Chattanooga, SR 99 from SR 270 to SR 1, and SR 285 from SR 10 to SR 24. TDOT strives to accommodate bicyclists on all existing state roadways and seeks to implement additional accommodations in new construction and reconstruction of roadway projects.

Transit agencies in the Southeast Area also accommodate bicyclists, allowing for seamless transitions from bicycle travel to transit use. This is critical for an efficient transit system, as bicycle and pedestrian facilities are imperative for first and last mile access to transit; that is, for the transportation of the rider between the transit route and his or her final destination. All of the Nashville Metro Transit Authority's (MTA's) fixed route vehicles are equipped with bicycle racks on the front of the bus. Additionally, the Regional Transportation Authority (RTA), which operates the Music City Star, the commuter rail line from Nashville to Wilson County, also allows bikes onboard at no charge with bike storage areas on each rail car. Murfreesboro's transit system, Rover, has bike racks on buses as well. Improvements in transit service efficiency will likely encourage further bicycle use among commuters.

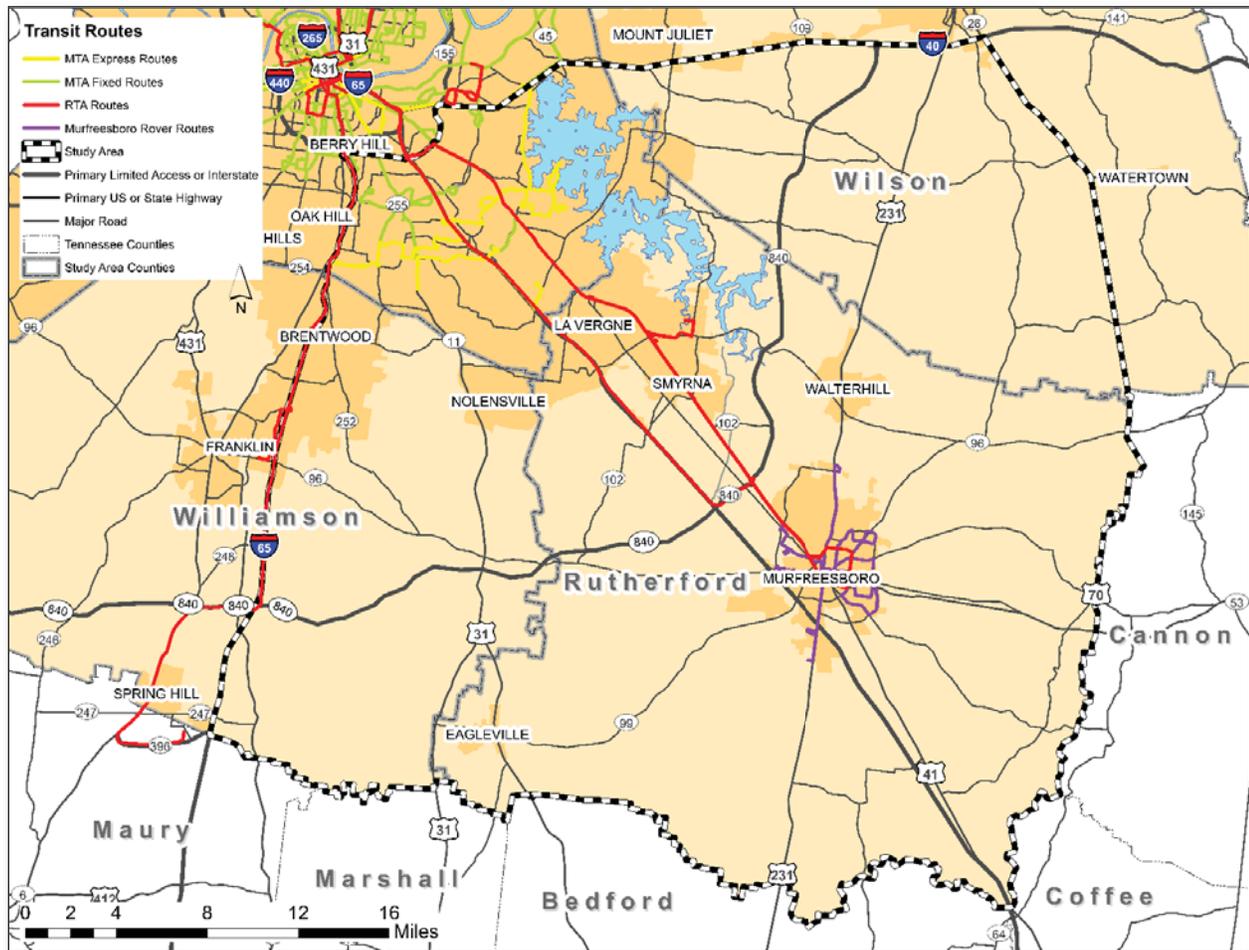
## Transit Market Analysis

The transit market analysis conducted for this study (the full report is available as a separate document) includes a detailed look at existing transit services, service availability, planned service improvements, and latent demand analysis.



*Providence Development in Mt. Juliet*

Figure 2-11. Southeast Area Transit Routes Map



The Southeast Area is currently served by five transit service providers (Figure 2-11):

- Nashville Metropolitan Transit Authority (MTA)
- Regional Transportation Authority (RTA)
- Murfreesboro Transportation Department (Rover)
- Mid-Cumberland Human Resource Agency (MCHRA)
- MTSU Parking and Transportation Services (Raider Xpress)

The Nashville MTA operates local and express route service, and AccessRide paratransit service within Metro-Davidson County. MTA's routes are structured in a radial fashion, with nearly all routes operating to/from the Music City Central transit station, located in downtown Nashville. The RTA operates regional express route service that connects to the Nashville MTA system. The express routes operate on weekdays primarily in the peak periods. Most of the routes only provide one to four express trips in each peak period. The RTA also oversees the Music City Star commuter rail line. In addition, RTA's rideshare program organizes vanpools and carpools for commuters throughout Middle Tennessee. The RTA contracts with MTA to provide the express route service. Within the Southeast Area, MTA currently operates four local routes, one BRT lite route, and

nine express routes, plus AccessRide paratransit service. MTA and RTA ridership trends are included in Tables 2-5 and 2-6.

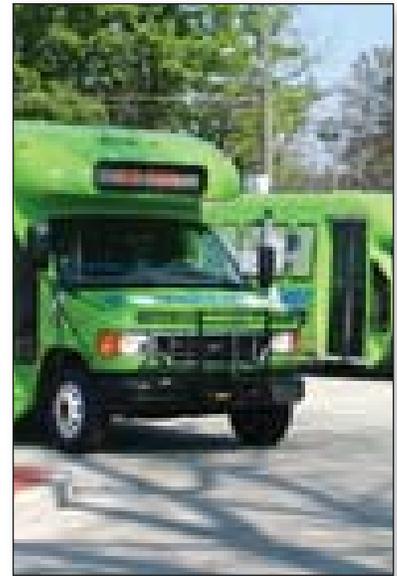
The City of Murfreesboro Transportation Department is responsible for the administration and operation of public transportation service within the City of Murfreesboro. Rover began service in April 2007, providing fixed route bus transportation for the citizens of Murfreesboro. MCHRA Public Transit, in cooperation with Rover, provides paratransit transportation service for those who, because of disability, cannot use the existing Rover fixed route bus system. Currently, there are seven routes throughout the city. Rover routes operate Monday through Friday from 6:00 AM to 6:00 PM. All but one route originate at and provide transfers at the Rover Transit Center at the northeast corner of Walnut and Burton. Murfreesboro Rover ridership trends are included in Table 2-7.

The Mid-Cumberland Human Resource Agency (MCHRA) Public Transit provides curb-to-curb rural demand response public transportation service to 12 counties, including Williamson, Rutherford, and Wilson counties in the Southeast Area. As a mass public transportation service, it provides a basic level of rural mobility to those who depend on some form of public transportation. As an additional service to people with a greater economic need, organizations contract with MCHRA Public Transit to subsidize the cost of rides. MCHRA Public Transit is also the broker for the Mid-Cumberland Region's Job Access Reverse Commute (JARC) program, called "Access to Jobs." This program provides free transportation to/from work or work related activities for eligible low-income or Welfare-to-Work clients. Public service is available to anyone regardless of age or income on a first-call, first-served basis. Priority is given for medical appointments. MCHRA operates Monday through Friday from 6:00 AM to 6:00 PM.

Given the wide range of service coverage and service levels in the Southeast Area, service availability is particularly sensitive to geographic location, day of the week, and the time of the day. This is especially true of RTA routes, most of which only operate for weekday peak period commuters. Similarly, Rover service is not operated during the weekday evening period or on weekends. Some general service availability observations emerge.

- MTA routes on Nolensville Road and Murfreesboro Pike are generally the most frequent service
- Frequent service is available on the four Murfreesboro Rover routes extending south, west, and northeast of the Rover Transit Center
- The other four Rover routes, as well as MTA routes serving Nashville International Airport, generally provide infrequent service
- Only two of the nine MTA/RTA express routes provide mid-day service

Over the past decade, many regional and sub-regional studies have been conducted in the Nashville MPO area. Several of these studies



*Murfreesboro Rover Buses*

Table 2-5. MTA Local Ridership – 12-Month Historical Ridership



Route Number and Name	2012						2013					
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
12 – Nolensville Pike	58,133	55,457	52,616	61,420	56,456	63,275	57,789	51,758	56,125	54,366	55,225	57,683
15 – Murfreesboro Pike	78,502	73,187	69,642	85,441	78,492	84,488	77,500	69,975	74,940	73,447	70,760	35,702
18 – Airport/Downtown Hotels	8,736	8,749	8,321	9,781	9,090	10,564	9,425	8,722	8,492	8,162	8,697	9,791
55 – Murfreesboro Pike BRT Lite	---	---	---	---	---	---	---	---	---	---	---	40,808
72 – Edmondson Pike Connector	2,189	2,059	2,102	2,418	2,003	2,692	2,485	2,303	2,572	2,571	2,551	2,865
75 – Antioch Bus Link	829	868	751	921	819	927	967	901	936	943	902	855
<b>TOTALS</b>	<b>148,389</b>	<b>140,320</b>	<b>133,432</b>	<b>159,981</b>	<b>146,860</b>	<b>161,946</b>	<b>148,166</b>	<b>133,659</b>	<b>143,065</b>	<b>139,489</b>	<b>138,135</b>	<b>147,704</b>

