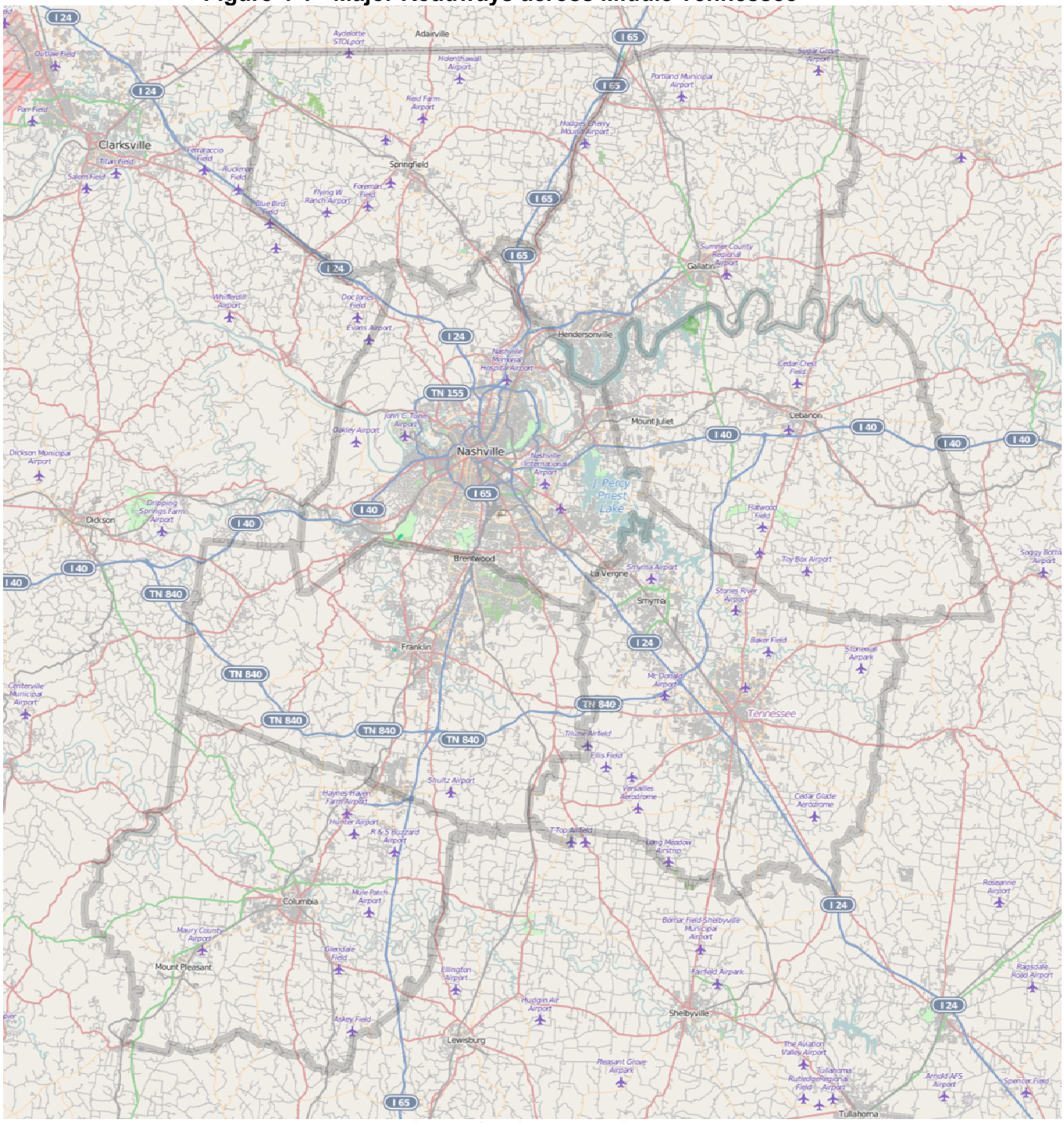
4.0 Transportation Infrastructure

4.1 Major Roadways

Middle Tennessee's transportation system is vast and serves as the backbone of its regional economy, carrying millions of trips daily by people and goods going across town or cross-country. While the system is diverse and includes bridges, rail lines, transit service, sidewalks, and bicycle paths, highways are by far the most visible component. The greater Nashville area benefits from the convergence of three major U.S. Interstates which connect the region to the rest of the nation while supporting local accessibility and economic development.

Figure 4-1 Major Roadways across Middle Tennessee



Source: OpenStreetsMap, 2015

Functional Classification

Not every roadway is created equally. The Federal Functional Classification is the system by which roads are grouped into categories according to the type of service and amount of traffic the facility carries. Functional Classification is used to determine design standards of roads and is a consideration in determining eligibility for federal aid funding. A classification is assigned to all public roads by the MPO in partnership with TDOT using federal guidelines, and is approved by FHWA. In general, there are four major classifications of roadways including: 1. Interstates and freeways, 2. other Arterials, 3. Collectors, and 4. Local Roads. Technically, Interstates and freeways are considered Principal Arterials. The following graphic helps to clarify their functional differences.

Interstates and Freeways - A divided highway having two or more lanes for the exclusive use of traffic in each direction and full control of access. The freeway is the only type of highway intended to provide complete "uninterrupted" flow.

Examples: Interstates 24, 40, and 65, State Route155-Briley Parkway, State Route 6-Ellington Parkway, State Route 386- Vietnam Veterans Parkway, 440 Parkway, State Route 840, etc.

Principal and Minor Arterials: A major thoroughfare that is vital for moving people and goods within and between communities.

Examples: Gallatin Pike, West End Avenue, Dickerson Pike, Hillsboro Pike, Nolensville Pike, Lebanon Road, State Route 109, State Route 96, etc.

Major and Minor Collectors Streets: Intended to balance access and mobility considerations by serving through movement as well as access to land uses. Collectors connect traffic on highways and arterials to local streets.

Local Streets: All other streets are generally considered to be local. Local streets typically support direct access to homes and are generally designed for slow speeds to safely allow for other neighborhood activities like walking and biking.

There are more than 12,000 linear miles of roadways throughout the MPO planning area. That is about the same distance one would cover by driving from Nashville to New York to California and back, twice. Of that, nearly 2,500 lane miles are eligible for federal funding made available through the MPO and TDOT. The federal-aid system includes all public roadways not classified as rural minor collector or local roads. Some exceptions are made to allow federal funds to be used for improvements to bridges on rural minor collectors or local roads, or projects that improve the safety of local roadways for the non-motorized modes of transportation (e.g., sidewalks, bicycle lanes, etc.). Figure 4-2 summarizes the linear, or centerline, mileage of roadways in each county by functional classification.

Figure 4-2 Roadway Centerline Miles by Functional Classification and County

Functional Class	MPO	Davidson	Maury	Robertson	Rutherford	Sumner	Williamson	Wilson	TN	MPO/TN
Interstates	226	89	18	28	33	6	24	27	1,104	20%
Other Freeways	60	29	9	-	7	13	0	2	159	38%
Principal Arterials	533	135	66	19	90	84	85	53	3,488	15%
Minor Arterials	806	291	72	75	120	80	89	79	5,698	14%
Major Collectors	949	168	105	92	177	149	131	127	7,327	13%
Minor Collectors	982	58	200	124	115	133	150	201	10,019	10%
Local Roads	8,860	2,280	912	800	1,496	1,212	1,266	894	66,939	13%
Total All Roads	**12,416**	**3,049**	**1,383**	**1,137**	**2,039**	**1,677**	**1,747**	**1,383**	**94,735**	**13%**
Federal-Aid System	**2,574**	**711**	**270**	**214**	**428**	**332**	**330**	**288**	**17,777**	**14%**

Source: Tennessee Department of Transportation E-TRIMS System (2014)

While centerline mileage is the way most people think about roadway distance, TDOT and local government agencies that build or maintain the system tend to measure distances in terms of lane miles. This method provides a better sense of the amount of roadways across the network. Lane miles are calculated by multiplying the centerline distance by the number of travel lanes. For instance, a one-mile stretch of four-lane highway has a lane-mile distance of four miles. When using that calculation, the MPO area has more than 26,000 lanes miles of roadways across the region. If one were to stretch those lanes out in a straight line, there would be enough pavement to circle the entire globe at the equator, or to get 10 percent of the way to the moon. Figure 4-3 provides a summary of roadway lane miles by functional classification for each county.

