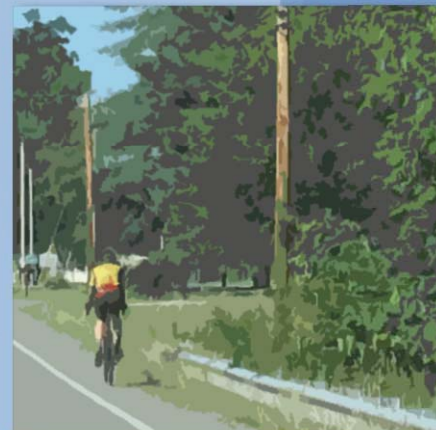
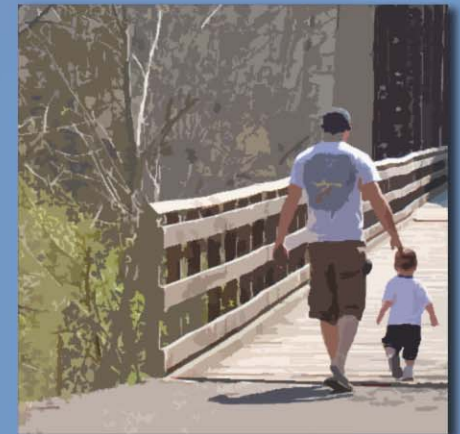




NASHVILLE AREA METROPOLITAN PLANNING ORGANIZATION

BICYCLE AND PEDESTRIAN STUDY

NOVEMBER 2009



PREPARED BY:

RPM TRANSPORTATION CONSULTANTS, LLC
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VARALLO PUBLIC RELATIONS



The sum of the whole is this: **walk and be happy; walk and be healthy.** The best way to lengthen out our days is to walk steadily and with a purpose.

~Charles Dickens

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ACKNOWLEDGEMENTS

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Tennessee Department of Transportation
Federal Highway Administration
Federal Transit Administration

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It is by riding a bicycle that you learn the contours of a country best, since you have to sweat up the hills and coast down them. Thus you remember them as they actually are, while in a motor car only a high hill impresses you, and you have no such accurate remembrance of country you have driven through as **you gain by riding a bicycle.**

~Ernest Hemingway

1.1 WHY A REGIONAL PLAN

A STUDY FOR THE NASHVILLE REGION

The regional Bicycle and Pedestrian Study is intended to establish a strategic vision for improving walking and bicycling opportunities in the greater Nashville region. This strategic vision will feed into the Nashville Area Metropolitan Planning Organization's (MPO's) overall regional transportation plan and provide the basis by which future funding priorities of the MPO are established for bicycle and pedestrian accommodations within the Davidson, Rutherford, Sumner, Wilson, and Williamson counties, plus the cities of Spring Hill and Springfield.

Working with local governments, businesses, non-profit organizations, and the general public, the Nashville Area MPO conducted the Regional Bicycle and Pedestrian Study as a mechanism to foster a better understanding of bicycle and pedestrian needs within the region. The Study provides guidance for policies, programs, and investments intended to maximize opportunities for greater walking and bicycling activity now and in the future within the greater Nashville region.

Nine Technical Memorandum reports were prepared as part of the Regional Bicycle and Pedestrian Study. Find more information and complete Technical Memorandum reports on the MPO website:

<http://www.nashvillempo.org>

THE STUDY

- *Provides a comprehensive inventory of existing and currently proposed on and off-road bicycle and pedestrian facilities in the greater Nashville region*
- *Increases the region's understanding of how improving walking and bicycling connectivity between residential areas, employment centers, schools, retail centers, recreational centers, and other attractions increases individual mobility, enhances transit options, and promotes active living.*
- *Serves as a framework for identifying and selecting bicycle/pedestrian projects for the region's Long Range Transportation Plan and Transportation Improvement Program.*
- *Provides guidance for engineering, education, enforcement, encouragement, and evaluation activities to help improve the safety of walking and bicycling.*



1.2 THE BENEFITS OF WALKING AND BICYCLING

Walking and bicycling are the simplest forms of transportation and afford basic mobility to all. Walking and bicycling offer society a great number of benefits that improve communities and individuals, beyond just transportation alone. Just a few of the greatest benefits include:

- Increased physical activity and active lifestyles are promoted by well designed sidewalks, bikeways, and interconnected streets especially when combined with a mixture of land uses at the human-scale.

WHY DO WE NEED A REGIONAL PLAN?



- In addition to combating obesity, physical activity, such as walking and bicycling, can help prevent many other health-related problems which can reduce health care costs.
- Walking and bicycling can directly replace short motor vehicle trips which reduces driving trips and lessens traffic congestion. Traffic congestion causes pollution, wastes time and energy, causes driver frustration, and reduces economic productivity.
- Pedestrian and bicycle accommodations promote greater use of transit by providing sidewalk and bicycle facilities from home and employment to public transit (and vice versa).
- Walking and bicycling can help residents stimulate their local economies by encouraging them to support retail merchants and restaurants near their home and workplace.

- Providing multi-use trails can increase real estate value as trails are the top ranked outdoor community assets according to the National Association of Homebuilders.
- Providing for pedestrians and bicyclists can be an excellent way to increase local tourism.
- Businesses that promote active transportation can see an increase in productivity, improved employee health, and better customer relations, as well as a decrease in absenteeism and employee turnover.
- Providing bike racks and lockers at transit stops and transfer stations can encourage more people to use public transit.
- Communities, neighborhoods, and downtowns with high levels of pedestrian and bicycle activity are often considered as places that are livable, prosperous, and inviting.
- Walking and bicycling can provide mobility to citizens who cannot, or who choose not to, own a car, helping them to be more productive and active members of society.

DID YOU KNOW:

- *40% of all trips are less than 2 miles in length*
- *It takes about 15-20 minutes to walk a mile*
- *It takes about 10-15 minutes to bicycle two miles*

A WAY TO STAY HEALTHY

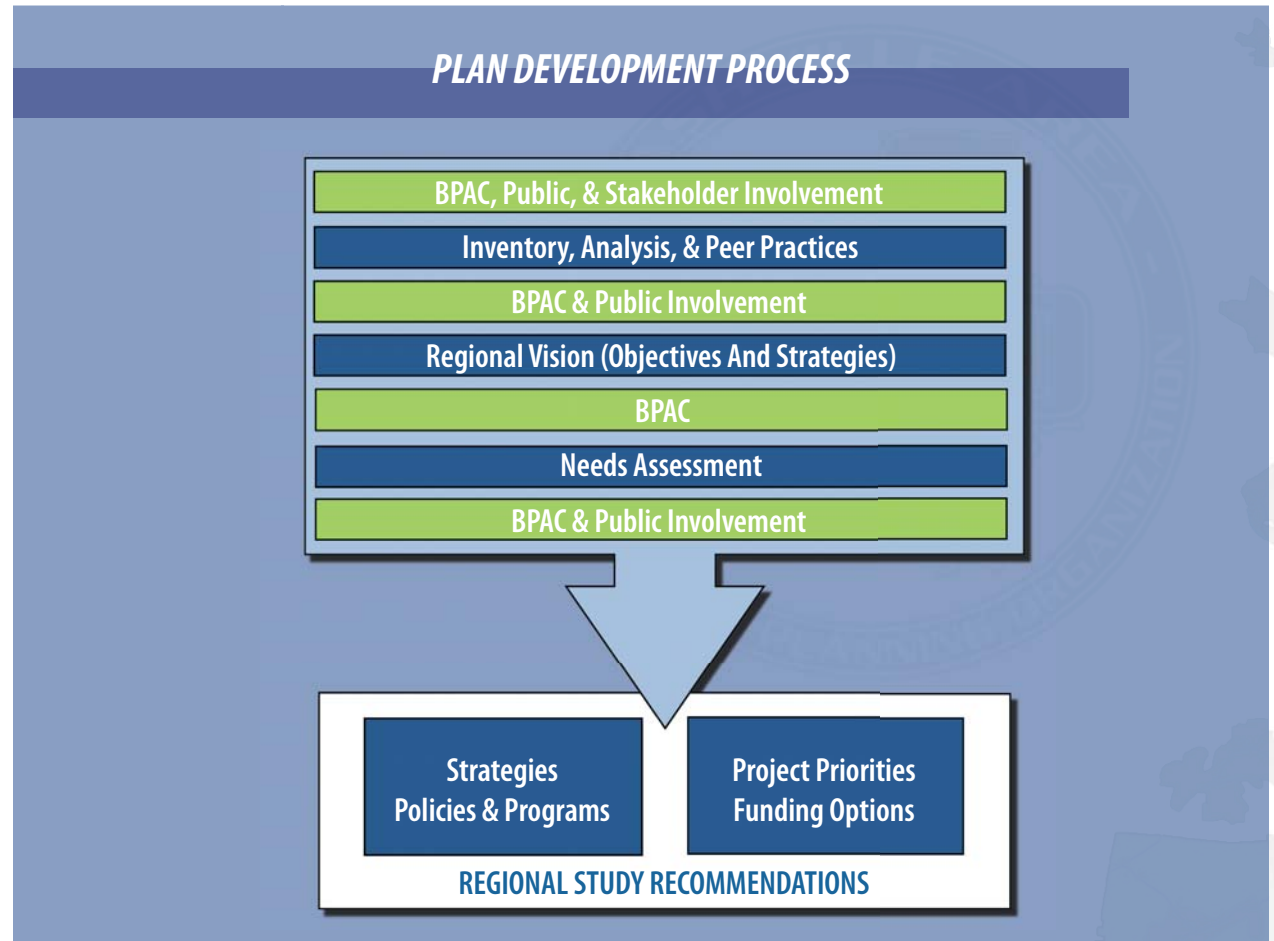
Health professionals recommend that both children and adults participate in moderately intense physical activity for at least 30 minutes each day. For most people, this need can be met by simply bicycling to work or walking to school. A 15 minute walking or bicycling commute in the morning and again in the afternoon can provide the physical activity that is necessary to remain healthy.



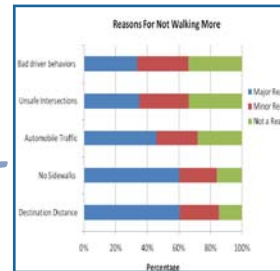
1.3 THE PLAN DEVELOPMENT PROCESS

Developing a common set of objectives and strategies is an important part of any planning process as it is the foundation upon which policies, resources, and other actions are based. Objectives are clear, realistic, specific, and measurable statements of action which when completed will move towards goal achievement. Objectives describe future expected outcomes or states. They provide programmatic direction and focus on ends rather than means. Strategies are the specific activities that will be conducted to achieve the stated objective.

The Regional Bicycle and Pedestrian Study objectives and strategies were developed based on **four key input components:**



- Stakeholder & Public Input
- Nearly **400** Participants



- Online Survey
- Over **1,700** respondents



- Peer Community Practices
- **6** Peer Communities



- Bicycle & Pedestrian Advisory Committee (BPAC) Input
- **23** Members

2 | OBJECTIVES AND STRATEGIES: CREATING A VISION

2.1 OBJECTIVES AND STRATEGIES

After gathering ideas and comments from the four key input components described in the plan development process, the planning team, consisting of the BPAC, MPO, and consultant team, developed four major objectives. In order to further describe how to meet each objective the team came up with numerous strategies as well. A complete list of the strategies is found on pages 8 and 9.

TRANSIT IN THE REGION

Walking and bicycling provide the most convenient ways to access public transportation. A recent Metro Transit Authority on-board survey found that 90 percent of transit riders walked or bicycled to access transit services. As public transportation investments in the region occur, the provision of bicycle and pedestrian accommodations is essential to a successful transit system.

1 Objective | Provide Facilities

Provide a comprehensive, safe, and convenient bicycle and pedestrian system for a wide range of skill levels that is interconnected and accessible making it easier for individuals to choose to walk and bicycle.

2 Objective | Build Support

Build a collaborative and cooperative environment within the region among stakeholders and communities that supports more non-motorized transportation choices.

3 Objective | Create Policies & Programs

Integrate walking and bicycling within the region through policies and programs that foster accommodations for improved safety, mobility, and health.

4 Objective | Increase Awareness

Elevate the level of understanding and awareness of the benefits, uses, and needs of non-motorized transportation choices through comprehensive educational, enforcement, evaluation, and outreach programs.

ONLINE SURVEY RESULTS

In January 2009 an online survey was initiated for the project. The nineteen survey questions asked about individual's walking and bicycling habits as well as obstacles and opportunities for improving facilities such as sidewalks, greenways, and bikeways within the greater Nashville region.

The following highlights key findings of the survey:

- *Nearly 35% said they currently walk or bicycle once a week for exercise or to go to the park*
- *Over 25% said they currently walk once a week to run errands, shop, or eat*
- *Over 50% said they would walk or bicycle to work*
- *Over 65% said they would walk or bicycle to run errands, shop, or eat*
- *Nearly 40% live within 5 miles of their place of employment or school*



STRATEGIES PER EACH OBJECTIVE

1

Objective | Provide Facilities

1. Designate and implement a regional bicycle network of bicycle commuter corridors and community connections.
2. Require sidewalk accommodations along all arterial roadways for which pedestrians are allowed as well as for roadways within 1 mile of all schools, parks, community centers, and transit routes/stations.
3. Construct new bicycle and pedestrian facilities to meet current national standards.
4. Use innovative designs, as appropriate, to expand and enhance walking and bicycling opportunities in the region.
5. Work with local municipalities, counties, and the state to devise appropriate maintenance practices to ensure safe use of facilities.
6. Create, fund, and implement spot improvement programs so that minor walking and bicycling improvement needs can be quickly addressed.
7. **Increase the availability of bicycle parking** and support facilities at destinations, transit stations, and transit stops across the region.
8. Fully integrate bicycling with all public transit facilities and services by providing racks on buses, trains, and at transit stops.
9. Develop strategic connections for traditional neighborhoods and areas having characteristics that are conducive to walking and bicycling.