Table 2-6. MTA Express Ridership – 12-Month Historical Ridership



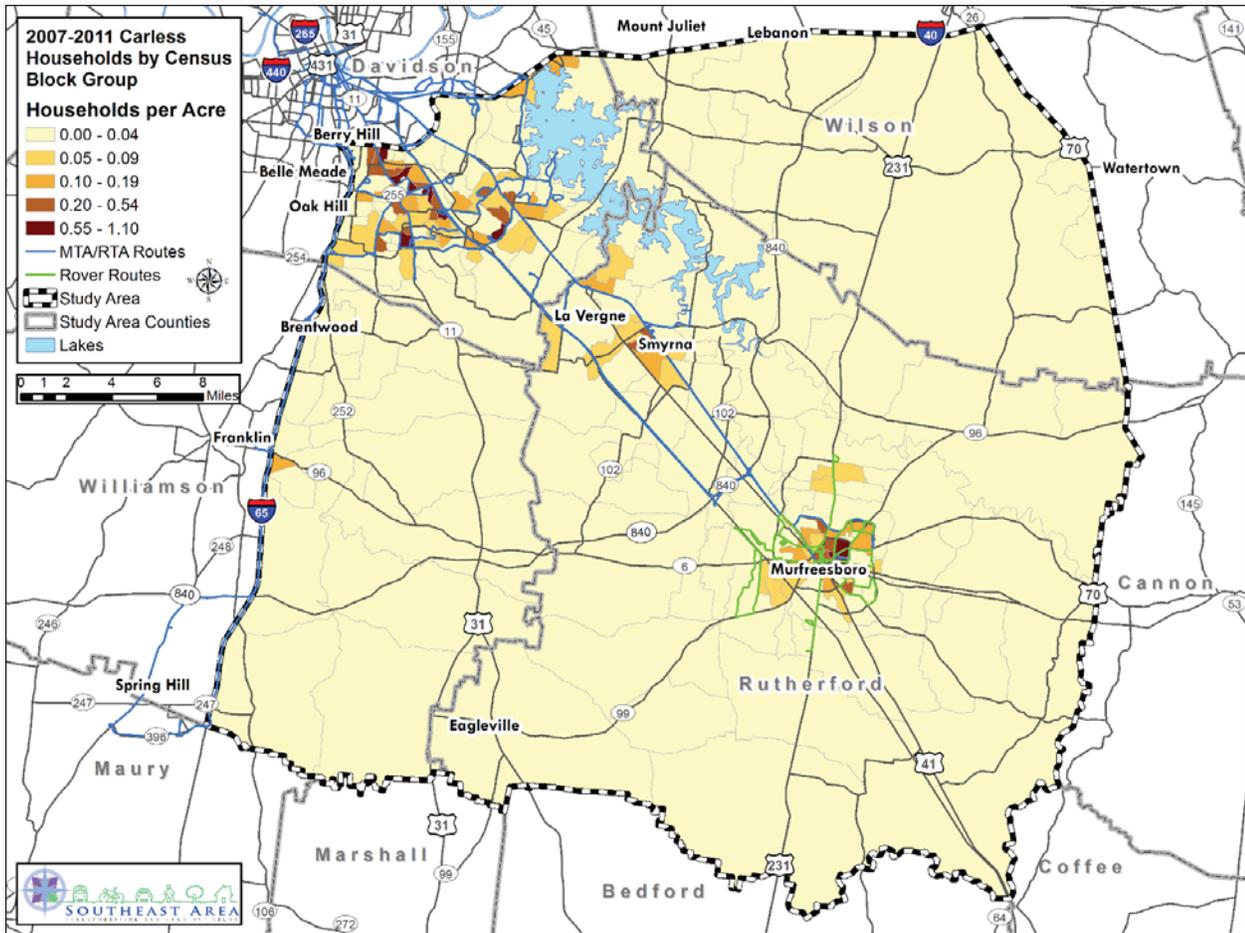
Route Number and Name	2012						2013					
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
33x – Hickory Hollow/Lenox	5,398	3,136	3,035	7,156	5,940	6,043	5,676	4,023	5,654	5,545	4,215	5,919
37x – Tusculum/McMurray	2,407	1,631	1,541	3,043	2,603	2,966	2,524	1,893	2,854	2,394	1,895	2,803
38x – Antioch	5,424	1,924	2,037	7,480	6,319	6,389	6,137	4,491	6,124	6,242	4,200	7,538
39x – Cane Ridge	1,069	455	466	1,028	767	902	906	700	971	1,048	767	1,044
84x – Murfreesboro	---	---	---	---	---	3,918	3,289	2,905	3,876	3,454	3,312	3,842
86x – Smyrna/LaVergne	---	---	---	---	---	3,174	2,987	2,573	3,427	3,075	3,124	3,501
91x – Franklin/Brentwood	3,163	2,893	2,847	3,438	2,822	3,270	2,607	2,203	3,203	2,945	2,936	3,273
95x – Spring Hill	1,742	1,706	1,645	1,936	1,587	1,976	1,687	1,444	1,926	1,821	1,781	2,150
96x – Nashville/Murfreesboro	9,000	8,539	8,539	10,066	8,776	4,417	4,189	2,937	3,543	3,967	3,935	4,340
<b>TOTALS</b>	<b>28,203</b>	<b>20,284</b>	<b>10,110</b>	<b>34,147</b>	<b>28,814</b>	<b>33,050</b>	<b>30,002</b>	<b>23,169</b>	<b>31,578</b>	<b>30,491</b>	<b>26,165</b>	<b>34,410</b>

Table 2-7. Murfreesboro Rover Ridership – 12-Month Historical Ridership

Route Number and Name	2012												2013												
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
NW Broad & Medical Center	2,503	2,269	2,080	2,630	2,173	2,644	2,110	2,023	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
West Side Loop	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Memorial & Gateway	3,544	3,419	3,288	3,617	3,190	3,990	3,277	3,006	687	4,710	4,806	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889	4,889
South Church	4,198	3,929	4,183	4,572	3,967	4,749	3,444	3,240	3,483	3,120	3,669	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852	3,852
Old Fort	4,615	4,071	4,095	4,810	3,975	5,414	4,533	4,270	4,066	3,669	3,582	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636	3,636
Highland	4,321	3,948	4,044	4,991	4,246	4,919	3,949	3,790	3,898	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582	3,582
Mercury	4,791	4,421	3,992	4,860	4,280	5,283	4,087	3,811	2,972	2,844	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084	3,084
<b>TOTALS</b>	<b>23,972</b>	<b>22,057</b>	<b>21,682</b>	<b>25,480</b>	<b>21,831</b>	<b>26,999</b>	<b>21,350</b>	<b>20,140</b>	<b>19,816</b>	<b>18,691</b>	<b>19,590</b>	<b>21,407</b>													



Figure 2-12. Carless Households



have focused on the entire region while others have been specific to a particular Southeast Area. Most of the studies identify specific transportation problems and needs that include the Southeast Area in some fashion. Significantly, building on the studies and in response to growth pressures, transit service in the Southeast Area has begun expanding, particularly among MTA/RTA and Murfreesboro Rover routes. New fixed routes have been introduced on major arterials parallel to I-24, and express route services on I-24 have been recently restructured. The Murfreesboro Rover recently completed a round of expansion and restructuring as well.

Finally, a latent demand analysis was conducted to examine the potential impacts of demographic changes and economic growth on the transit system. The analysis revealed underserved household and employment density areas in the Southeast Area, as well as underserved concentrations of transportation disadvantaged groups. Figure 2-12, for example, illustrates the relationship between existing services and carless households. Areas with the highest densities of carless households (at least 0.2 per acre) are currently located within Metro-Davidson County between I-65 and Murfreesboro Pike north and west of Bell Road, in Smyrna, and in central Murfreesboro.

## Freight

Today, the southeast portion of Nashville remains the region's most freight-intensive with high levels of truck activity, freight rail traffic, and industrial land usage. Figure 2-13 highlights the freight system operating in the southeast region, supporting both national and regional freight movement as well as local freight and goods movement. Key freight generators are also identified in relation to the freight network.

The Southeast Area also features some of the heaviest freight rail volumes in the Nashville metropolitan region. CSX owns the former N&C Railroad track which is part of its mainline that connects from Atlanta to Chicago. CSX operates over 20 trains per day on this track which is comparable to the number of trains operating east-west through Nashville parallel to the I-40 corridor. This includes inter-modal trains, coal trains, automotive traffic, and merchandise traffic such as pulp and paper.

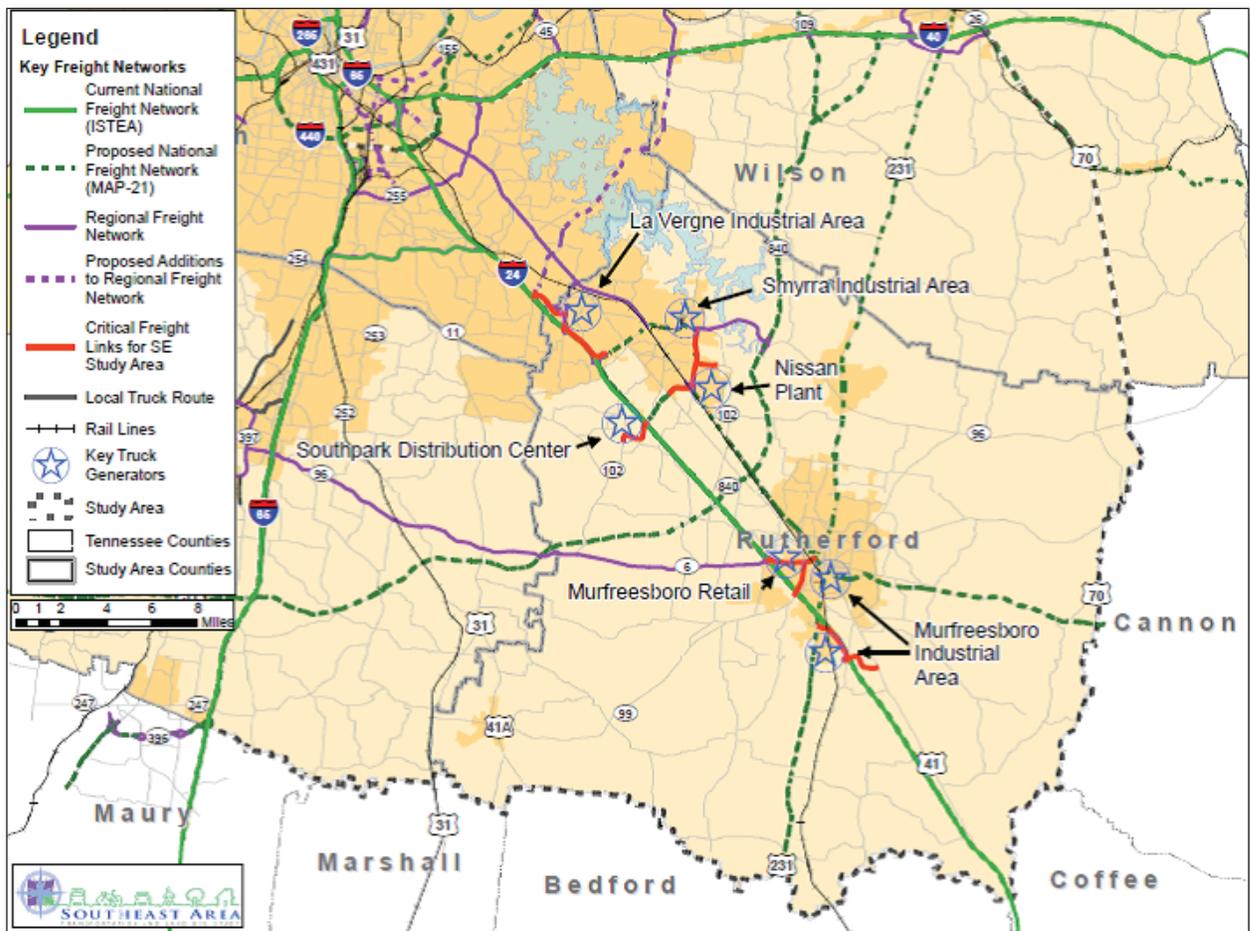
As shown in Figure 2-13, the largest freight generators in the region are:

- LaVergne industrial area
- Smyrna industrial area



*Titan Transfer on Firestone Parkway*

Figure 2-13. Freight Networks in the Southeast Area



- Southpark Distribution Center
- Nissan Plant and nearby warehouses and truck terminals
- Two small industrial areas in Murfreesboro
- Murfreesboro retail center

The vast majority of these industrial areas are located adjacent to I-24, so there is minimal local road traffic from long-haul trucks in the Southeast Area. The Smyrna industrial area and the Nissan Plant are the exceptions being located roughly two miles east of I-24. The LaVergne industrial area is the largest in terms of square footage with industrial parks and logistics centers that include Interchange City, NDC Distribution & Logistics Center, Center Pointe Industrial Park, Gould Distribution Center, and Mid South Logistics Center. The Nissan Plant is also particularly noteworthy, because it is the single largest freight facility in the Southeast Area with over 5 million square feet of manufacturing space and annual production capacity of over 550,000 vehicles.

