2015 motion RTA

NASHVILLE MTA/RTA STRATEGIC PLAN

STATE OF THE RTA SYSTEM REPORT

MARKET ANALYSIS

Nashville MTA

RTA

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CAMBRIDGE SYSTEMATICS

3. MARKET ANALYSIS

The RTA of Middle Tennessee serves a 10-county area that consists of Cheatham, Davidson, Dickson, Maury, Montgomery, Robertson, Rutherford, Sumner, Williamson, and Wilson Counties. The focal point of the region is Nashville and Davidson County where the largest numbers of the region's residents live and work and where the largest amounts of social and economic activity take place. As Nashville and Davidson County have grown, the surrounding nine counties have also grown. Some communities that are just beyond the Davidson County line, such as Brentwood, have effectively become part of the Nashville metro area, while others that are farther away, such as Clarksville and Murfreesboro, are regional centers whose ties with Nashville have been growing significantly and will continue to grow.

With the population and employment growth that has been occurring and that will continue to occur, travel has also increased—both to and from Nashville and Davidson County and within the nine surrounding counties. This chapter presents an overview of the factors that impact travel volumes and patterns in terms of how they are increasing the demand for better transit services.

MAJOR FACTORS IMPACTING UNDERLYING TRANSIT DEMAND

The underlying demand for transit is driven primarily by four factors, which are:

- **Local Conditions:** Land use diversity, design, regional destinations, and distance to quality transit are key factors that influence transit demand. There is an extremely strong correlation between development patterns and transit ridership. In areas with denser development, mixed-use development, and a good pedestrian environment, transit can become very convenient and, thus, attractive and well used. In most cases, these factors outweigh those directly controlled by the service provider.
- **Population and Employment Densities:** Put simply, where larger numbers of people live or work in close proximity, transit can be more effective, and transit demand is higher.
- **Socio-Economic Characteristics:** Different groups have different "propensities" to use transit service, and important characteristics related to transit demand include age, disability status, income, and race/ethnicity.
- **Travel Flows:** All trips involve travel from one point to another. Where there are large concentrations of trips—for example, to and from downtown Nashville—there will be sufficient numbers of people to fill buses and trains. In areas where trip patterns are very dispersed, there will not be.

In Middle Tennessee, there are two primary types of transit demand:

1. Local service in larger communities, and
2. Service to and from Nashville, primarily for work trips.

These two types of service are very different and serve different types of riders. Demand for the two types of service is driven by the same factors, but with one important exception. Although development patterns are still important, people who use longer distance services (in particular, commuter rail and express bus services) are much more willing to drive to access transit. As a result, park-and-ride access extends the effective reach of transit, which means that lower population densities can be effectively served. Park-and-ride access also means that more people who live in areas with disconnected street networks and poor pedestrian environments—both of which are common in much of Middle Tennessee—are able to access transit.

DEVELOPMENT PATTERNS AND TRANSIT DEMAND

Transit demand is strongly related to development patterns, in particular, development density. In areas with denser development, transit can be provided in close proximity to many people. Combined with a good pedestrian environment, transit can become very convenient and, thus, attractive and well used. In most cases, these "external" factors outweigh those directly controlled by the service provider.

As Nashville has grown, the metropolitan area has grown beyond Davidson County, and the populations and economic activities in the surrounding nine counties have become increasingly linked with Nashville and Davidson County. Outlying communities such as Clarksville, Springfield, Gallatin, Lebanon, Murfreesboro, Franklin, and Spring Hill, while retaining unique identities, have also become bedroom communities to Nashville, with residents commuting to and from Nashville. Some, such as Brentwood, have become part of the Nashville metro area, and others, such as Cool Springs, are very new and representative of the region's growth.

As is the case with most areas that developed rapidly since the 1940s, Middle Tennessee has developed around the automobile, but to an even greater extent. In 2001, USA Today ranked Nashville as the nation's most sprawling metropolitan area.[1] Thirteen years later, Smart Growth America ranked the Nashville area as the second most sprawling in the country (after Atlanta).[2] The Nashville region has been sprawling for many years. This sprawl has spread the demand for better transit outward from Nashville, while at the same time making the provision of convenient and effective transit much more challenging.

LOCAL CONDITIONS

Land use diversity, design, regional destinations, and distance to quality transit are key factors that influence transit demand. Demand management (pricing, incentives, and other information-based programs) is also important. Referred to as the "6Ds," these are major factors that will influence the demand for and success of transit in Middle Tennessee (see Figure 19).

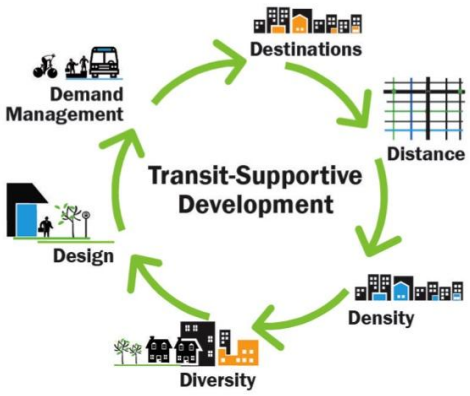
DESTINATIONS

People are more likely to choose transit when it can conveniently take them where they want to go. At present, RTA provides commuter service to Nashville, and three local transit systems provide service in Clarksville (Clarksville Transit System), Murfreesboro (Rover), and Franklin (Franklin Transit Authority). As described in the Overview of Existing Services, most RTA service is provided during peak hours and primarily in peak commute directions only (inbound to Nashville in the morning and outbound in the afternoon). Looking forward, service will need to expand to serve emerging destinations and connect more destinations across the region.

[1] *A Comprehensive Look at Sprawl in America,* USA Today, February 22, 2001.
[2] *Measuring Sprawl 2014*, Smart Growth America, April 2014.

FIGURE 19 OVERVIEW OF FACTORS INFLUENCING TRANSIT DEMAND - THE "6DS"

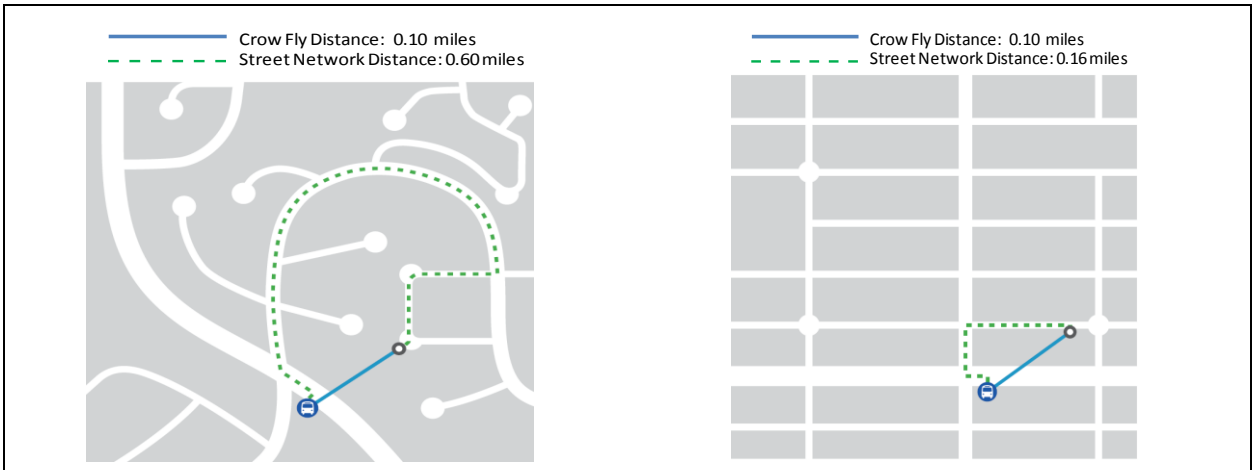
6D Factor	Principle
Destinations	Align major destinations along reasonably direct corridors served by frequent transit
Distance	Provide an interconnected system of pedestrian routes so that people can conveniently access transit
Density	Concentrate higher densities close to frequent transit stops and stations and multimodal nodes
Diversity	Provide a rich mix of pedestrian-friendly uses to support street-level activity throughout the day and night
Design	Design high-quality, pedestrian-friendly spaces that connect people seamlessly to transit
Demand Management	Provide attractive alternatives to driving by managing parking, providing incentives not to drive, and/or providing programs to help educate people about driving alternatives



DISTANCE

Both street connectivity and block length strongly influence people's likelihood of walking or biking to transit. Interconnected streets in a grid pattern tend to shorten distances between transit stops and destinations. Neighborhoods where all roads are designed to connect to arterials or collector streets allow transit customers to reach bus stops without walking out of their way and provide more efficient routing options that can support high frequency service (see Figure 20).

FIGURE 20 STREET NETWORK DESIGN AND WALK DISTANCES TO TRANSIT



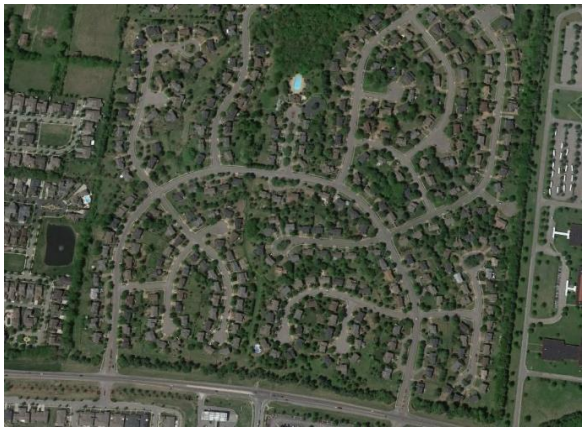
A disconnected street network (shown at left) with long blocks and indirect streets results in long walking distances and less efficient transit operations. A well-connected street network (shown at right) enables shorter more direct walking connections and is easier to serve cost effectively with transit.

Source: TransLink Transit Oriented Communities (2011)

The grid-like street patterns in older downtowns such as downtown Murfreesboro support easy and comfortable access to transit (see Figure 21). However, in many newer areas, for example, Founders Pointe in Franklin, pedestrian connections to streets that are suitable for transit are very limited (see Figure 22). Primarily for this reason, most RTA services rely on park-and-ride lots for access.

FIGURE 21 CONNECTED STREET NETWORK IN DOWNTOWN MURFREESBORO

FIGURE 22 LIMITED CONNECTIONS TO ARTERIALS IN FOUNDERS POINTE

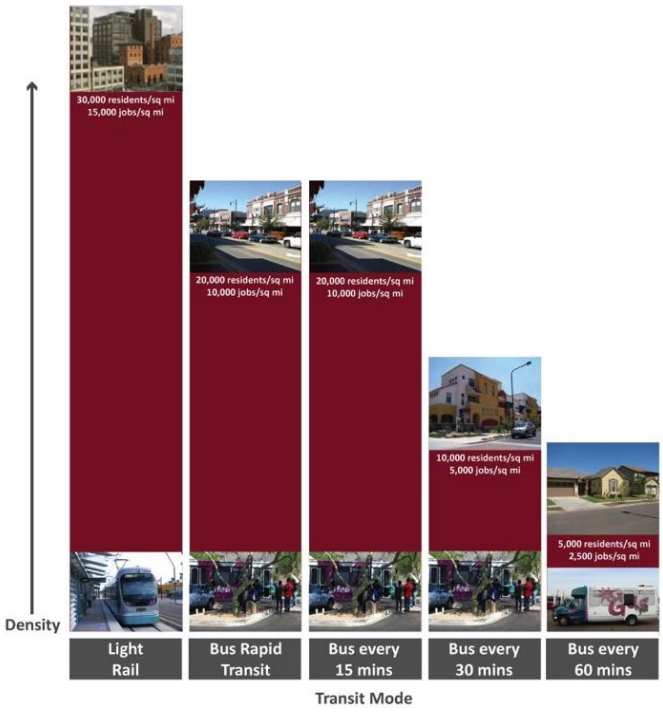


Source: Google Maps

DENSITY

Population and employment densities determine how many people will be able to access transit. By extension, they also strongly influence the amount of service that will be required (see Figure 23) and, in turn, the types of riders who will use transit. Infrequent service is inconvenient and will largely serve residents and workers who, for one reason or another, cannot drive. Conversely, frequent service is convenient and will attract many who choose to take transit rather than use other travel modes. Frequent service is clearly desirable but, because of the operating costs involved and to avoid running empty buses, transit service levels must be matched to demand. As described further in this chapter, there are densities of population and employment in Middle Tennessee's larger communities that are sufficient to support transit service; this is not the case in less developed areas.

FIGURE 23 RELATIONSHIP BETWEEN DENSITY AND TRANSIT DEMAND



Source: Composite data compiled by Nelson\Nygaard from various sources

DIVERSITY

Traditional zoning separates land uses, sets maximum densities and minimum lot sizes, and usually contains explicit regulations such as bulk and height limits and minimum parking requirements. This approach generally encourages automobile use and discourages transit use (see Figure 24). Mixed-use development, which reverses this approach, is now becoming more popular as it creates a more interesting environment. It also encourages transit, walking, and bicycling and focuses much less on automobiles and parking.

FIGURE 24 TRADITIONAL ZONING AND SPRAWLING DEVELOPMENT ALONG MEMORIAL BOULEVARD IN SPRINGFIELD, TN

Source: Google Maps

In Middle Tennessee, the land uses that are most compatible with transit are in older communities such as Clarksville, Franklin, Gallatin, and Murfreesboro. Conversely, newer areas such as Cool Springs and Spring Hill have more sprawling development patterns that make the provision of attractive transit service more difficult.

DESIGN

People will not use transit if it is difficult or dangerous to use. Safe and accessible streets are essential to ensure that people will be able to access transit easily and feel safe doing so. Transit stops and stations must be attractive and clean and include amenities like benches, trash cans, and schedule information. As RTA plans for future investments in transit, coordination with the communities it serves to prioritize safe bicycle and pedestrian access to transit will be required. A framework to invest in transit station amenities at high demand stops will also be important to build demand for transit. In a similar manner as development diversity, Middle Tennessee's older communities generally have better pedestrian and bicycling environments than more recently developed areas.

DEMAND MANAGEMENT

Demand management measures can be used to encourage transit use and discourage automobile use. RTA manages a ride-matching database to coordinate carpools and rideshares for commuters in the region. In addition, participants qualify for RTA's Emergency Ride Home program, which provides six taxi trips per year for any regular transit rider who has a sickness in their immediate family, is asked to work late by a supervisor, or cannot make their regular rideshare due to extenuating circumstances. Beyond these efforts, a comprehensive transportation demand management program that works with employers and residents to provide information and incentives related to taking transit will be a necessary step to increase transit ridership.

CURRENT AND PROJECTED DEVELOPMENT PATTERNS

Development in Middle Tennessee is centered in Nashville and generally decreases with distance from there. However, rather than decreasing uniformly, development outside of Nashville is highly focused along the region's radial highways, in and around the older communities of Clarksville, Dixon, Franklin, Brentwood, Murfreesboro, Lebanon, Gallatin, and Springfield (see Figure 25). Development has also occurred in a few areas where most growth has begun only recently, such as Cool Springs and Spring Hill. These areas are also located along Middle Tennessee's radial highways. In between those highways, most areas are still rural and development is sparse.

Looking forward to 2040, development patterns will be similar to current patterns, but with significantly higher levels of both population and employment and with more development in areas between radial highways. These future patterns indicate that demand for local transit will grow in regional centers and demand for commuter service to and from Nashville will also grow.