10. Connections should link neighborhoods and activity areas such as commercial areas, schools, parks, and transit service.

11. Prioritize connections according to the areas of highest potential to increase the number of walking and bicycling trips.

12. **Develop school siting and child school zoning recommendations** to ensure that walking and bicycling are options for children.

13. Promote and encourage land use decisions that provide a meaningful and context-appropriate mixture of uses that are supportive of increased walking and bicycling.

14. Ensure that new and refurbished bridges and underpasses are designed and constructed to be safe for walking and bicycling.

15. Develop a consistent wayfinding and route signing program for bike lanes, bike routes, and greenways throughout the region.

2

Objective | Build Support

1. Continue with regular meetings of the MPO's BPAC to advise on regional issues to the MPO Technical Coordinating Committee and Executive Board regarding non-motorized transportation choices like walking and bicycling.

2. Hold monthly meetings with local and state bicycle and pedestrian coordinators.

3. **Hold annual walking and bicycling regional summits** in order to enhance awareness and report on progress made on increasing non-motorized transportation throughout the region.

4. Foster relationships between the public and private sector as a means of building awareness and support for non-motorized accommodations and programs.

5. Create and maintain a multi-jurisdictional mapping database of bicycle and pedestrian facilities for technical use by jurisdictions and for educational use and mapping by residents. This GIS database should also be capable of being integrated with transit routes.

6. Partner with local planning and transit agencies on integrated transportation and land use corridor studies, small area plans, and transit-oriented developments.

7. Establish an annual report on the state of walking and bicycling improvements and activities in the region whereby **municipalities report annually on their local activities**. Information can be used to prepare a package to present throughout the region to mayors and elected officials, community organizations (i.e. YMCA, health depts., bicycle clubs, parks depts., etc.), and other stakeholders detailing the benefits, projects, and practices for the year related to walking and bicycling in the region.



3 Objective | Create Policies & Programs

1. Designate a local (City and County) bicycle and pedestrian coordinator in every jurisdiction within the MPO.
2. **Require continuing education regarding a balanced transportation system** for public staffs that are involved in capital improvements and/or transportation programs.
3. Create a dedicated funding source for bicycling and pedestrian facilities improvements.
4. Integrate consideration of walking and bicycle travel into all transportation planning, design, construction and maintenance projects as well as in local community and transportation plans.
5. **Regionally establish a Complete Streets Policy** and work with all MPO member jurisdictions to adopt similar policies and practices.
6. Implement bicycle and pedestrian facilities as a part of other projects, such as roadway repaving, construction and reconstruction. Annually work with local municipalities and the state to identify roadways where bicycle accommodations can be made as part of a resurfacing project or through a road diet (e.g. restriping).
7. Integrate the recommendations of the Regional Bicycle and Pedestrian Study, as appropriate, into local ordinances, plans, and guidelines.



8. Effectively link project funding and approval decisions to priorities identified in the bicycle and pedestrian components of local, regional and state transportation plans.
9. Tie MPO and other funding to the inclusion of bicycle and pedestrian facilities as part of projects.
10. Give guidance to local communities on methods for establishing developer incentives for inclusion of sidewalks, bike lanes, and transit accommodations as part of all projects, and for inclusion of bike racks, lockers, showers, and other facilities in commercial and public building projects.
11. Create, fund, and **implement a regional bicycle parking program** to increase the amount of storage facilities within communities throughout the region.

4 Objective | Increase Awareness

1. Emphasize a greater importance of pedestrian and bicycle laws on the driver's licensing exam.
2. **Establish an informational website** showing routes and locations of bicycle facilities as well as printable PDF maps.
3. Publicize successful bicycle and pedestrian projects and events.
4. Partner with existing organizations to establish a Bicycling Ambassadors Program to educate more bicyclists and motorists about safe and responsible road use.
5. Integrate bicycle and pedestrian skills training into appropriate school curricula and annually fund school-based education programs on walking and bicycling safety.

6. Train transportation engineers, planners, and other stakeholders on the principles of Complete Streets, Road Diets, and other accommodation practices as a means of accommodating pedestrian and bicycling improvements into projects.
7. Create, fund, and **implement pedestrian and bicycle media campaigns** and promotional materials to promote walking and bicycling as a safe, healthy, cost effective, environmentally beneficial transportation choice. Identify partners to provide bicycle and pedestrian education, enforcement, and encouragement programs.
8. Partner with local media outlets to educate people about walking and bicycling.
9. Increase safety and create mutual respect among all system users by working with local police departments to establish enforcement strategies such as increasing enforcement of bicycle and pedestrian safety laws equally among bicyclists, pedestrians, and motorists.
10. Continue the **annual bicycle and pedestrian count program**.
11. Analyze crash data in order to identify locations with high bicycle and pedestrian crash rates and evaluate and implement countermeasures for crashes.
12. Conduct annual surveys of bicyclists and pedestrians.

3.1 THE OPPORTUNITIES AND CHALLENGES

BICYCLE AND PEDESTRIAN FACILITIES

Facilities | Challenge

The most frequently identified challenges to walking and bicycling in the region were lack of facilities, lack of a connected and complete system of facilities, and the lack of support facilities for bicycling.

Facilities | Opportunity

There is strong support and appreciation for the facilities that do exist. The survey results show that greenways were often referred to when walking and bicycle facilities were mentioned and these facilities are being used by many pedestrians and cyclists. This perception was affirmed through the stakeholder meetings in which professional staff spoke to the high level of interest and use of existing greenways in their respective communities.

Design | Challenge

An obstacle most communities face in the greater Nashville area as well as throughout the United States, is that many facilities were designed prior to the Americans with Disabilities Act (ADA) and do not meet current standards.

Design | Opportunity

Many communities in the region have adopted standards to address the ADA requirements for pedestrian facilities to ensure new facilities are constructed to meet the current standards.

Maintenance | Challenge

Lack of maintenance and poor facility conditions were identified as issues that affect walking and bicycling in the region. Debris in bike lanes, on paved shoulders, on sidewalks and cracked sidewalks are common problems.

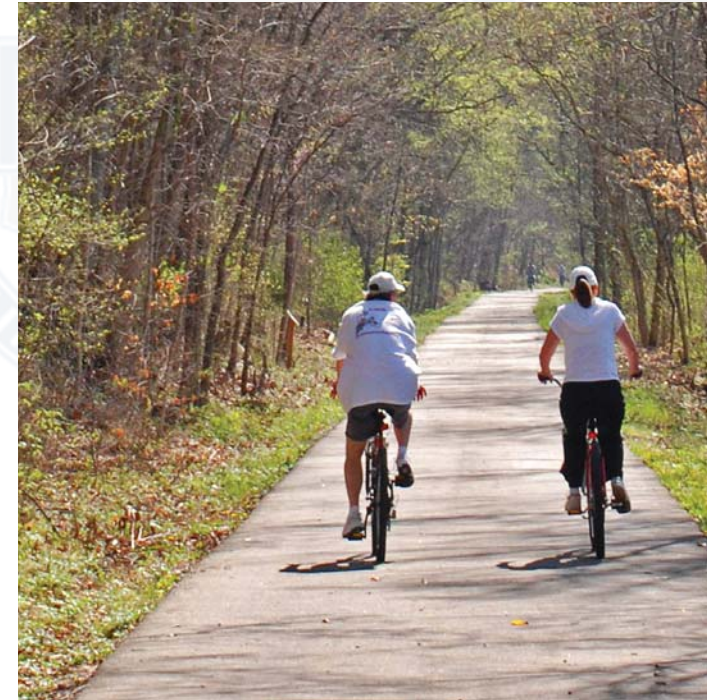
Maintenance | Opportunity

A number of communities in the region have begun to add the sweeping of bike lanes as part of their normal street sweeping programs as well as addressing sidewalk replacement needs.

EDUCATION, AWARENESS, AND ENFORCEMENT

Sharing the Road | Challenge

The second most identified challenge in the region was lack of driver understanding and awareness of pedestrians and bicyclists.



Sharing the Road | Opportunity

Several example practices currently exist such as local training and education programs geared towards bicyclists and students, bicycle rodeos which are occurring at the local level in communities such as the City of Franklin and Murfreesboro, and recent Safe Routes to School program initiatives like the ones in Metro Nashville and Williamson County.

EVALUATION OF EXISTING CONDITIONS



Safer Streets | Challenge

Unsafe practices, including speeding, wrong way riding, and other safety issues, both for motorists as well as pedestrians and bicyclists, are currently significant challenges.

Safer Streets | Opportunity

Enforcement of laws concerning walking and bicycling and greater involvement with law enforcement safety were viewed as essential to improving conditions for non-motorized users in the region.

Land Uses and Land Use Patterns | Opportunity

Over the last several years there have been a number of mixed-use developments approved in the region and many communities are exploring land use decisions with full consideration of walking and bicycling needs.

Crossing Major Features | Challenge

Interstates, major intersections, bridges and underpasses, and railroads were all identified as features which make walking and bicycling difficult. Additionally, there are a number of controlled access roadways in the region which pedestrians and bicyclists must find their way around as well as major river crossings such as the Cumberland River.

Crossing Major Features | Opportunity

Nashville's greenway system provides bridges crossing the river and railroad tracks. The Cumberland River Bridge spanning the Cumberland River connects the Stones River greenway and Shelby Bottoms greenway. The rehabilitation of the Shelby Pedestrian Bridge provides a connection across the Cumberland River while the Old White Bridge Road Bridge provides a connection across railroad tracks.

LISTENING TO THE COMMUNITY

- *In total, 50 representatives participated in the stakeholder meetings providing valuable insight into local efforts to improve walking and bicycling conditions within their respective areas.*
- *342 residents from the MPO region participated in two rounds of public meetings, which were held in February and July 2009.*
- *At the end of April 2009, nearly 1,700 surveys were completed providing valuable insights into walking and bicycling activity and conditions in the greater Nashville region.*

CONNECTIVITY

Land Uses and Land Use Patterns | Challenge

Currently, the region has a lack of mixed use development and concentrations of development activity that can make walking and bicycling more realistic options for replacing today's automobile trips throughout the region.



VEHICULAR TRAFFIC & CULTURAL ENVIRONMENT

Traffic | Challenge

The amount of traffic, the speed of traffic, and driver behavior greatly influence the perception and comfort of individuals who use the region's roadways to walk or bicycle.

Traffic | Opportunity

An emerging practice to combat this systemic issue is the policy of complete streets. A Complete Streets Policy ensures that transportation agencies routinely plan, design, and operate the entire right-of-way to enable safe access for drivers, transit users and vehicles, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities.

FUNDING

Funding | Challenge

Both the citizen and stakeholder involvement processes revealed that many feel without adequate funding for sidewalk and bikeway improvements the region is unlikely to be able to substantially increase walking and bicycle travel.

Funding | Opportunity

The primary funding source for most bicycle and pedestrian projects in the region is federal transportation funds. There are also a wide range of grant sources including federal, state, and local programs that have been used. A number of communities in the region have allocated local funds for sidewalk and bikeway improvements and one community is using a portion of their hotel/motel tax to fund greenway improvements.

3.2 BICYCLE AND PEDESTRIAN NETWORK

THE EXISTING NETWORK

A critical component of understanding walking and bicycling conditions in the region is to first understand the existing environment and provision of accommodations for non-motorized users. As part of this project, a comprehensive inventory of existing and currently proposed on and off road bicycle and pedestrian facilities within the region was undertaken.

PEDESTRIAN LEVEL OF SERVICES (PLOS)

A Pedestrian Level of Service (PLOS) analysis was conducted for roadway segments inventoried in the Nashville MPO (3,312 miles) based on the National Cooperative Highway Research Program (NCHRP) Report 616 on Multimodal Level of Service Analysis for Urban Streets. The evaluation of pedestrian levels of service involves the walking conditions within the shared roadway environment (sidewalk or path to the side of the roadway).

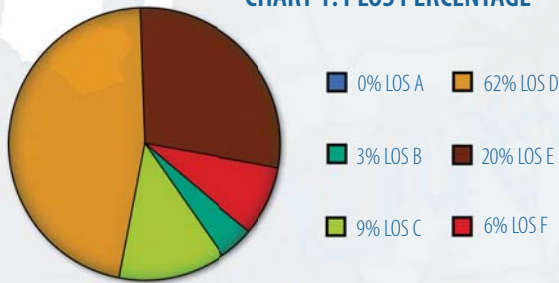


Results of the Nashville area PLOS analysis are divided according to the roadway classification as well as the level of service. Chart 1 shows the results of arterial and collector roadways in the MPO area with **88% operating at a PLOS D or worse.**

PLOS/BLOS SCORE

The numeric level of service value is converted to a corresponding A-F score much like a letter grade in school with "A" being (best) and "F" being (worst).

CHART 1: PLOS PERCENTAGE

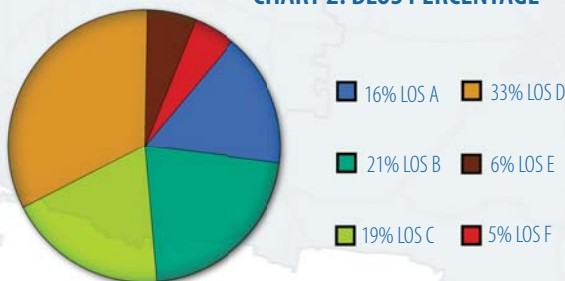


BICYCLE LEVEL OF SERVICE (BLOS)

Similar to the PLOS analysis, a Bicycle Level of Service (BLOS) model for the Nashville region was developed based on NCHRP Report 616 for the analyses of the roadway segments inventoried in the Nashville MPO area (3,312 miles).