Table 2-8. Key Freight Corridors in Nashville Southeast Region

Corridor	Primary Function(s)
I-24	Connects Southeast Area to Nashville and Chattanooga as well as the broader national interstate system.
SR 840	Provides east-west connection from core of Southeast Area to I-65 and north-south connection from core Southeast Area to I-40. Serves as a bypass for truck and auto traffic travelling through the region during congested periods.
SR 96	Connects Murfreesboro to Franklin.
Old Hickory Boulevard	Local road that includes an interstate interchange that provides access from I-24 to the northern section of the La Verge industrial region.
Waldron Road	Local road that includes an interstate interchange that provides access from I-24 to the middle section of the La Verge industrial region.
Firestone/Bridgestone Pkwy	Local connecting road running through the heart of the LaVergne industrial region.
Industrial Boulevard	Local road connecting the LaVergne industrial region to I-24.
SR 102/Nissan Drive/ Lee Victory Pkwy/ Almadale Road	Local road that includes an interstate interchange providing access from I-24 to the Smyrna industrial region, the Nissan Plant and Sam Ridley Parkway.
Enon Springs Road	Local road connecting to Gate 9, the main truck gate at the Nissan Plant.
Jefferson Pike	Local road providing access from Nissan Plant and Smyrna Airport to SR 840 for trucks going to Lebanon or I-40 EB.
Salem Pike	Local road that includes an interstate interchange providing access from I-24 to Murfreesboro retail and industrial areas.
US 231/ South Church Street	Local road that includes an interstate interchange providing access from I-24 to Murfreesboro retail and industrial areas.
Joe B. Jackson Pkwy	Emerging industrial corridor extending from I-24.
Butler Drive	Local road providing access from Murfreesboro industrial area to South Church Street and I-24.



TA Truckstop at Old Hickory Boulevard and I-24

Table 2-8 describes the key freight corridors in the region along with their primary freight-related functions. Many of these roads are already included in the Nashville regional freight network and the national freight network, while others have been proposed to be added to these networks as part of recent freight planning activities in the region. There are also several local roads that provide last-mile connectivity to key truck generators in the region.

The top freight issue in the Southeast Area is recurring congestion along I-24. As shown in Figure 2-3, severe congestion currently extends from downtown Nashville to just past Smyrna during peak periods. On this portion of I-24, peak period speeds are less than half of free flow speeds. There are also areas of moderate congestion from Smyrna to SR 840. This congestion causes many shippers to change times for shipments out of the peak periods which typically increases costs to supply chains. Other shippers drive during these congested periods incurring congestion related charges. High congestion levels were also identified as an issue on SR 96.



TDOT Help Truck

## Safety

Transportation system safety is an important measure, not only for transportation system performance but also for public health and general quality of life. While there are many different ways to discuss transportation system safety, this discussion will focus on crash rates and critical infrastructure condition.

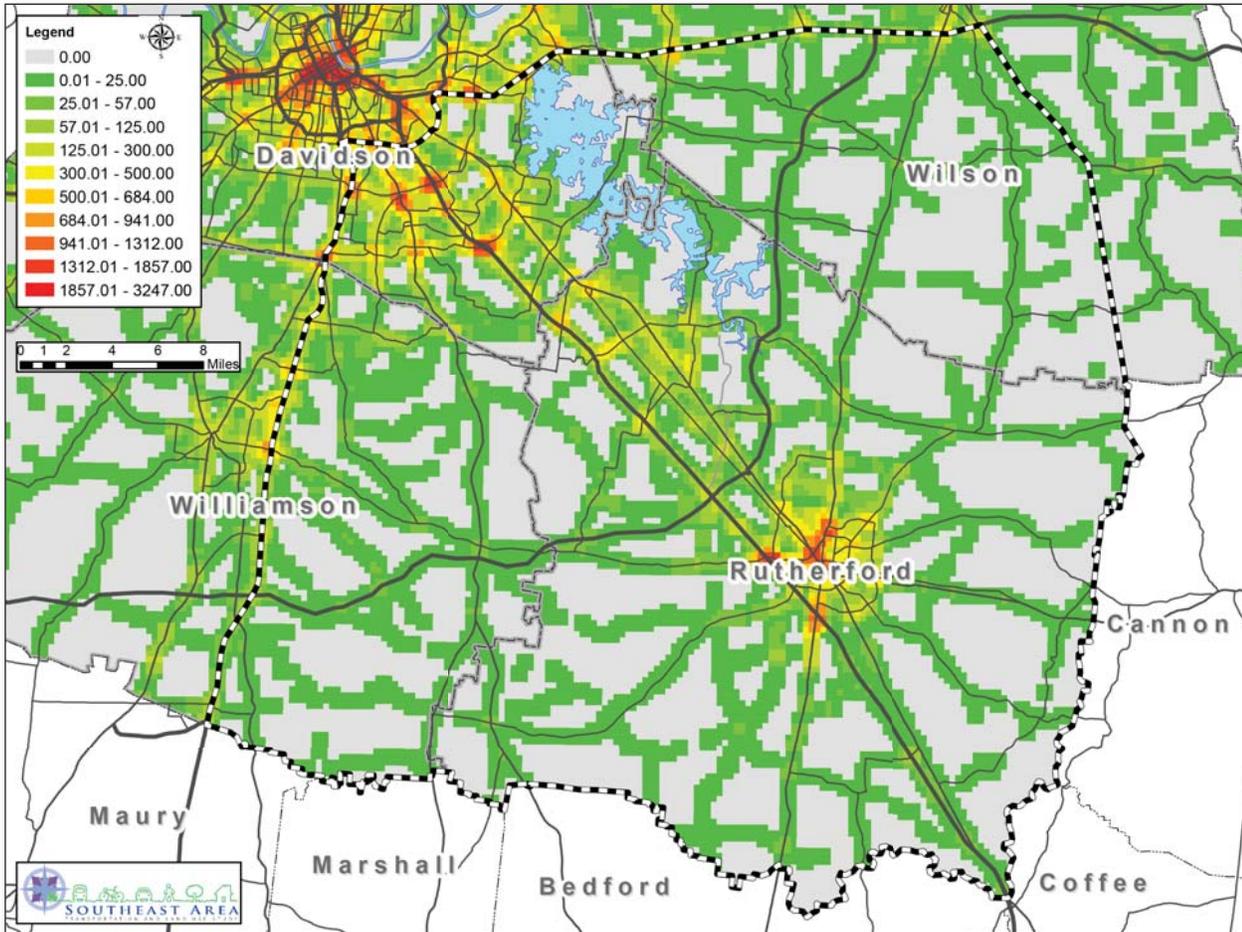
Between 2003 and 2009, the region logged approximately 175,000 vehicular crashes. Approximately 39 percent of these occurred within the Southeast Area. However, a number of specific segments of roads experienced a high share of crashes during this period. While several roadway segments experienced a high number of crashes (greater than 10), these hot spots had values indicating a persistent safety problem. These problem segments are shown in Table 2-9. Figure 2-14 illustrates the concentration of vehicular crashes over a multi-year period.

Table 2-9. Vehicular Crash Hot Spots



Route	Termini	Crash Count (2003-2008)
Murfreesboro Road	Pin Hook Road and Mount View Road	29
Hobson Pike	Murfreesboro Road and Pin Hook Road	27
Greenland Drive	Gunnerson Avenue and Old Lascassas	47
Waldron Road	Bain Drive and Ingram Boulevard	39
Haynes Drive	James Edmon Court and Tedder Boulevard	17
Mercury Boulevard	Hancock Street and SE Broad Street	17
John Bragg Highway	Double Springs Road and Murfreesboro Street	16

Figure 2-14. Vehicular Crashes (2003-2009)



In addition to vehicular crashes, non-vehicular crashes are also a pressing concern for transportation system safety. As more people begin walking and bicycling for both transportation and recreation, conflicts between vehicular and non-vehicular traffic can occur. Between 2004 and 2008, approximately 1,900 crashes involving both a vehicle and bicyclist/pedestrian occurred, which resulted in 91 fatalities over that period. The Southeast Area experienced approximately 500 of these crashes (26 percent of total) which resulted in 27 fatalities (30 percent of total).

Roadway infrastructure condition and maintenance has always been a concern in transportation system safety. However, as infrastructure nationally begins to approach the end of its lifespan and federal transportation dollars are diminishing, infrastructure condition (particularly that of bridges) has become an object of increased focus. According to the National Bridge Inventory, the region is home to 1,147 bridges. Forty-nine of these bridges are considered structurally deficient. An additional 250 bridges are considered in need of critical maintenance. The Southeast Area is home to 392 of these bridges, 15 of which are considered structurally deficient, and 79 of which are considered in need of critical maintenance.



TDOT camera shot during morning rush hour showing westbound traffic into Nashville.

## Trend Analysis

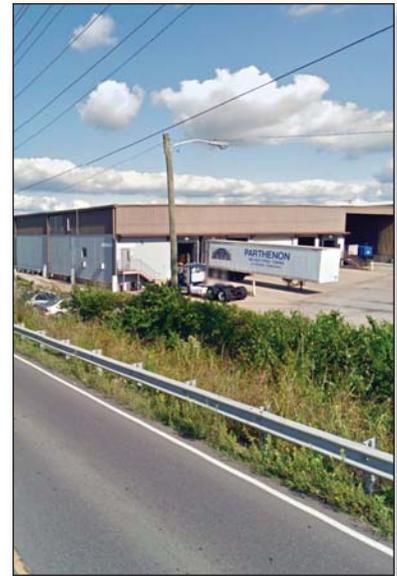
One defining characteristic of the region's transportation system is the degree to which residents rely on it to connect them with employment destinations. Approximately one-third of the region's residents currently commute to a different county for work. The Southeast Area is expected to grow as a regional employment center, adding approximately 310,000 jobs by 2040. Growth in employment will allow many residents to stay in their home county for work, increasing in-commuting in the area. This increase in in-commuting will place a greater strain on the region's arterial network as more people commute to jobs not located in existing employment centers. The primary needs and opportunities within the roadway network involve the reduction of congestion through several means, including improved arterial and collector spacing, enhanced transportation system management and operations, expanded multimodal options, and more efficient land use patterns.

Congestion is forecast to increase significantly between 2010 and 2040 throughout the Southeast Area. Figure 2-4 shows forecasted congestion levels during the P.M. peak period in 2040. Congestion is forecast to be severe on all of I-24. The route will experience a significant increase in lower than average speeds during peak hour. VMT and VHT are both projected to increase dramatically by 2040. Within the region, VMT will increase by 88 percent by 2040; VHT will increase by 196 percent. In the Southeast Area specifically, VMT will experience a 119 percent increase; VHT a 269 percent increase.