TRANSIT DEMAND

POPULATION AND EMPLOYMENT

For transit to be successful, it must be frequent, fast, and easy to access. More than any other factor, population and employment density will determine whether this will be possible:

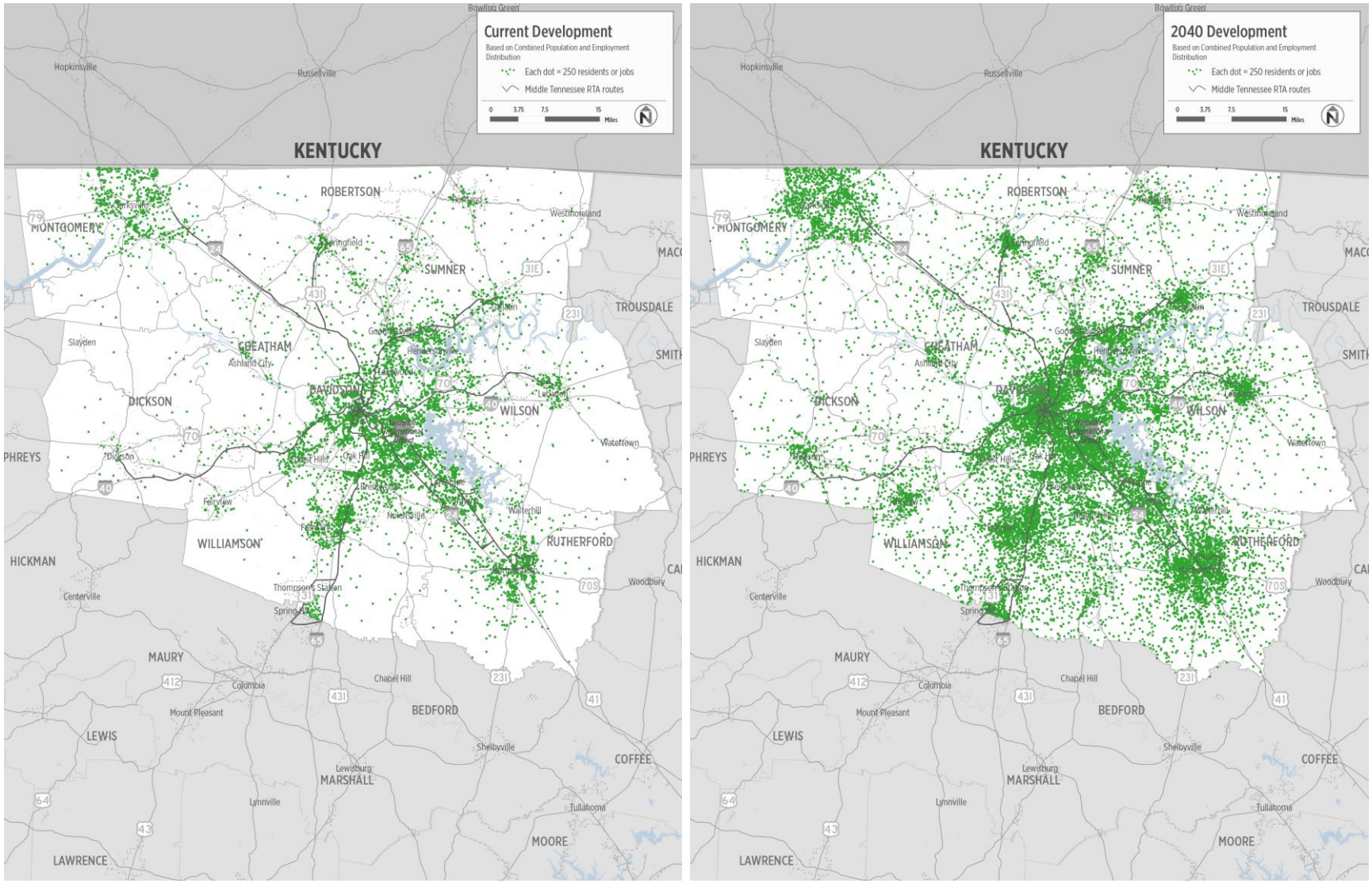
- Transit needs to serve sufficiently high volumes of travelers to be cost effective, and the density of development determines the overall size of the travel market. The reach of transit is generally limited to within one-quarter to one-half mile of the transit line or station; therefore, the size of the travel market is directly related to the density of development in the area.
- Transit service frequencies, in turn, are closely related to market size. Bigger markets support more frequent service, while smaller markets can support only less frequent service.
- To attract travelers who have other options, such as automobiles, transit must be relatively frequent—at least every 30 minutes and preferably every 10 to 15 minutes. Service less frequent than that can be expected to largely serve those who do not drive or cannot drive.

In addition, population and employment levels and densities provide an indication of the types of riders that transit will serve. In general terms, there are two types of transit riders:

- **Riders with Many Choices,** who have sufficient resources and the ability to operate private vehicles but choose to use transit for some or all trips. These riders may choose transit to avoid congestion, the high cost of long commutes, or high parking charges, among other reasons.
- **Riders with Limited Choices,** who are often referred to as "transit dependent riders," use transit services because they do not have an automobile available for their trip or are unable to operate a private vehicle. Because they have fewer travel options, they rely more on transit than riders with many choices. Riders with fewer choices are also more likely to use transit to get to appointments, shop, and visit friends and family.

Transit dependent riders are often located in densely populated areas, and the combination of discretionary and transit-dependent riders produces demand for even more frequent service that increases the attractiveness of transit for discretionary riders. However, in less densely developed areas, the overall demand is lower, and consequently service levels are lower. As a result, transit dependent riders often comprise a large majority of riders on local services in smaller communities such as those in Middle Tennessee. There are exceptions to this however; for example, fast longer distance express services, which through a combination of local access and park-and-ride access, can pool sufficient numbers of riders from lower density communities to attract many riders with other choices. In Middle

FIGURE 25 CURRENT AND PROJECTED DEVELOPMENT (BASED ON COMBINED POPULATION AND EMPLOYMENT DISTRIBUTION)



Tennessee, and as described further in this document, the major markets for transit are and will continue to be for commuter services to and from Nashville and for local services in regional centers.

2010 Population Distribution

As shown in Figure 26, outside of Davidson County, the majority of Middle Tennessee's population is concentrated in 12 regional centers. These include:

- Clarksville
- Cool Springs
- Dickson
- Gallatin
- Hendersonville
- La Vergne
- Lebanon
- Mt. Juliet
- Murfreesboro
- Smyrna
- Springfield
- Spring Hill

Three of these communities—Clarksville, Franklin, and Murfreesboro—have local bus systems. Two communities—Lebanon and Mt. Juliet—are served by the Music City Star, which provides commuter rail service to and from Nashville. All except Lebanon and Mt. Juliet are served with RTA express bus service to and from Nashville. However, as also described in more detail in the Overview of Existing Services, much of this service is very limited in terms of the hours it operates, the number of trips provided, and service frequencies.

2010 Population Density

As described above, population and employment densities are two of the strongest indicators of both where the demand for transit will be highest and where transit will work best. As such, with respect to population, population densities provide an indication of the underlying population-based demand for transit in terms of the type and frequency of service that would be most appropriate.

As shown in Table 7, there must be eight to 16 residents per acre to produce demand for hourly service, which is the lowest level of service that is generally considered acceptable. As densities grow, the demands for transit grow, particularly with respect to more frequent service. Population densities higher than around 31 residents per acre produce demand for frequent services (every 15 minutes or less) and premium services.

TABLE 7 TRANSIT-SUPPORTIVE POPULATION DENSITIES

Transit Service Level	Population/Acre
Flex Bus	0.5
Community Circulator	2
Local Bus	
60-minute frequency	8-16
30-minute frequency	16-31
15-minute frequency	31-47
10-minute frequency	47-92
5-minute frequency	>92

Source: Nelson\Nygaard compiled from various national sources

FIGURE 26 2010 POPULATION DISTRIBUTION

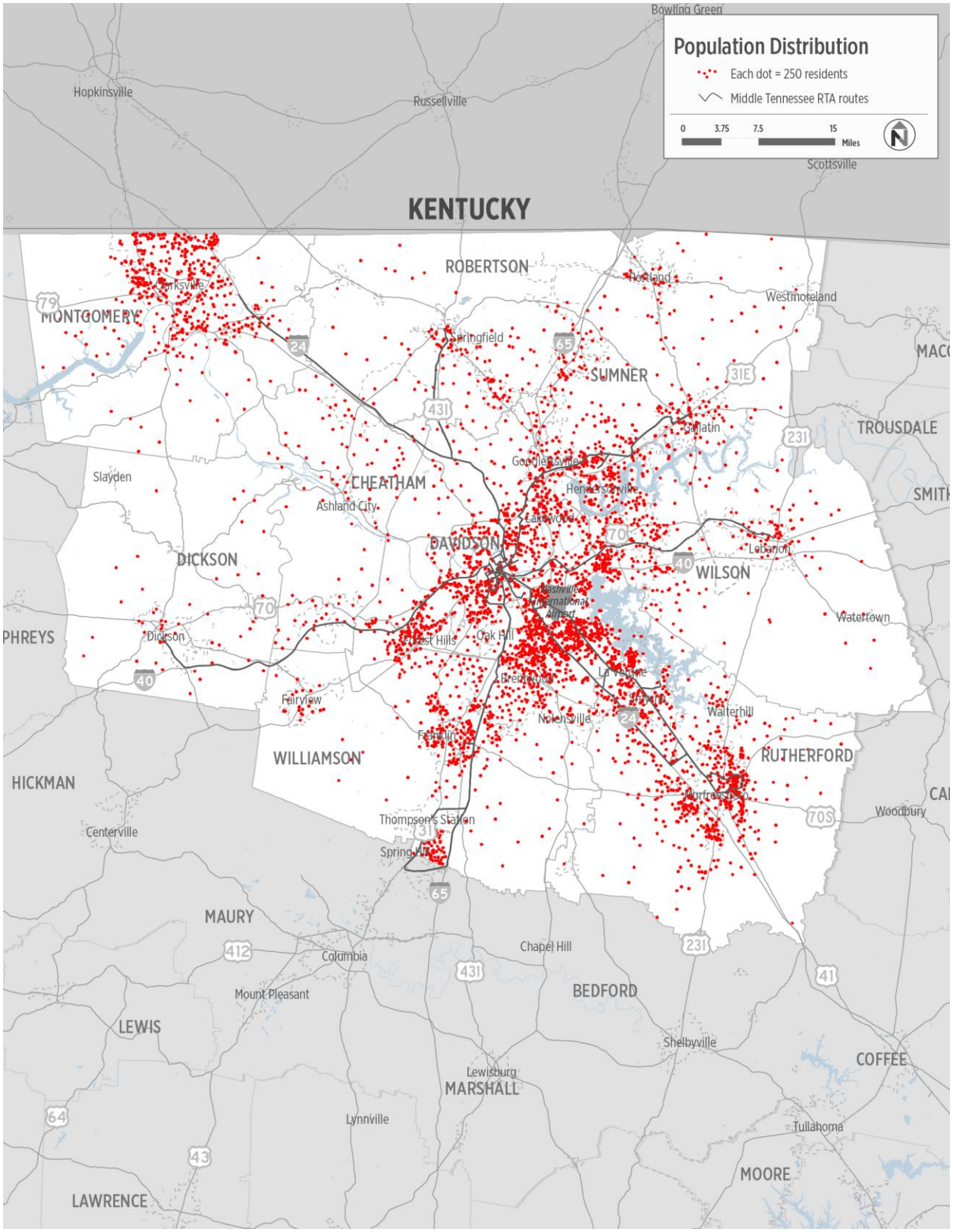
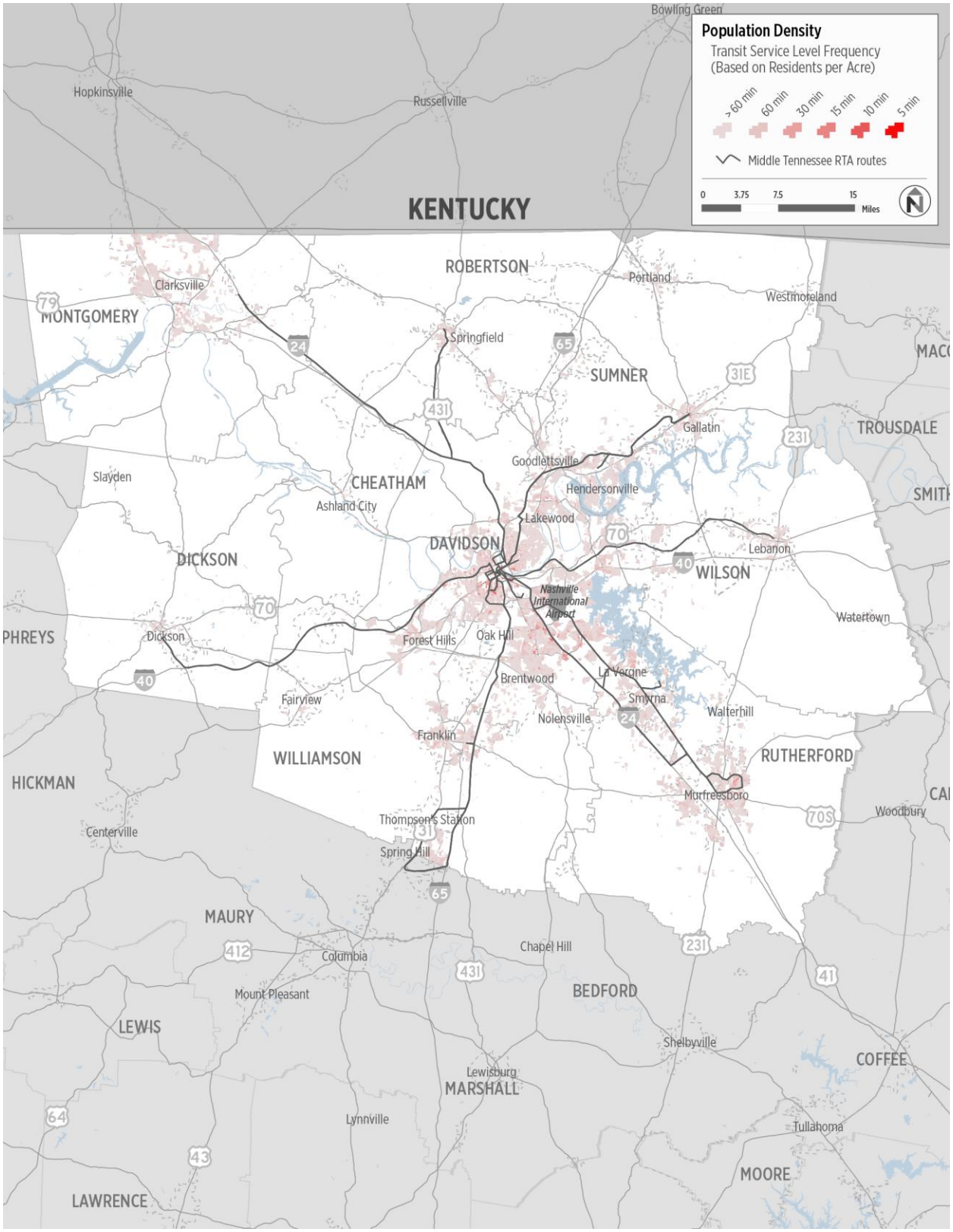


FIGURE 27 2010 POPULATION DENSITY



Based on population density alone, there are relatively few concentrations of dense residential development outside of Nashville that can support fixed-route transit service. Those that could are located in established town and city centers as well as their immediate surroundings. These are shown in Figure 27 and include:

- Clarksville, particularly the neighborhoods along the US 41 Alternate corridor from the intersection with Route 76 to Fort Campbell in Kentucky. Clarksville Transit Service provides local transit in Clarksville.
- Murfreesboro, where Rover provides local service.
- Downtown Franklin and neighborhoods to the north and southeast, where Franklin Transit provides service.
- Communities adjacent to the US 31 East corridor northeast of Nashville, especially portions of Hendersonville and downtown Gallatin. These areas do not have any local service.