Figure 4-3 Roadway Lane Miles by Functional Classification and County

Functional Class	MPO	Davidson	Maury	Robertson	Rutherford	Sumner	Williamson	Wilson	TN	MPO/TN
Interstates	1,297	582	71	116	207	25	147	149	5,196	25%
Other Freeways	284	157	37	-	32	51	0	7	722	39%
Principal Arterials	1,817	522	205	61	332	252	274	171	12,070	15%
Minor Arterials	2,019	799	164	163	330	169	211	183	13,846	15%
Major Collectors	1,964	357	210	185	368	303	278	265	15,013	13%
Minor Collectors	1,961	117	401	248	230	266	302	398	19,880	10%
Local Roads	17,266	4,597	1,765	1,445	2,939	2,352	2,532	1,637	122,174	14%
Total All Roads	**26,610**	**7,131**	**2,853**	**2,217**	**4,439**	**3,416**	**3,744**	**2,810**	**188,900**	**14%**
Federal-Aid System	**7,382**	**2,417**	**687**	**524**	**1,270**	**799**	**910**	**775**	**46,846**	**16%**

Source: Tennessee Department of Transportation E-TRIMS System (2014)

Highway Systems and Ownership

Whereas the federal functional classification of a roadway is intended to set standards for the form and function of a roadway, the classification alone does not indicate the entity responsible for its operations and maintenance. The following describes the various types of highway/roadway systems that exist in Middle Tennessee which provide a clearer view of ownership and maintenance responsibilities.

- **National Highway System (NHS)** – The NHS is a network of strategic highways within the United States, including the Interstate Highway System and other principal arterials serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. While designated by the U.S. DOT in partnership with state and MPO officials, the NHS system is typically maintained by the appropriate state government, with federal-aid funding.
- **State Route System of Tennessee** – Tennessee's state-route system is developed and maintained by TDOT. Of the 14,000 miles in the system, only about 1,000 are part of the U.S. Interstate Highway System.
- **Local Roadways** – Municipal public works departments and county highway departments are responsible for maintaining the remainder of the publicly-owned roadways across the area. Some of those roadways are eligible for federal or state-aid funding depending on the nature of the proposed improvement and the roadway's federal functional classification.
- **Federal-Aid System** – Generally speaking, all public roadways not functionally-classified as a rural minor collector or local road are considered eligible for federal transportation funding. The federal-aid system is comprised of both state and locally-owned roadways. In certain cases, federal funding may be used off-system to repair bridges or improve safety for motorists, pedestrians, and cyclists.

The following map series presents information about major roadways across the MPO planning area including the federal functional classification (figure 4-4), system type (figure 4-5), and posted speed limits and number of lanes (figure 4-6).

Figure 4-4 Major Roadways by Functional Classification

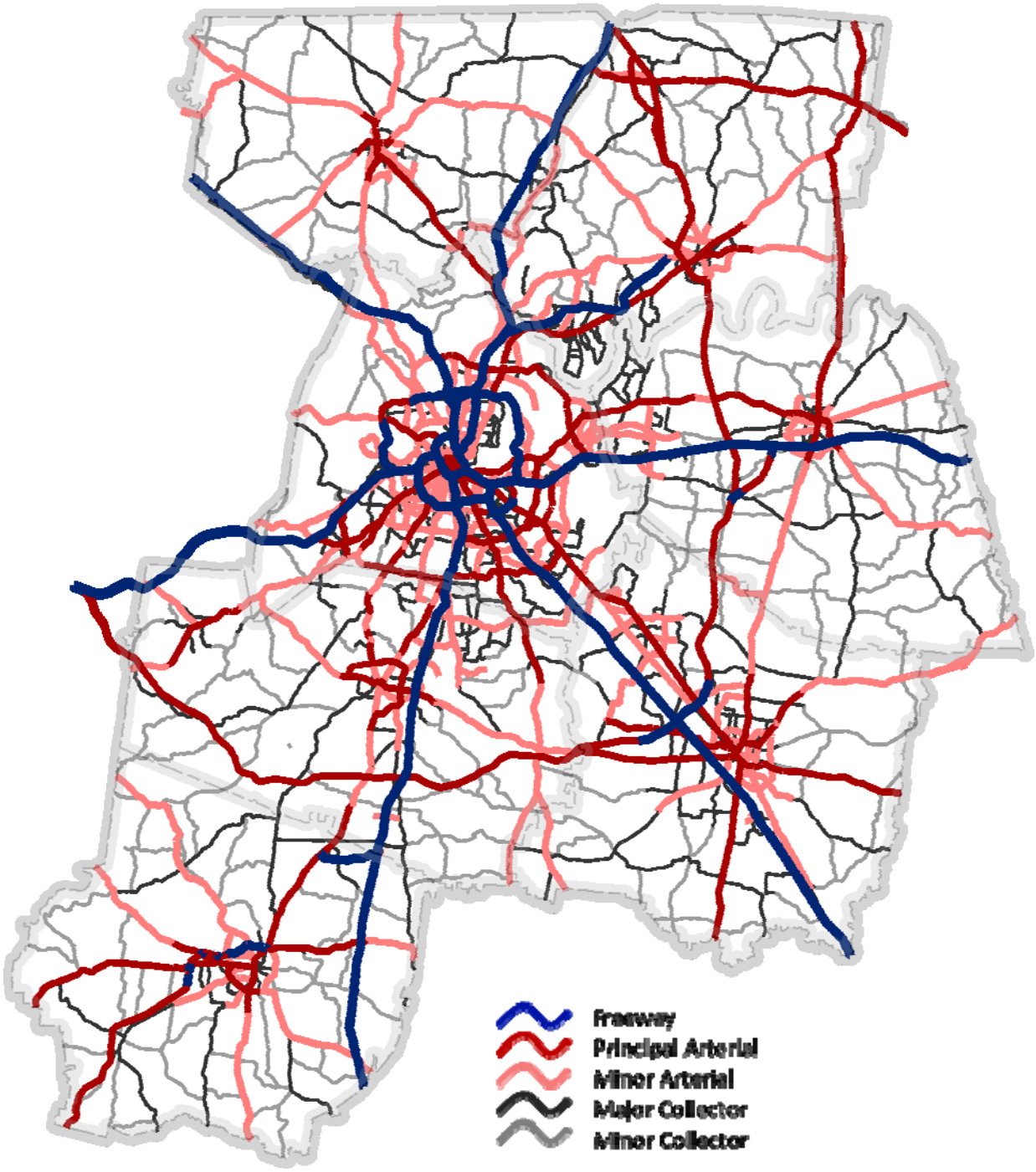


Figure 4-5 Roadways by System Type (NHS, State, Local)