Results of the Nashville area BLOS analysis are broken into the roadway classification as well as the Level of Service. Chart 2 shows the results of arterial and collector roadways in the MPO area with **56% operating at a BLOS C or better**.

CHART 2: BLOS PERCENTAGE



NUMBER OF MILES OF BICYCLE FACILITIES - REGION WIDE

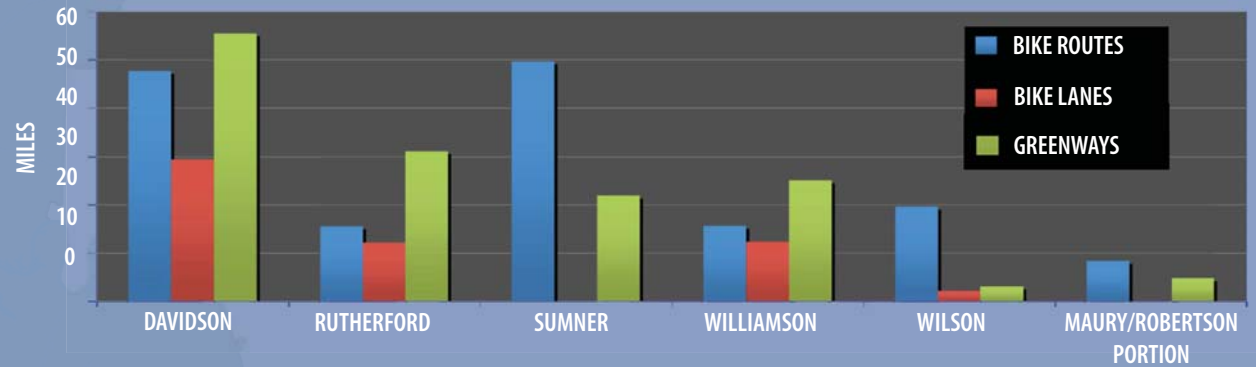


FIGURE 1.0

NUMBER OF MILES OF SIDEWALKS - REGION WIDE

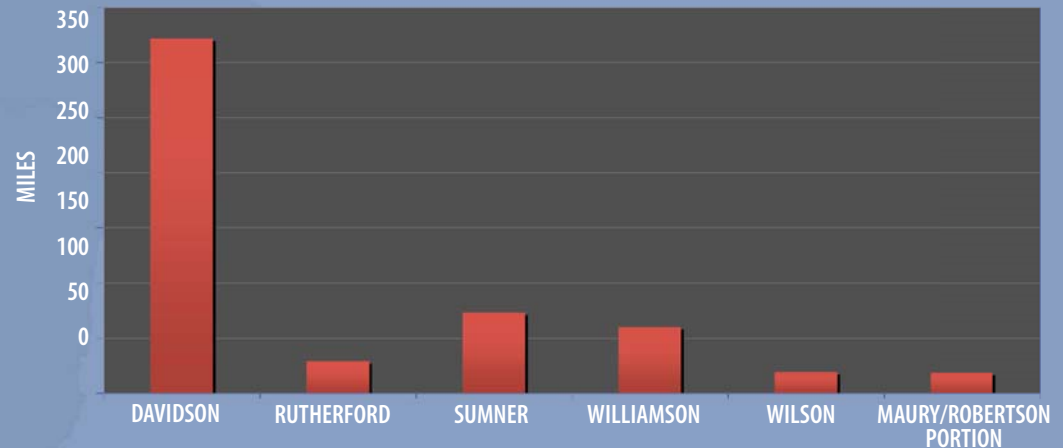


FIGURE 2.0

3.3 CRASH ANALYSIS

A bicycle and pedestrian crash analysis was undertaken to complement the level of service analysis previously discussed. This analysis evaluated crashes involving bicyclists and pedestrians in the MPO based on data provided by the Tennessee Department of Transportation (TDOT). The data were evaluated to determine areas and corridors in the MPO that need improvements to increase safety for bicyclists and pedestrians. The data spanned the five-year time period between 2003-2007.

According to the data, **2,076** reported crashes involving a pedestrian or bicyclist occurred within the MPO during this time period, **107** of which resulted in a fatality. Refer to figure 3.0 for the results of the crash data analysis.

3.4 DEMAND ANALYSIS

The objective of the development of the Non-Motorized Demand Model (Trip Model) was to produce a decision tool that would allow the MPO to determine the real need for walking and bicycling facilities within the Nashville region.

At the macro level, this is a regional bicycle and pedestrian model that incorporates the entirety of the transportation planning area of the Nashville region. Aside from the scope of the model's planning area, however, the Trip Model is very much a microscopic model, producing a fine-grained, parcel-level analysis of walking and bicycling trips. (Figure 4.0)

The Trip Model is based on data from national and local sources, such as the 2001 National Household Transportation Survey, US Census Data, and MTA on-board transit survey.

HOW THE TRIP MODEL WORKS

The Trip Model uses land use, demographic, and proximity data for every parcel in the study area to predict the trip making characteristics of each individual parcel.

To estimate the walking or bicycling trips for a parcel, several things must be known about that parcel; namely, its number of residences, employment, and the shortest distance to the nearest school, recreational facility, retail area, and transit stop.

Once the distance relationships to other land uses are known, the effect of distance on making the walk or bicycle trip is quantified. The closer the land use, the more likely that the trip will be made by walking or bicycling.

Each parcel in the study area is assigned a probability for every walking and bicycling trip type. Employment and population attributes are used in a series of equations to estimate the number of walking and bicycling trips from a parcel.

Travel to School *Travel to*
Recreation Travel to Shop
 Travel to Work *Travel to Errand*
Walk to Transit Walk from
 Transit Walk from Parking

CRASH ANALYSIS - REGION WIDE

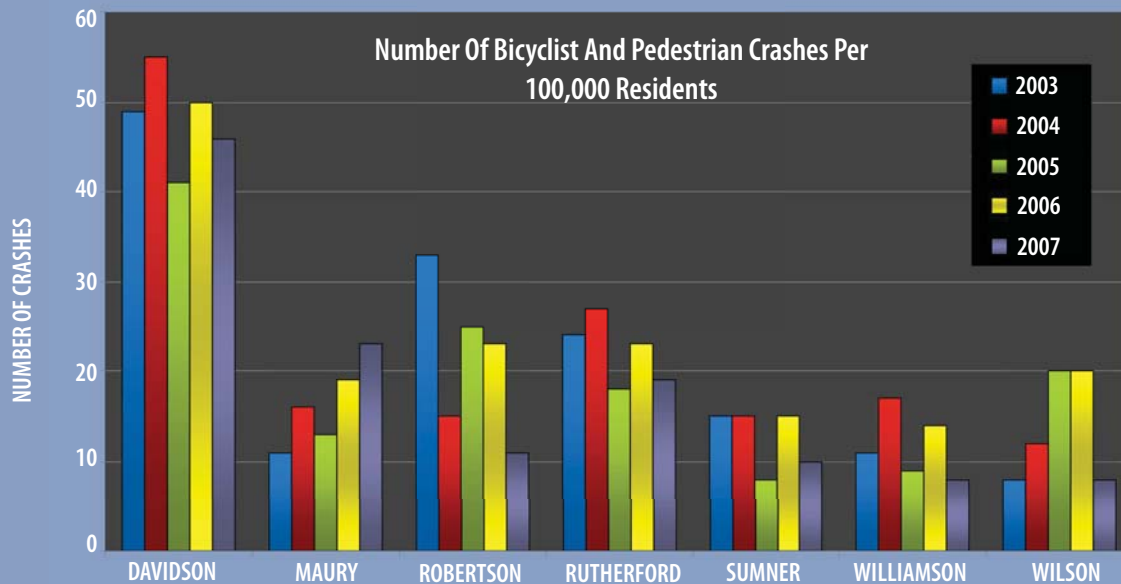


FIGURE 3.0

DOWNTOWN NASHVILLE

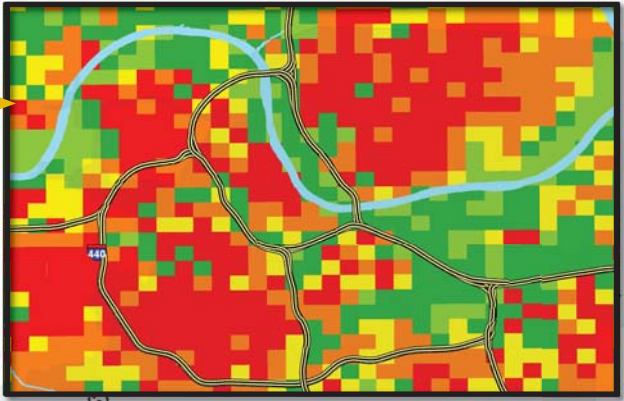
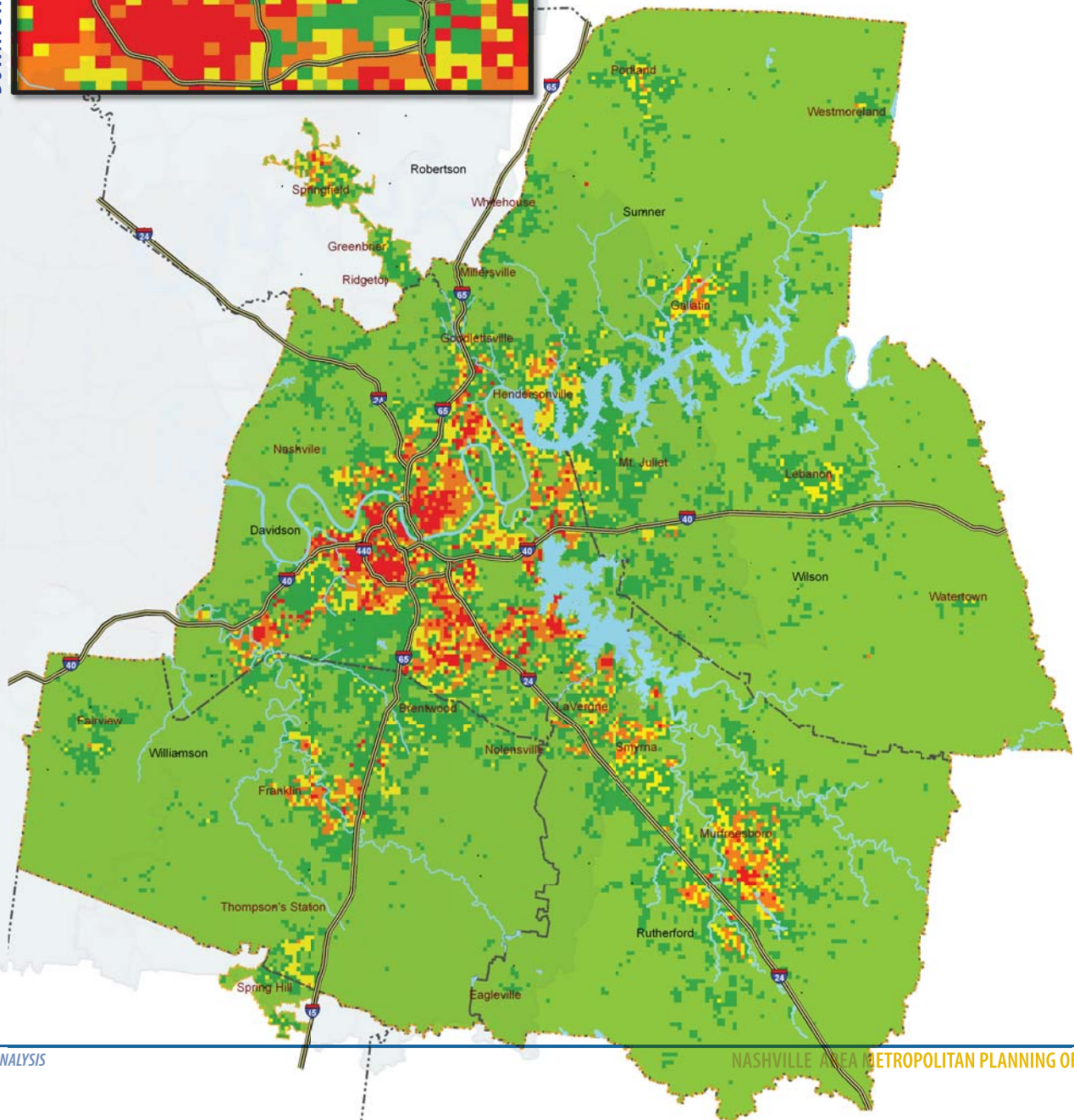


FIGURE 4.0 | POTENTIAL WALKING AND BICYCLING TRIPS IN THE MPO REGION*

*By 1/4 mile grid



LEGEND

■	< 5	Non-Motorized Trips
■	6 - 50	Non-Motorized Trips
■	51 - 100	Non-Motorized Trips
■	101 - 200	Non-Motorized Trips
■	> 200	Non-Motorized Trips
	Interstate	
	Bodies of Water	
	MPO Planning Boundary	
	County Boundaries	

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>

3.5 HEALTH

The link between lack of physical activity and chronic disease is undeniable. Sixty percent of the U.S. adult population is at risk for chronic disease because they do not meet the recommended 30 minutes of daily physical activity.

Tennessee ranks among one of the more obese states in the U.S.

- 31% of adults in Tennessee are considered obese
- 17% of youth in Tennessee are considered obese

The built environment can have an effect on the levels and frequency of physical activity. The design of the physical environment can either facilitate or reduce the opportunities for physical activity. Greater land use mixes, population and employment density, street connectivity and continuity of the bicycle and pedestrian network, are all believed to contribute to positive health outcomes, as are the presence of recreational facilities and parks.