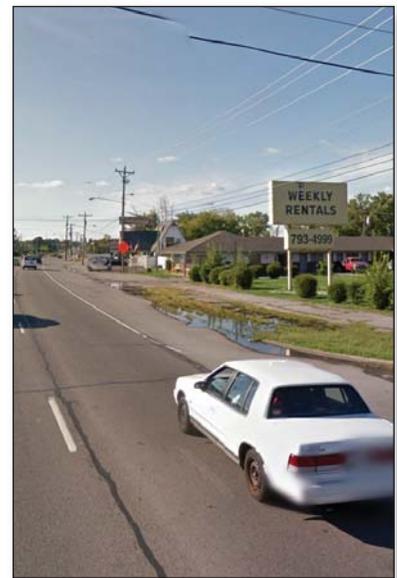
This congestion will result in increased travel times between destinations throughout the Southeast Area. For example, afternoon rush hour travel between downtown Nashville and Murfreesboro is expected to increase from about 44 minutes in 2012 to 53 minutes by 2040, an increase of over 20 percent.

With respect to freight traffic, severe congestion is also forecast for many sections of SR 840 with moderate congestion on many state highways and local roads. The cumulative amount of delay for trucks is projected to increase tenfold, from just over 17,000 hours today to over 178,000 hours by 2040. These could result in significant changes in supply chains in the region which would increase costs for freight-related companies in the Southeast Area. It would also have significant negative impacts on business attraction and retention in the Southeast Area and economic development more broadly.

The region as a whole has a higher number of transit options than the Southeast Area; this is due to the more robust local transit network in Metropolitan Nashville-Davidson County. The Southeast Area is served with limited transit options, and, with the exceptions of Murfreesboro and southeast Davidson County, none of the communities have local transit service. No changes to existing transit service are currently funded. However, the MPO's Regional Transit Vision includes several enhancements, including bus rapid transit to Lennox Village on Nolensville Pike, express bus service from Franklin to Lebanon on SR 840 and premium transit in between Nashville and



*Parthenon Warehouse on Parthenon Boulevard near Murfreesboro Pike.*



*Few of the communities have local transit service (SR 41 at 73rd Avenue in LaVergne).*



*MTSU quad in front of the James E. Walker Library*

Murfreesboro in the I-24 corridors. A key objective of this study will be to get a better sense of regional and local transit possibilities in the Southeast Area given the preferred vision for growth and development. Within the Southeast Area, the number of people and jobs within walking distance of local transit decreases from 20 percent to 18 percent in 2040. The number of people and jobs within 2.5 miles of a park-and-ride facility will decrease from approximately 50 percent to 45 percent by 2040. However, the regional transit that serves these populations will not be adequate to serve future demand without significant service improvements, despite the fact that services such as BRT Lite on Murfreesboro Pike and Murfreesboro and LaVergne/Smyrna express routes show promising ridership gains. As currently planned, transit will continue to play a relatively small but promising role in mobility. Given the projected increases in congestion, VMT, and VHT, transit is likely to become an attractive alternative for commuting.

As density in the region increases to accommodate the projected development, the potential for walking and bicycling will also increase. However, a lack of connectedness between residents and destinations will likely result in a continued dependence on cars and transit for mobility. Coordination between land development practices and transportation system planning is critical to provide a built environment suitable for viable pedestrian and bicycle mobility. A growing body of research links the ability to walk and cycle with the overall economic health and vitality of a region. Thus, measures of bicycle and pedestrians facilities and of walk and bike potential are also considered indirect measures of regional economic development. The indicators for travel demand and transportation systems conditions are described in Table 2-10.

Table 2-10. Travel Demand and Transportation Systems Indicators



Goal(s)	Indicator	Description	4-County Region		Southeast Area	
			Existing	Trend (2040)	Existing	Trend (2040)
1	Vehicle Miles Traveled (VMT)	The number of vehicle miles traveled on an average day reflects the reliance on the automobile for individual mobility within the Southeast Area	49,160,389	92,496,854	16,010,271	35,077,615
1	Vehicle Hours Traveled (VHT)	The number of vehicle hours traveled on an average day reflects the amount of time spent in a vehicle. It is calculated as the product of vehicle travel times by the number of vehicles on the system	724,773	2,143,966	251,607	928,165
1	Congestion/Delay	The number of hours spent in congestion per year.	174,206	2,429,713	57,910	634,133
1	Population within 1/4 mile of local transit routes	The number of people and jobs within 1/4 mile (walkshed) of a transit route	836,386 (40%)	1,235,180 (34%)	169,889 (20%)	297,966 (18%)
1	Population within 2.5 miles of Park-and-Ride facility	The number of people and jobs within 2.5 miles (easy car access) of a Park-and-Ride facility	1,565,069 (75%)	2,473,764 (68%)	422,674 (50%)	754,631 (45%)
1, 2	Walkability/ Intersection density	The number of intersections (four-way and three-way) per square mile	23	45	16	57
1,4	Reliability of I-24 from Smyrna to downtown Nashville	Percent of PM peak period speeds less than 75 percent of average speed	N/A	N/A	8.59%	50.83%
1,4	Residential-Industrial use conflicts	Allocated population within 500 feet of industrial center	114,562	209,192	60,775	122,017
1,4	Transit Ridership		0.2%	0.1%	Not available	Not available
1,2,4	Systemwide Truck Delay	The number of hours trucks spent in congestion per year.	48,138	572,104	17,064	178,778
1,2,4	Truck VMT	The number of truck vehicle miles traveled on an average day	11,484,418	20,829,507	3,996,968	8,065,254

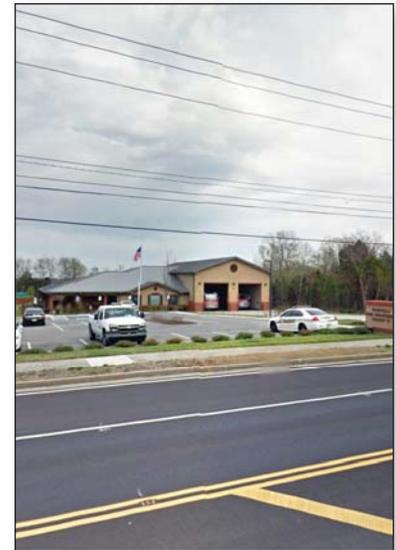


### 3. DEMAND FOR OTHER PUBLIC SERVICES

In addition to transportation infrastructure, new growth places pressure on other needed public facilities and services. Water and public safety are two critical public services that move in tandem with development and can significantly impact community resources.

#### Water/Wastewater Infrastructure

While Middle Tennessee, in general, boasts plentiful water resources, the infrastructure that transmits the water to and from residential and business locations will experience greater capacity demand as the region absorbs people and jobs in the future. Additionally, according to conversations with local leaders, the ability of the region's largest water source, Percy Priest Lake, to serve the region's water needs will likely be more limited going forward. The region currently has approximately 230 million gallons of water storage capacity. The majority of the capacity is in Davidson County (117 million gallons) with Rutherford, Williamson, and Wilson Counties currently having approximately 40 million, 40 million, and 30 million gallons of capacity respectively. According to NPDES permits obtained through the Tennessee Department of Environment and Conservation, the region has approximately 115 million gallons of existing sewer treatment capacity, 63 percent of which is in Davidson County.



*Nashville Fire Department, Station 35 on Hobson Pike*

#### Fire, Police, and EMS

The Southeast Area's cities and counties each have police departments responsible for their jurisdictions. The Southeast Area is served by eight fire companies, as well as 11 volunteer fire departments. Each county is serviced by at least one emergency medical service. Specific numbers of fire fighters, police officers, were difficult to obtain. However, the projected demand in each is included in Table 3-1.

#### Schools

The region is home to a significant number of primary and secondary schools. The four county region currently has approximately 394 primary and secondary schools, of which 297 are public schools and 97 are private educational institutions. One hundred and seven (36% of total) public schools are located within the Southeast Area. The region's public schools currently enroll approximately 181,000 students, with approximately 84,000 of those students (46% of total) attending Southeast Area schools.

## Trend Analysis

Approximately 80 percent of the projected capacity demand for both water and sewer will occur outside of Davidson County. Williamson County has expressed a preference against decentralized sewer systems, preferring that growth occur in identified development areas that can more easily serve additional sewer demand. Rutherford County has limited wastewater capacity for significant additional demand. A significant increase in the availability of wastewater services in Rutherford County may require coordination of decentralized treatment systems and some form of beneficial reuse of treated effluent. All municipalities, as they annex their respective urban growth boundaries, will need to ensure that revenue is sufficient to cover the expansion costs for water and wastewater infrastructure.

Demand for fire and police services and facilities will increase as the area absorbs projected population increases. Municipalities will need to plan for these service expansions, particularly as growth occurs within their respective urban growth boundaries.

Demand for public school capacity is certain to increase significantly by 2040. With many of the existing public schools operating at or above capacity, this represents a significant demand on public dollars in the coming years. Importantly, the total number of residents within one mile of the region’s public schools is set to increase by 52 percent by 2040. In the Southeast Area, the total will increase by 40 percent.

Table 3-1. Other Public Services Indicators

Goal(s)	Indicator	Description	4-County Region		Southeast Area	
			Existing	Trend (2040)	Existing	Trend (2040)
3	Demand for sanitary sewer	Demand for additional sanitary sewer (gallons) generated by dwelling units or non-residential square footage of different land uses in the Southeast Area	114,230,000	82,912,989	Not Available	49,907,624*
3	Demand for potable water	Demand for additional water (gallons) generated by dwelling units or non-residential square footage of different land uses in the Southeast Area	228,050,000	66,331,975	Not Available	39,926,900
3	Demand for police protection	Demand for police protection (additional officers) generated by dwelling units or non-residential square footage in the Southeast Area.	Not Available	3,765	Not Available	2,042
3	Demand for fire protection	Demand for fire protection (additional firefighters) generated by dwelling units or non-residential square footage in the Southeast Area	Not Available	1,506	Not Available	817
3	Development within proximity to existing schools	The total number of people within one mile of an existing school	948,176	1,443,572	389,817	545,766

\*Additional

# 4. ENVIRONMENTAL RESOURCES

Located in the Stones River watershed and bounded on the east and west by the Old Hickory Lake and Harpeth River watersheds respectively, the Southeast Area is characterized by rolling hills and streams and recognized for its rich flora and fauna. The Stones River watershed alone, for example, is home to 69 known rare plant and animal species, including eight rare fish species. The status of natural resources and habitat plays a pivotal role in the Southeast Area's quality of life and is a strong measure of how conditions change over time.