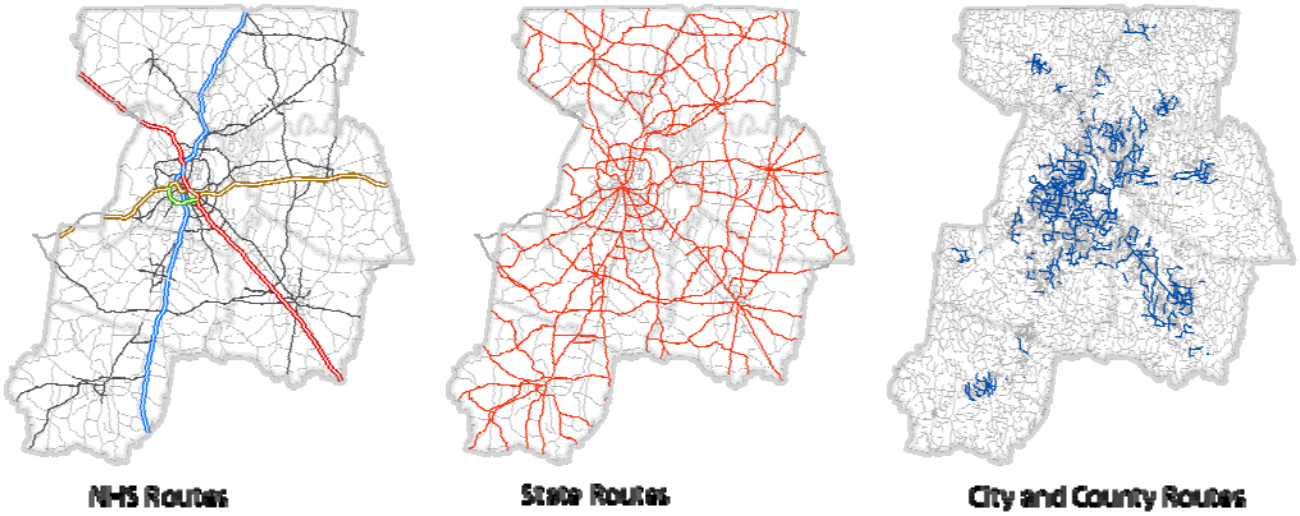
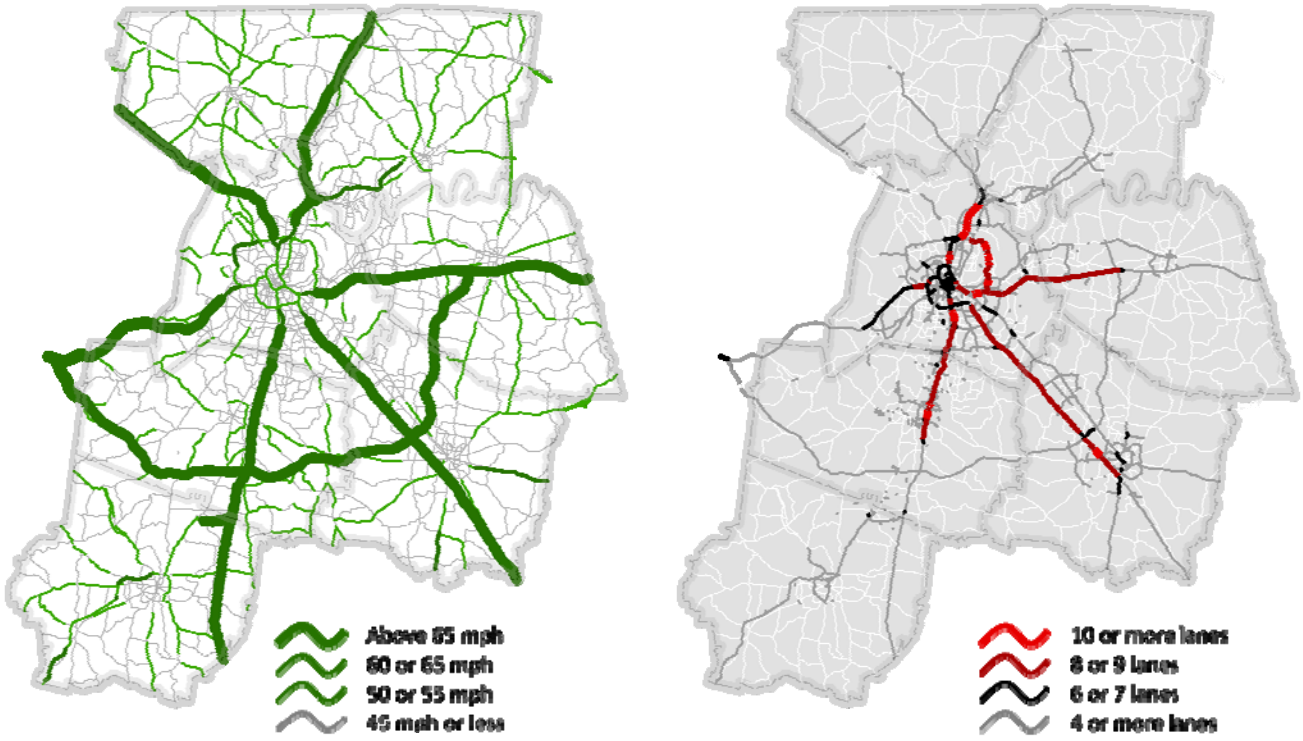


Figure 4-6 Roadways by Posted Speed Limit and Number of Lanes



4.2 Bridges & Overpasses

Most roadways would be impassible if it were not for the more than 1,400 bridges that span rivers, streams, valleys, railroads, and even other roadways across the area. Bridges also play an important part of the architectural and aesthetic landscape of Middle Tennessee. For example, the award-winning design of the Natchez Trace Parkway Arch Bridge, the first of its kind in the U.S., inspires bridge enthusiasts and attracts tourists to the Natchez Trace National Park. *Enhancing The Bridges,* a joint project between the MPO and the Nashville Civic Design Center, is meant to elevate the conversation around innovative bridge designs when new projects emerge — offering alternatives to *status quo* designs and exploring the concept of "signature" bridges (highly-visible gateways, entrances), as well as showcasing potential future locations for signature bridges in downtown Nashville. The following figures show the location of bridges by ownership and type of crossing (figure 4-7) and year built (figure 4-8). Information about bridge conditions can be found in Chapter 5.

Figure 4-7 Roadway Bridges by Type of Crossing and Ownership

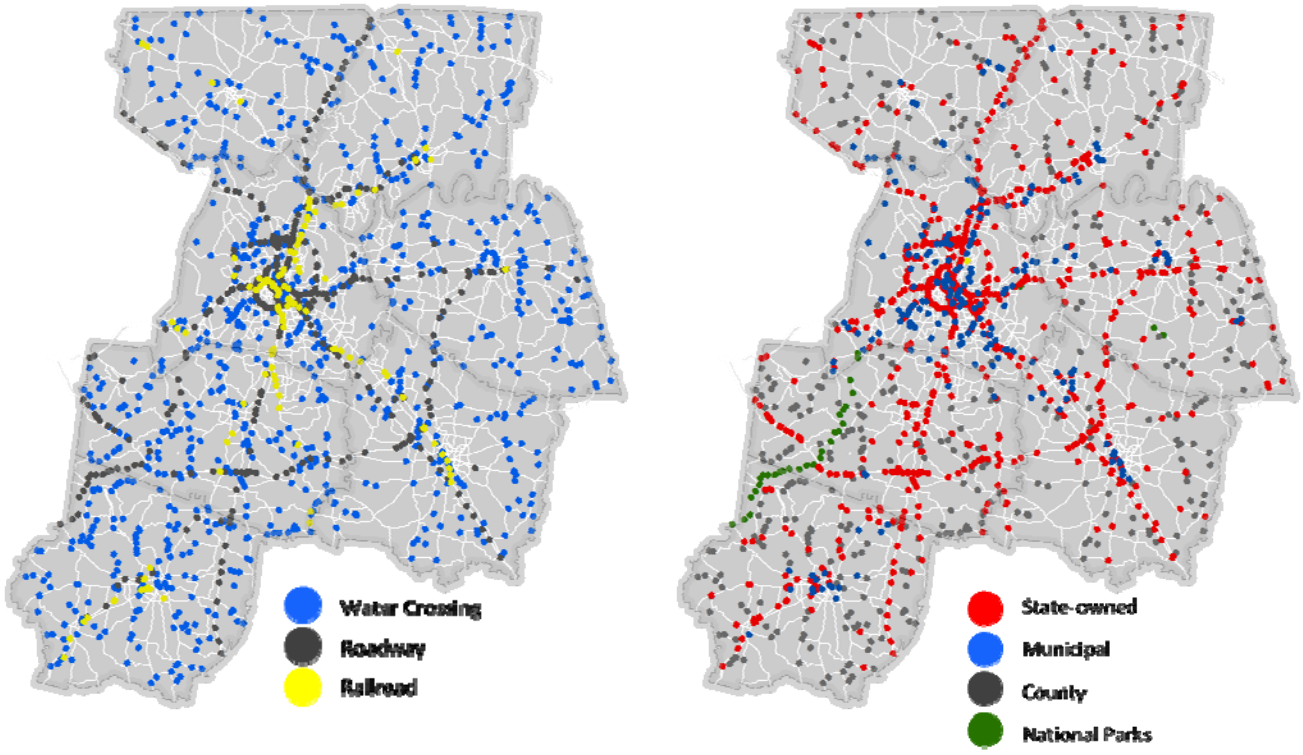
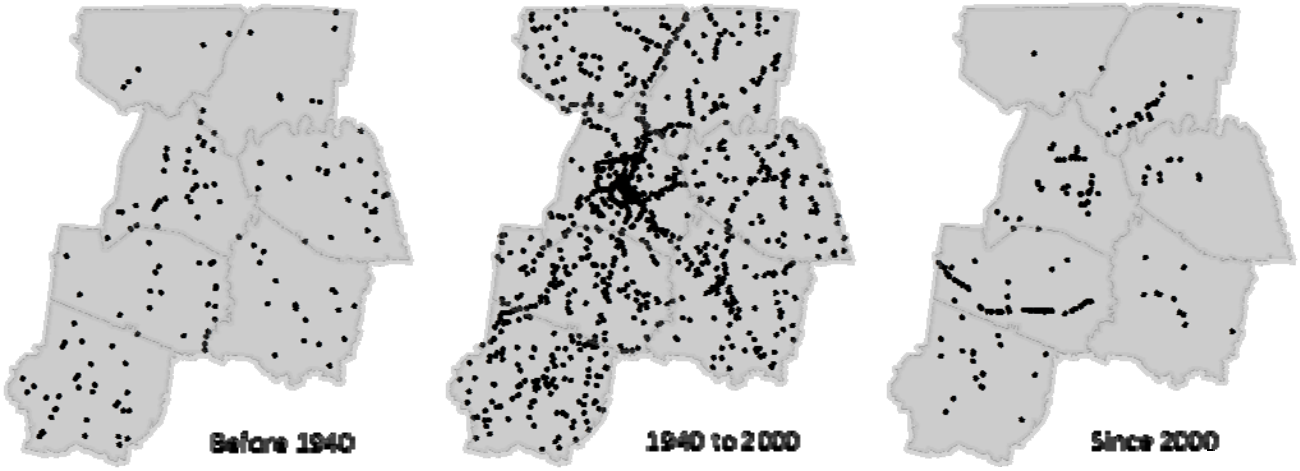