While research studies have identified many personal characteristics that appear to be associated with a higher or lower propensity for

physical activity and overall health, a higher level of disparity exists relative to income, race, and age. Population groups that suffer the worst health status also are those that have the highest poverty rates, are elderly or are minority. In addition to income levels, research has shown that African Americans and Hispanics do not get the recommended amount of physical activity and that by age 75, one in three men and one in two women engage in no regular physical activity. The socioeconomic combination of income, race, and age indicates potential high health risk areas. (Figure 5.0) In addition these populations may be less likely to have access to an automobile and may be more reliant on transit, walking, and bicycling to travel.

3.6 CONGESTION

Congestion occurs when vehicle volumes exceed the capacity of road infrastructure. Reducing miles driven therefore helps reduce congestion, in particular when driving is reduced during peak hours. Lowering the miles driven can be much more cost-effective than expanding highway laneage to accommodate increased use.

Non-motorized travel can provide many benefits. Walking and bicycling are inexpensive for users and reduce costs associated with congestion, parking subsidies, energy consumption and vehicular emissions. Although non-motorized transportation improvements do not usually rank as the most effective way to reduce congestion, they tend to provide many diverse benefits, and so may be the most cost effective way to improve transportation overall, considering all impacts.

Cost savings that result from reductions in motor vehicle travel include:

- Road and parking congestion reductions
- Road and parking facility cost savings

- Vehicle ownership and mileage-based depreciation costs
- Land use impacts (i.e. reduced pavement area and sprawl)
- Reduced per capita accident risk
- Energy conservation
- Air and noise pollution reductions

Investments to encourage increased walking and bicycling can reduce miles driven in three ways:

- Because a majority of car trips are short, bicycling and walking can often be as fast and convenient as driving
- More car trips can be shifted to public transportation when well-integrated networks of bicycle and pedestrian infrastructure provide convenient access to bus stops and stations
- Investments to make communities conducive to bicycling and walking promote a richer and denser mix of residences, businesses and amenities, leading to shorter trip-distances even for those who drive.

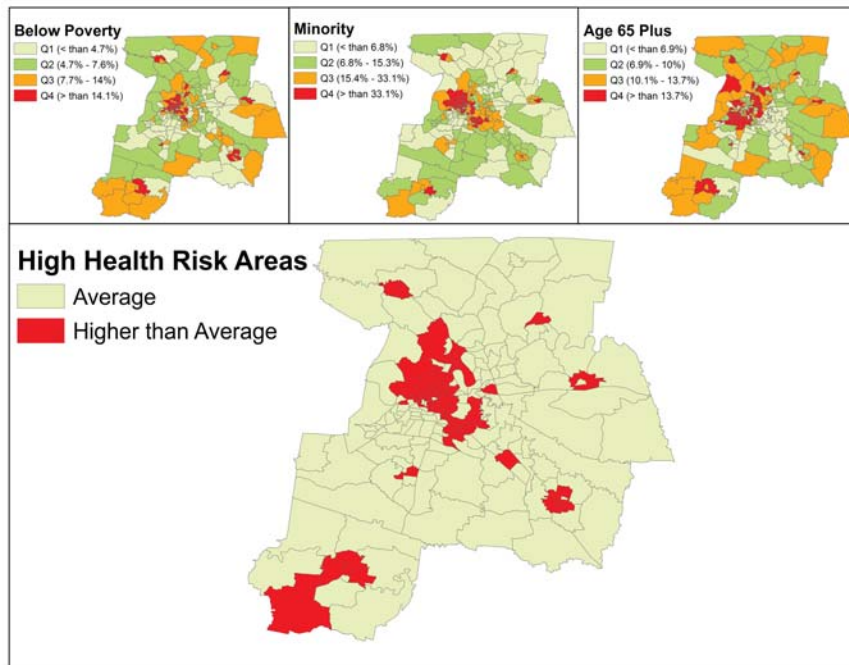


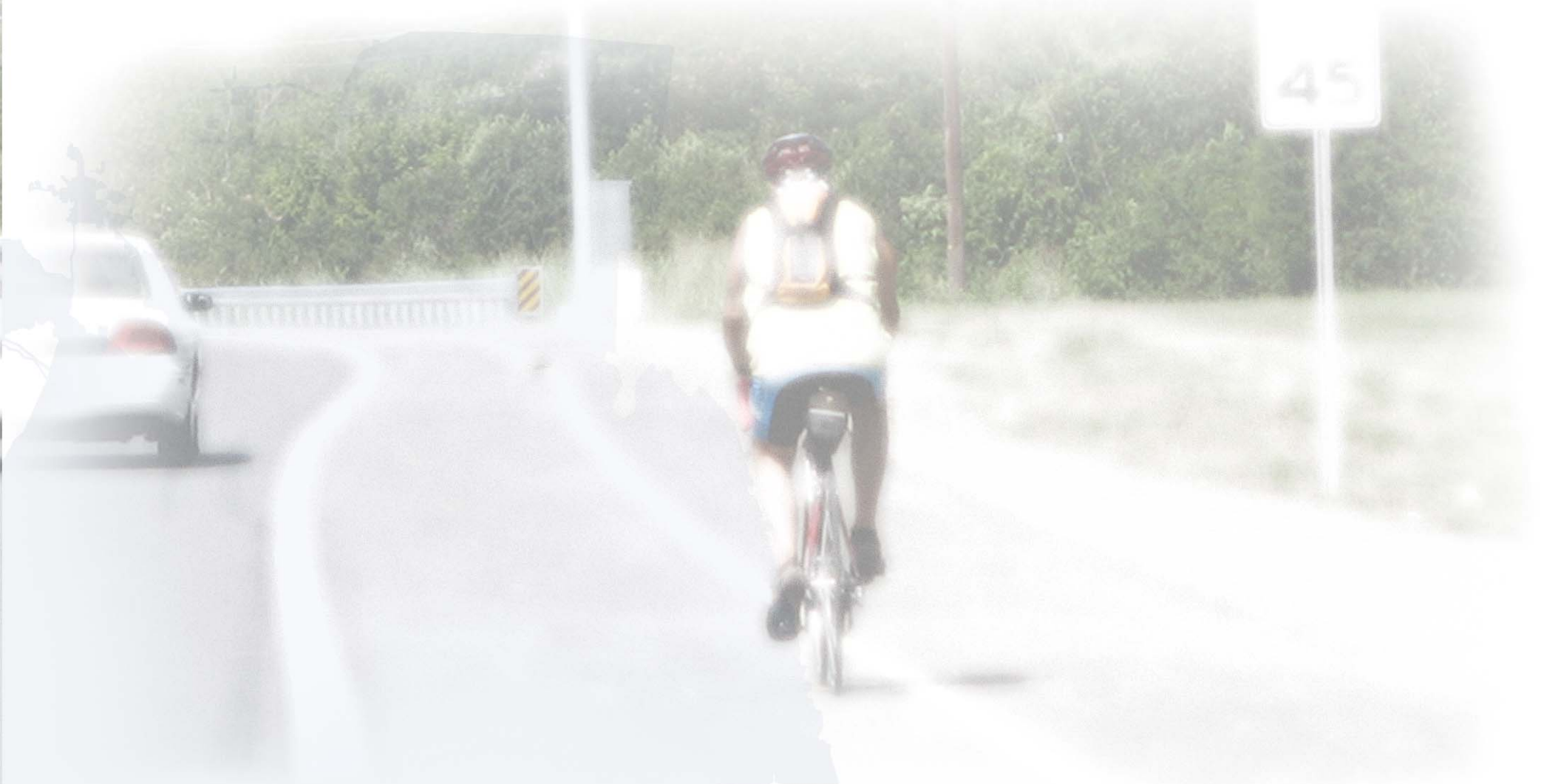
FIGURE 5.0

PEER COMMUNITY REVIEW

A peer community review was also undertaken as part of the Regional Bicycle and Pedestrian Study which included the communities of:

Charlotte, North Carolina
Chattanooga, Tennessee
Chicago, Illinois
Denver, Colorado
Louisville, Kentucky
Phoenix, Arizona

Numerous innovative policies and programs by peer communities were identified including the use of complete street policies, routine accommodation provisions, and MPO funding linked to projects including sidewalk and bikeway provisions. A number of the identified practices of these peer communities are applicable in the Nashville region and are incorporated into the recommendations of this Study.



For instance, **the bicycle is the most efficient machine** ever created:
Converting calories into gas, a bicycle gets the equivalent of three thousand
miles per gallon.

~Bill Strickland, *The Quotable Cyclist*

3.7 PROGRAM AND POLICY EVALUATION

As part of the Regional Bicycle and Pedestrian Study, a review of current practices in terms of plans, policies, and programs pertaining to bicycle and pedestrian travel in the greater Nashville region was undertaken. As part of this review, local bicycle and pedestrian plans, greenway plans, and regulatory practices such as subdivision and zoning regulations, which often include sidewalk and bikeway requirements were reviewed.

| BICYCLE AND PEDESTRIAN PLANS

In total, 11 bicycle and pedestrian plans have been undertaken by cities and counties within the MPO along with 16 greenway master plans. (Refer to Figure 6.0) In addition to these efforts, a statewide bicycle and pedestrian plan developed by TDOT as part of the State's long range transportation plan and a statewide greenway and trails plan developed by TDEC also cover non-motorized travel activities of the region.

Some example plans that have resulted in sizable investments in sidewalk and bikeway improvements locally include:

- City of Brentwood's Bikeway Plan, part of the City's Comprehensive Plan
- City of Franklin's Bicycle and Pedestrian Plan
- Nashville–Davidson County's Strategic Plan for Sidewalks & Bikeways

Some example plans that have resulted in sizable investments in greenway improvements locally include:

- City of Brentwood's Greenway Plan, part of the City's Comprehensive Plan
- City of Murfreesboro's Greenway Master Plan
- Nashville–Davidson County's Parks and Greenways Master Plan
- Town of Smyrna's Greenway Plan, which is part of the City's Comprehensive Plan

Additionally, the cities of Brentwood, Franklin, Gallatin, Goodlettsville, Murfreesboro, and Metro Nashville–Davidson County have streetscape master plans for certain designated areas within their respective communities.

| REGULATORY PROVISIONS

A large number of communities through their zoning and subdivision regulations require sidewalk and bikeway accommodations as part of residential, commercial, and mixed-use developments.

For example, the City of Brentwood requires a minimum of 6-foot sidewalks or the use of a multi-use path along arterial roadways in their subdivision regulations and the City of Gallatin has provisions within their zoning and subdivision regulations which allow bicycle parking accommodations to be used as a means of minimizing off-street vehicular parking requirements.



POLICIES

Nationally, numerous communities have enacted Complete Streets policies pertaining to providing non-motorized accommodations as part of larger transportation projects or as part of major transportation projects which may allow for the provision of sidewalk and bikeway improvements. Typically these policies go beyond sidewalk and bicycle facility requirements of a city's or county's subdivision or zoning regulations.

Currently no local municipalities within the MPO have such a Complete Streets policy in place, however, TDOT does have an internal policy, which calls for routine integration of walking and bicycling options into the transportation system.

The peer communities of Charlotte and Denver both have Complete Street policies which advocate for considering all user needs, including pedestrians and bicyclists, in the planning, design, and construction of both new and retrofitted streets.

AN IDEAL COMPLETE STREETS POLICY

- Includes a vision for how a community wants to complete its streets
- Considers all users – vehicles, pedestrians, bicyclists, and transit passengers
- Encourages street connectivity
- Is adopted by all agencies for all roads
- Applies to both new and retrofit projects
- Makes any exceptions specific
- Calls for the latest and best design standards
- Solutions complement the context of the community
- Establishes performance standards
- Recommends specific next steps for implementation

PROGRAMS

Beyond physical infrastructure there are a number of programs and activities which add to the overall foundation of the walking and bicycling environment in a community.

Some programs in the MPO area include:

Walking and Biking Awareness and Encouragement Programs
Bicycle Safety Training
Safe Routes to School
Health Based Programs
Bike and Transit Programs

SUMMARY OF LOCAL PLANS

MPO Jurisdiction	Bicycle & Pedestrian Master Plan	Greenway Master Plan
Davidson County	Yes	Yes
Williamson County	No	No
City of Brentwood	Yes ¹	Yes ¹
City of Franklin	Yes	Yes ¹
City of Fairview	Yes ²	No
Town of Nolensville	No	Yes ²
City of Spring Hill*	No	No
Rutherford County	No	No
City of Murfreesboro	Yes	Yes ²
City of Smyrna	Yes ²	Yes ²
City of LaVergne	Yes ¹	Yes ¹
Wilson County	Yes	Yes ¹
City of Mt. Juliet	Yes ¹	Yes ¹
City of Lebanon	Yes	Yes ¹
Sumner County	Yes	Yes ¹
City of Hendersonville	Yes	Yes
City of Gallatin	Yes ¹	Yes
City of Goodlettsville*	No	Yes
City of Portland	Yes ²	Yes ²
City of White House*	No	Yes ²
City of Millersville	No	No
City of Springfield	No	No

* Municipality in Multiple Counties

¹ Reflective in One or More Documents (not necessarily stand-alone)

² Map Only

FIGURE 6.0

4.1 THE REGIONAL BICYCLE & PEDESTRIAN NETWORK

Recommendations include sidewalk accommodations on all arterial classified roadways within an Urban Growth Boundary of the MPO (Figure 7.0) and the designation of a Regional Bikeway Network which is intended to link communities and destinations such as employment and shopping throughout the region via a system of bicycle accommodations. (Figure 7.1 - 7.8)

The Regional Bicycle and Pedestrian Study supports the development of local sidewalk and bikeway improvements through city and county bicycle and pedestrian plans but places emphasis on regional accommodation recommendations. The MPO focuses on regional roads since many of the funding sources available to the MPO are designated for regional roadways on the

federal funding classification system. Recommendations are not intended to replace existing local plans or local efforts but serve to build a complete network of facilities.