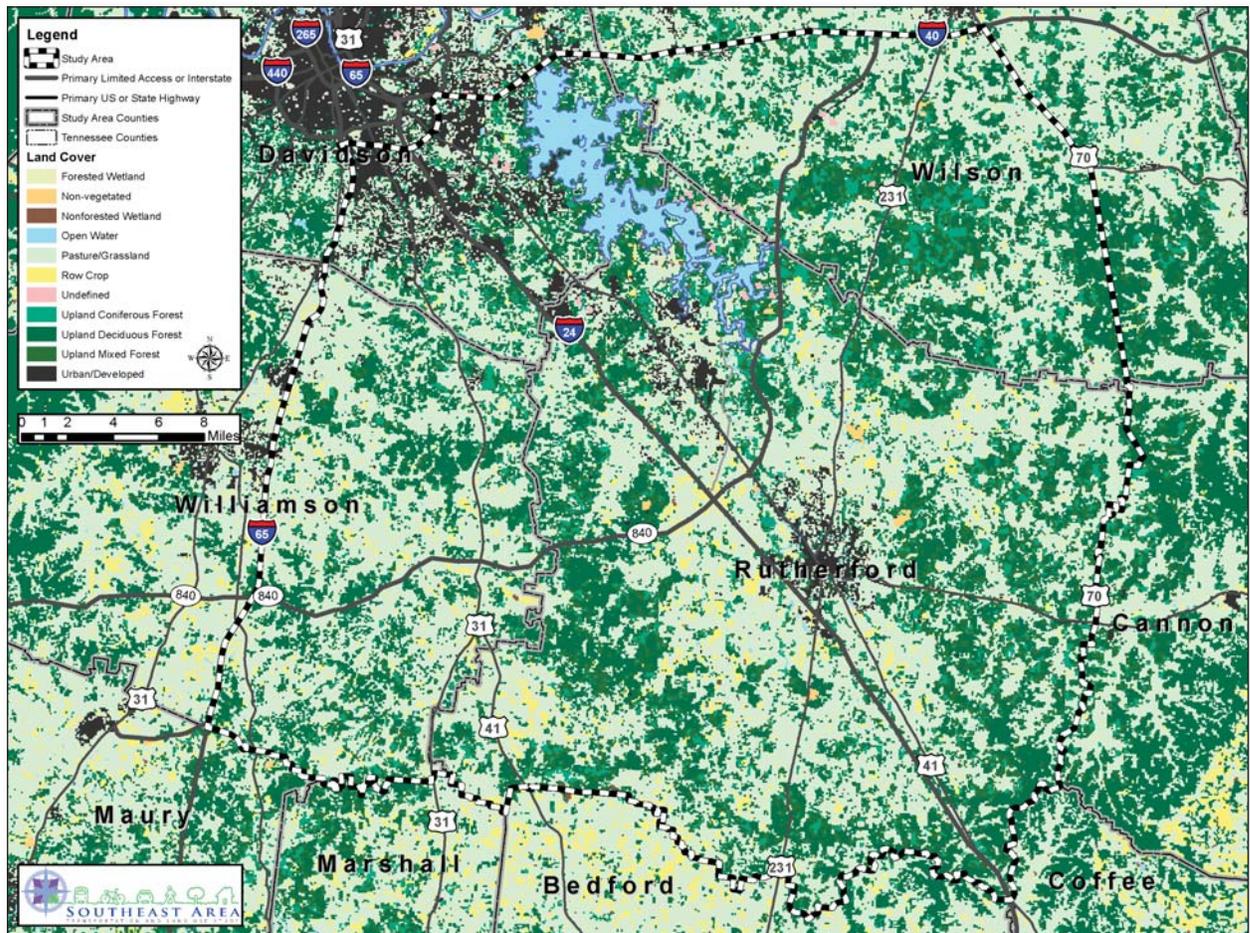
## Land Cover

Land cover in the Southeast Area is primarily forest and grasslands, providing ample opportunities for future development (Figure 4-1). This is particularly true in Rutherford County where, outside of the urban and developed areas, grassland interspersed with row crop is the dominant land cover. Upland forest cover is present in higher concentrations along the southern and western borders of the county. Eastern Williamson County and southwestern Wilson County



*Vacant land for sale along Murfreesboro Road in Antioch*

Figure 4-1. Land Use/Land Cover Map





*Shoreline at J. Percy Priest Lake*

consist of more upland forest cover, though with significant amounts of pasture and grassland. Eastern Williamson County contains a good deal of row cropland. Southeastern Davidson County is more urban in character, though pasture land and upland forest cover become more prominent as development farther from the Nashville city center becomes more dispersed.

## Habitats and Biodiversity

According to The Nature Conservancy, Tennessee has one of the highest levels of biodiversity in the nation. While Middle Tennessee has high levels of biodiversity in land-based flora and fauna, the most striking diversity occurs in the region's freshwater fauna. Unfortunately, The Nature Conservancy has also identified Tennessee as having one of the highest risk levels to species and habitat in the country. Development throughout the region has put many of its indigenous animal and plant species at risk, consuming forests and grasslands and fragmenting habitat. Additionally, the Cumberland River and other aquatic ecosystems in the region have been altered to allow for energy production, development, irrigation, flood control, and recreation.

The region is home to a number of federally-listed endangered species. Many of these are flowering plants that live in aquatic environments. In terms of fauna, the primary species of concern in the region are the Nashville crayfish and the Gray Bat. According to the Tennessee Wildlife Resources Agency, both of these species are especially sensitive to habitat degradation, which is often the direct result of development.

The Southeast Area includes two Tennessee Wildlife Management Areas (WMA). One is located at Percy Priest Lake, and straddles Davidson, Rutherford, and Wilson Counties. The other is located just west of US 31A in Williamson County, just northwest of Eagleville. WMAs are large tracts and water areas managed by the state to provide important wildlife habitat. In addition to wildlife viewings, WMAs are also managed for hunting, fishing, trapping, and other recreational opportunities. The state also offers technical assistance and funding for private property owners wishing to enhance wildlife habitat through activities such as planting appropriate grasses and shrubs, protecting riparian buffers, managing forested lands, and restoring wetlands.

## Water Quantity and Water Quality

The Southeast Area, as is the case with most areas in Tennessee, is rich with water resources. The Southeast Area contains approximately 1,300 linear miles of streams, along with the 14,200 acre J. Percy Priest Lake. In total, the Southeast Area is part of seven watersheds: Caney Fork River, Cheatham Lake, Harpeth River, Lower Duck River, Old Hickory Lake, Stones River, and Upper Duck River.

According to the Tennessee Department of Environment and Conservation (TDEC), the Southeast Area's greater four-county region is home to 98 waters designated either Exceptional or Outstanding National Resource Waters. Due to their excellent water quality, ecological value, recreational uses, and/or scenery, they cannot be degraded unless there is no other alternative or there is conflict with the public interest. There are 37 "Exceptional" or "Outstanding" waters in Davidson County, 11 in Rutherford County, 30 in Williamson County, and 20 in Wilson County.

The Southeast Area, however, is home to several waterways and water bodies which are listed on the 303(d) list by TDEC. The list is a compilation of lakes and streams in the state that are "water quality limited" or are not expected to meet water quality standards in the next two years and need additional pollution controls. In 2010, TDEC identified approximately 390 linear miles of waterways and two water bodies in the Southeast Area as impaired, that is, not supporting the designated uses (habitat, recreational, etc.) of that stream (Figure 4-2).

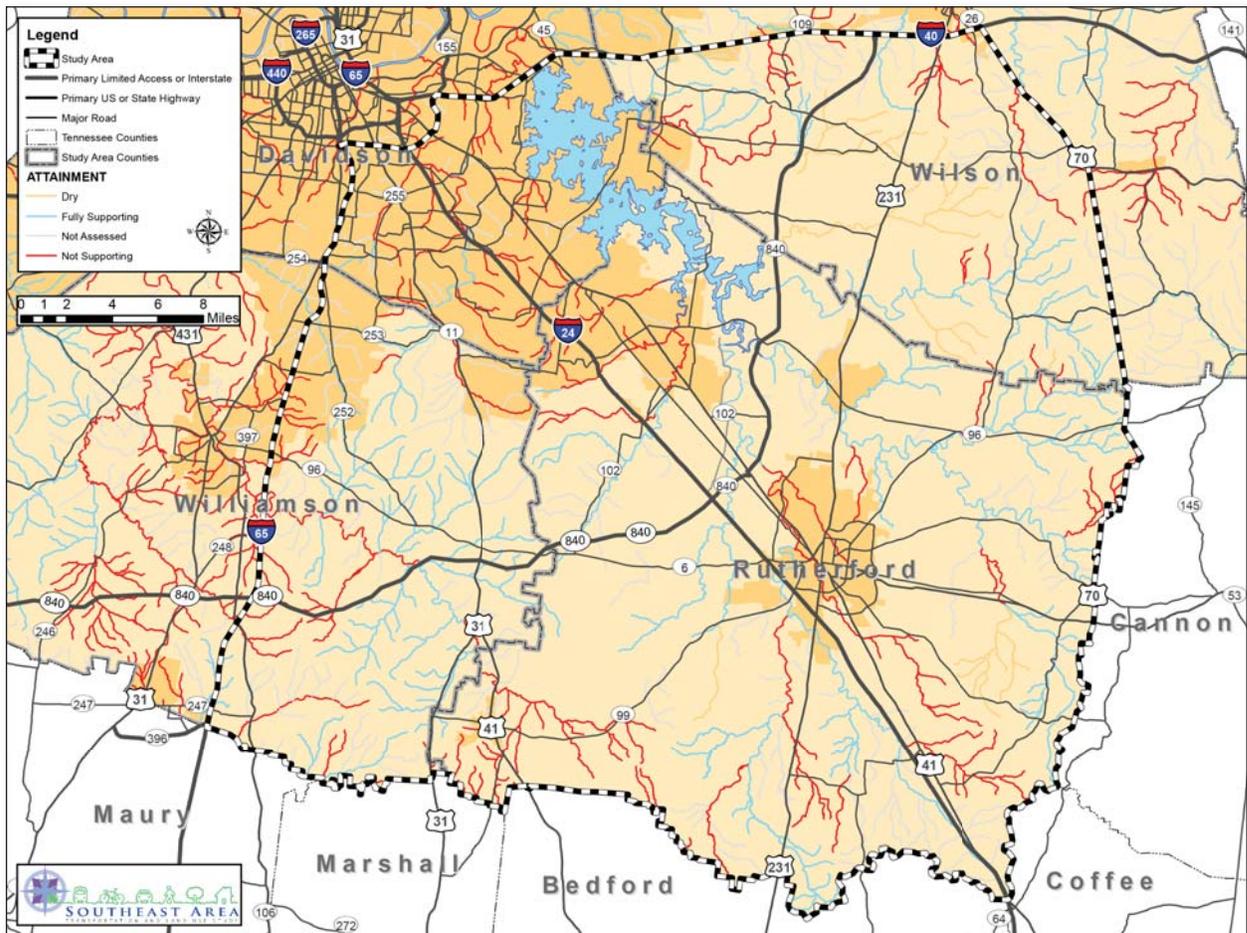


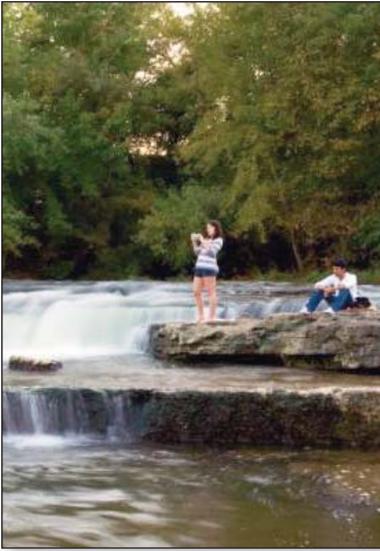
Long Hunter State Park in Davidson and Rutherford Counties

## Floodplain Development

Numerous state and federal agencies provide guidance and regulations involving development within the 100-year floodplain. In

Figure 4-2. Stream and Attainment Map





*Greenway Trail in Murfreesboro*

Middle Tennessee, however, floodplain development, even within the 500-year floodplain, has become an important issue since the devastating floods of 2010. According to the State of Tennessee, at least 30 counties in the state were declared major disaster areas, constituting more than half the state. Middle Tennessee, and especially Nashville, was hit particularly hard by these disasters. Ensuring conformity with state and federal regulations regarding development within the 100-year floodplain is always a focus. The region should also be mindful of the amount of new development occurring within larger floodplains as well in order to prevent future disasters from happening.