Figure 4-8 Roadway Bridges by Year Built

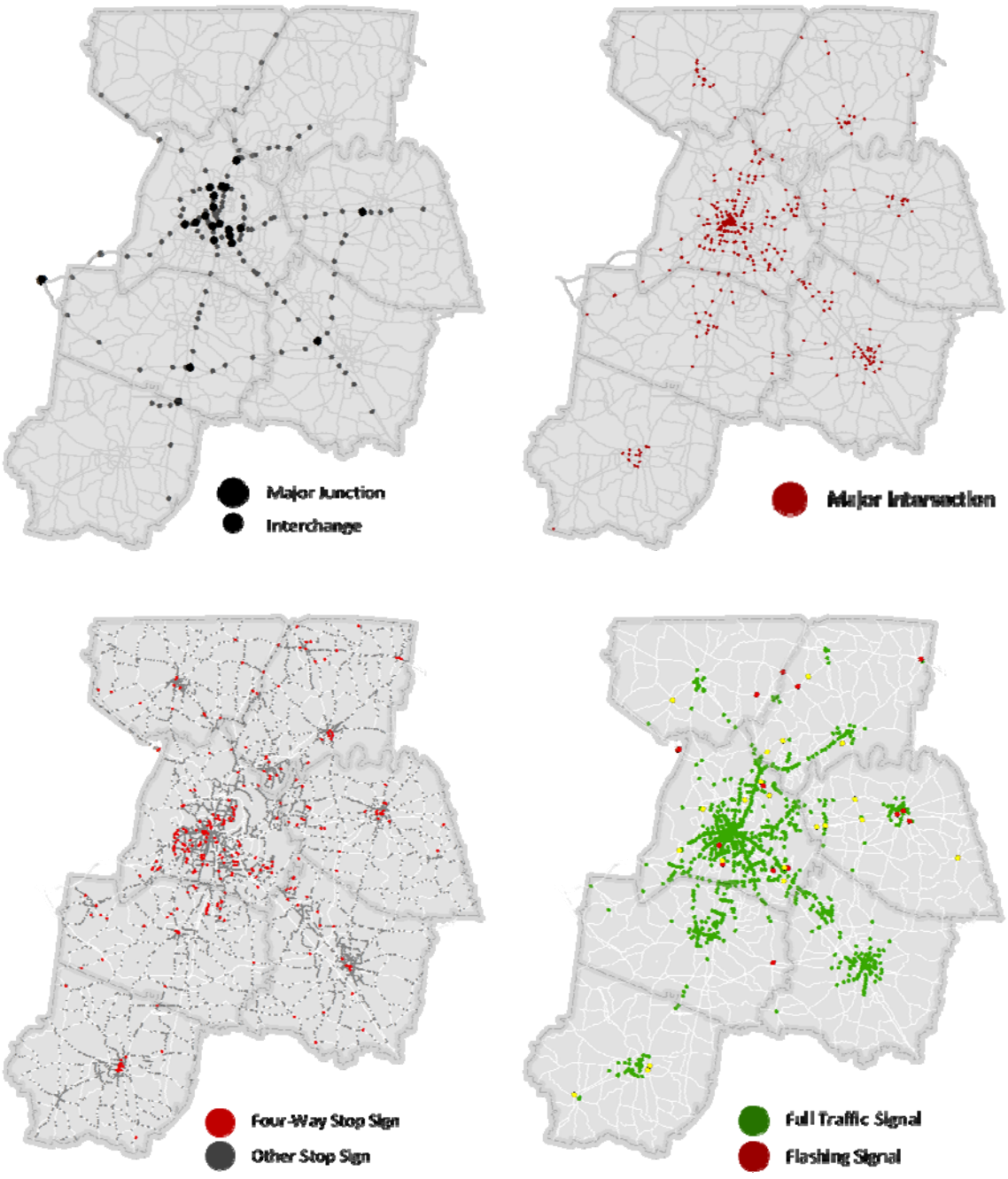


4.3 Interchanges & Intersections

There are more than several thousand intersections between roadways across the seven county area. Of those 163 are grade separated, meaning that dedicated ramps are used to connect one route to another. Those type of intersections are typically referred to as interchanges or junctions. Junctions are interchanges that connect two or more major highways that are themselves accessible only by interchanges with secondary roadways (e.g., U.S. Interstates, SR 840, Briley Pkwy Ellington Pkwy, Saturn Pkwy, etc.).

The following figure depicts the location of interchanges, junctions, and major intersections between roadways classified as arterials. The second pair of maps depict the locations of stop signs and more than 1,200 traffic signals across the region.

Figure 4-9 Grade-Separated Interchanges and Major Intersections



4.4 Public Transportation Services

The Nashville area is served by multiple transit agencies that provide a variety of services to Middle Tennesseans, ranging from rural demand response to vanpools to commuter rail. The following presents an overview of the urban fixed route services offered by the Regional Transportation Authority, the Nashville MTA, the Franklin Transit Authority, and the Murfreesboro Rover, and the rural services provided by the Mid-Cumberland Human Resource Agency.

Regional Transportation Authority (RTA)

The RTA is a multi-county authority created by state statute in 1988 to encourage transportation alternatives and develop a regional mass transit system. RTA oversees the operation of a variety of regional transit services including the area's only commuter rail line, express bus routes between Nashville and surrounding counties, and the regional ridesharing and vanpool program.

Nashville Metro Transit Authority (MTA)

The MTA was formed in 1973 for the purpose of stabilizing existing public transportation services and meeting other transportation needs of the citizens within Davidson County and visitors who visit the city and local areas. Nashville MTA currently has more than 200 fixed-route buses and a host of paratransit vehicles for customers with a disability. A five-member Board of Directors, appointed by the Mayor and approved by the City Council, governs the Nashville MTA. A management team, headed by a Chief Executive Officer (CEO), oversees the day-to day operations. Nashville MTA receives funding from federal, state, and local governments to supplement its operating revenue.

Franklin Transit Authority (FTA)

The FTA, operated under contract by The TMA Group, offers a unique, flexible service in that anyone who needs to be picked up or dropped off within three-quarters of a mile of a daily trolley route can call and make a reservation. The trolleys are all wheelchair accessible. FTA also provides Transit On DemanD (TODD), a pre-arranged, zone-based curb-to-curb pick-up and drop-off service as well as all-day, same-day access to the Franklin Trolleys.

Murfreesboro Rover

The City of Murfreesboro Transportation Department is responsible for the administration and operation of "Rover," local bus service within the city of Murfreesboro established in 2007. Service is provided from 6 AM to 6 PM along eight fixed routes. Each bus in the Rover fleet has a bicycle rack and is accessible to passengers who use wheelchairs.