Numerous other communities have pockets of residential density that could support transit service frequencies of 60 minutes or better. These areas, however, are scattered throughout the region and would be unlikely to support fixed-route transit in isolation.

2010 Employment Distribution

The distribution of employment opportunities is a second strong indicator of transit demand, as commute-based trips are the most common use of public transportation services. Employment outside of Davidson County is generally concentrated near the centers of established towns and along radial highways (see Figure 28). There are also several commercial and industrial clusters located along or at the intersections of major interstates and highways, including:

- Brentwood, located at the interchange of Interstate 65 and Old Hickory Boulevard, which is home to several corporate headquarters, including Comdata and Tractor Supply Company.
- The I-24/US-79 interchange in Clarksville, especially to the southwest of the interchange along US-79.
- La Vergne and Smyrna, particularly between Interstate 24 and Murfreesboro Pike, which includes numerous warehouse and automotive manufacturing facilities, such as plants operated by Nissan and Bridgestone.
- Cool Springs, a major retail and office center along Interstate 65 in Franklin.

Local connections are provided to many of the employment areas in Clarksville, Franklin, and Cool Springs. However, much of this service is limited. Also, while all of the above areas are served by RTA express routes, those routes are not designed to serve reverse commute trips.

2010 EMPLOYMENT DENSITY

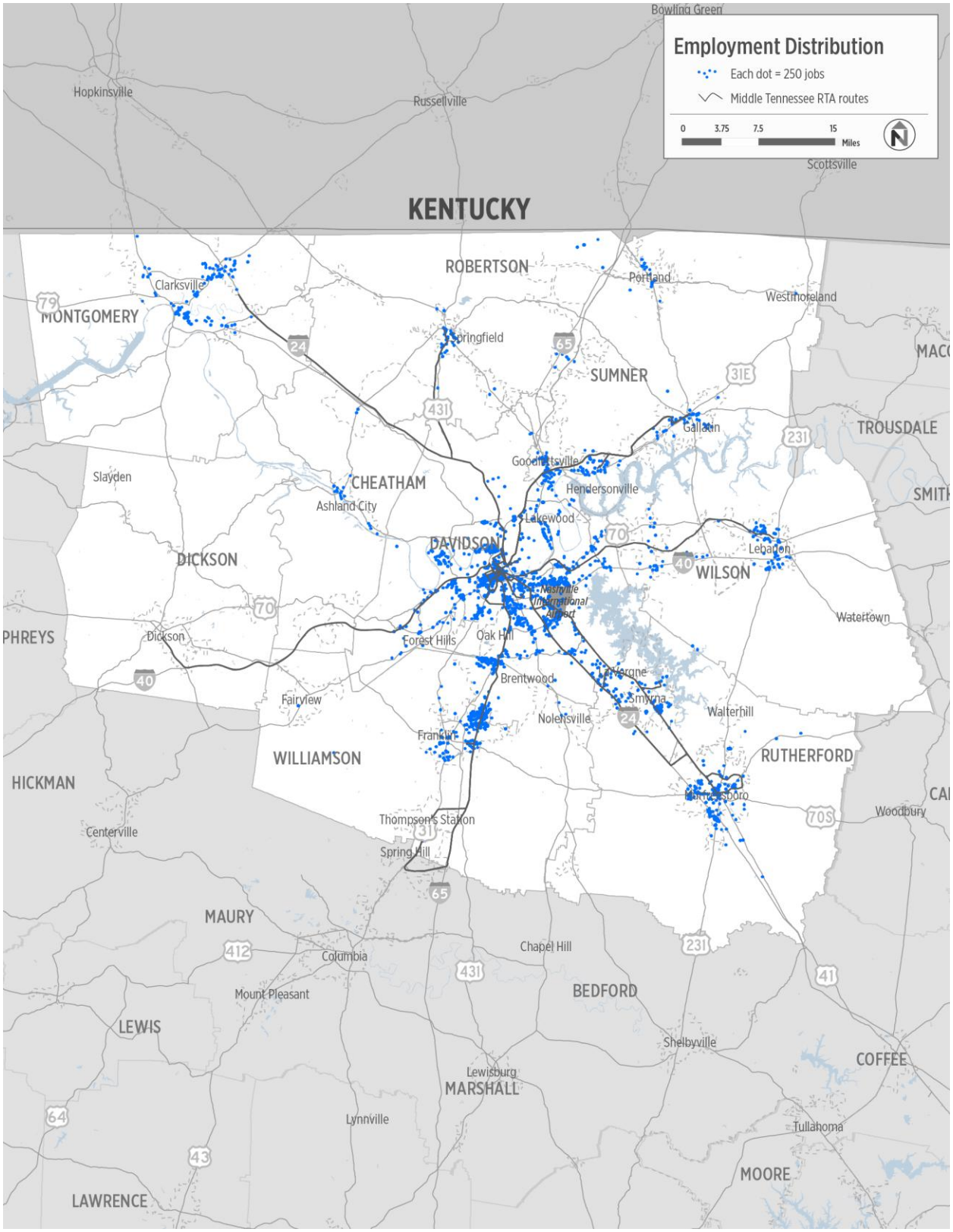
In the same manner as population densities, employment densities provide a strong indication of underlying employment-based transit demand. As shown in Table 8, four to eight jobs per acre typically produce demand for hourly bus service. As densities grow, the demands for transit grow, particularly with respect to more frequent service. Employment densities higher than around 16 jobs per acre produce demand for frequent services (every 15 minutes or less) and premium services.

TABLE 8 TRANSIT-SUPPORTIVE EMPLOYMENT DENSITIES

Transit Service Level	Population/Acre
Flex Bus	-
Community Circulator	-
Local Bus	
60-minute frequency	4-8
30-minute frequency	8-16
15-minute frequency	16-24
10-minute frequency	24-48
5-minute frequency	>48

Source: Nelson\Nygaard compiled from various national sources

FIGURE 28 2010 EMPLOYMENT DISTRIBUTION



Although there are a number of major employment centers in Middle Tennessee, only those in Brentwood and Cool Springs and parts of Murfreesboro could currently support local transit service based on employment levels alone (see Figure 29). Other areas with employment densities that could support transit service are generally located near the center of established cities and towns. These employment centers, however, are typically very small and consist primarily of retail establishments. The variable hours of most retail jobs are likely not conducive to the extremely low transit service frequencies that these employment centers could support.

2010 COMBINED POPULATION AND EMPLOYMENT-BASED DEMAND

When both population and employment densities are considered together, transit demand is often significantly higher than indicated by the individual measures. This is especially the case in mixed-use areas (see Figure 30).On this basis, there are several areas where there is demand for local bus services:

- Franklin and Cool Springs (which are served by Franklin Transit).
- Clarksville, especially the city center and points to the northwest towards Fort Campbell and to the northeast towards Interstate 64 (served by Clarksville Transit).
- Murfreesboro (which is served by Murfreesboro Rover).
- The US 31 East corridor extending from Nashville to Gallatin, including within Hendersonville and Gallatin. These communities are just beyond the limits of Nashville MTA's service area.
- Lebanon and Mt. Juliet, which are both located along RTA's Music City Star commuter rail. Both of these communities could likely support local bus services.

SOCIO-ECONOMIC CHARACTERISTICS

Many population groups have a higher propensity for transit use than the general population. These include:

- **Millennials,** who have a significantly higher interest in using many transportation options such as transit, walking, and biking and a lower interest in driving. In many cases, the availability of good transit is an important factor in where they will live.
- **Older Adults,** who as they age often become less comfortable or less able to operate a vehicle. Transit offers older adults the freedom to stay in their homes as they transition away from their vehicles and "age in place."
- **People with Disabilities,** many of whom cannot drive and or have difficulty driving.
- **Low-Income Residents,** who often use transit because it is much less expensive than owning and operating a car.
- **Minorities,** who often have lower incomes and use transit because it is much less expensive than owning a car.

An additional population that uses transit to a much greater extent than the general population is residents without automobiles. In larger cities, many residents do not have an automobile by choice because transit is more attractive, car ownership is a hassle, and there plentiful options such as taxis, car sharing, and car rentals for the times when a car is desired or needed. However, in urban areas such as Nashville that are oriented toward automobile travel and where transit options are much more limited, people without automobiles are largely those with lower incomes or people who do not drive.

FIGURE 29 2010 EMPLOYMENT DENSITY

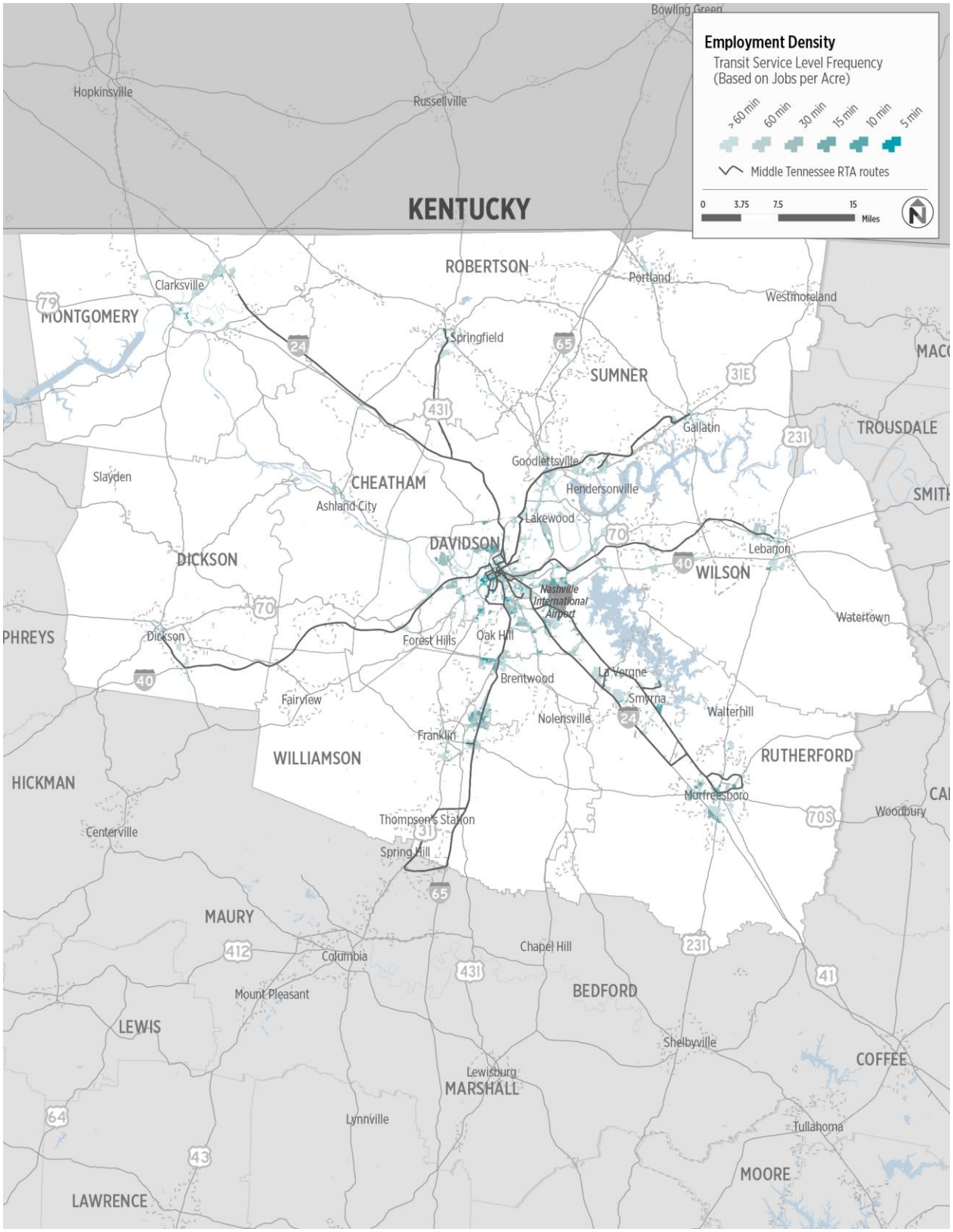
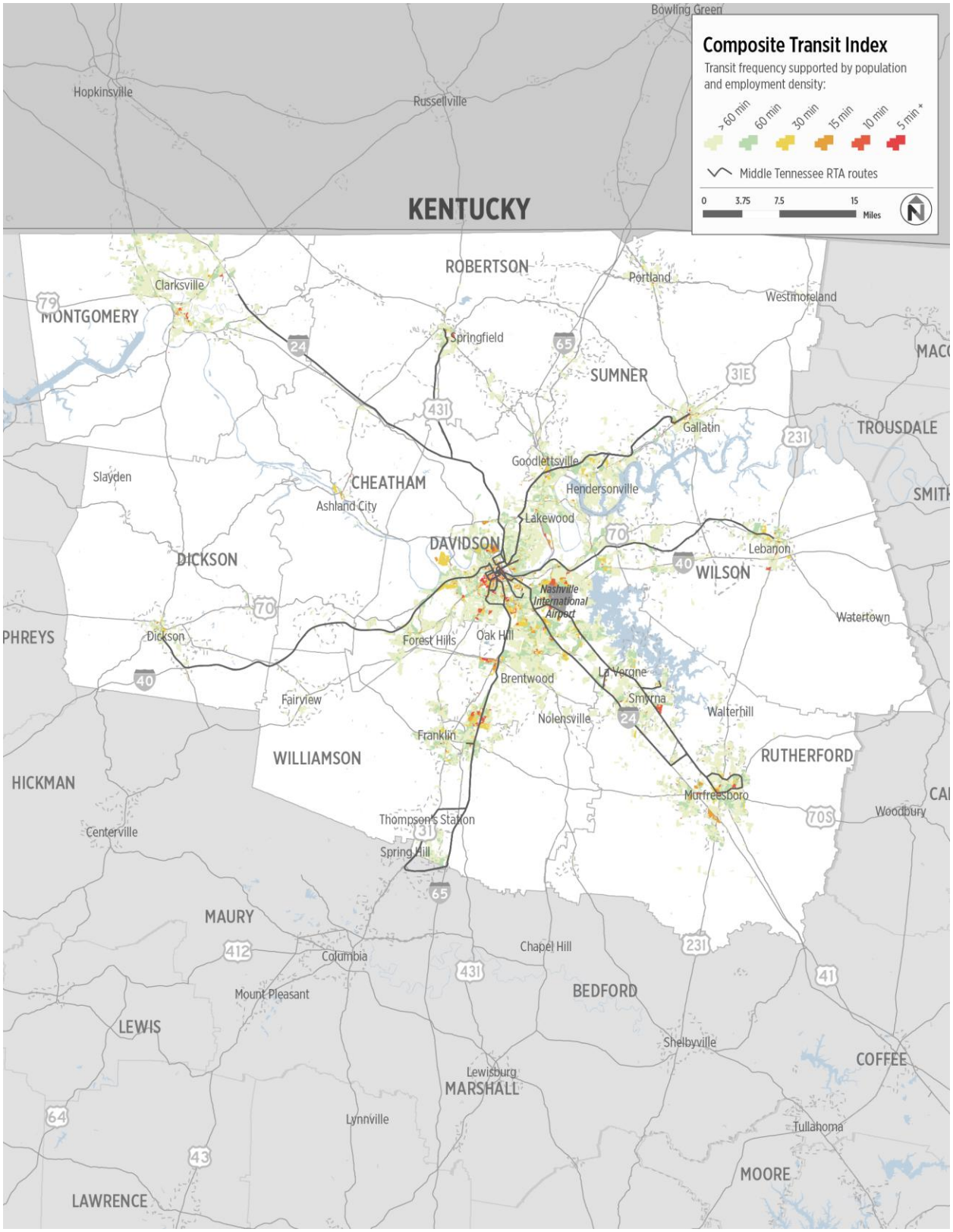


FIGURE 30 2010 COMPOSITE TRANSIT INDEX



Note that there is a large amount of overlap between these groups. For example, many elderly residents have low incomes and also have a disability; a large proportion of individuals without access to an automobile are also part of low-income households; and minority populations typically use transit to a greater extent because of low incomes and not specifically due to ethnic background. Still, the presence of each population group is an important indicator of increased demand for public transit and, therefore, is presented individually.