4.2 REGIONAL BIKEWAY NETWORK PRIORITIES

The Regional Bikeway Network focuses on regional routes and connections. The study recognizes that the cities and counties within the MPO will need to also develop or update community level bicycle plans so that local bikeway networks and connections between the regional facilities are provided. The Regional Bikeway Network consists largely of on-street facilities but also includes the Cumberland River Greenway in Davidson County and the Stones River Greenway of Davidson and Rutherford Counties given the linear and regional connections of these two greenway facilities.

PROPOSED REGIONAL BIKEWAY NETWORK

- 1,127 miles traversing the complete region
- 908 miles of on-street bicycle facilities
- 219 miles of greenways
- 160 miles of the Regional Network exist today
- Another 284 miles currently have 4-foot or more of paved shoulders but are unsigned
- Of the Regional Network, 625 miles (or 55 percent) are currently identified in local plans



THE REGIONAL NETWORK



4.3 REGIONAL SIDEWALK PRIORITIES

As a regional priority, sidewalk accommodations are proposed on all federally classified arterial roadways which are not on controlled access roads within an Urban Growth Boundary of the MPO. Refer to Figure 7.0 for the limits of Urban Growth Boundaries within the MPO area.

PROPOSED REGIONAL SIDEWALK ACCOMMODATIONS

- Sidewalks on 914 miles of federally classified arterial roadways
- 252 miles currently have sidewalk accommodations

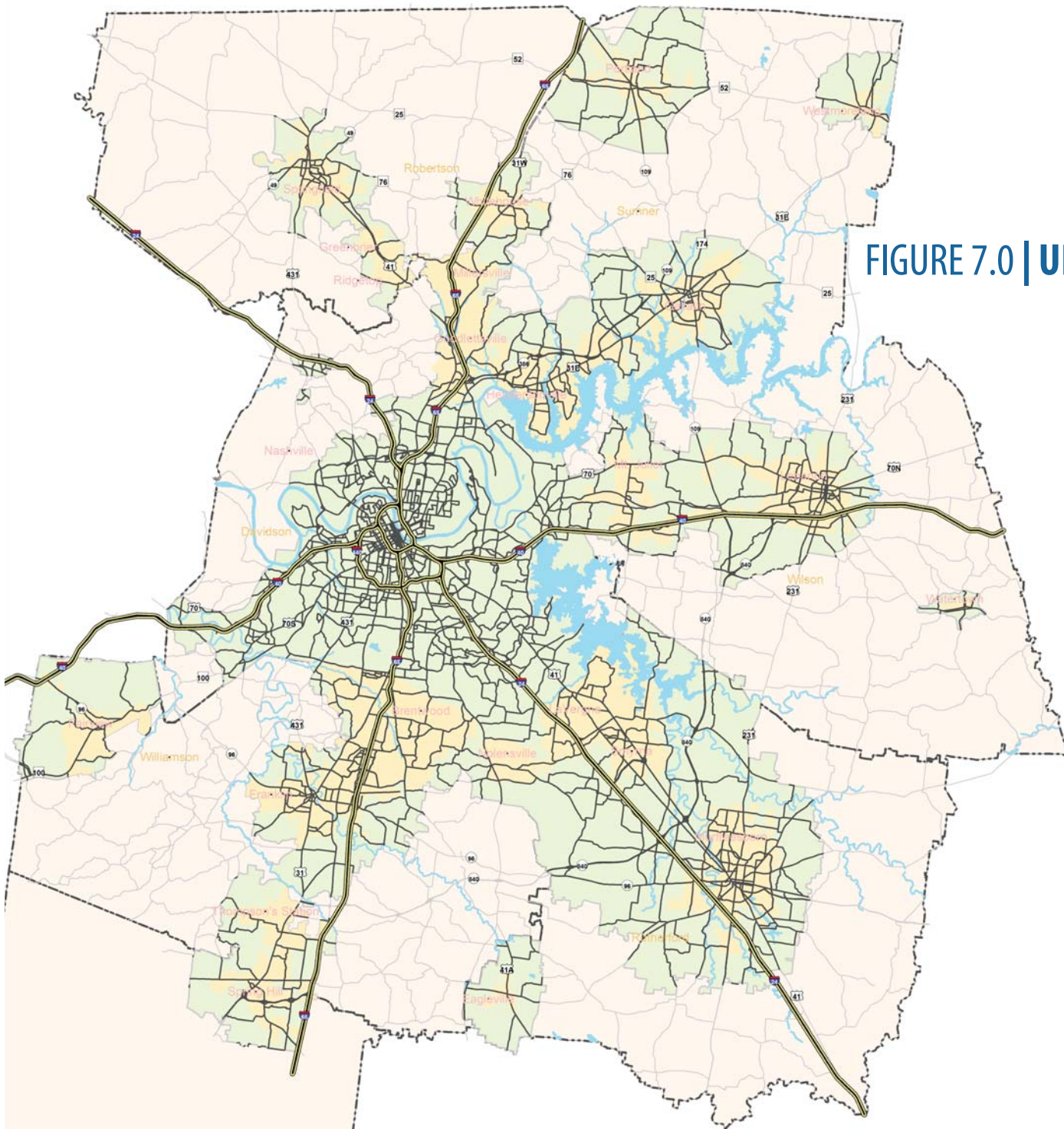
PROJECT PRIORITY

Technical Memorandum #4 (Project Evaluation Methodology) provides a regional prioritization process to assist the MPO in ranking project priority needs.

The process is intended to provide the MPO with an objective and quantifiable way for assessing both walking and bicycling project needs that are consistent with the MPO's regional goals and objectives.

The prioritization methodology provides a consistent yet flexible means for selecting bicycle and pedestrian facility improvement projects for funding.

This provides the MPO the flexibility of assessing project priorities, which could change over time, yet allows for the development of a regional system of accommodations.



**FIGURE 7.0 | URBAN GROWTH BOUNDARIES
IN THE MPO REGION**
(Regional Sidewalk Priority Area)

LEGEND

- Arterials & Collectors
- Interstate
- Bodies of Water
- City Limits
- Urban Growth Boundary
- - - County Boundaries

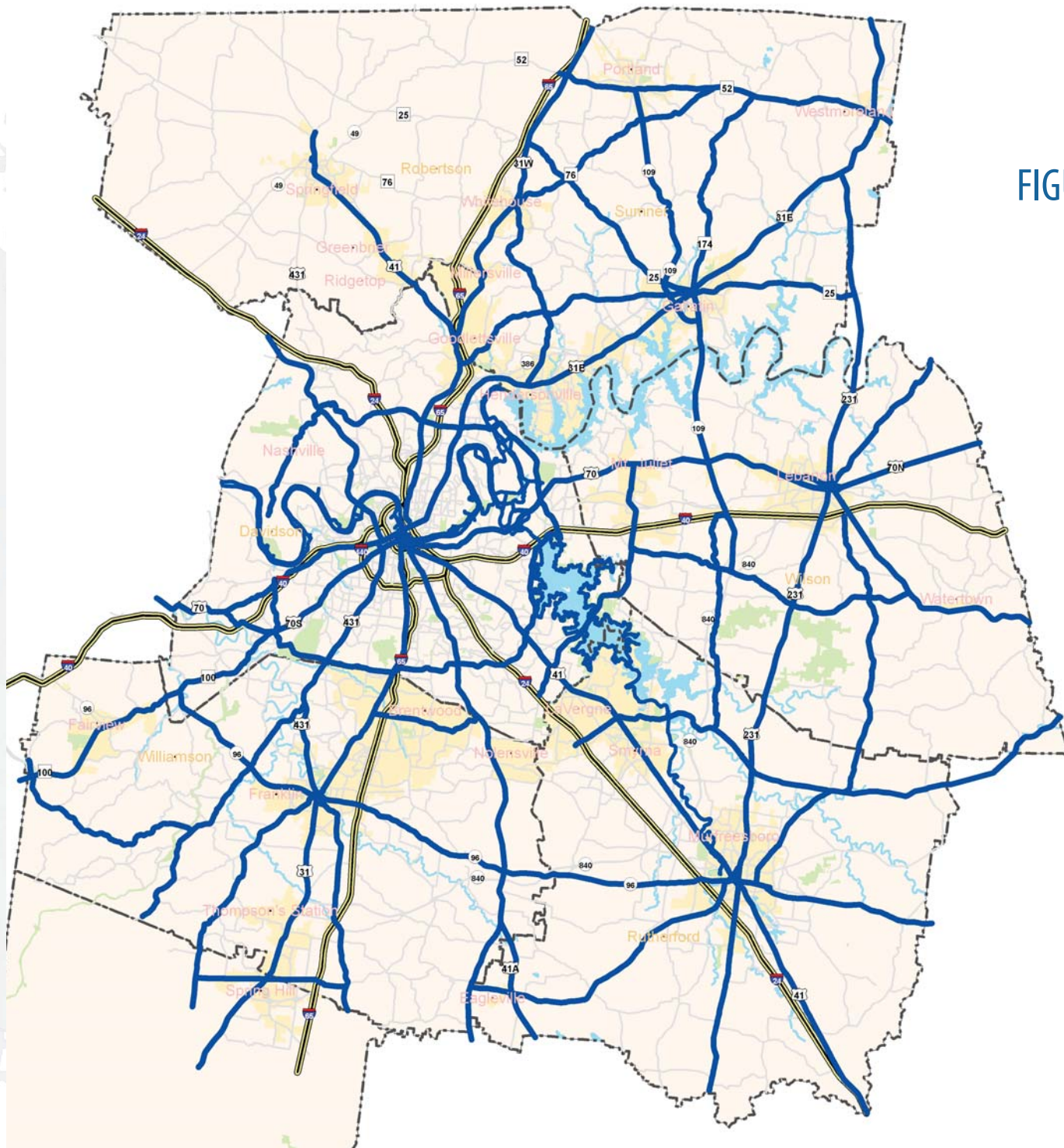


FIGURE 7.1 | REGIONAL BIKEWAY NETWORK - VISION MAP

LEGEND

-  Regional Bicycle Network - Vision
-  Interstate
-  Parks
-  Bodies of Water
-  City Limits
-  County Boundaries