Mid-Cumberland Human Resource Agency

The Mid-Cumberland Human Resource Agency (MCHRA) provides transit services to residents of rural Middle Tennessee, connecting thousands of people to jobs, schools and other destinations. Specifically, MCHRA Public Transit provides rural mobility service to people residing in Cheatham, Dickson, Houston, Humphreys, Montgomery, Robertson, Rutherford, Stewart, Sumner, Trousdale, Williamson, and Wilson counties.

The figures on the following page show the regional and local transit routes (figure 4-10) and bus stops, transit stations, and park-n-ride lots (figure 4-11) by agency.

Figure 4-10 Regional and Local Transit Routes

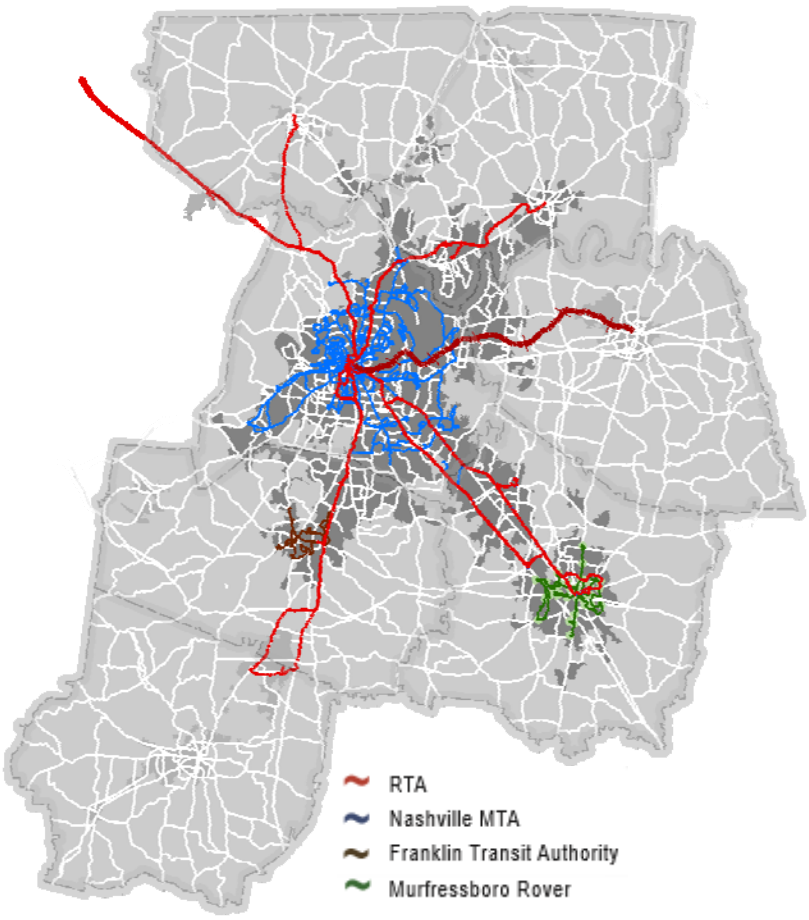
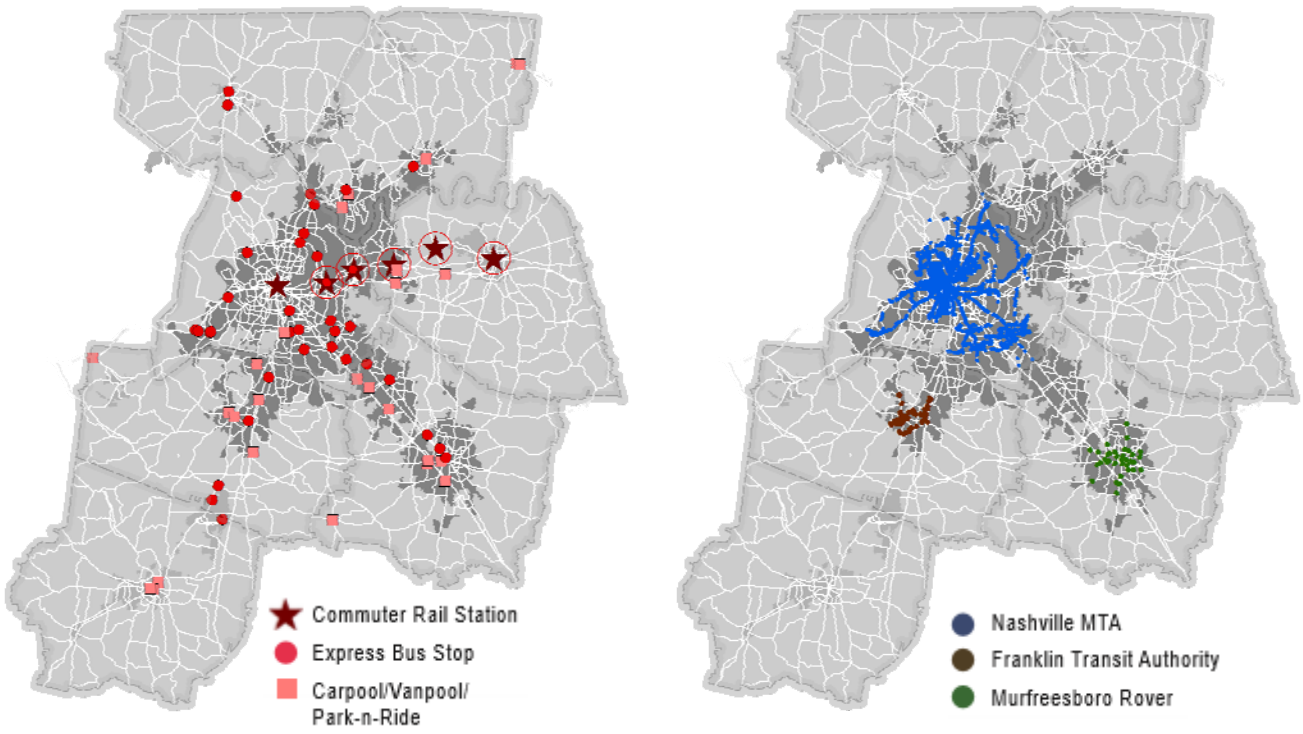


Figure 4-11 Transit Stops and Park-and-Ride Lots



4.5 Bicycle & Pedestrian Facilities

Historically, bicycle and pedestrian facilities have not been a major focus of regional transportation planning. Over the past several years, however, MPO communities have realized the importance of non-motorized modes of transportation such as walking and bicycling, as well as the need for crosswalks and traffic control features. These facilities are crucial for safe and convenient access to transit, as well as to access to employment, schools, and retail located along major streets. They also provide connections between neighborhoods, community centers, parks, and greenways.

In order to understand the walking and biking conditions across the seven-county area, the MPO conducted an inventory of existing bicycle and pedestrian infrastructure in 2014 as an update to the Regional Bicycle and Pedestrian Study first published in 2009. In order to accomplish this task, the MPO referenced TDOT's Transportation Roadway Information Management System (TRIMS) database, Google Earth imagery, and conducted in-field reviews to document the provision of facilities.

The 2014 inventory includes nearly every mile of arterial and collector roadways located across the seven-county area, about 3,270 miles in total. Controlled access highways like U.S. Interstates, Briley Parkway, Ellington Parkway, among others, were not inventoried since those highways typically prohibit pedestrian and bicycle use. Of the inventoried roadways, 505 miles had sidewalk facilities and 423 miles had bicycle facilities. In summary, **the inventory found that 25 percent of MPO area arterials had sidewalks and 26 percent had bicycle facilities, compared with 8 percent and 4 percent, respectively, of collector roadways.**

Figure 4-12 Miles of Sidewalks and Bicycle Facilities by County

Area	Total Road Miles*	with Sidewalks		with Bicycle Facilities	
Davidson County	647	260	40%	153	24%
Maury County	462	16	3%	44	10%
Robertson County	310	17	5%	12	4%
Rutherford County	489	87	18%	36	7%
Sumner County	450	49	11%	65	14%
Williamson County	455	55	12%	65	14%
Wilson County	456	21	5%	48	11%
MPO Area Total	3,269	505	15%	423	13%

** Arterial and Collector Streets. Source: Regional Bicycle & Pedestrian Study and TDOT E-Trims*

For purposes of the inventory, bicycle facilities included bicycle lanes, buffered bicycle lanes (wide shoulders), designated bicycle routes, and shared roadways that were identified by pavement markings and/or signage.