Millennials

The distribution of Millennials in Middle Tennessee generally reflects the distribution of the general population, as shown in Figure 31. Millennials comprise 29% of the nine-county Middle Tennessee region. However, they are more likely to live in the region's largest cities, and as a result, the largest share of Middle Tennessee's Millennials (38%) lives in Davidson County. Concentrations of Millennials outside of Davidson County include:

- Murfreesboro, especially at Middle Tennessee State University and surrounding neighborhoods
- Clarksville, particularly in the neighborhoods north of downtown approaching Fort Campbell in Kentucky
- Downtown Franklin

Each of these communities is served by local fixed-route service, as well as RTA commuter bus lines.

Older Adults

Baby Boomers, and those before them, increasingly desire to remain as active and independent as possible and to age in place. One important way for them to remain independent is through the availability of transit. There are over 101,000 adults over the age of 65, representing 10% of Middle Tennessee's population (excluding Davidson County). In the northeast suburbs, residents over the age of 65 are concentrated in communities such as Mt. Juliet, Hendersonville, and Goodlettsville (see Figure 32). These communities lack local fixed-route bus services. There is also a notable cluster of older adults in Murfreesboro, particularly in the northern part of the city. Compared to other demographic groups, older adults are much less likely to live in Clarksville, apart from a cluster of assisted living facilities located near the intersection of US 41A and Memorial Drive.

People with Disabilities

While many people with disabilities are able to drive, many cannot. As a result, public transportation, including both general fixed-route bus service and specialized paratransit services, is an essential resource to ensure people with disabilities are able to live actively and productively.

The distribution of people with disabilities generally reflects the overall population distribution within the Middle Tennessee region, and accounts for 10% of the nine-county region's population. People with disabilities are most concentrated in Nashville and its surrounding suburbs (see Figure 33). Outside of this area, people with disabilities primarily live within or in proximity to established city and town centers. The most notable concentrations include Murfreesboro and Clarksville, the two largest cities other than Nashville. Additionally, people with disabilities are also lightly dispersed throughout the more rural areas of Middle Tennessee.

Low-Income Households

People with low incomes tend to use transit to a greater extent than higher income residents because transit provides significant cost savings over automobile ownership and use. As shown in Figure 34, low-income households in the Middle Tennessee region are primarily concentrated in the area's largest urban areas: 6% of households in Davidson County are considered low-income, compared to 4% of households in the rest of Middle Tennessee. Outside of Davidson County, Murfreesboro and Clarksville have relatively large low-income populations. In Murfreesboro, low-income households are particularly concentrated in the east part of the city. In Clarksville, low-income households are less concentrated, but primarily located in neighborhoods along the US 41A corridor. Other areas with concentrations of low-income households include:

- Gallatin, particularly northeast of US 31E. This community is served by an RTA express bus, but otherwise has no access to public transit.

FIGURE 31 2010 DISTRIBUTION OF MILLENNIALS

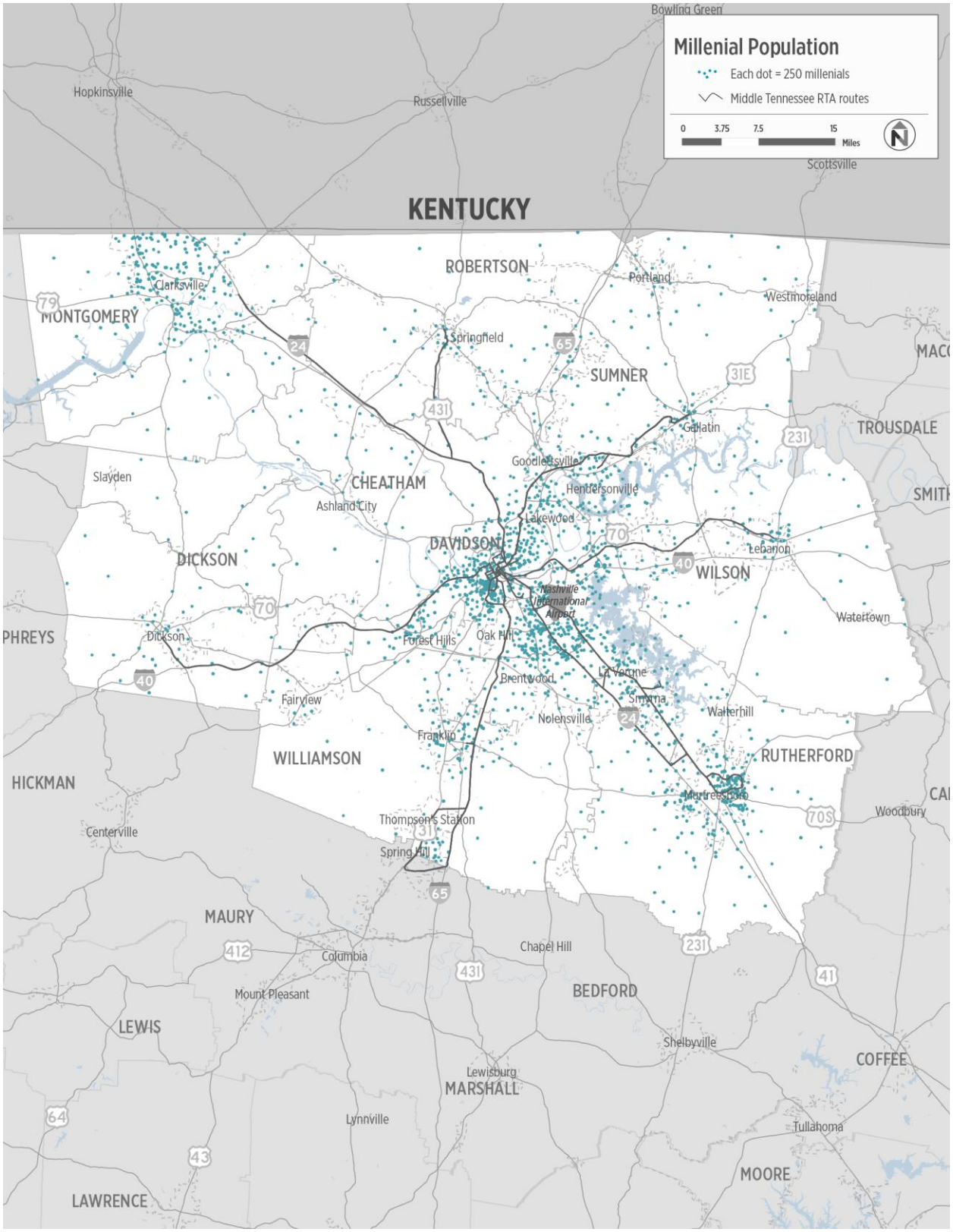


FIGURE 32 2010 DISTRIBUTION OF OLDER ADULTS (65 AND OLDER)

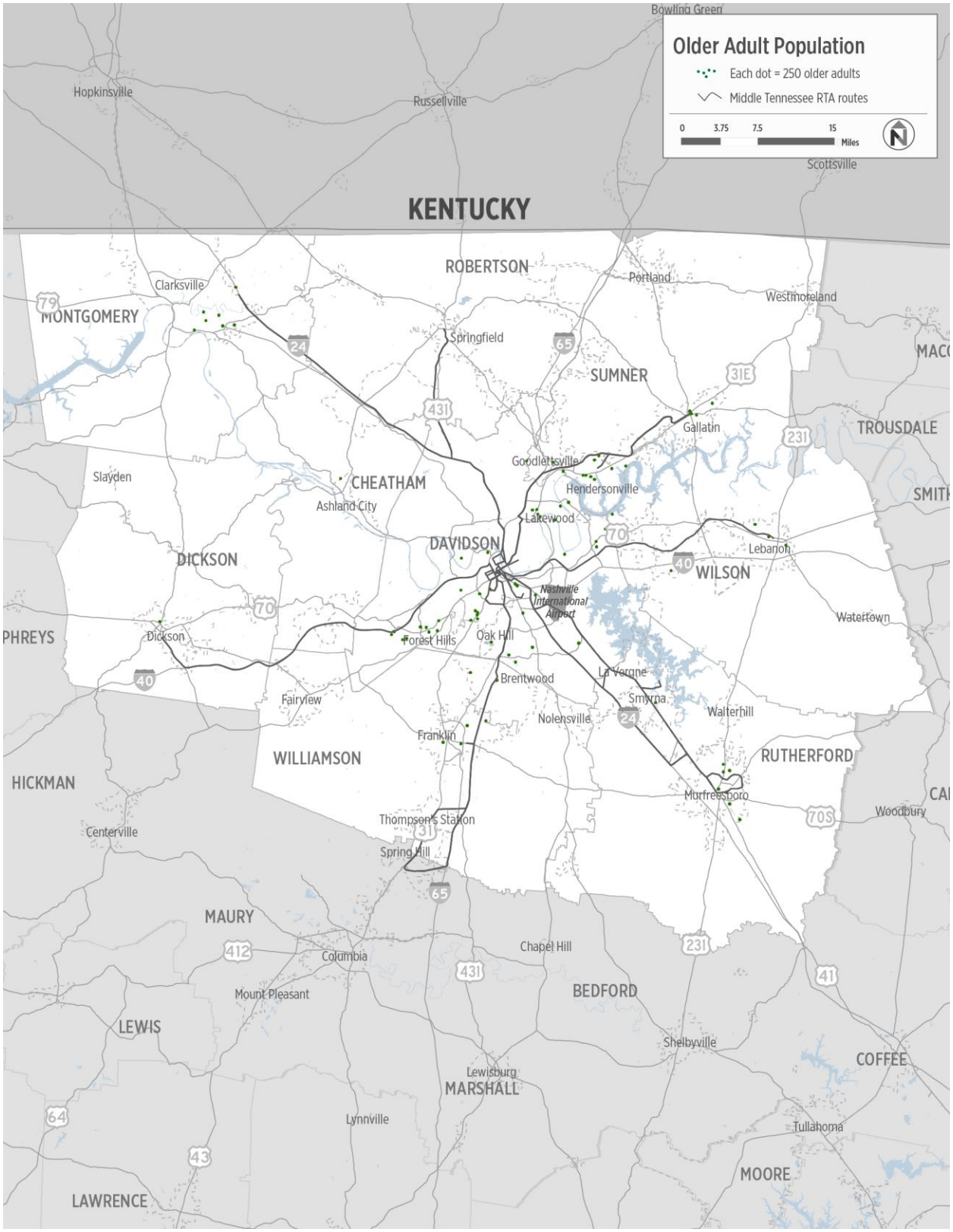


FIGURE 33 2010 DISTRIBUTION OF PEOPLE WITH DISABILITIES

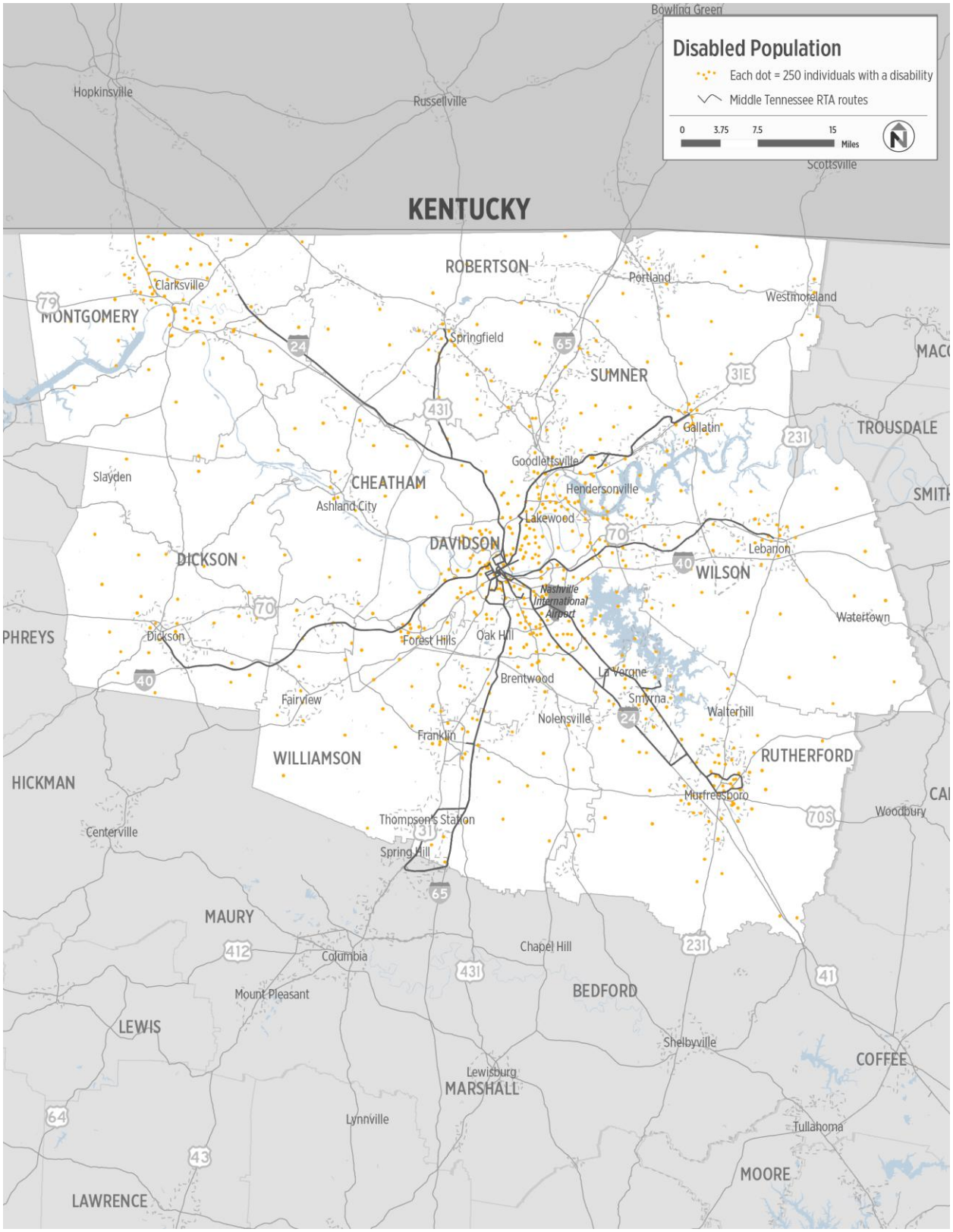
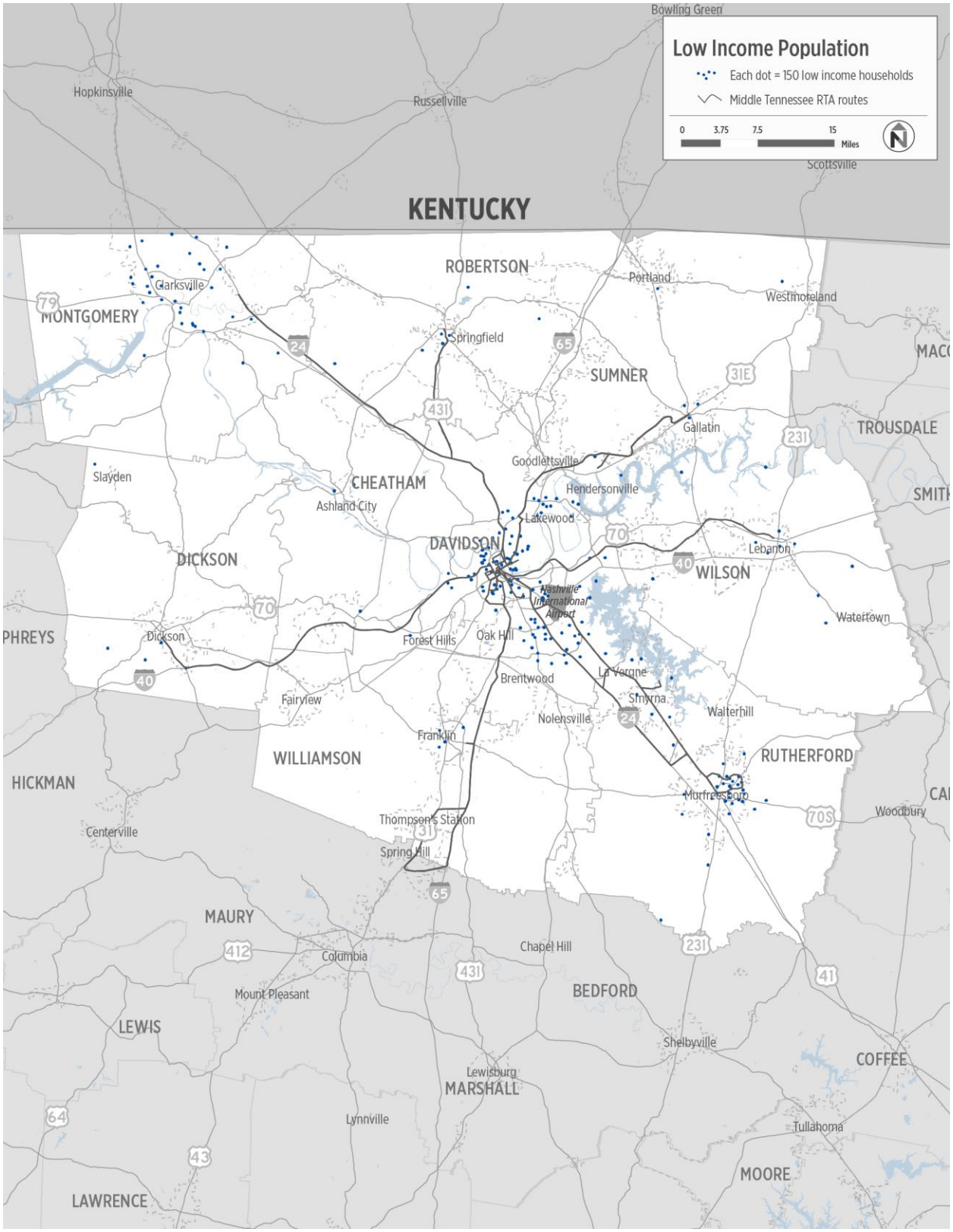