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>

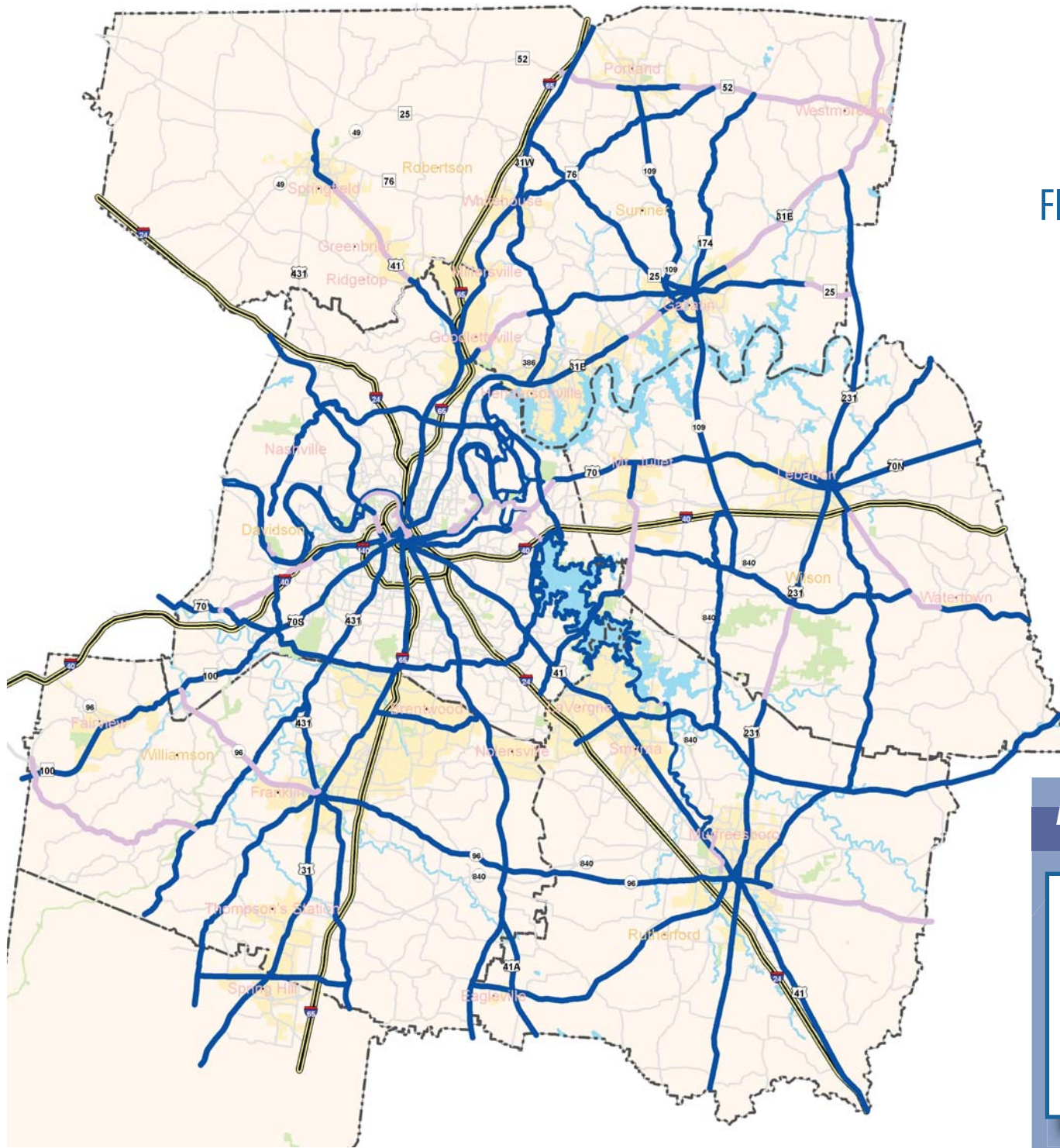
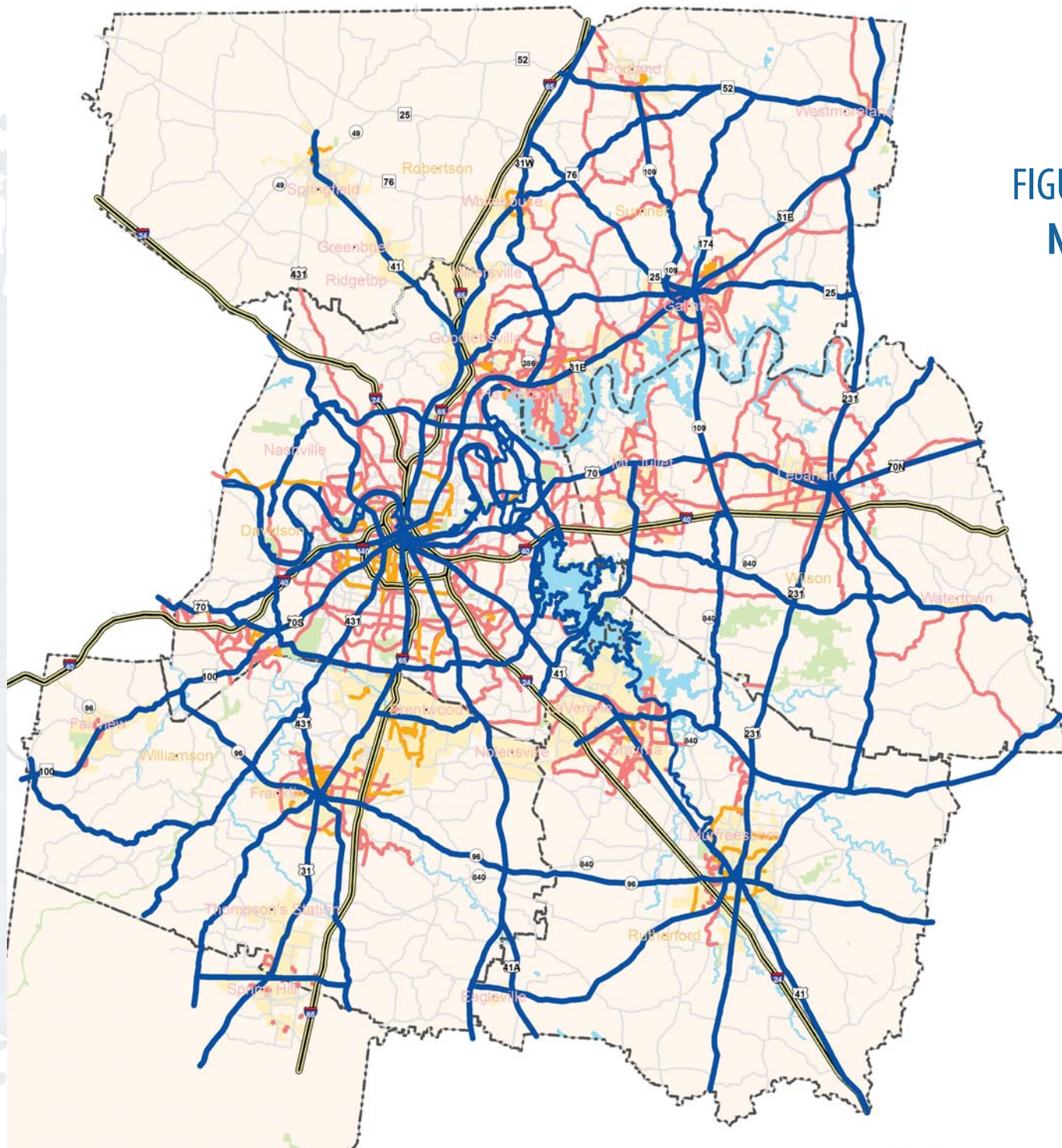


FIGURE 7.2 | REGIONAL BIKEWAY NETWORK VISION MAP WITH EXISTING FACILITIES









LEGEND

- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries

FIGURE 7.3 | REGIONAL BIKEWAY NETWORK VISION MAP WITH LOCAL FACILITIES

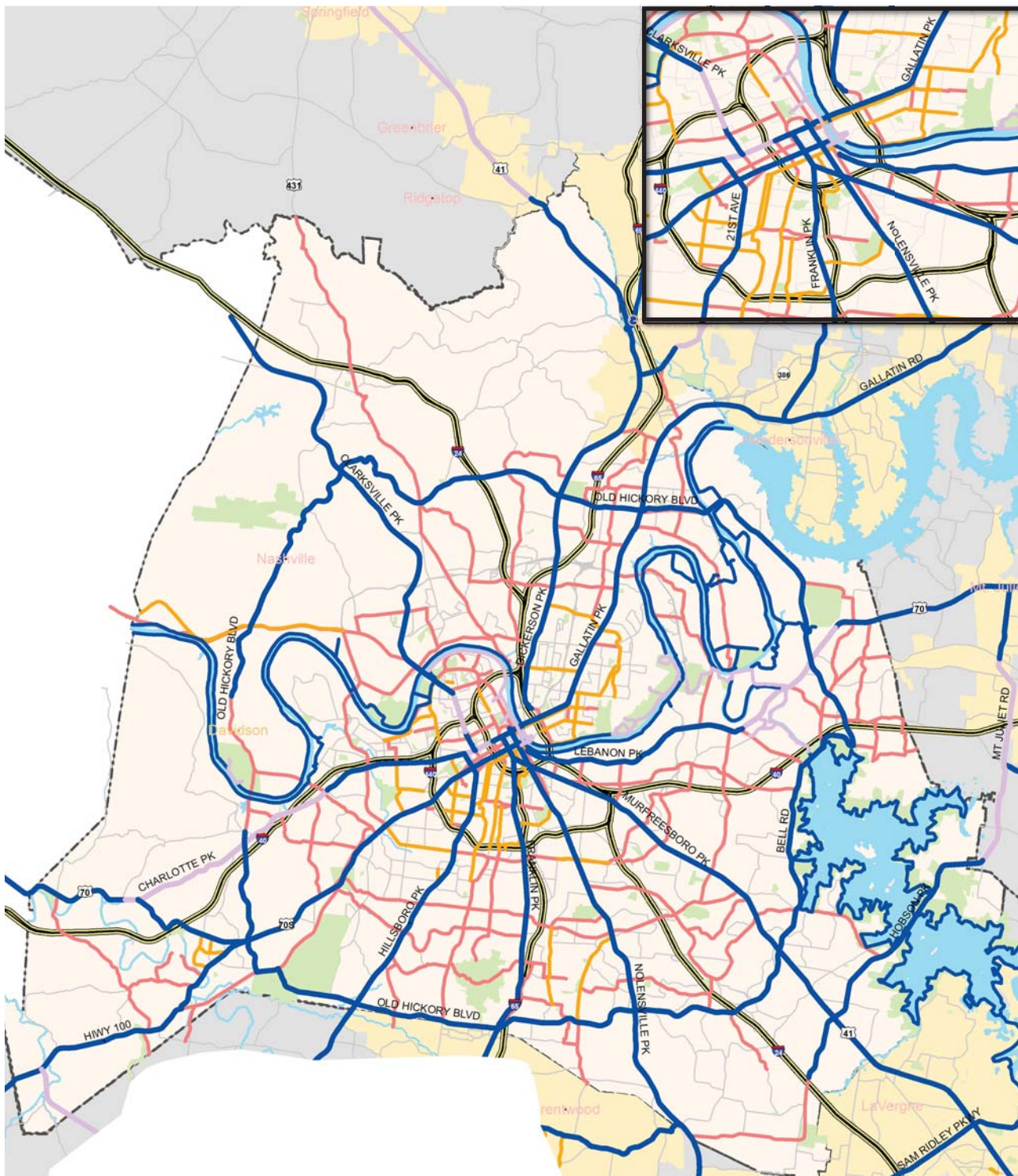


LEGEND

-  Regional Bicycle Network - Vision
-  Local Bicycle Facilities - Existing
-  Local Bicycle Facilities - Planned
-  Interstate
-  Parks
-  Bodies of Water
-  City Limits
-  County Boundaries

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>

FIGURE 7.4 | DAVIDSON COUNTY MAP



LEGEND

- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Local Bicycle Facilities - Existing
- Local Bicycle Facilities - Planned
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries

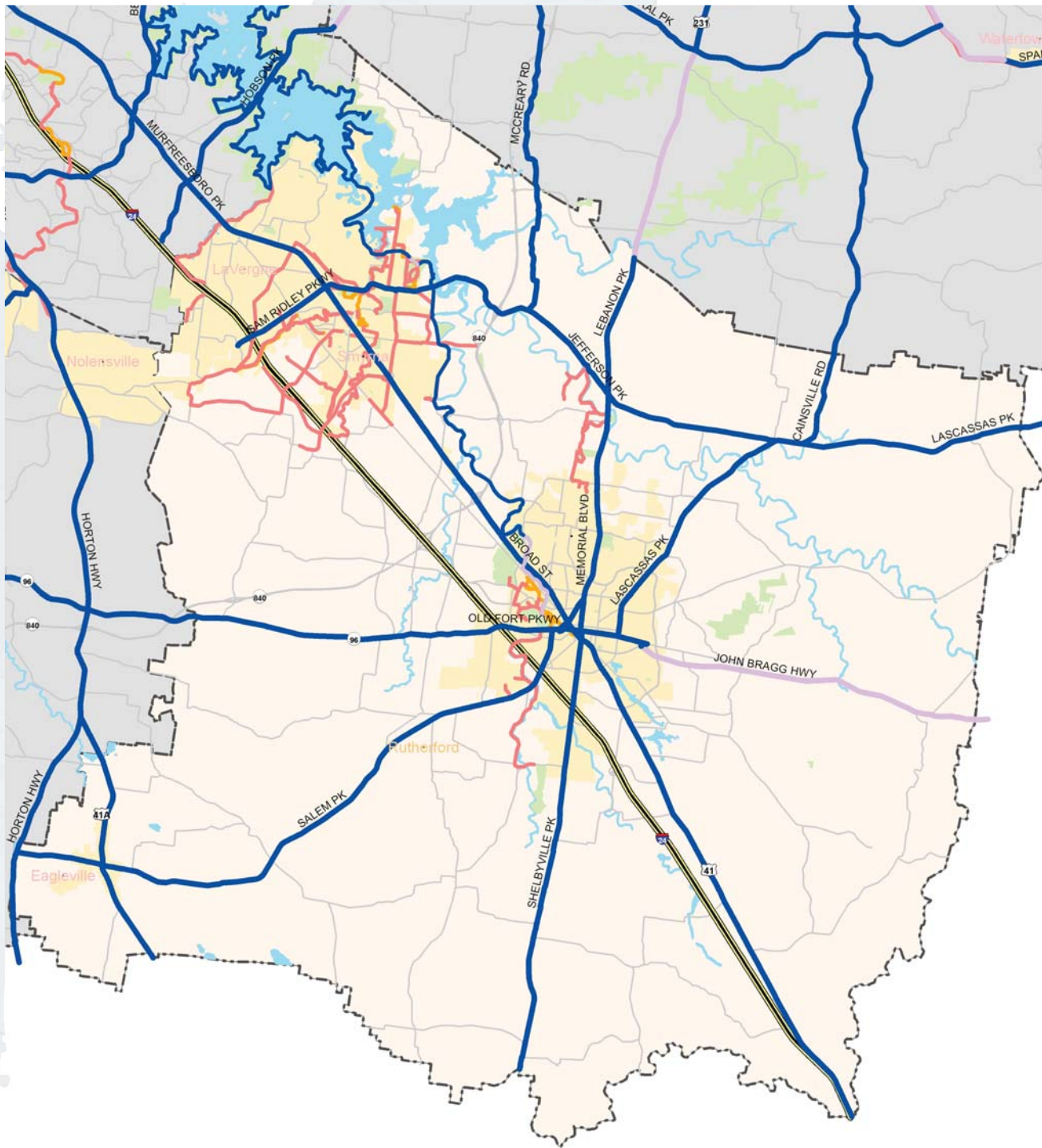
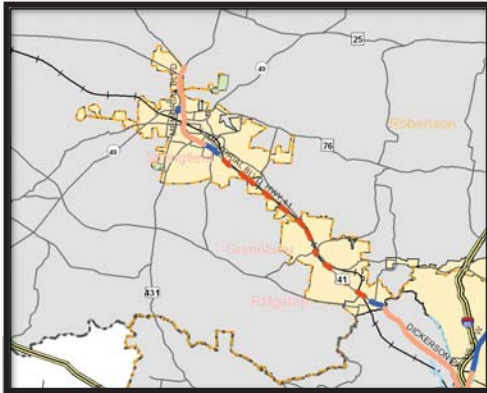