Figure 4-13 Types of On-Road Bicycle Facilities

Bicycle Lane | Buffered Lane/ Shoulder | Signed Route/ Shared Road

The MPO's inventory also accounts for shared-use paths, or greenways that are often built on exclusive rights-of-way with limited motor vehicle crossings. Currently, there are approximately 136 miles of greenways, 10 miles of multi-use paths, and 39 miles of trails located within the seven county area. The following figures provide the geographic coverage of sidewalks, on-road bicycle facilities, and shared-use paths across the region.

Figure 4-14 Sidewalks and On-Road Bicycle Facilities

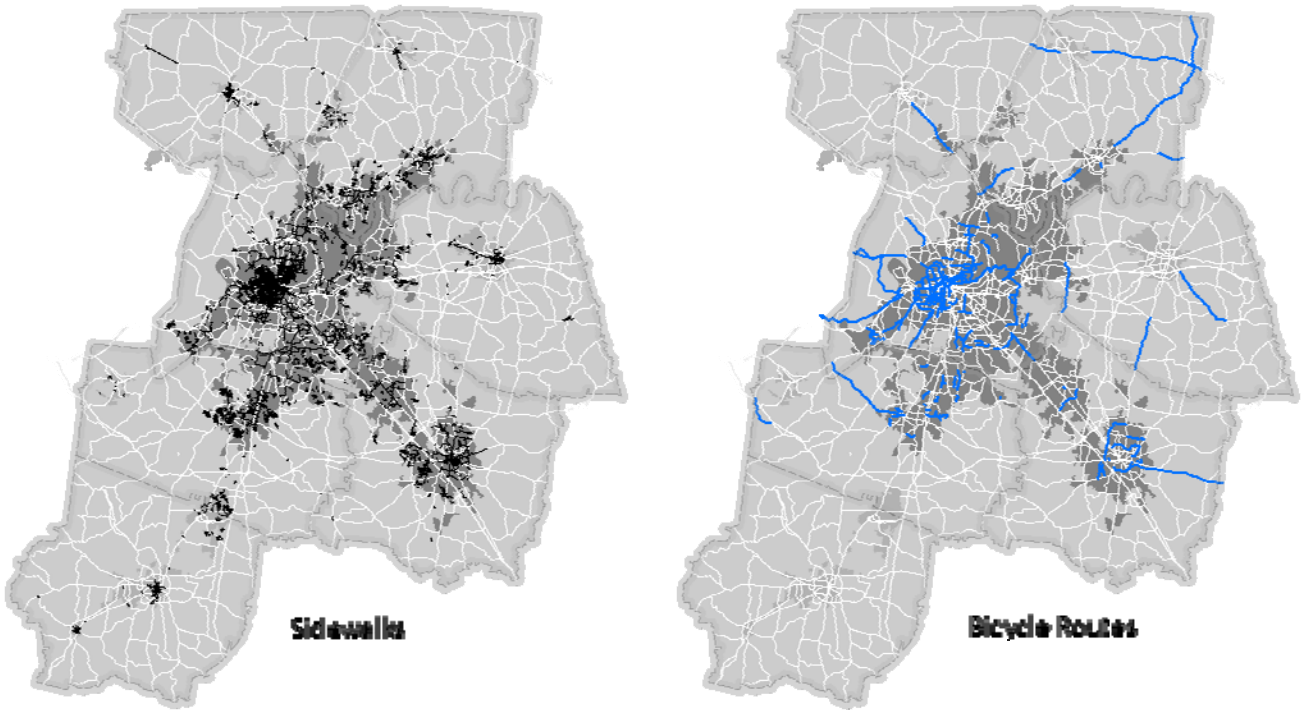
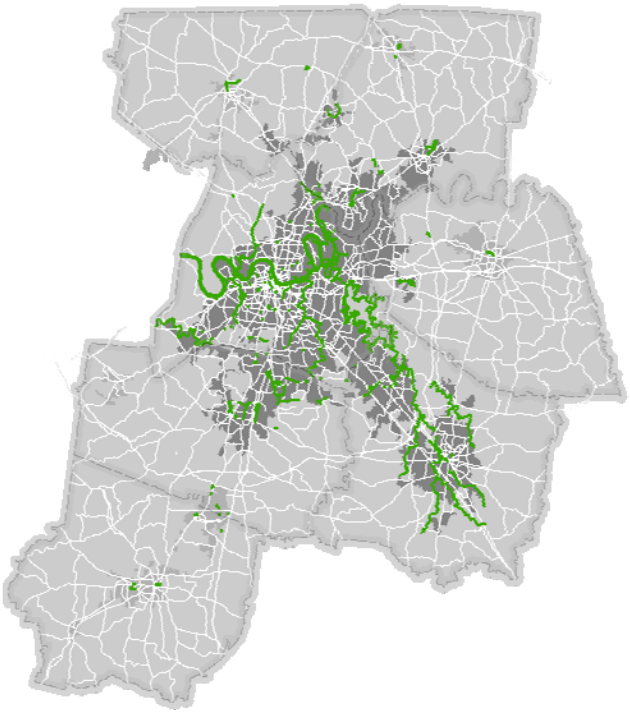


Figure 4-15 Greenways and Multi-Use Paths

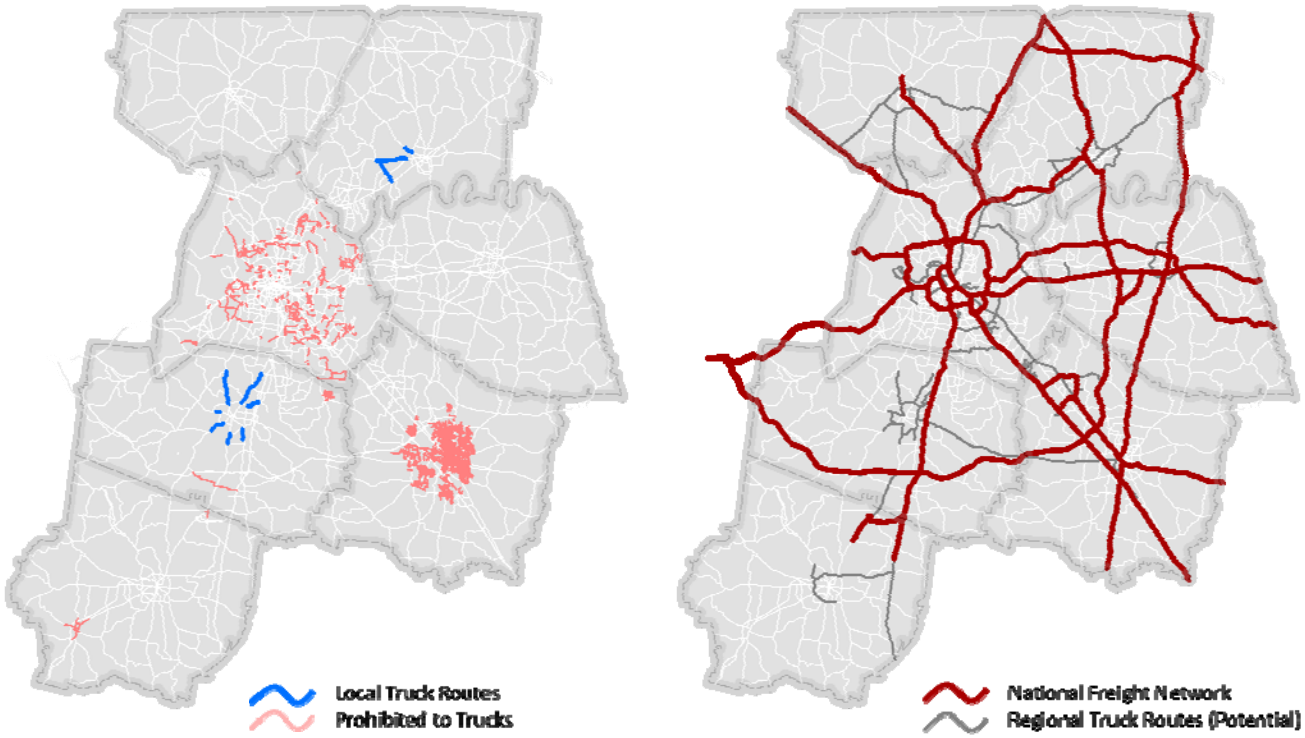


4.6 Freight & Logistics Infrastructure

The Nashville area occupies a strategic location within North America at the convergence of three major U.S. Interstates and within 650 miles of half the U.S. population and sits at the nexus of major highways and rail routes. As such the region has an excellent distribution network at hand with highway, rail, air, and barge facilities all readily available. The area is served by numerous freight carriers with terminal locations throughout the metropolitan area and beyond. The Cumberland River provides full river barge access to the Gulf of Mexico. CSX Transportation serves Nashville with a major classification yard as well as container, automotive, and bulk terminals.