FIGURE 34 2010 DISTRIBUTION OF LOW-INCOME HOUSEHOLDS



- Established cities and towns in the southern portion of the Middle Tennessee region, including Columbia. None of these communities have access to fixed-route public transportation services.

Overall, due to their concentration primarily in dense urban areas, low-income households in the Middle Tennessee region have access to public transportation services. However, it should be noted that there are many low-income households, especially in the rural and southern portion of the region, in neighborhoods that likely cannot support fixed-route transit services.

MINORITY POPULATIONS

Minority populations use transit to a much greater extent than non-minority populations, largely because they tend to have lower incomes than non-minorities. This means that there is a large amount of overlap between minority populations and low-income households; however, the presence of high numbers of minority residents still provides an additional strong indicator of transit demand. The provision of effective transit service to minority populations is also particularly important to the Federal Transit Administration and is a requirement under Title VI of the Civil Rights Act of 1964.

The minority population of the Middle Tennessee region is almost exclusively concentrated in the region's major cities, primarily Nashville. In Davidson County, 39% of the population is considered minority, compared to 16% in the rest of Middle Tennessee. Clarksville and Murfreesboro also have significant minority populations, and the distribution of minorities generally reflects the overall population distribution (see Figure 35). Many of the smaller cities in the region also have large minority populations. Several of these cities—including Lebanon, Gallatin, Springfield, and Franklin—are served by RTA commuter rail or bus lines. While these services provide some transit access, none of these communities has local fixed-route transit other than Franklin.

FUTURE TRANSIT DEMAND

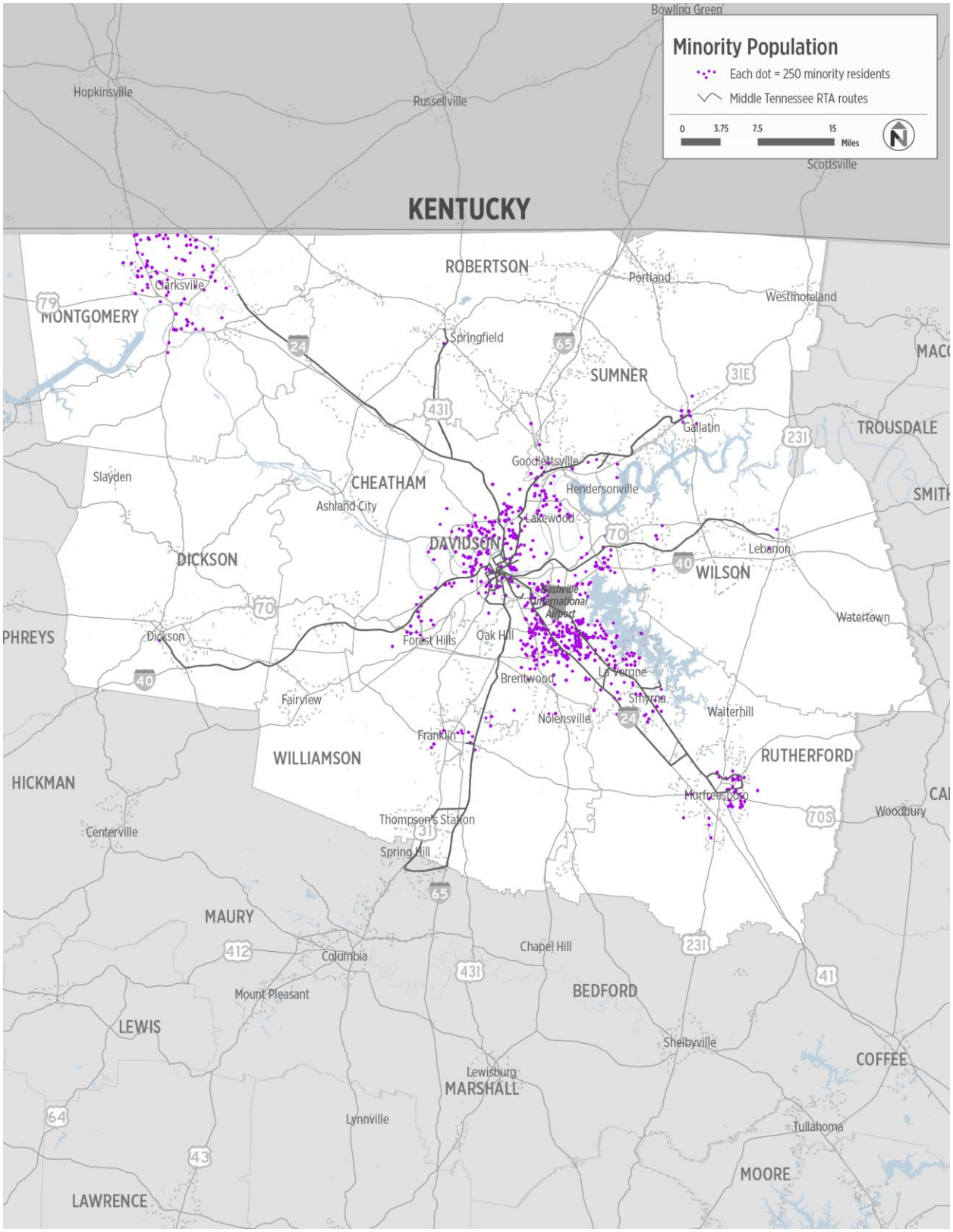
Future transit demand in the Middle Tennessee region will be driven by a number of factors, the most important of which will be the area's population and employment growth.

PROJECTED POPULATION AND EMPLOYMENT GROWTH

Between 2010 and 2040, the population of the 10-county area will grow by 80% from 1.7 million to nearly 3.1 million, and most of this population growth will occur in the nine counties surrounding Davidson County (see Figure 36).[3] The largest amount of growth, in both percentage terms and absolute terms, will be in Williamson and Robertson Counties. In Williamson County, the population is projected to increase between 2010 and 2040 by 207% from 174,000 to 536,000 residents, and in Rutherford County, it is projected to increase by 135% from 251,000 to 592,000 residents. Wilson and Montgomery Counties will also add more than 100,000 new residents. By comparison, and

[3] The Nashville Area Metropolitan Planning Organization (MPO) has developed 25-year employment and population growth projections for the central portion of the region, including all or part of Davidson, Robertson, Sumner, Wilson, Rutherford, Williamson, and Maury counties. The Clarksville Urbanized Area Metropolitan Planning Organization (Clarksville MPO) generated 25-year population and employment growth projections for Montgomery County. Projected 2040 population and employment in Cheatham and Dickson counties was generated by the Tennessee Department of Transportation (TDOT).

FIGURE 35 2010 DISTRIBUTION OF MINORITY POPULATIONS



while Davidson County will remain the center of the region and its largest county, its population is projected to increase by only 22%.

Employment in the region is projected to an even greater extent than employment, from 796,000 jobs in 2010 to over 1.8 million jobs in 2040, or by 133%. As with population growth, jobs will grow faster in the nine counties that surround Davidson County than in Davidson County (178% versus 96%). However, Nashville and Davidson County will remain the region's employment center, with over 47% of the region's jobs.

These increases in population and jobs will have profound impacts on travel within the region:

- The volumes of commuters to Nashville will increase significantly, as 111% of the region's population growth will be in the nine counties surrounding Davidson County, and 38% of the new jobs will be created within Davidson County. This will create significant new demands for commuter services to serve jobs in Nashville's core.
- By 2040, the number of jobs that will be outside of Davidson County will increase from 534,000 to more than a million, and from 50% of the total to 55%. These increases in jobs will mean that many Davidson County residents will begin commuting to jobs outside of Davidson County, which will increase the demand for reverse commute transit service.
- Increases in both population and jobs will increase the demand for local services, both to serve local trips and to connect with regional services.

FIGURE 36 MIDDLE TENNESSEE POPULATION GROWTH

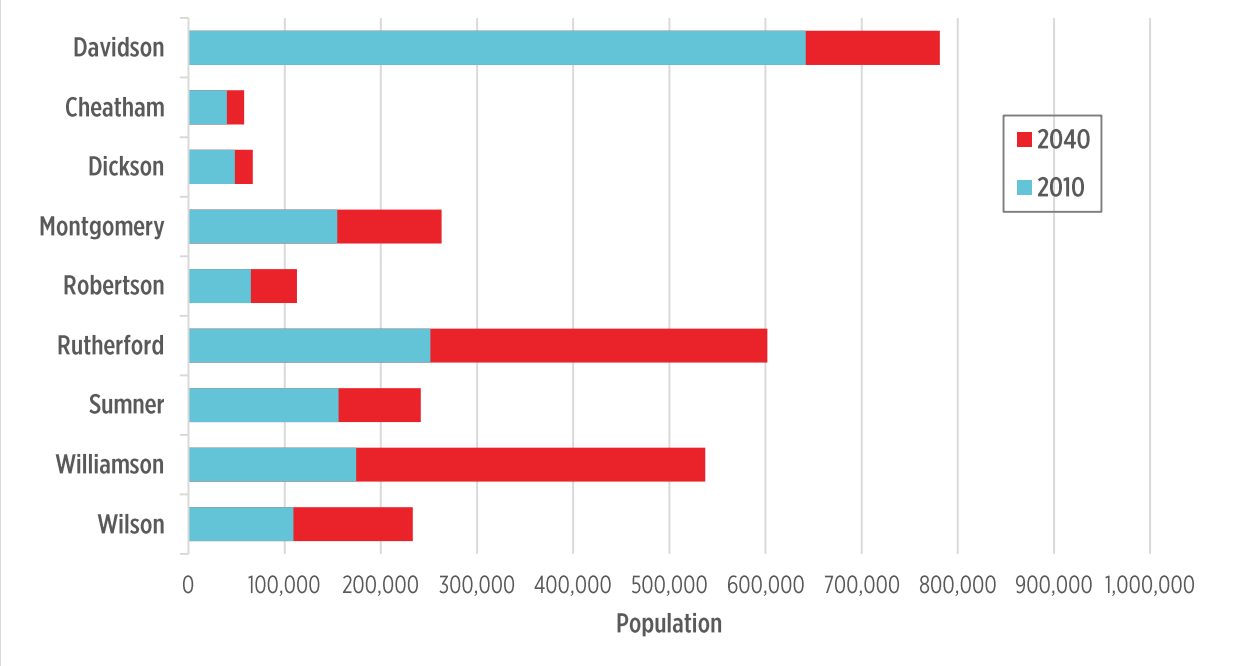
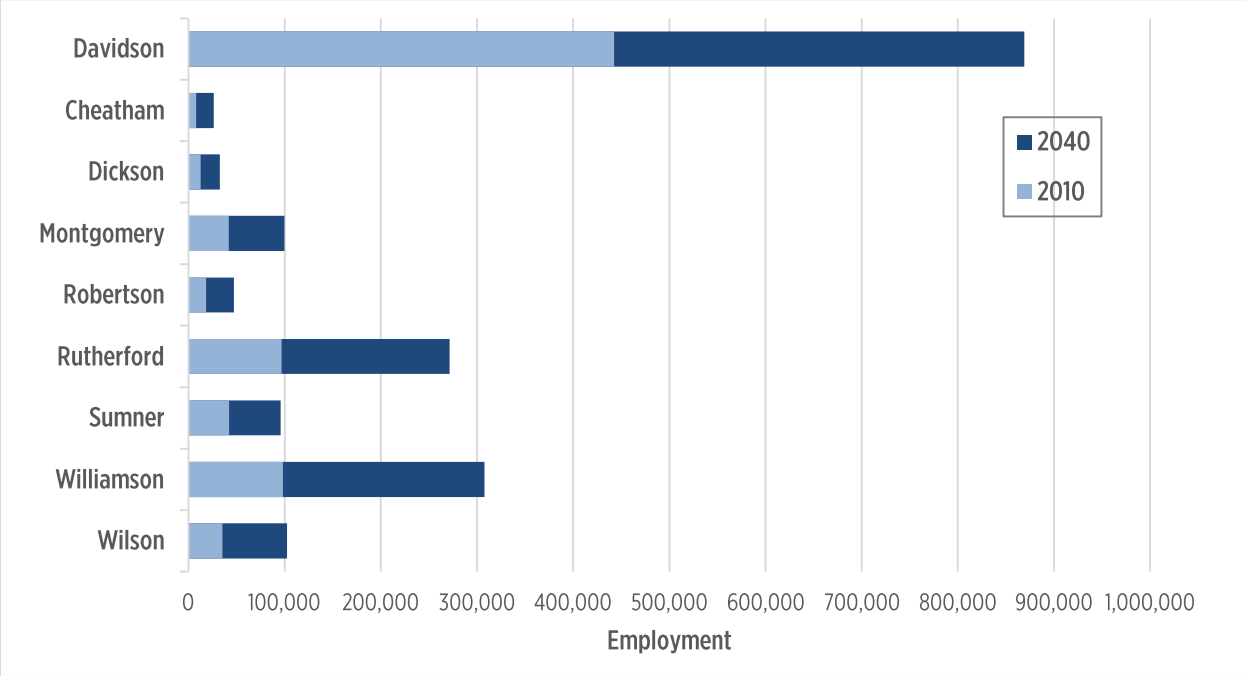


FIGURE 37 MIDDLE TENNESSEE EMPLOYMENT GROWTH



2040 Population Distribution

Between 2015 and 2040, population is expected to increase significantly in the central portion of the Middle Tennessee region. The entire region is projected to add over a million people in the next 25 years, reaching 3.1 million in 2040. Excluding Davidson County, the nine-county region's population will more than double. Population growth outside of Davidson County will be particularly concentrated to the southeast, including Murfreesboro (see Figure 38). Other areas with large projected population increases include Franklin, Mt. Juliet, and neighborhoods to the northeast of Lebanon.