## Air Quality

On April 15, 2009, the Middle Tennessee region was considered in compliance with National Ambient Air Quality Standards and is now no longer required to demonstrate conformity with established motor vehicle emissions budgets. The region does remain part of the Tennessee State Implementation Plan, and as such continues to be eligible to receive Congestion Mitigation Air Quality Funding from FHWA at the discretion of TDOT.

## Parks and Open Space

The Southeast Area contains 17 parks and natural areas managed by TDEC which cover a total of nearly 7,000 acres. The largest of these are Cedars of Lebanon State Park in southwestern Wilson County (approximately 2,300 acres) and Long Hunter State Park in eastern Davidson County (approximately 2,700 acres). Cedars of Lebanon State Park contains a unique, desert-like habitat and flora regime, the result of large limestone deposits overlain by a thin layer of soil. Long Hunter State Park is located along J. Percy Priest Lake. It contains miles of trails traversing unique cedar glades and a Mississippian Indian village satellite. It serves as critical habitat for the endangered Tennessee Coneflower. The municipalities within the region also operate numerous parks and recreation departments which provide local recreation opportunities.

Some non-protected open space in the region is home to small area farms. Nationally, many food consumers are increasingly concerned about their food sources, and are favoring local sources of food over conventional grocery stores. Ensuring the preservation of small area farms will provide a continued source of income for area farmers, as well as a continued source of fresh, local produce for area consumers.

## Greenways

Davidson County has the most extensive greenway facilities in the region with approximately 55 miles of trails on the ground, although much of this system is not located in the Southeast Area. Approximately 30 miles of trails are in Rutherford County. The vast majority of these are located in the cities of Murfreesboro and

Smyrna. Murfreesboro has 12.5 miles of greenway trails including the Stones River and Lytle Creek Greenways. Smyrna has an extensive network of greenway trails, second only to Nashville among cities in the Southeast Area. The city has just over 17 miles of existing facilities. There are approximately 25 miles of greenways in Williamson County, which are largely located in the cities of Brentwood and Franklin. The City of Brentwood has 12.6 miles of trails, which are primarily asphalt pathways, including an extensive trail from Concord Road to Crockett Park. There are currently 12.4 miles of greenways in the City of Franklin. Recently completed projects within Franklin include trails along Carothers Parkway and a trail utilizing an old roadway near the new Nissan Headquarters. Southwestern Wilson County does not contain any greenway trails.

## Trend Analysis

The current growth trend will result in increased demand for land for new development, as much of the new residential development will be low-density and suburban style. Additionally, new employment centers will require suitable sites, many of which will be greenfield development. The trend scenario predicts an additional 80,000 acres of land will be consumed for development in the Southeast Area. This is likely to result in some habitat degradation, especially for tree- and stream-dwelling threatened species such as the long-eared bat and the Nashville crayfish. Protected lands will also experience potential development impacts. The region will absorb an additional 78,600 people and jobs in land adjacent to (within 50 feet of) protected open spaces, representing a 113 percent increase from current levels.

Residents of the region currently enjoy their communities' recreational facilities, as well as the outdoor recreation provided by the region's local and state parks. An additional 21,000 acres of parkland will be required by 2040 to maintain the current service delivery standard of 25 acres per 1,000 residents (as identified by the Nashville MPO's 2040 Land Use Model). Approximately 13,000 of these acres will be required in the Southeast Area. Municipalities will be required to identify and fund new parks as the current stock in the region will be inadequate to meet the anticipated demand.

The region is home to rich water resources. Ninety-eight water ways in the region are designated either Exceptional or Outstanding National Resource Waters. However, the region is also home to a significant number of waters considered impaired, that is, not supporting their designated uses. As the region continues to develop, water quality will be a major concern. A useful proxy for determining potential water quality threats is the expansion of impervious surfaces, which result in greater stormwater runoff into lakes and streams. Between now and 2040, the region is projected add an additional 24,000 acres of impervious surfaces (an approximately 31 percent increase), increasing stormwater runoff into the region's impaired streams and threatening currently healthy water bodies.

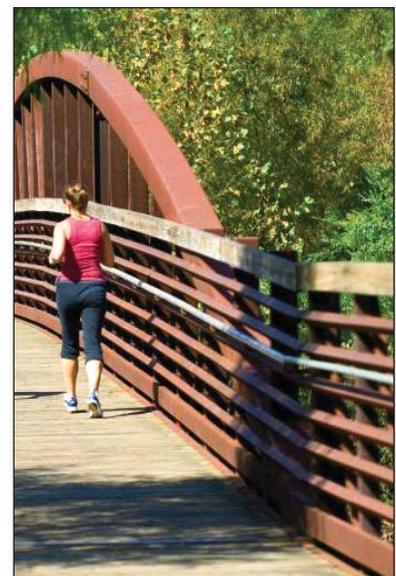


Table 4-1. Environmental Resources Indicators



Goal(s)	Indicator	Description	4-County Region		Southeast Area	
			Existing	Trend (2040)	Existing	Trend (2040)
5	Acres of Impervious Surface	The amount of new acres of impervious surface anticipated under a growth scenario	74,000	97,500	31,700	46,700
5	Encroachment on Protected Open Space	People and jobs within 50 feet of protected open spaces	69,200	147,820	56,700	118,500
5	Demand for New Parkland	Demand for new acres of parkland generated by new population in the Southeast Area	---	21,394	---	13,033*
5	Growth in 100-year Floodplain	People and jobs in 100-year floodplain	127,400	236,700	52,200	111,900
5	Growth in 500-year Floodplain	People and jobs in 500-year floodplain	182,400	326,900	65,300	136,700
2,3,5	Prime Agricultural Land Consumed	Acres of USDA-designated prime agricultural soils consumed by development	394,411	153,992	222,652	56,852

\*Additional

The USDA defines prime agricultural soils as those that have the physical and chemical properties most conducive to successful agriculture. While not all prime agricultural acres are arable, the measure does provide a useful proxy for determining agricultural potential. Under current projections, the region will lose approximately 60 percent of its prime agricultural soils. This is likely to reduce the potential for expanded local agriculture in the region. Table 4-1 lists the indicators for the environmental resources element of the study.

## 5. PUBLIC HEALTH

A region's general health and well-being affect far more than the lives of its individual residents. Improving the health status of a community can result in savings to households, businesses, and the public sector. Healthy people ultimately contribute directly to regional prosperity. The Middle Tennessee region, and Tennessee as a whole, falls behind on most national measures of health. According to the 2013 Nashville Region's Vital Signs Report, the entire region does not meet the national standard in premature death. One in five persons experiences a fair to poor health status, well below the national standard of no more than one in ten. All but one Middle Tennessee county exceeds the national goal of 25 percent adult obesity, and all but one county falls below the national goal of approximately 15 recreational facilities per 100,000 residents. Additionally, the region currently offers less than one foot of bicycle facilities per capita, and just over two feet of sidewalk per capita. A lack of convenient and proximate facilities discourages the active lifestyles that would partially address the region's negative health outcomes.

Over the past decade, tremendous strides have been made nationally and internationally to document and understand the health impacts of community planning and design. Organizations as varied as the American Public Health Association and the Urban Land Institute recognize that while many factors influence health the built environment has a significant influence. The U.S. Centers for Disease Control and Prevention (CDC) regularly collects data and conducts research on healthy community design and places a special emphasis on the link between transportation and health. Recently, the CDC issued the following recommendations for improving health through transportation policy:

- Reduce injuries associated with motor vehicle crashes
- Encourage healthy community design
- Promote safe and convenient opportunities for physical activity by supporting active transportation infrastructure
- Reduce human exposure to air pollution and adverse health impacts associated with these pollutants
- Ensure that all people have access to safe, healthy, convenient, and affordable transportation

The Nashville MPO has taken a leadership role in advancing the state-of-the-practice in transportation planning and public health, conducting Health Impact Assessments (HIA) for several projects. For this study, indicators that tie directly to the CDC policy recommendations and provide insight on the connection between transportation and health can be found in many of the community elements – for example, vehicle miles traveled, access to transit, and air quality. Table 5-1 includes two additional indicators for public health that

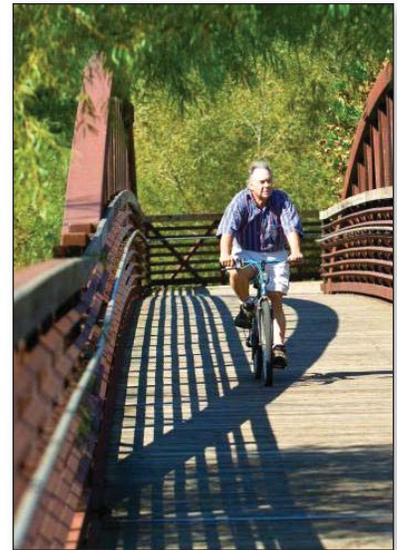


Table 5-1. Public Health Indicators



Goal(s)	Indicator	Description	4-County Region		Southeast Area	
			Existing	Trend (2040)	Existing	Trend (2040)
3	Development within proximity to existing schools	The total number of people within one mile of an existing school	948,176 (78 %)	1,443,572 (68 %)	389,817 (70 %)	545,766 (51%)
1, 2, 3, 5	Access to parks	The total number of people within ¼ mile (walk) and one mile (bike) of parks	Bike: 706,245 (58%) Pedestrian: 251,770 (20 %)	Bike: 1,032,700 (49%) Pedestrian: 388,750 (18%)	Bike: 107,348 (19%) Pedestrian: 34,501 (6%)	Bike: 182,645 (17%) Pedestrian: 44,719 (4%)
1, 2	Walkability/ Intersection density	The number of intersections (four-way and three-way) per square mile	23	45	16	57
5	Demand for new parkland	Demand for additional acres of parkland generated by new population in the Southeast Area	---	21,394	---	13,033

highlight the ability of students to walk or bike to school and community access to parks and recreational facilities.

### Trend Analysis

The potential for current and future residents to walk and bike to existing recreational facilities is expected to decrease under the trend. The regional share of the population within one mile of existing schools will decrease by approximately 10 percentage points; a 19 percentage point decrease will occur within the Southeast Area. It should be noted that bicycling is only possible when safe and adequate facilities connect neighborhoods to schools.

The regional percentage of households within biking distance (one mile) of existing parks will decrease by 9 percentage points; households within walking distance (one quarter mile) to parks will decrease by 2 percentage points. The region’s intersection density, a useful measure of walk potential, is projected to increase as new roadways are built to accommodate development. The region will still maintain its predominantly low-density development pattern, limiting walking opportunities to already walkable neighborhoods and centers. Municipalities should include bicycle and pedestrian infrastructure in capital improvement plans and encourage developers to incorporate these facilities into new residential developments.

The demand for parks will also increase. In order to encourage more active, healthy lifestyles, municipalities in the region will need to



“... bicycling is only possible when safe and adequate facilities connect neighborhoods to schools.”

provide adequate parkland that is located relatively close to existing and future population centers. The current service delivery standard calls for 25 acres of parkland per 1,000 residents. The region will need to provide an additional 21,000 acres of parkland to meet this standard based on projected demand; 62 percent of this demand will come from within the Southeast Area.

Ultimately, the built environment, including both land use patterns and transportation infrastructure, impacts multiple health outcomes for physical activity, air quality, transportation system safety, as well as access to healthy foods and medical facilities. Ensuring a built environment that encourages an active lifestyle must be a priority moving forward. Table 5-1 includes indicators for public health.