FIGURE 7.5 | RUTHERFORD COUNTY MAP

LEGEND

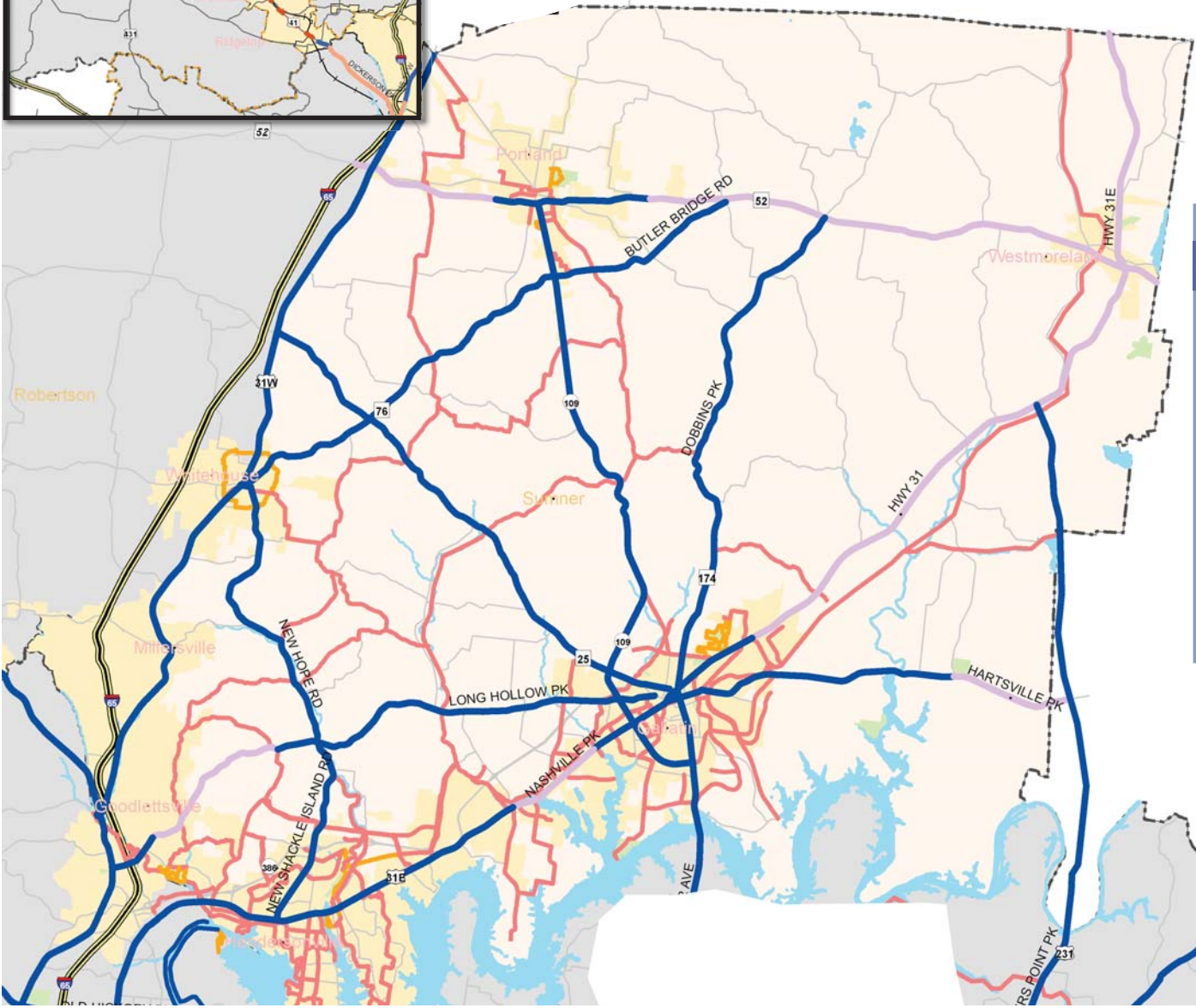
- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Local Bicycle Facilities - Existing
- Local Bicycle Facilities - Planned
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>



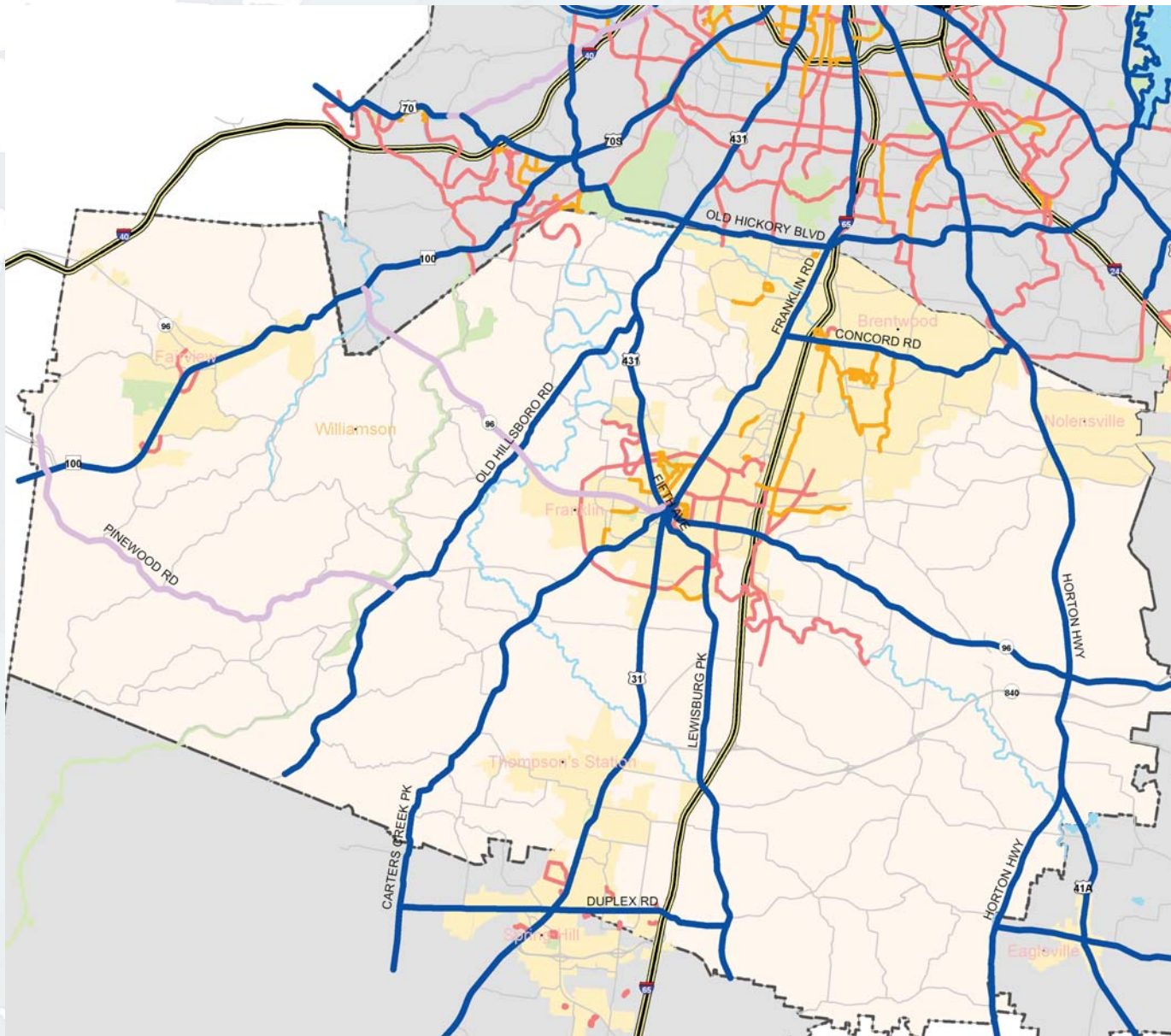
ROBERTSON COUNTY

FIGURE 7.6 | SUMNER/ROBERTSON COUNTY MAP



LEGEND

- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Local Bicycle Facilities - Existing
- Local Bicycle Facilities - Planned
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries



**FIGURE 7.7 | WILLIAMSON/
MAURY COUNTY MAP**

LEGEND

- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Local Bicycle Facilities - Existing
- Local Bicycle Facilities - Planned
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>

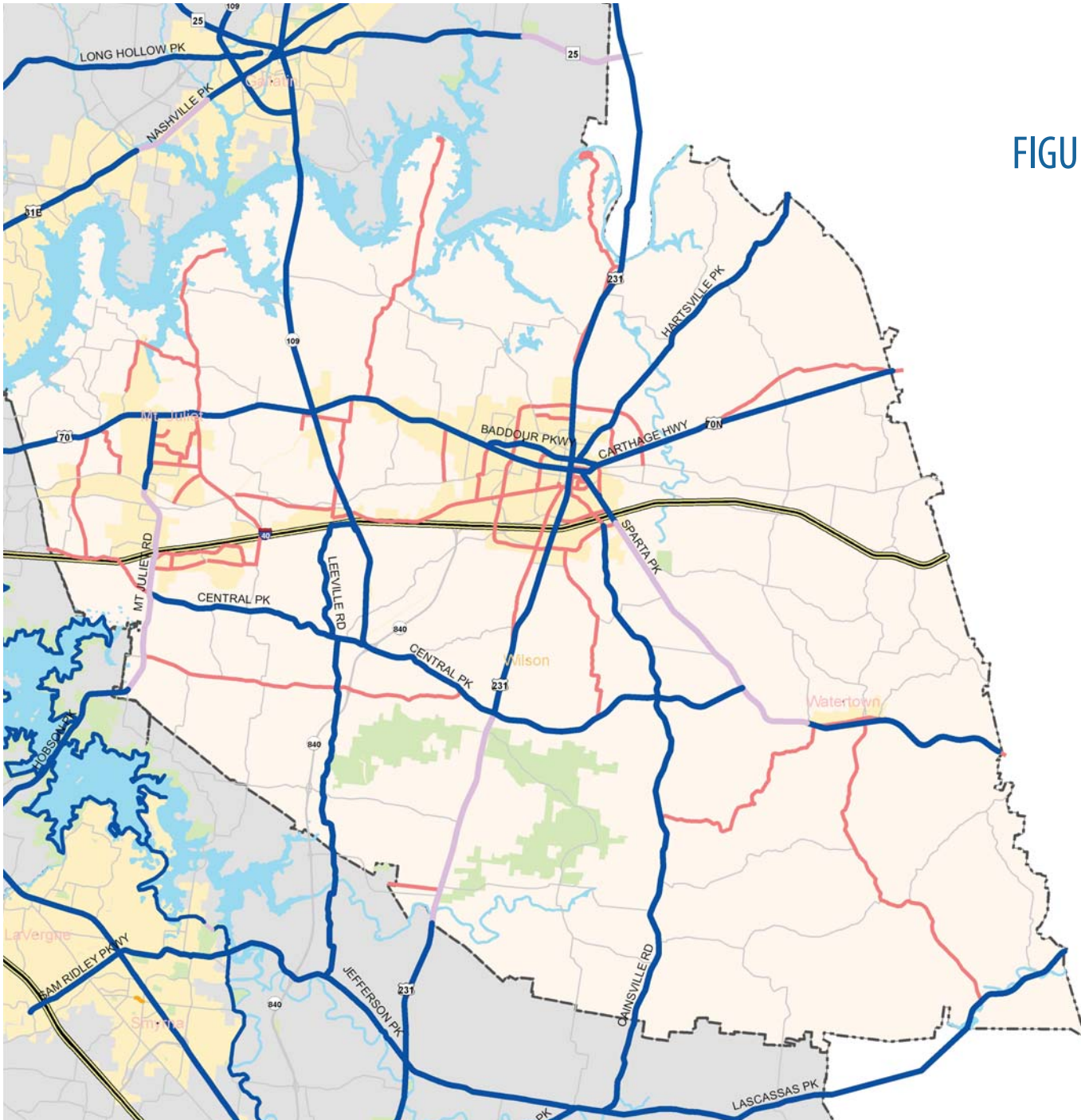


FIGURE 7.8 | WILSON COUNTY MAP

LEGEND

- Regional Bicycle Network - Existing Bicycle Facilities
- Regional Bicycle Network - Proposed Bicycle Facilities
- Local Bicycle Facilities - Existing
- Local Bicycle Facilities - Planned
- Interstate
- Parks
- Bodies of Water
- City Limits
- County Boundaries

Larger maps are available on the MPO website:
<http://www.nashvillempo.org>

4.4 PROGRAMS AND POLICIES

The Study contains a set of recommended policies and programs which will result in greater consideration, education, awareness, and accommodations for non-motorized users within the greater Nashville region. Emphasis is placed on policies and programs that support the top strategies endorsed by the MPO Bicycle and Pedestrian Advisory Committee (BPAC).

Proposed policies and programs are designed to provide guidance to the MPO and its member jurisdictions so that the objectives and strategies implemented will encourage, educate, and promote walking and bicycling.

The following are a few examples of the recommended policies and programs, a full list can be found in Technical Memorandum #6 (Policies and Programs). The programs are categorized as the following:

[R] = Regional (MPO)

[L] = Local Government (City or County)

[S] = State (TDOT, etc.)

[P] = Private/Non-Profit (YMCA, TMA Group, etc.)