Much of the population growth between 2015 and 2040 is anticipated to occur in what are currently lightly developed or greenfield neighborhoods. Furthermore, much of the growth will occur in areas that currently lack any public transit service, especially in the area between Franklin and Murfreesboro. In order for this area to support fixed-route public transportation services, new neighborhoods should have land use and roadway designs that promote and support transit use.

2040 Population Density

By 2040, increased population in many Middle Tennessee communities will result in an expanded number of neighborhoods that can support fixed-route public transit services (see Figure 39). The majority of these new neighborhoods will be located next to areas that are already served by transit. This will reduce the number of transit-supportive communities that are currently isolated from other higher-density areas. This increased demand for service will also increase the demand for express services.

Areas that are projected to be able to support fixed-route services can be seen in and include:

- The neighborhoods bordering Murfreesboro Pike in La Vergne and Smyrna. Murfreesboro Pike currently has RTA commuter bus service, but neither RTA nor Murfreesboro Rover serves the adjacent neighborhoods.
- The Interstate 65 corridor from Spring Hill to Nashville, including Franklin, Cool Springs, and Brentwood. Portions of this corridor are currently served by Franklin Transit, as well as RTA commuter bus service.
- Nolensville, which currently does not have any fixed-route transit service.

FIGURE 38 2040 POPULATION DISTRIBUTION

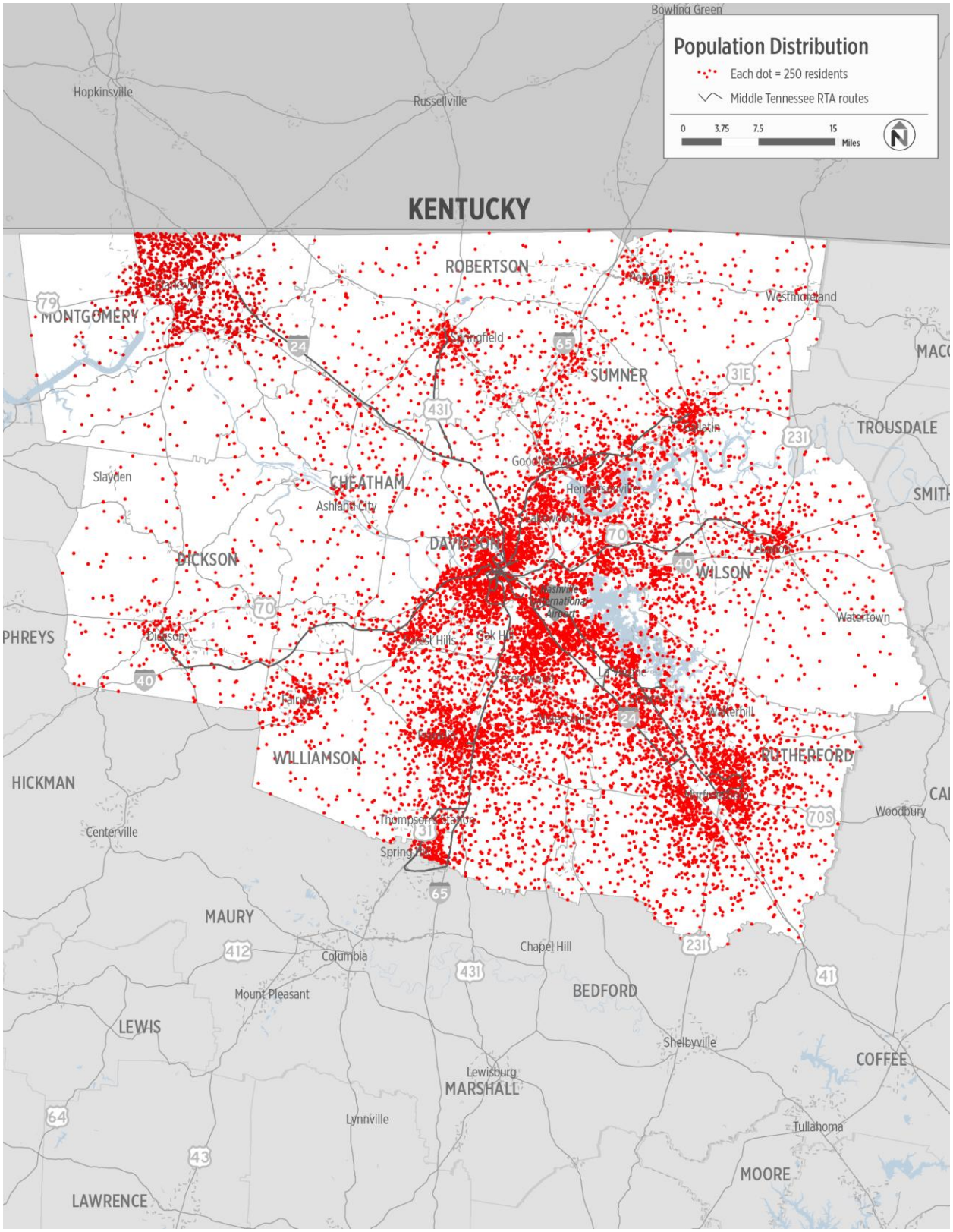
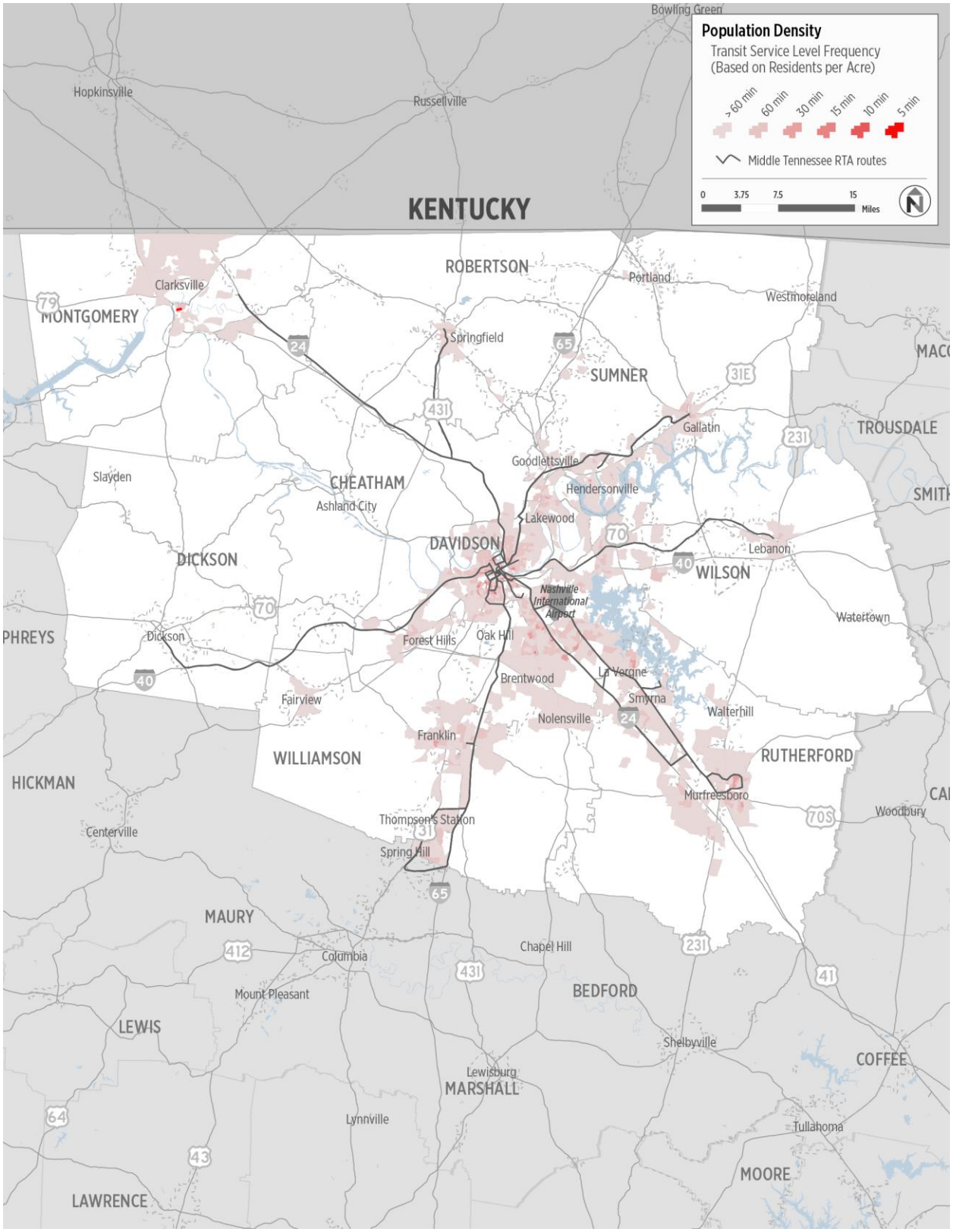


FIGURE 39 2040 POPULATION DENSITY



2040 Employment Distribution

Between 2015 and 2040, much of the growth in employment will occur in and around existing employment centers, such as Murfreesboro and Cool Springs. Growth is also expected in and around established cities and towns, such as Lebanon, Gallatin, and Columbia. The most notable employment growth, however, will be dispersed among what are currently lightly or undeveloped areas, especially in neighborhoods south of Nashville (see Figure 40). These growth areas include:

- Dickson, where RTA commuter bus service was implemented in January 2015.
- Fairview and areas to the northwest, as well as to the southwest in central Williamson County.
- The area near the split of US Alternate 31 and US 41 A, including Eagleville. This location is expected to develop a dense employment concentration.

2040 Employment Density

Much of the employment growth projected between 2015 and 2040 is anticipated to occur in neighborhoods with existing high frequency transit service or across widely dispersed areas. Therefore, the significant projected increase in employment growth will not result in a significant increase in neighborhoods where employment densities can support fixed-route transit. As shown in Figure 41, increased employment in transit-supportive neighborhoods outside of Nashville will primarily occur in two adjacent areas:

- La Vergne and the northern part of Smyrna. This area is currently served by RTA commuter bus service.
- Murfreesboro, including neighborhoods that are currently served by Rover.

Although a large share of new employment will be located outside of areas that may support fixed-route service, there will be increased demand for transit in the form of reverse-commute services that bring workers from Davidson County to jobs in the rest of the region.

2040 COMBINED POPULATION AND EMPLOYMENT-BASED DEMAND

As noted above, much of the growth in residential population and employment between 2015 and 2040 will occur in and around established cities and towns, particularly along major regional corridors radiating out from Nashville (see Figure 42). There will also be significant growth widely dispersed across currently undeveloped areas. The increase in more transit supportive development along the major corridors indicates potential demand for new or increased regional services to and from Nashville, especially all-day and reverse-commute services:

- **Southeast,** along I-24 and US 41, including the communities of Murfreesboro, La Vergne, and Smyrna. This corridor is already served by RTA Routes 84X Murfreesboro Express and 86X Smyrna/La Vergne Express during peak hours, as well as by Route 96X Murfreesboro Relax & Ride, which operates trips in both directions throughout the day.
- **South,** along I-65 south of Nashville, connecting to Brentwood, Cool Springs, and Franklin. This corridor is currently served by Routes 91X Franklin Express and 95X Spring Hill Express.
- **Northeast,** including Goodlettsville, Hendersonville, and Gallatin, which are currently served by Routes 87X Gallatin Express and 92X Hendersonville Express.

Along all three corridors, higher levels of development will likely produce demand for more all-day and reverse-commute service, such as Route 96X Murfreesboro Relax & Ride, which serves Murfreesboro, Smyrna, and La Vergne throughout the day. There will likely also be demand for all-day regional services in the northeast, east, and south corridors as well.

In some regional centers, increasing population and employment levels will create demand for new and expanded local services. At present, local transit service is provided in Clarksville, Franklin, and Murfreesboro. As these