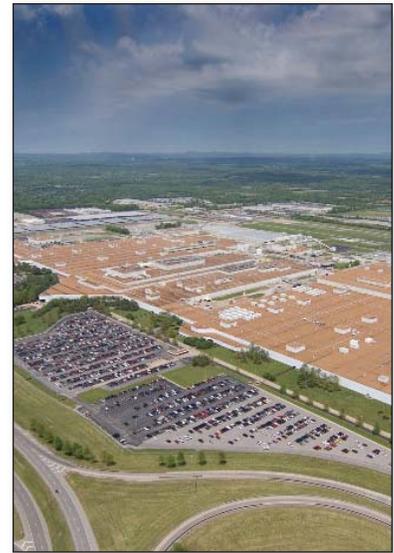
## 6. ECONOMIC AND MARKET CONDITIONS

As part of the existing conditions and trends analysis, an economic and market analysis (the full report is available as a separate document) was conducted to provide insight into the existing employment and industry submarket trends in the Southeast Area. This analysis will be used to understand the current economic landscape and as a “reality check” against which the preferred growth scenario will be tested.

Stretching from I-65 to I-40 south of Briley Parkway and including all of Rutherford County, the Southeast Area includes many of the metropolitan region’s largest employers across a variety of sectors, including National Healthcare in health care, MTSU in education, and Nissan North Americas in manufacturing. With more than 335,000 jobs, or 43 percent of the metropolitan region’s total, the employment composition of the Southeast Area largely mirrors the region’s mix of jobs. Education and health services is the leading employment sector in the Southeast Area accounting for 22 percent of jobs. Retail trade, manufacturing, professional and business services, and leisure and hospitality each represent roughly 10 percent of the jobs in the Southeast Area (Table 6-1). Professional and business services is the fastest growing sector, increasing by 10 percent between 2012 and 2013.

The submarkets for the four principal market segments – office, retail, industrial and residential – generally extend beyond the Southeast Area’s boundaries to include most or all of Williamson and Wilson counties. Given those constraints, key findings for the market segments include:

- Thirty-nine percent of the region’s total office market inventory is in the Southeast Area – more than a third of that total is in the Cool Springs submarket.
- Forty-eight percent of the region’s total retail inventory is located in the Southeast Area. The Rutherford County submarket represents almost a third of the total.
- Fifty-seven percent of the region’s industrial inventory is located in Southeast Area submarkets – more than half of that total is in Rutherford County and along I-24 south of Briley Parkway in Davidson County.
- Although not analyzed as separate market segment, the study has a large concentration of distribution centers along I-24 and SR 840 (Figure 6-1) with important implications for freight and goods movement.
- At 4.25 percent, the current multifamily vacancy rate is low in the Southeast Area. Most new multifamily construction is located outside of the Southeast Area.



*Nissan North America, Smyrna, TN*

Table 6-1. Southeast Area Employment by Sector

 Employment Sector	 Employment	 Percentage
Agriculture, Forestry, Fishing/ Hunting, and Mining	1,236	0%
Construction	23,536	7%
Manufacturing	34,883	10%
Wholesale Trade	12,002	4%
Retail Trade	40,497	12%
Transportation and Warehousing and Utilities	17,178	5%
Information	11,649	3%
Financial Activities	25,283	8%
Professional and Business Services	33,581	10%
Education and Health Services	72,633	22%
Leisure and Hospitality	32,088	10%
Other Services	16,729	5%
Government	14,004	4%
TOTAL	335,299	100%

The analysis of existing conditions suggests that the Southeast Area is well-positioned to continue to capture the majority of the region's industrial growth. Area communities can leverage low cost labor, availability of land, and strategic geographic proximity to major trade routes and multimodal facilities to attract new industrial employment. Finally, recent growth in professional and business services offers new opportunities in office development, with new multifamily construction a likely real estate opportunity going forward as well.

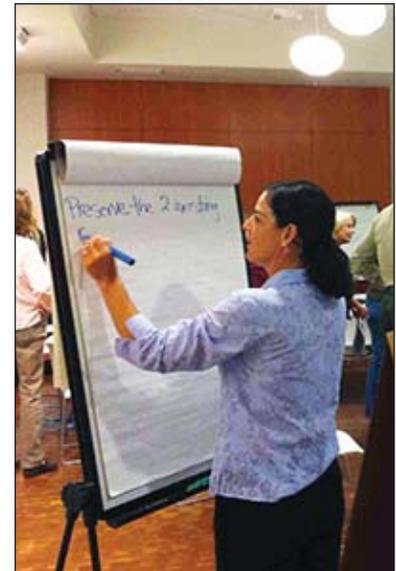




## 7. FISCAL IMPACT ANALYSIS

In addition to the land use and infrastructure impacts associated with population and employment growth of the trend scenario, each jurisdiction within the southeast study area will experience fiscal impacts related to the increased demand for public services. These fiscal impacts are linked to both the increased cost to provide public services and increased revenues related to a growing tax base.

A Fiscal Impact Analysis Model (FIAM) was developed to generate estimates of revenues and costs associated with the trend scenario. The analysis focuses solely on the jurisdiction's general fund expenditure and revenue items that: 1) represent a substantive component of the overall local budget, and 2) are likely to be affected by the regional policies and growth trends. The selected revenue and expenditure categories are listed in Table 7-1. Collectively, these categories comprise at least 70% of total local revenues and 70% of total local expenditures within each jurisdiction of the study area. Estimates of current expenditures and revenues for each jurisdiction are provided in Table 7-3. Revenues and expenditures reflect local dollars only.



**Table 7-1. Local Expenditure and Revenue Categories Reflected within Fiscal Impact Analysis Model**

Expenditure Categories	Revenue Categories
<ul style="list-style-type: none"> <li>• General Government</li> <li>• Justice</li> <li>• Police</li> <li>• Fire</li> <li>• Public Health</li> <li>• Public Works*</li> <li>• Education</li> <li>• Recreation</li> </ul>	<ul style="list-style-type: none"> <li>• Property Taxes</li> <li>• Local Option Sales Tax</li> <li>• Charges for Services</li> </ul>



*\*Includes road and bridge maintenance.*

### Methodology for Estimating the Fiscal Impact of Growth

To quantify the net fiscal impact associated with the trend development scenario, an average-cost fiscal impact analysis was conducted. The analysis captures the net (local) fiscal impact associated with population and employment growth. In this approach, average unit costs to provide basic public services across the expenditure categories identified in Table 7-2 are applied to future population and employment estimates, within each jurisdiction. Local sales tax and property tax revenues are estimated using future square footage assessments for commercial and residential

Table 7-2. Average Expenditures by Local Government (Reflects Local Expenditures Only)

Expenditure Category	County Government				Municipal Government				
	Rutherford	Wilson	Davidson	Williamson	Murfreesboro	Eagleville	La Vergne	Nolensville	Smyrna
General Government	\$16,681,499	\$11,419,882	\$120,291,000	\$20,752,042	\$13,209,846	\$257,901	\$2,554,500	\$514,562	\$7,798,430
Justice	\$6,756,409	\$4,854,145	88,469,000	\$4,655,311	---	---	---	---	---
Sheriff's Dept./Police	\$17,913,140 (2)	\$7,564,475 (2)	\$240,000,000	\$6,346,419 (2)	\$23,143,603	\$65,158	\$5,010,000	\$486,811	\$9,443,614
Fire	\$928,000 (3)	\$773,585	\$154,191,000	\$472,536	\$14,758,812	\$41,921	\$1,912,000	\$130,000	\$8,314,635
Public Health	\$18,913,482	\$3,253,673	\$123,569,000	\$10,039,571					
Roads/Public Works	\$10,234,997	\$9,743,829	\$148,106,500	\$11,500,610	\$16,937,768	\$17,320	\$2,522,000	\$245,032	\$4,659,782
Education	\$378,533,774	\$156,041,930	\$868,524,000	\$357,651,742	\$59,985,468	0	0	\$0	0
Recreation	---	---	---	---	\$12,655,903	\$54,901	\$1,017,000	\$130,000	\$4,595,331

Notes:

(1) Average expenditures from 2011 and 2012 CAFRS.

(2) Sheriff's Department expenses

(3) Rutherford County, 2013/2014

Table 7-3. Average Revenue by Local Government (Reflects Local Revenue Only)

Expenditure Category	County Government				Municipal Government				
	Rutherford	Wilson	Davidson	Williamson	Murfreesboro	Eagleville	La Vergne	Nolensville	Smyrna
Charges for Services	\$69,157,000	\$11,848,666	\$153,420,000	\$65,977,686	\$14,523,875	\$69,045	\$2,053,000	\$1,512,756	\$7,183,177
Property Tax	\$138,170,959	\$68,415,060	\$785,037,000	\$168,602,845	\$35,960,922	\$120,090	\$5,932,500	\$314,837	\$10,074,590
Local Sales Tax	\$42,289,794	\$15,741,776	\$269,700,500	\$37,741,184	\$31,124,392	\$120,313	\$3,573,500	\$519,449	\$9,123,040

Notes:

(1) Average revenues from 2011 and 2012 CAFRS.

Figure 7-1. Fiscal Impact Analysis Framework



land use within each jurisdiction. Figure 7-1 presents the general steps of the fiscal impact analysis. Additional detail is provided as a separate appendix to this report.

### Calculating Average Unit Costs and Unit Revenues

- **Costs** – The fiscal impact analysis was conducted using an the average cost approach for estimating current costs to provide public services. The average cost approach is the method most often used in fiscal impact analysis and it assumes that the current cost of serving current residents and businesses will be similar to the cost of serving new and future developments. Costs assigned to future developments are based on the current average cost of providing the service per unit (e.g., per household, student, or employee) times the number of new service units.
- **Revenues** – A per service unit method was used to determine the revenue factors for local option sales tax and charges for service revenues. Service population<sup>1</sup> was used for estimating average charges for public services and square footage of retail was used for generating average local option sales tax estimates. The square footage of retail captures both local spending and employee based spending impacts and allocates the revenues relative to physical retail concentrations. This captures revenue impacts that can change over time based on retail development patterns.

A modified average revenue approach was used for estimating property tax revenues. The revenue streams generated from this source vary significantly depending on the property types and the value of these properties in the market. Figure 7-2 shows the general approach for calculating property tax revenues. The methodology reflects assumptions used by the Nashville tax assessors’ office,<sup>2</sup> coupled with general assumptions about property values.