The following figures depict roadways that have been designated as truck routes where freight movement is encouraged and those local routes where through trucks are prohibited.

Figure 4-16 Freight Truck Networks (Local and Regional)



Rail Freight Facilities

The Nashville area is served by the following Class I and two short line railroads:

- **CSX Transportation:** As the region's only Class I railroad company, CSX Transportation (CSXT) operates 22,000 route miles in 22 eastern and Midwest states, the District of Columbia, and two Canadian provinces. Its network stretches from Chicago, East St. Louis, Memphis, and New Orleans to the eastern Great Lakes, Boston, New York, Philadelphia, and Baltimore on the east and down the Atlantic coast to Tampa and Miami. CSXT's Tennessee Operating Division Headquarters are located in Nashville. They manage 1,377 track miles, two major rail yards, and nine terminals. The Nashville Area facilities include a major classification yard (Radnor), intermodal terminal (Nashville), TRANSFLO terminal (Nashville), and three Total Distribution Services Inc. (TDSI) automotive distribution terminals (Nashville, Smyrna, Spring Hill). Radnor Yard is a key hub in the CSX system. Sixty trains per day are routed through the Nashville Area toward five key cities: Atlanta, Birmingham, Chicago, Louisville, and Memphis. Forty of these trains simply pass through; the rest are "hubbed" in a classification yard, with the majority of railcars sent out again on a different train set. The orientation of CSX lines in Tennessee is chiefly north-south, with a spur west from Nashville to Memphis, but none eastward. A second Class I railroad, the Norfolk Southern (NS), has a network orientation running northeast-southwest. The NS has a curving east-west line between Memphis and Knoxville via Huntsville and Chattanooga, skirting Nashville and lying over 100 miles to the south.
- **Nashville & Eastern Railroad (NERR):** Nashville & Eastern Railroad runs 110 miles from Nashville east to Monterey, TN. NERR is a short-line railroad that has worked collaboratively with the Tennessee Department of Transportation (TDOT)

and the Nashville and Eastern Railroad Authority (NERA). NERR does not offer intermodal services and are somewhat limited in their abilities to expand, however they carry important goods from Nashville to east Tennessee. They serve about 40 industries and are responsible for moving about 9,000 carloads a year.

- **Nashville & Western Railroad (NWR):** As a sister railroad to NERR, NWR runs 18 miles from Nashville west to Ashland City, TN. NWR is a short-line railroad that has worked collaboratively with the Tennessee Department of Transportation (TDOT) and the Cheatham County Railroad Authority. NWR does not offer intermodal services and are somewhat limited in their abilities to expand, however they carry important goods from Nashville to Cheatham County. They serve about 7 industries and are responsible for moving about 600 carloads a year.

Figure 4-17 Freight Rail Network and Terminals

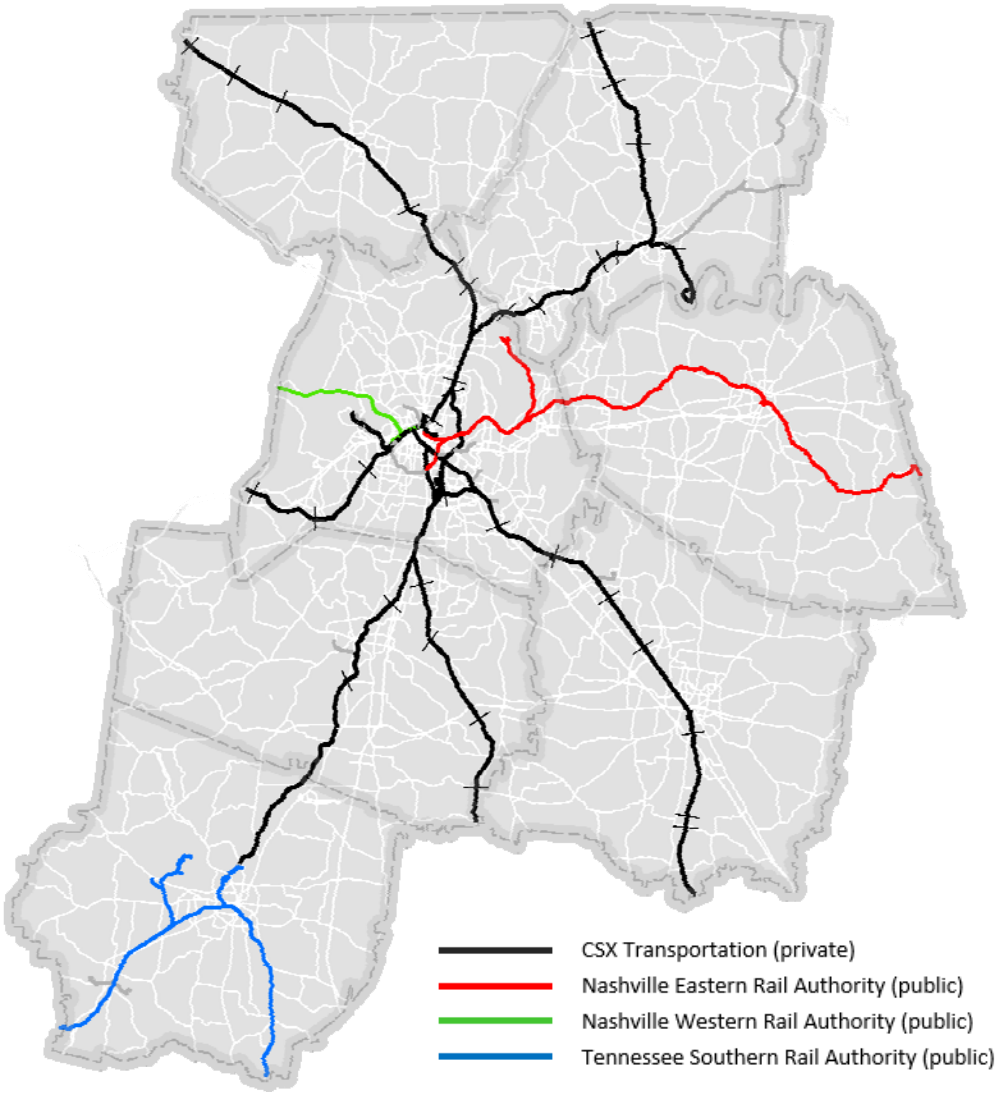


Figure 4-18 CSX Transportation Rail Network

Air & Water Freight Facilities

Across the state of Tennessee there are 79 public-use general aviation airports, 6 commercial airports, and over 140 heliports. Within the MPO planning area there 9 public-use airports including 8 general aviation airports, and 1 commercial airport. Three of those airports have facilities capable of shipping and receiving goods by air.

- **Nashville International Airport (BNA):** The largest and most active airport is the Nashville International Airport (BNA), with almost 70 thousand tons of freight annually in 2007. According to Airports Council International, BNA ranked 61 in total air cargo tonnage handled in North America in 2008. The Nashville International Airport is second busiest passenger airport in the state following Memphis International. The Nashville Airport covers more than 4,460 acres and is served by 16 scheduled air carriers. The Nashville Air Cargo Link all-cargo complex is located across the airfield from the passenger facility. The Air Cargo Link complex helps meet the high speed goods movement needs of area industries. Automotive manufacturers and health care facilities in particular rely on air cargo to keep their assembly lines moving and health care facilities supplied. FedEx operates a regional sort center at the airport. UPS used to operate aircraft at this facility but, within the last two years, switched to trucking air cargo to their global hub at Louisville Sanford International Airport (SDF). Until 2009, the airport received freighter flights on China Airlines 747 aircraft six days per week. This China Airlines flight supported Dell Computer's nearby assembly and distribution facility.
- **John C. Tune Airport (JWN):** Located on the west side of Nashville in Cockrill Bend off of Briley Parkway, JWN is owned and managed by the Metropolitan Nashville Airport Authority. It serves an important niche in Nashville's metropolitan economy by catering to corporate and personal aircraft users. The airport is capable of accommodating freight shipments, but it does not offer scheduled air cargo services.
- **Smyrna/Rutherford County Airport (MQY):** Located twelve nautical miles south of Nashville, Smyrna/Rutherford County Airport (MQY) is the "reliever" airport for Nashville. With more than 1,700 acres, MQY is the third largest airport and the busiest general aviation airport in Tennessee. It has an 8,000 foot runway which can handle Boeing-747 aircraft. The airport is within ten miles access to rail and three interstate systems which bisect Middle Tennessee. MQY handles corporate aviation, cargo, and aviation maintenance.