FIGURE 40 2040 EMPLOYMENT DISTRIBUTION

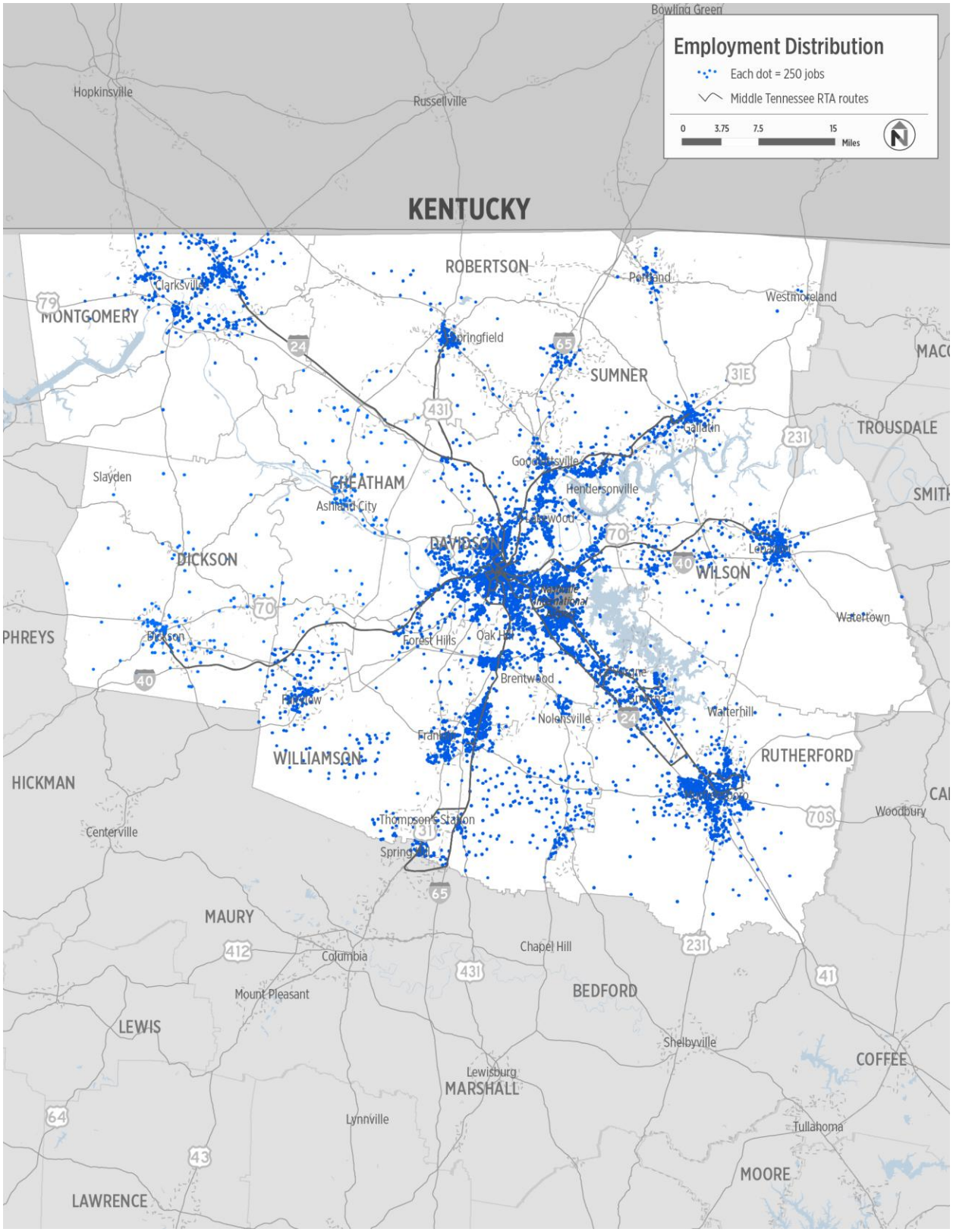


FIGURE 41 2040 EMPLOYMENT DENSITY

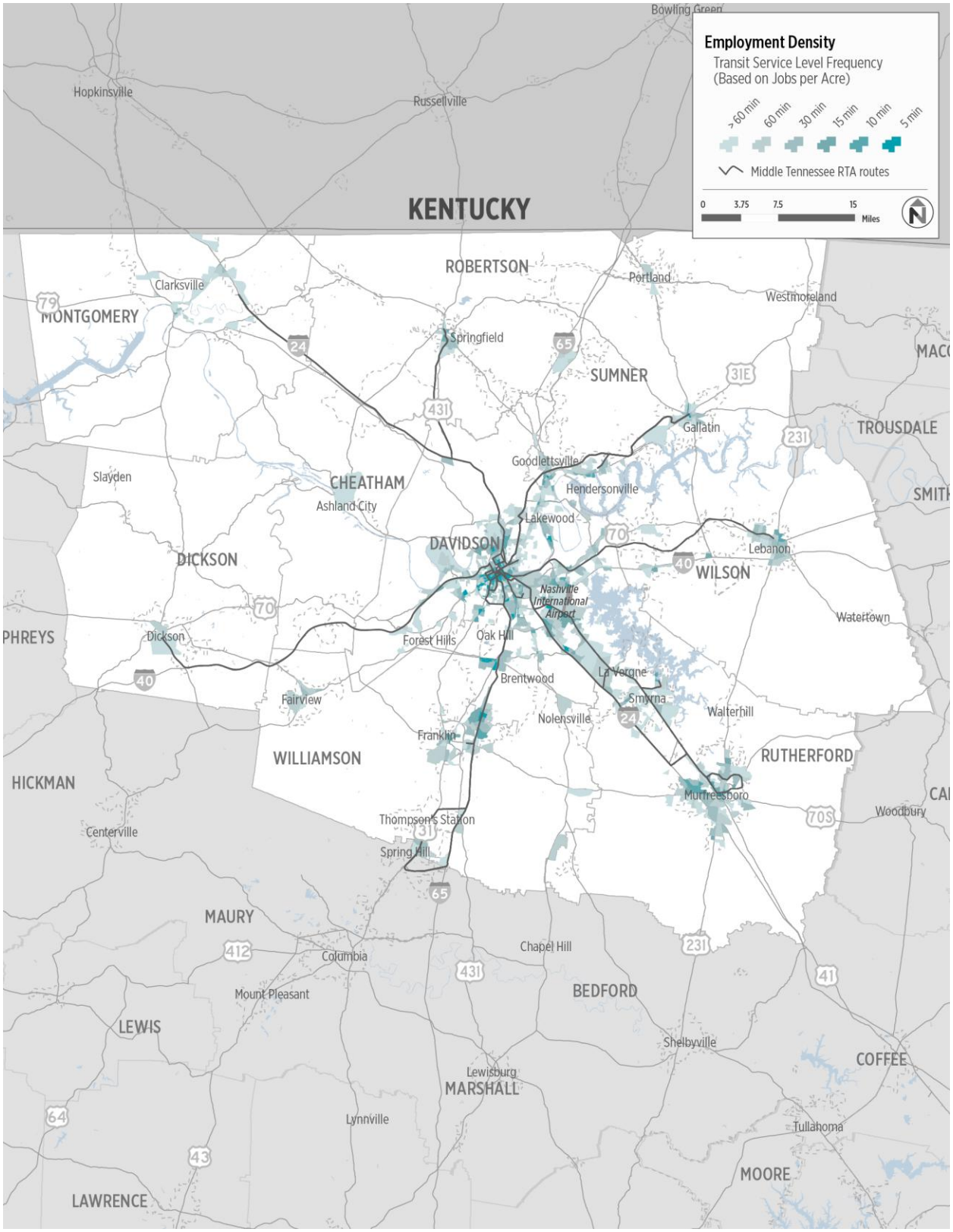
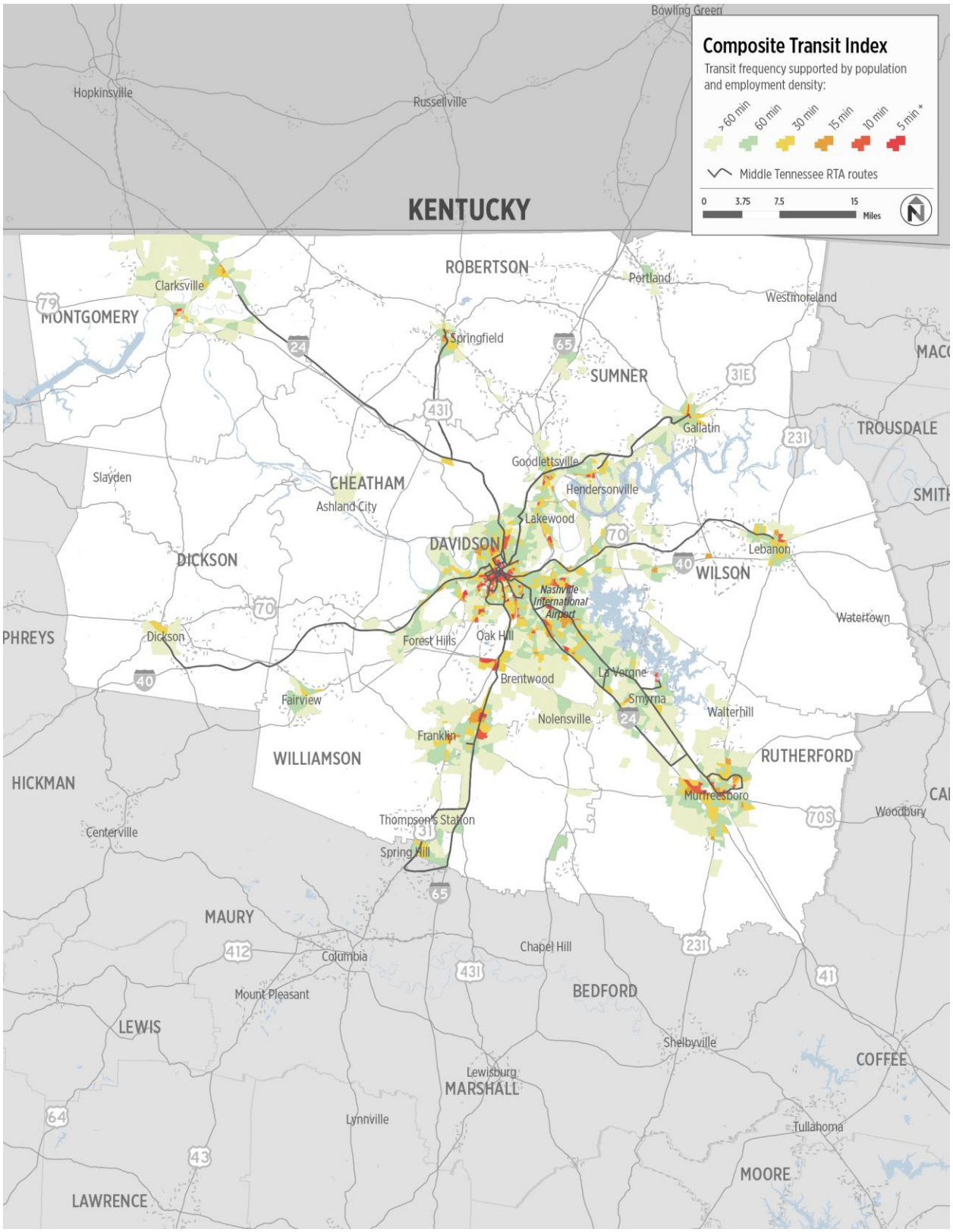


FIGURE 42 2040 COMPOSITE TRANSIT INDEX



communities grow, the demand for more local service will grow. In addition, demand for local service will emerge in many communities that are not currently served:

Northeast

- Goodlettsville
- Hendersonville
- Gallatin

East

- Lebanon

Southeast

- La Vergne
- Smyrna

South

- Brentwood
- Cool Springs

CURRENT AND FUTURE TRAVEL PATTERNS

For transit to be effective, it must take people from where they are to where they want to go. In Middle Tennessee, the largest volumes of trips have historically been to and from downtown Nashville, and this continues to be the case today. However, recent growth has been outward, and thus there is increasing demand for service to other places.

People also travel for many reasons including to and from work and school, and for shopping, medical, recreation, social, and other purposes. Transit serves all types of trips, but for all transit systems, work trips are particularly important. This is for a number of reasons, including public policy and because many work trips are concentrated around times and to places that can be very effectively served by transit (for example, peak period trips to and from downtown Nashville). Transit serves work trips throughout the day, but the highest numbers of trips are made during morning and late afternoon peak periods. Trips for other purposes typically comprise much lower volumes than work trips, between more dispersed locations, and are often more oriented toward the midday and evening.

2010 REGIONAL TRAVEL FLOWS

Even as the region has grown outward, the largest travel volumes in the nine counties that surround Davidson County continue to be to and from Nashville, and to a lesser extent to and from Murfreesboro and Lebanon.

All Trip Types

As of 2010, for all types of trips, the heaviest travel flows for the region continue to be most heavily centered on Nashville, and are in the northeast, east, and south corridors (see Figure 43). Other high travel flows are to and from Murfreesboro and between Franklin and Brentwood.

Work Trips

Home-based work trips are highest in the northeast, southeast, and south corridors:

Northeast

- Gallatin - Hendersonville
- Goodlettsville - Nashville

FIGURE 43 CURRENT REGIONAL TRAVEL FLOW, ALL TRIPS

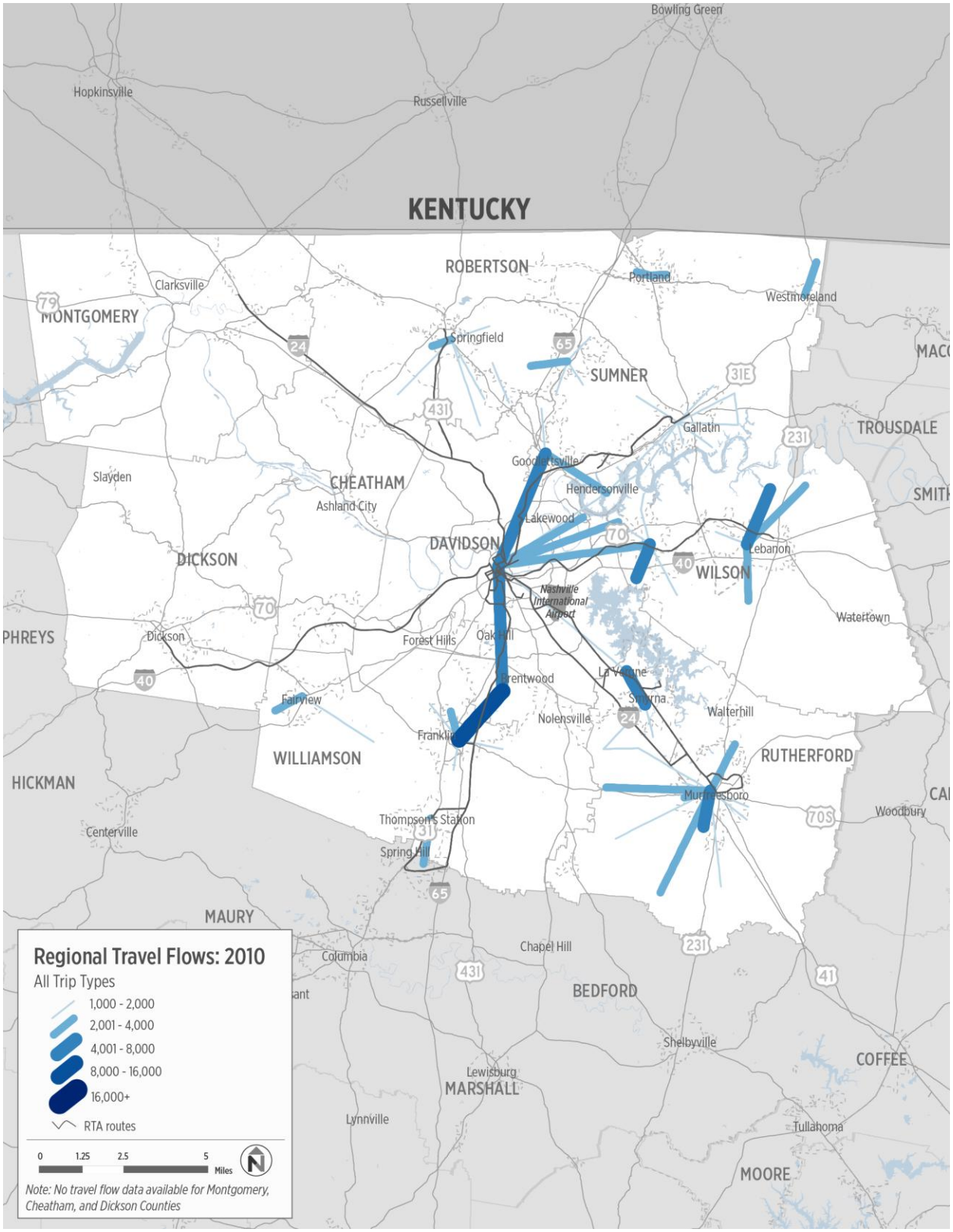
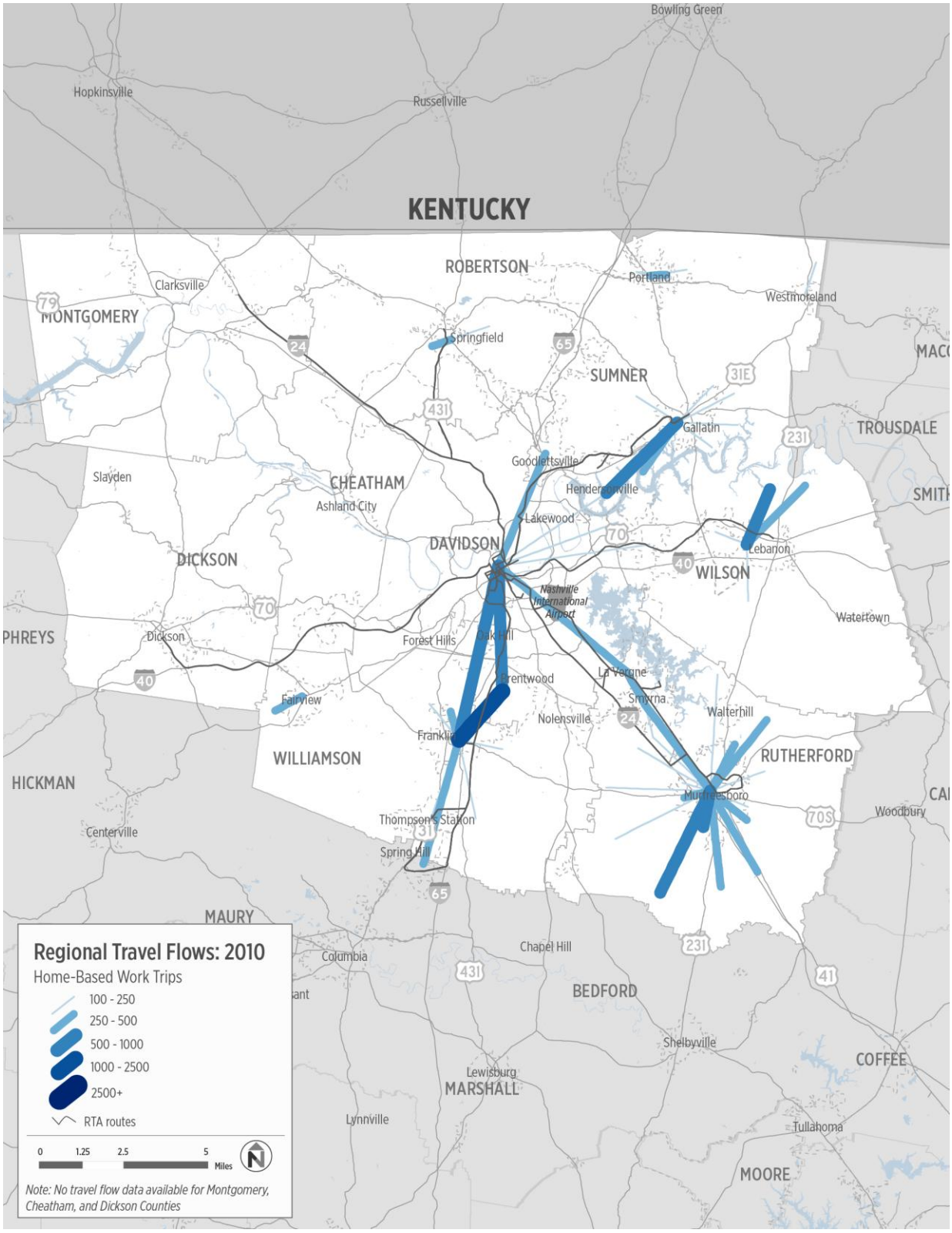