### Results of Fiscal Impact Analysis

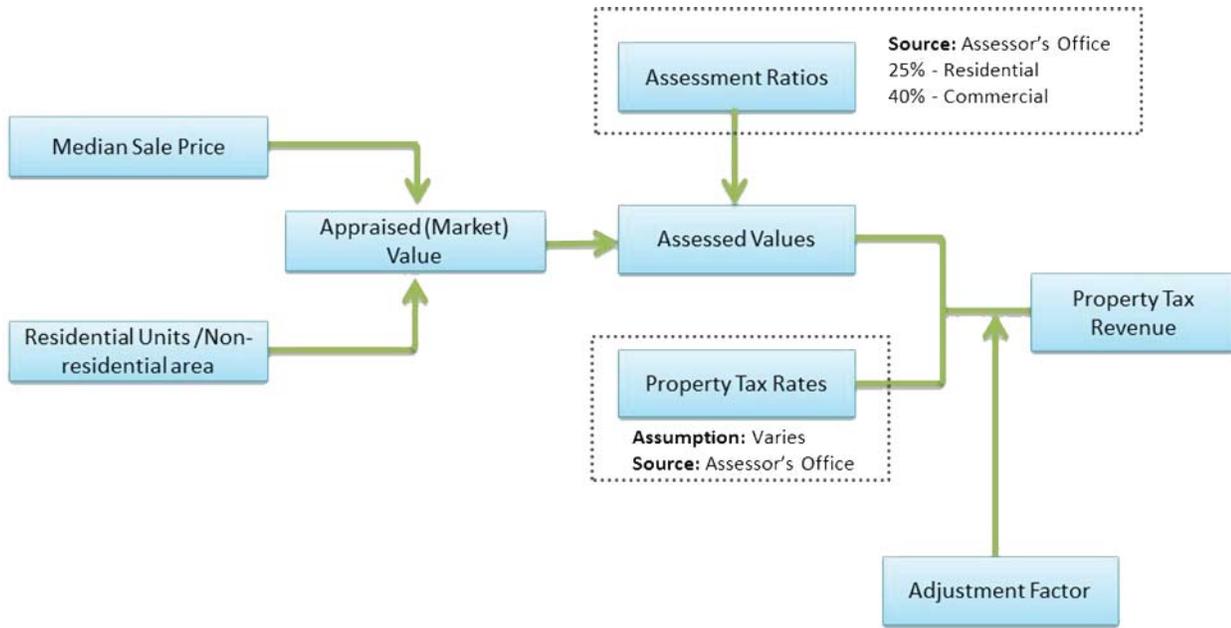
Average unit costs and unit revenues were applied to projected socio-economic conditions under the 2040 business as usual scenario

<sup>1</sup> Service population is defined as the universe of individuals that generate impacts (i.e., residents and employees). Service population was defined as 100 percent of residents residing within a jurisdiction plus one-half of the employees who work at firms located within the jurisdiction.

<sup>2</sup> Assessor of Property, Metro Nashville-Davidson County, Tennessee.



Figure 7-2. Property Tax Revenues General Approach



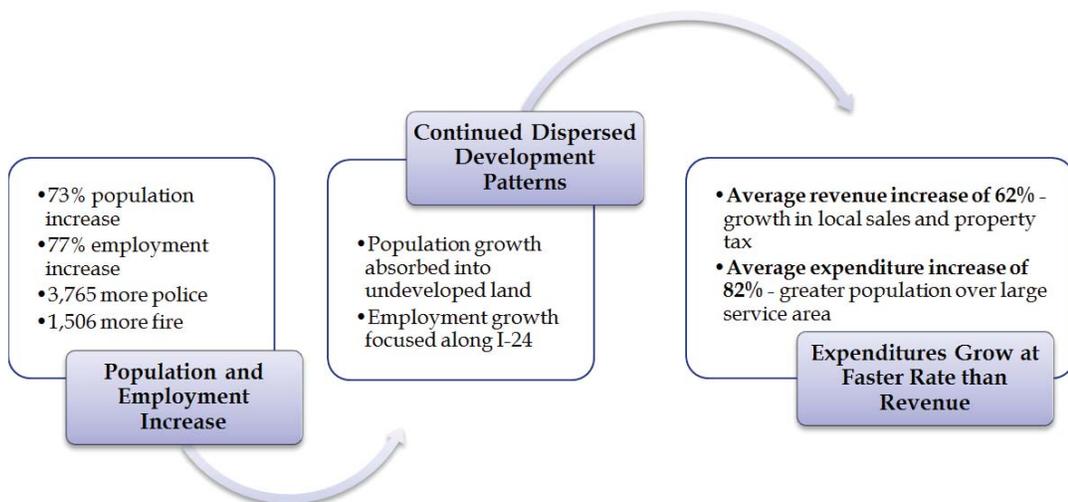
to calculate projected revenues and expenditures over the plan horizon under the trend scenario. Table 7-4 presents the fiscal impact results for the southeast study region for the 2040 trend scenario. For the study region, the trend scenario yields an average revenue increase of 62 percent and an average expenditure increase of 80 percent. The study region as a whole is seeing revenue benefits associated with increased charges for services due to the increasing service population, but not as strong an increase in the much more dominant – and more stable – property tax revenue source. Expenditures are rising at a more consistent rate across expenditure categories, given the consistent impact of population and jobs across most expenditure categories (i.e., most expenditure types will feel the impacts of population and employment growth to the same degree), unlike revenue categories. The exception is educational expenses, which are tied proportionally to population increase.

Despite the slight density increase from the base year to 2040 Trend (Figure 7-3), the development pattern associated with the Trend scenario is reflecting a continued, unbalanced revenue and expenditure baseline; i.e., local expenditures exceeding local revenues. This is resulting primarily from a fairly homogenous mix of land uses dominated by single-family residential units. With expenditures growing at a faster rate than revenue, a net negative fiscal impact is expected under the Trend scenario, compared to base year conditions.

Table 7-4. Fiscal Impact Results – Study Region

	Base Year	Trend 2040	Percentage of Increase
Residential Units*	405,877	659,934	63%
Non-residential area (sq.ft.)*	249,792,425	329,505,455	32%
Developed Area (acres)	336,620	541,058	61%
Residential Density (residential/acres)	1.21	1.22	1%
Non-residential Density (sq.ft./acres)	742	609	-18%
<b>Revenue (millions)</b>			
Property Tax	\$1,213	\$1,861	53%
Sales Tax	\$410	\$655	60%
Charges for Services	\$326	\$638	96%
<b>Total Revenues</b>	<b>\$1,948</b>	<b>\$3,154</b>	<b>62%</b>
<b>Expenditures (millions)</b>			
General Government	\$193	\$341	76%
Justice	\$105	\$158	51%
Police	\$310	\$481	55%
Fire	\$182	\$274	51%
Public Health	\$156	\$233	50%
Public Works	\$204	\$333	63%
Education	\$1,821	\$3,510	93%
Recreation	\$18	\$41	122%
<b>Total Expenditures</b>	<b>\$2,989</b>	<b>\$5,371</b>	<b>80%</b>
<b>Net Revenue</b>			
Net Revenue (millions)	-\$1,040	-\$2,217	---
Per Residential Unit	-\$2,563	-\$3,360	---
% Gap	35%	41%	---

Figure 7-3. Fiscal Impact Summary for Trend Scenario





## 8. CONCLUSION

The Southeast Area is currently one of the fastest growing regions in Tennessee, and will experience continued growth in both population and employment in the coming decades. The inevitable increase in development will have effects on each of the topic areas covered in this report. Some of the key issues and areas of concern to be addressed include:

- **Land use patterns:** Continued reliance on lower density residential patterns and its impacts on environmental and natural resources, transportation, public services and public health.
- **Growing employment:** The area is emerging as a major employment center for the region. Promoting economic growth while preserving community character will be a major challenge.
- **Lagging transportation infrastructure:** Significant increases in congestion on major corridors in the study area that will be a major impediment to economic growth and quality of life.
- **Lack of transportation options:** Under the status quo, a majority of residents and businesses will lack access to transportation options, including regional and local transit, walking, and cycling. A key objective of this study will be to get a better sense of regional and local transit possibilities in the study area and create places where walking and cycling are safe and convenient.
- **Growing demand on public services and infrastructure:** Significant growth brings increased demand on public services and infrastructure. Determining an efficient and fiscally sound growth strategy is a top priority.
- **Evolving housing needs:** A majority of the area's planned housing stock is single family residential. As the area continues to grow, housing options will need to expand to meet an increasingly diverse population.
- **Preserving the natural environment:** The area benefits from a diverse natural landscape with high levels of biodiversity and a rich local and state park system. Preserving environmental assets and quality in the face of tremendous growth will be a challenge.
- **Improved public health:** Like most of the southeast United States, the area suffers from high obesity rates and other indicators of poor public health. Creating a built environment that supports active and health lifestyles is an important objective of this study.

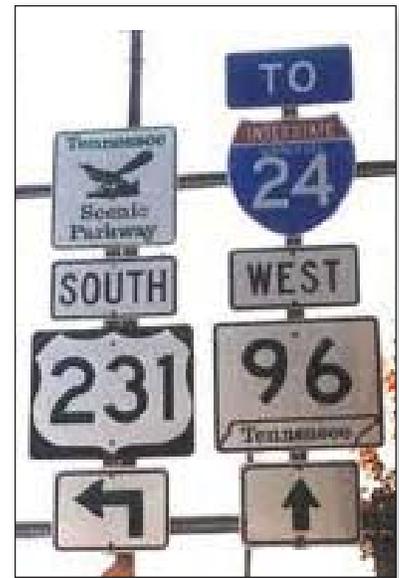


Table 8-1. Key Issues and Areas of Concern along the Southeast Area Corridor

	Key Issue	Area of Concern
 <p>Land Use and Development Patterns</p>	<ul style="list-style-type: none"> <li>The Southeast Area currently consists of primarily low-density, suburban style development.</li> <li>A large amount of the land in the Southeast Area is currently rural or undeveloped.</li> <li>Industrial and office concentrations exist along the I-24 and I-40 corridors in the area.</li> </ul>	<ul style="list-style-type: none"> <li>The area's low residential density will likely be insufficient to absorb the projected residential growth.</li> <li>The area's future housing is projected to be less than 10% multi-family.</li> <li>Large amount of undeveloped land will be converted for residential or employment use.</li> </ul>
 <p>Travel Demand and Transportation Systems</p>	<ul style="list-style-type: none"> <li>Approximately one-third of the area's residents commute to another county for employment.</li> <li>Congestion in the Southeast Area is concentrated along interstates and major arterials.</li> <li>The area is served with limited transit options; several communities have no local transit service.</li> </ul>	<ul style="list-style-type: none"> <li>Existing transportation system will struggle to accommodate projected future development.</li> <li>VMT and VHT are expected to increase significantly.</li> <li>Transit system use is not expected to change.</li> <li>Transportation demand and transit solutions will need to be a part of the overall strategy.</li> </ul>
 <p>Public Services</p>	<ul style="list-style-type: none"> <li>The region has plentiful water resources and sufficient water/wastewater infrastructure to service current demand.</li> <li>Existing emergency service providers are concentrated in incorporated areas and supplemented by volunteer efforts.</li> </ul>	<ul style="list-style-type: none"> <li>Existing municipalities have large urban growth boundaries; annexation could strain public services budgets until new development provides sufficient revenues.</li> </ul>
 <p>Economic and Market Issues</p>	<ul style="list-style-type: none"> <li>The Southeast Area is poised to capture a majority of the region's industrial growth.</li> </ul>	<ul style="list-style-type: none"> <li>The area has few large, suitable industrial sites for future expansion.</li> <li>New multi-family construction may lag behind demand as population increases.</li> </ul>
 <p>Environmental Resources</p>	<ul style="list-style-type: none"> <li>The Southeast Area has high levels of biodiversity.</li> <li>Residents currently enjoy both local and state park infrastructure.</li> <li>Water quality remains a concern in the region, which is home to portions of seven watersheds.</li> </ul>	<ul style="list-style-type: none"> <li>Parks and protected open spaces may experience conflict with new development.</li> <li>Municipalities will need to provide additional parks infrastructure, as the current stock will be inadequate to meet future demand.</li> <li>Impervious surfaces that accompany new development may further degrade water quality in the region.</li> </ul>
 <p>Public Health</p>	<ul style="list-style-type: none"> <li>The region currently lags behind the rest of the nation in many critical indicators of public health.</li> <li>As the region's density increases, walking and biking opportunities will increase</li> </ul>	<ul style="list-style-type: none"> <li>Maintaining a built environment that encourages an active lifestyle must be a priority moving forward.</li> <li>Despite an increase in potential, increased walking and biking will depend on an improved infrastructure network and a built environment that provides places to which to walk and bike.</li> </ul>