Nashville lies on the banks of the Cumberland River, an important waterway in the Southeastern United States that provides full river barge access to the Gulf of Mexico via the Ohio River. The waterway flows through southern Kentucky, looping through northern Tennessee before returning north to join the Ohio River after a course of 687 miles. Most of the river below Lake Cumberland's Wolf Creek Dam is navigable because of several locks and dams. Dams at various locations of the Cumberland River have created large reservoirs for recreation such as Lake Barkley, Lake Cumberland, Cordell Hull, Old Hickory, and Cheatham Lake. Laurel Lake, the Dale Hollow Reservoir, and Percy Priest Lake are each created by dams located just upstream from their respective confluences with the Cumberland River.

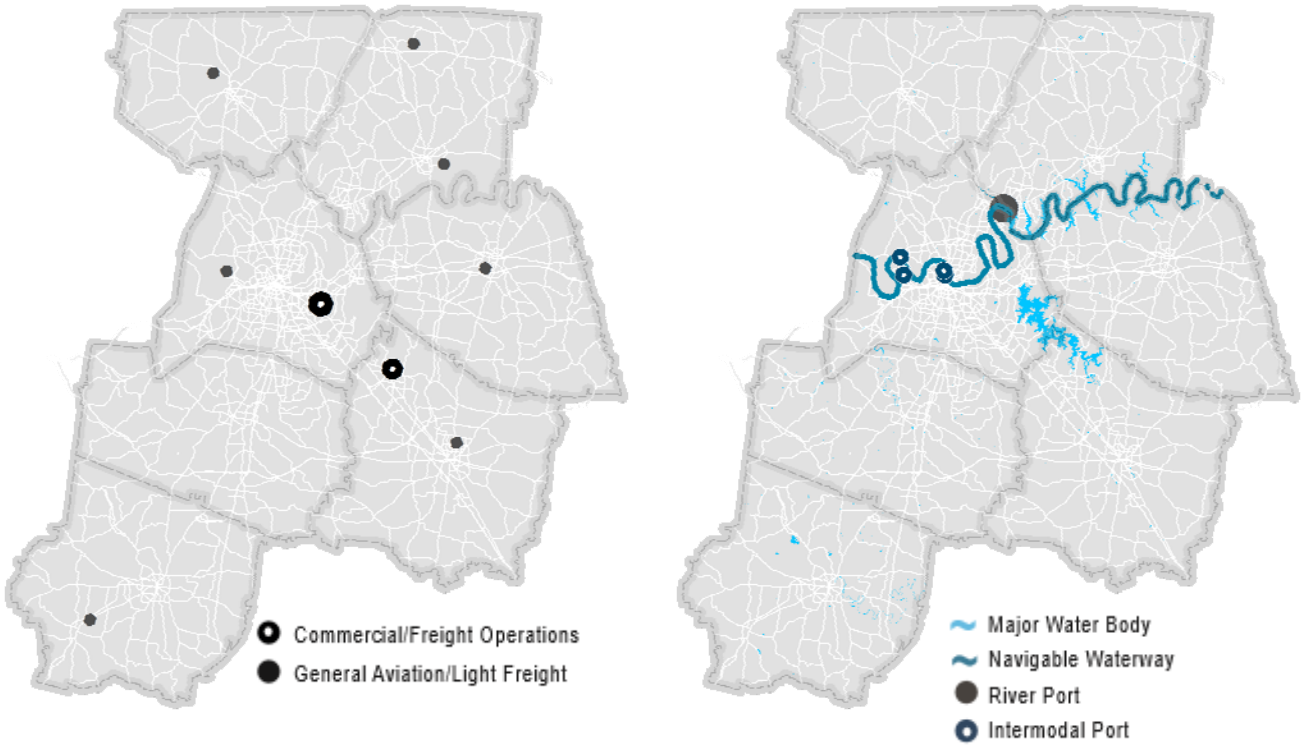
There are two single-chamber locks along the Cumberland River in the Nashville region: Old Hickory Lock and Dam upstream between the City and Gallatin, and Cheatham Lock and Dam downstream. These locks were both built in the 1950s and have been operational since that time. Port facilities in the Nashville region tend to have a channel depth of 9 to 10 feet.

The Port of Nashville is an official Port of Entry for the United States, including operating fully bonded customs capabilities. Most of the port facilities along the Cumberland in the Port of Nashville are privately owned and operated. The inland waterway system, including the lock and dam structures, is maintained by the U.S. Army Corps of Engineers. There are dozens of facilities located along the Cumberland in the Nashville region.

The majority of water transport is mostly inbound. Most of the freight is delivered by truck to nearby locations – usually terminating within twenty to thirty miles of the riverside. Steel for automotive plants, for example, is supplied in part by water and trucked south from Nashville. Aggregates like sand and gravel are the chief form of outbound traffic, and primarily originate at locations adjacent to the riverbank. Water carries approximately 3 percent of the total tons of freight in the Nashville region. 96 percent of the total tons of water freight are inbound to Nashville and Gallatin. Water freight transport is very limited by the available docking and inland waterways available for cargo shipments.

The two largest commodities are coal and nonmetallic minerals, accounting for 85 percent of the total water freight in the Nashville region. Most of the coal is delivered to the Gallatin power plant. Almost all the nonmetallic minerals (typically gravel and sand) are going to Nashville. Ingram Barge Company is the primary carrier of waterborne freight.

Figure 4-19 Air Cargo and Waterborne Freight Facilities



Intermodal Facilities

Intermodal freight facilities play an important role within the region, allowing commodities that travel over long distances on rail or barge to transfer to truck in order to support the delivery of goods to the local market. There are five key intermodal facilities across the area.

- **Radnor Intermodal Rail Yard** – Radnor Yard serves as the primary Class I rail yard for the region and is operated by CSX Transportation, Inc. This yard is used for rail to rail, rail to truck, and truck to rail transfers. The primary truck routes to the yard are SR 255 to Sidco Drive to the south of the facility, and I-65 to Sidco Drive via Armory Drive to the north.
- **CSX TRANSFLO** - This facility, located in Nashville near 2nd Street and Chestnut Street and operated by CSX, provides for the transfer of bulk materials from railcars to truck and containers.
- **Cherokee Marine Terminal** - Cherokee Marine Terminal Inc. operates a bulk dock in the Port of Nashville for shipping and receiving dry bulk commodities that include sand and gravel, coke, salt, ferroalloys, and dry bulk fertilizers. One surface rail track serves the storage area and connects with the CSX rail network. The terminal is located along the Cumberland River just west of I-24 between the I-65 Bridge and the Jefferson Street Bridge.
- **Lone Star Industries River Port** - Lone Star Industries handles bulk and break-bulk materials along the western side of the Cumberland River between the I-65 Bridge and the Jefferson Street Bridge. It primarily develops hydraulic cement used for construction activities.
- **BMI/Bulk Storage, Inc. River Port** - Bulk Materials International (BMI) is part of the Lafarge Group of companies and specializes in the supply of cementitious materials to the cement and construction industries. Products include blast furnace slag, fly ash, bottom ash, gypsum, silica fume, and copper slag. These are cementitious materials used in building and road construction. This facility is located along the Cumberland River west of downtown Nashville just south of Briley Parkway.

Additionally, CSX operates two Total Distribution Services, Inc. (TDSI) auto distribution terminals; one in Smyrna and one in Spring Hill to service the Nashville region's two automotive plants.