FIGURE 44 CURRENT REGIONAL TRAVEL FLOW, HOME-BASED WORK TRIPS



East

- To and from Lebanon

Southeast

- Murfreesboro – Smyrna/La Vergne
- Smyrna/La Vergne – Nashville
- To and from Murfreesboro from surrounding areas
- Smyrna

South

- Spring Hill – Franklin/Cool Springs
- Franklin/Cool Springs – Brentwood
- Franklin/Cool Spring - Nashville
- Cool Springs

Somewhat surprisingly, travel flows between communities along the east corridor and Nashville are not among the highest in the region. However, the Music City Star attracts more riders than express bus routes in the northeast, southeast, and south corridors. This is one indication of commuter rail's higher attractiveness relative to express bus service.

2040 REGIONAL TRAVEL FLOWS

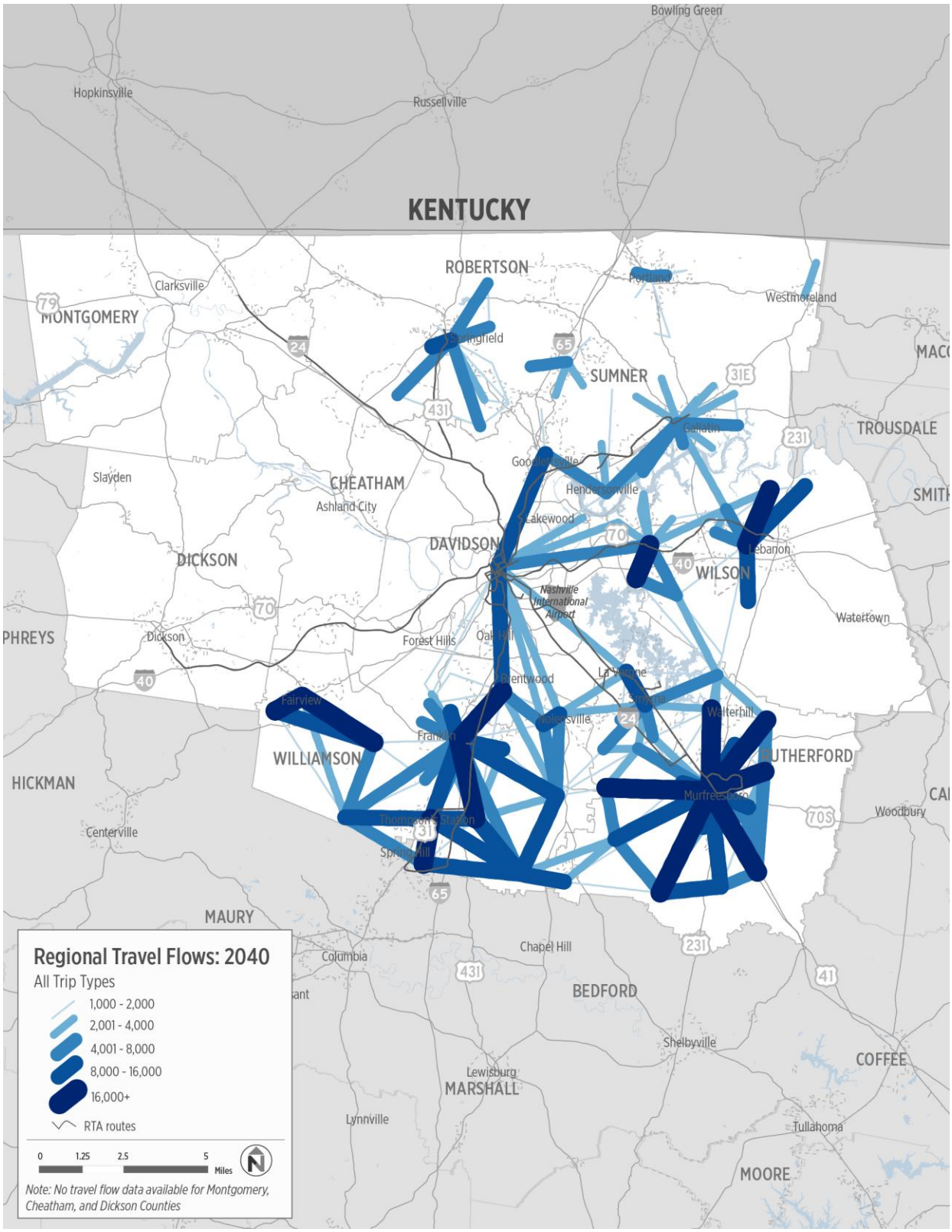
By 2040, both the population and the number of jobs in the region are projected to increase by 80%. These increases will produce very large increases on overall travel volumes and changes in travel patterns.

ALL TRIP TYPES

Through 2040, the most significant changes in travel patterns will occur in the south and southeast corridors, and particularly in Rutherford and Williamson Counties (see Figure 45):

- Travel flows in both Rutherford and Williamson Counties will grow to be larger than those to and from Nashville. The heaviest flows will be to and from Murfreesboro and Franklin/Cool Springs. This indicates that there will be demand for significant increases in local services.
- Travel flows throughout the entire South Corridor between Spring Hill and Nashville will be high, indicating the demand will develop for all day regional serves between Spring Hill and Nashville via Franklin, Cool Spring, Brentwood, and other intermediate points.
- Travel flows will also be high throughout the southeast corridor between Murfreesboro and Nashville, although not as high as in the south corridor.
- Travel volumes will increase significantly in the east corridor between Lebanon and Nashville, indicating demand for all day Music City Star service.
- Travel flows will also be high in the northeast corridor between Gallatin and Nashville, indicating demand for all day regional service between Gallatin and Nashville via Hendersonville and Goodlettsville.
- There will much higher travel flows to and from Springfield, Gallatin, Lebanon, and Mt. Juliet, indicating that demand will grow for local services in those areas.

FIGURE 45 2040 REGIONAL TRAVEL FLOW, ALL TRIPS



WORK TRIPS

In a similar manner as for all trip types, the largest growth in work trips will be in Rutherford and Williamson Counties (see Figure 46):

- Work trip flows in both Rutherford and Williamson Counties will be the largest in Middle Tennessee, and much higher than in other areas. As with all trip types, the heaviest flows will be to and from Murfreesboro and Franklin/Cool Springs. High growth in these areas indicates that there will be demand for significant increases in local services to serve work trips.
- Work trip flows throughout the entire south corridor between Spring Hill and Nashville will be high. Although travel flows to and from Nashville will be lower than flows within Williamson County, they will still grow significantly, indicating demand for stronger commuter service. Furthermore, with much higher traffic volumes on I-65, it will become increasingly important to develop services that can bypass freeway congestion.
- Work trip flows will also be high throughout the southeast corridor between Murfreesboro and Nashville. As in Williamson County, travel flows will be larger within Rutherford County than to and from Nashville; however the increases in travel to and from Nashville will be very large. As with much higher traffic volumes on I-65, it will become increasingly important to develop southeast corridor services that can bypass freeway congestion on I-24.
- Work trip volumes will not increase significantly in the east corridor between Lebanon and Nashville, although work trip volumes to and from Lebanon will grow significantly.
- Work flows in the northeast corridor will be highest to and from Gallatin, between Gallatin and Hendersonville, between Hendersonville and Goodlettsville, and between Goodlettsville and Nashville, indicating demand for increases in commuter services through the corridor.
- There will much higher work trip flows to and from Springfield, again indicating that demand will grow for local service in the Springfield area.

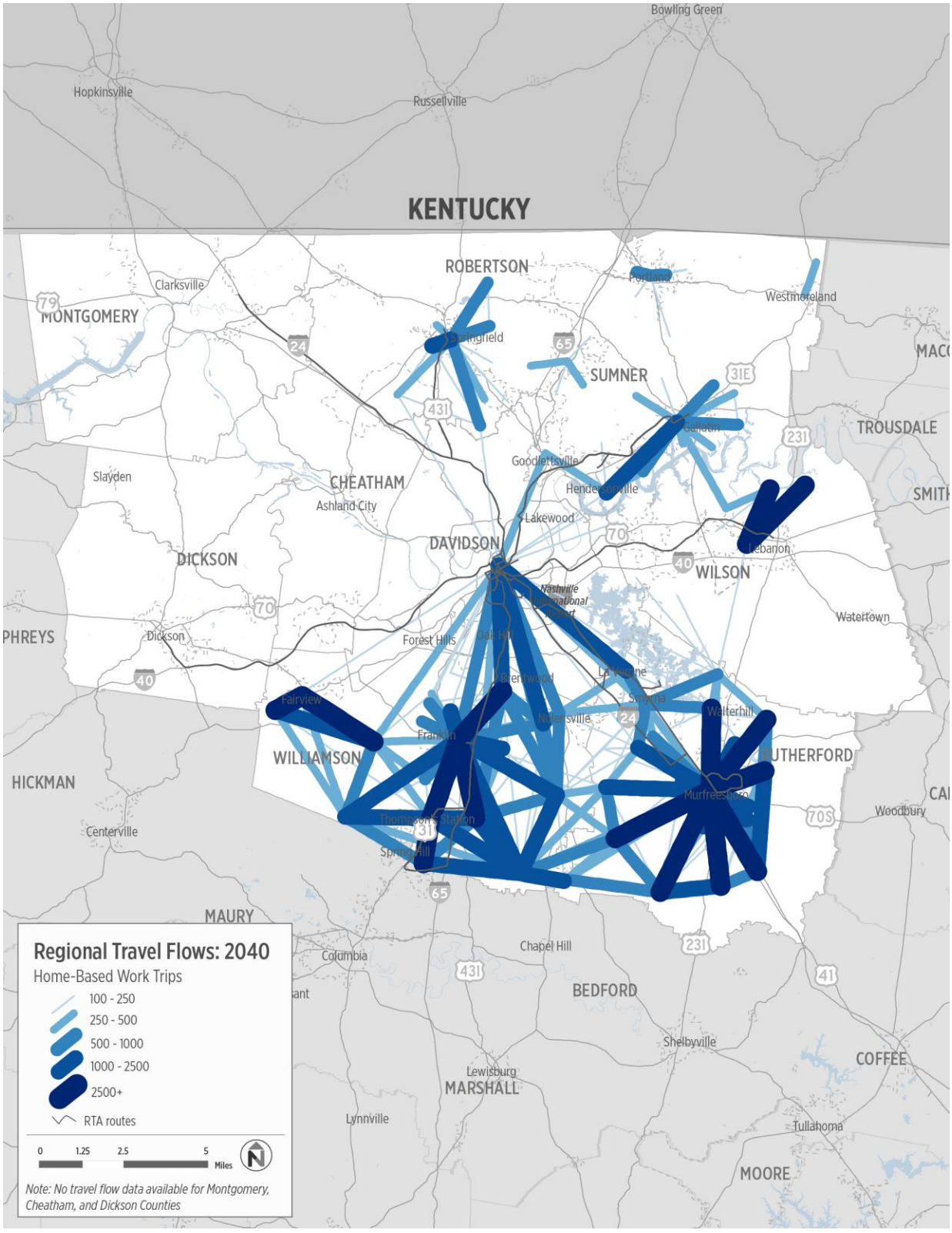
CONCLUSIONS

RTA's services connect outlying cities to downtown Nashville via express buses and commuter rail. Buses serve areas north, west, south, and southeast of Nashville, and Music City Star commuter rail serves cities to the east of Nashville. In terms of location, these services are generally well matched to the major population centers outside of Nashville and correspond to the major travel flows between Nashville and the cities to its immediate north, east, and south.

At the present time:

- The region's population is concentrated in Nashville and in several neighboring cities, particularly to the south, southeast, and northeast of Nashville, plus Clarksville to the northwest. Major population centers include Clarksville, Murfreesboro, and Franklin.
- Apart from these larger urban areas, other notable residential concentrations include Hendersonville, La Vergne, Smyrna, and Gallatin.
- Outside of Nashville, employment is generally concentrated near the centers of established cities and towns, plus Cool Springs.

FIGURE 46 2040 REGIONAL TRAVEL FLOW, HOME-BASED WORK TRIPS



- There are also notable commercial and industrial clusters located along or at the intersections of major interstates and highways, including the interchange of Interstate 65 and Old Hickory Boulevard (including several corporate headquarters), Interstate 24/US 79 in Clarksville, La Vergne and Smyrna between Interstate 24 and Murfreesboro Pike (several warehouse and manufacturing facilities), and Cool Springs along Interstate 65 in Franklin.
- When population and employment are considered together, areas where there is significant demand for service include Franklin and Cool Springs, Clarksville, Murfreesboro, and the US 31 East corridor from Nashville to Hendersonville and Gallatin.

Looking ahead to 2040, the population and number of jobs in the 10-county region will grow by approximately 80%. These increases will have profound impacts on travel within the region, including the demand for transit:

- The number of commuters to Nashville will increase significantly, as although 111% of the region's population growth will be in the nine counties surrounding Davidson County, 38% of the new jobs will be created within Davidson County. This will create significant new demands for commuter services to serve jobs in Nashville's core.
- By 2040, the number of jobs outside of Davidson County will increase from 534,000 to more than a million, and from 50% of the region's total to 55%. These increases in jobs will mean that many Davidson County residents will begin commuting to jobs outside of Davidson County, which will increase the demand for reverse commute service.
- Increases in both population and jobs will increase the demand for local services, both to serve local trips and connect with regional services. This will increase the demand for all day local and regional services (as has already occurred in the Murfreesboro – Nashville corridor.