1 | PROVIDE FACILITIES

Strategy | **Designate and implement a regional bicycle network of bicycle commuter corridors and community connections.**

- As part of the Study, a bicycle network has been developed which includes all the major commuting corridors into downtown

Nashville as well as the US and State highways that connect the urbanized areas in the Nashville MPO region. [R, L, S]

Strategy | **Require sidewalk accommodations along all Arterial roadways on which pedestrians are allowed.**

- As part of the Study, a Sidewalk Accommodation Policy is proposed that calls for sidewalk accommodations on all federally classified Arterial roadways within an Urban Growth Boundary of the MPO on which pedestrians are not prohibited. The Urban Growth Boundary area (as defined by TN Public Chapter 1101) is used as this defines areas of the region that are expected to be urban in form over the next 20 years. For Davidson County, the Urban Transect categories (T3 through T6) define Metro Nashville's urban growth area. [R, L, S]



Strategy | **Create, fund, and implement spot improvement programs so that minor walking and bicycle improvement needs can be quickly addressed.**

- Develop a maintenance and spot improvement program to be run by a Public Works or a Parks and Recreation Department. The responsibility could be split where onroad facilities are maintained by Public Works and greenways are maintained by a Parks and Recreation Department. [R, L]
- Provide spot maintenance forms upon request at bicycle shops and on a website set up for bicycle and pedestrian information. [R, L, S]
- Roads that have bicycle facilities should be on the regular street sweeping schedule in jurisdictions where a schedule exists. [L, S]

Strategy | Promote and encourage land use decisions that provide a meaningful and context-appropriate mixture of uses that are supportive of increased walking and bicycling.

- MPO member jurisdictions should encourage local school boards to establish school siting policies that favor sites with good walking and bicycling access. As an example, the policy could include a recommendation that new elementary schools be located on neighborhood streets with low traffic volumes and speeds, and within walking distance of a large proportion of students' homes. In addition, the site design of schools should give opportunity for pedestrian and bicycle access. [L]

2 | BUILD SUPPORT

Strategy | Hold annual walking and bicycling regional summits in order to enhance awareness and report on progress made on increasing non-motorized transportation throughout the region.

- Numerous communities across the U.S. have conducted regional and statewide symposiums on walking and bicycling as a means of increasing awareness and building support for non-motorized transportation. Example locations include California, Maryland, Massachusetts, North Carolina, and Texas. In May 2009, the MPO held a summit in conjunction with Cumberland Region Tomorrow

and the Tennessee Department of Transportation to discuss transit initiatives in Middle Tennessee. It was well attended by local mayors and other public officials as well as by private businesses. The MPO could hold an annual (or biennial) walking and bicycling summit as a stand-alone event or in conjunction with other related initiatives. [R, P]

Strategy | Establish an annual report on the state of walking and bicycling improvements and activities in the region whereby municipalities report annually on their local activities. Information can be used to prepare a package to present throughout the region to mayors and elected officials, community organizations, and other stakeholders detailing the benefits, projects, and practices for the year related to walking and bicycling in the region.

- The Nashville Region should continue an annual bicycle and pedestrian count program as piloted in 2009 consistent with the National Bicycle & Pedestrian Documentation Project (NBPD). Guidance on this program is described in Technical Memorandum #3B — Count Procedures Manual of the Regional Bicycle and Pedestrian Study. The results of the counts should be used to track walking and bicycling activity in the future. [R, L]



3 | CREATE POLICIES & PROGRAMS

Strategy | Integrate consideration of walking and bicycle travel into all transportation planning, design, construction and maintenance projects as well as in local community and transportation plans.

- Across the country Complete Streets policies are being adopted by communities. A Complete Streets policy ensures that the roadway is designed with all users and all skill levels in mind, i.e. it is designed to accommodate bicyclists, pedestrians, transit users, and motorists of all ages. Establishing a Complete Streets policy will ensure roadway designs include safe and effective access to all users. The MPO, TDOT, and local communities in the MPO region should adopt Complete Streets policies. [R, L, S]



4 | INCREASE AWARENESS

Strategy | **Establish an informational website showing routes and locations of bicycle facilities as well as printable PDF maps.**

- A website should be established that contains information regarding walking and bicycling in the region. This website can be used to post bicycle maps showing the routes in the MPO region. [R, P]
- The website should provide information on a variety of educational resources including information such as elementary instructor training courses. [R, P]

OUTREACH AND ENCOURAGEMENT INITIATIVES

These initiatives, which are designed to have a positive influence on walking and bicycling, spread across four categories:

- *Enforcement activities, training for law enforcement*
- *Educational initiatives for walkers, bicyclists, and motorists*
- *Encouragement programs designed to increase walking and bicycling*
- *Media campaigns targeted at walking and bicycling for all users*

City, county, and regional programs can be designed to encourage walking and bicycling. Implementation of these programs is intended to increase the number of walking, bicycling, and transit trips. These initiatives offer a spectrum of opportunities that could be employed within the Nashville region. The Nashville MPO should consider working with existing local non-profit walking and bicycling organizations and clubs, chambers of commerce, and private companies to obtain support for similar programs in the Nashville region.

SOME INNOVATIVE OUTREACH AND ENCOURAGEMENT PRACTICES

(examples of initiatives developed throughout the United States that support the various policy and program recommendations)

Employee Outreach (promote transportation options to employees) *Organized Rides – Evening Rides and Summer Rides (for new cyclists and those who have not been on a bike for years)* **Senior Cycling (designed to encourage seniors to get back on their bicycles)** *Youth Helmet Distribution* **Women Bike Training** (a series of clinics, conversations, and rides) *New Resident Packets (offering an opportunity to request neighborhood bike maps, bus and light rail schedules)* **Bike Month Promotions**
Commuter Bicycle Club (log their miles on a website to receive prizes and discounts)

REGIONAL SIDEWALK AND BIKEWAY SYSTEM COSTS

Planning level cost estimates were prepared for both the regional sidewalk recommendations as well as the recommended Regional Bikeway Network. Cost estimates are in 2009 dollars and were prepared as stand-alone projects (not as part of a road widening project).

The total estimated cost for implementing the regional sidewalk and bikeway recommendations is nearly **\$800 million** with the regional sidewalk recommendations accounting for **\$149 million** and the Regional Bikeway Network accounting for **\$644 million**.

Find more information and complete Technical Memorandum reports on the MPO website:
<http://www.nashvillempo.org>

HISTORICAL FUNDING

A review of historic funding levels within the MPO was undertaken to derive an understanding of the current funding commitments toward sidewalk and bikeway improvements within the Nashville MPO region.



The results of the analysis indicate that over the six year period (2006 to 2011), approximately \$87 million (representing an annual average of \$14.5 million per year) in funds have been, or are to be, expended specifically for sidewalk, bikeway, and greenway facilities in the Nashville region. Of these funds, all are federal funds less local match requirements. Technical Memorandum #5 (Regional Priority List and Funding Options) provides the review of historic funding levels and funding needs.

Looking at implementing the proposed recommendations over a 25 year horizon, which is consistent with the planning horizon of the MPO's Long Range Transportation Plan, there would be a **funding gap of approximately \$17.2 million annually** (or 2.19 times the current funding level).

FUNDING PROGRAMS

Costs associated with constructing the bicycle and pedestrian facilities recommended in the study far exceed available resources.

THE FUNDING TOOLBOX



To help alleviate this deficiency, numerous sources can be used to provide monetary assistance for bicycle and pedestrian facilities and programs.

Most of these federal programs are administered by the Tennessee Department of Transportation (TDOT). Additionally, there are other state and local funding sources which can be used to help achieve the goals and objectives of this Study. Finally, a myriad of private funding sources exist which can be used by local governments to implement bicycle- and pedestrian-related programs.

A complete listing of over 30 federal, state and local, and private funding opportunities is described in more detail in Technical Memorandum #7 (Funding Toolbox). **Some examples include:**

FUNDING | FEDERAL

- Surface Transportation (STP) funds are typically used for road widening projects but can also be used to add sidewalk and bicycle facilities.
- Congestion Mitigation and Air Quality (CMAQ) funds are geared toward transportation investments that have a positive impact on air quality. Non-motorized investments such as sidewalks, greenways, and bicycle facilities including bike racks and bike storage facilities are eligible activities.

- Transportation Enhancement (TE) funds can be used to provide sidewalk and bicycle facilities including greenways.

- Safe Routes to School (SRTS) funds are available for both capital and program activities that encourage and promote safe walking and bicycle travel to and from elementary schools.

FUNDING | STATE & LOCAL

There are a variety of state and local funding sources that could be used for bicycle and pedestrian projects. In Tennessee, there are a number of state shared revenues that come to municipalities which can be used for pedestrian and bicycle accommodations. One example is the Tennessee Hotel Motel Tax. The City of Franklin currently uses a portion of their Hotel Motel Tax for greenway projects.

FUNDING | PRIVATE

There are a number of private grant programs throughout the U.S. which offer funding for both capital and program activities which promote greater walking and bicycling. A number of these grants are offered by foundations such as the Robert Wood Johnson Foundation and Bikes Belong Coalition which support healthy lifestyles, environmental conservation, and active living.

PEER COMMUNITIES

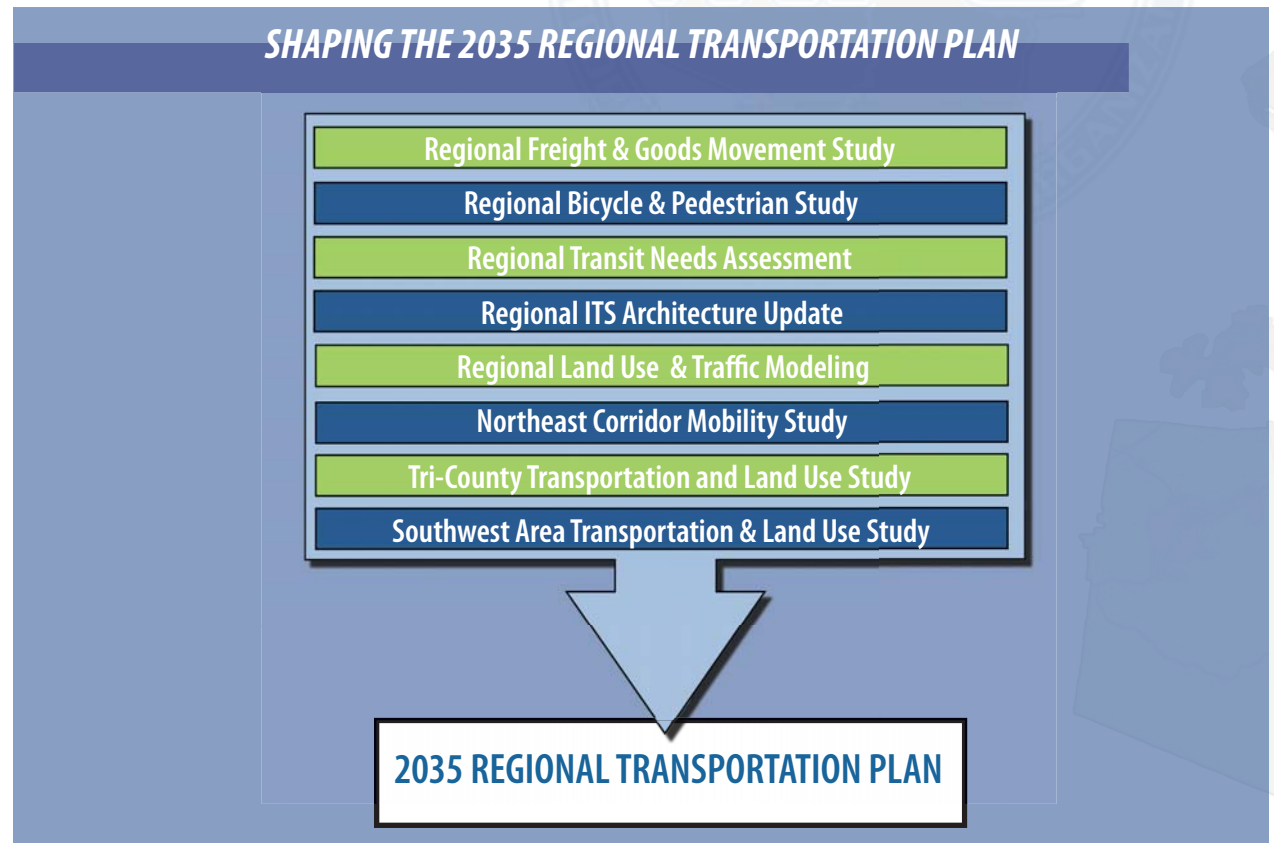
- *Some cities such as Charlotte have used grants to prepare Bicycle Plans.*
- *Chicago & Louisville both have dedicated regional or local funds for Bicycle and Pedestrian accommodations.*
- *Phoenix has incentive funding for projects that include provisions of non-motorized accommodations.*
- *The cities of Charlotte, Chicago, & Louisville all require "in lieu of" construction payments.*



NEXT STEPS

This Study is a culmination of 12 months of hard work by dedicated citizens, civic leaders, and governments throughout the five-county planning area. Without their help, this planning initiative would not have been possible. With the completion of the Study, the work of implementing its recommendations has already begun. It will take the efforts of each community to pursue and implement the policies and programs herein. The guidance and tools provided by the study will provide a means for institutionalizing walking and bicycling as legitimate transportation options within the region.

As the Metropolitan Planning Organization develops the upcoming 2035 Long Range Transportation Plan (LRTP), this Study will serve to inform its recommendations. The LRTP will set the region's transportation priorities and policies for the next twenty-five years. This Study will be one component of the plan. The flowchart below shows the other initiatives that will also inform the Plan. The development of several of these other initiatives has paralleled this study's efforts. Together they form a comprehensive vision for addressing our region's transportation issues and ultimately our economic health and quality of life.



WHERE DO WE GO FROM HERE?



REVIEW THE COMPLETE STUDY

Find more information and complete Technical Memorandum reports on the MPO website:
<http://www.nashvillempo.org>

COMPLETE LIST OF TECHNICAL MEMORANDUMS:

- 1 - Inventory
- 2 - Needs Assessment
- 3A - Objectives & Strategies
- 3B - Count Procedures Manual
- 4 - Project Evaluation Methodology
- 5 - Regional Priority List & Funding Options
- 6 - Policies & Programs
- 7 - Funding Toolbox
- 8 - Pedestrian and Bicycle Design Guidelines



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