

2017

MOVING FORWARD REPORT



m  **oving forward**
transit solutions for our region

MOVING FORWARD: TRANSIT SOLUTIONS FOR OUR REGION

Moving Forward exists to ensure the creation of a regional transportation solution through a cohesive community effort. Launched in August 2015, Moving Forward's work is grounded in the values of regionalism, accountability, urgency and collaboration. Throughout the year, business and community leaders engage in a systematic review of the region's progress toward implementing regional transportation. Governed by a Coordinating Committee, Moving Forward's three task forces research and debate aspects of public transit. The Revenue & Finance Task Force is charged with investigating transit funding solutions. The role of the Routes, Network & Modes Task Force is to envision the transit system our region needs. And the Public Engagement Task Force is focused on making sure all residents have an opportunity to learn about forward-thinking transit solutions. The work of these task forces is supported by an Advisory Forum that provides timely feedback and perspective. Middle Tennessee residents interested in participating in Moving Forward should visit movingforwardmidtn.com.

Moving Forward measures the progress made toward creating and implementing regional transportation through the following goals:

- Support the completion of an RTA and MTA Strategic Plan update by the end of 2016 **(completed)**.
- Support the identification and passage of state and federal government revenue enhancements for transit by the end of 2017 **(completed)**.
- Ensure at least 30,000 engagements with Middle Tennesseans in the transit conversation by the end of 2017 **(underway)**.
- Identify and secure a local dedicated funding source for transit in the region by the end of 2018 **(not yet completed)**.
- Support breaking ground on the first rapid transit project in the region by the end of 2020 **(not yet completed)**.

Moving Forward takes action to meet these five goals by offering recommendations to responsible parties and the interested public and by producing an annual scorecard each January on the progress made toward meeting these goals. Over the course of Moving Forward's second year, more than 200 volunteers from across the Middle Tennessee region have actively contributed to the work of the task forces and advisory forum, totaling 102 meeting hours. This 2017 Moving Forward report represents the culmination of their efforts.

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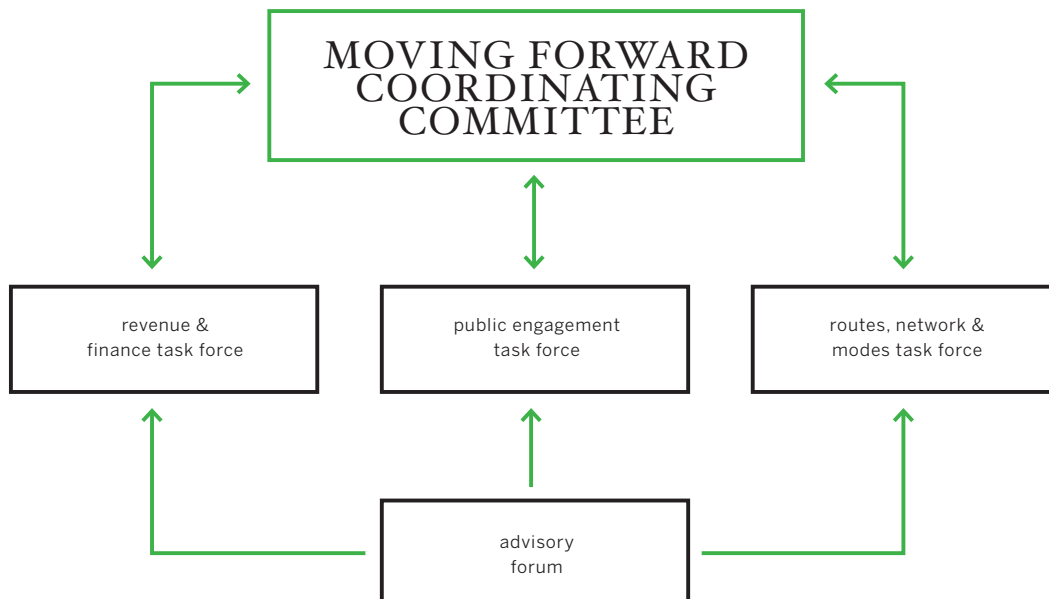


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Middle Tennessee mayors

EXECUTIVE SUMMARY

Over the past year, Middle Tennessee has continued to grow and so has our need for mass transit. In 2016, the Nashville region was named the 23rd worst region in the U.S. for traffic, with our residents sitting in traffic an average of 33.6 hours per year at an annual cost of \$1,308 per driver¹. In the 2016 Nashville Region Vital Signs poll, 62 percent of Middle Tennesseans reported experiencing more traffic congestion over the previous year, with 49 percent of our residents willing to use alternatives to their automobile, such as transit, if it were more available and convenient. Our region's growth will only cause our congestion to worsen, challenging residents as they try to reach employment, education and entertainment. While we have made substantial progress toward implementing a regional transportation solution over the past year, we must continue to push toward Moving Forward's ultimate goal of breaking ground on the first new mass transit project in the region by the year 2020.

Moving Forward continues to engage Middle Tennessee business and community leaders to ensure the creation of a regional transportation solution through a cohesive community effort. While Moving Forward's first year of activity centered on examining and commenting on the draft *nMotion* transit plan, the primary focus of this year's work has been on transit funding. The Revenue & Finance Task Force worked with the Victoria Transport Policy Institute (VTPI) to examine the pros and cons of twenty potential revenue sources for local transit funding through the lens of eight different criteria. Task force members built working models for many of these funding sources to estimate their revenue potential in the region. This work culminated in a report published by VTPI in November 2016 that identified several funding sources

for further study based on their revenue potential and applicability. The goal of a second phase of the revenue study is to produce 30-year projections for sales tax, property tax, wheel tax and hotel/motel tax in each of *nMotion*'s 10 counties, so that local elected officials and the public can consider which revenue sources best address local needs. The Boyd Center for Economic Research at the University of Tennessee Knoxville began work on phase II of the revenue study in May 2017, with plans for the report to be completed this August.

While Moving Forward studied potential revenue sources for transit, there was a need for the Tennessee state legislature to broaden the range of potential revenue sources available to local governments since local governments' existing authority was limited. The 2017 legislative session came to be dominated by a debate over transportation funding. In January 2017 Governor Bill Haslam proposed the IMPROVE Act, whose primary feature was an increase in the gasoline and diesel tax to fund state highway projects, as well as cuts in the taxes on groceries, investments and manufacturing businesses. Mayors in Middle Tennessee, and the leadership of Moving Forward, also advocated for the IMPROVE Act to include enabling legislation that would allow local governments to put a dedicated transportation funding source on the ballot for voter approval. Ultimately, Gov. Haslam included the enabling provision for local transit funding in the legislation and the IMPROVE Act passed with bipartisan support. This allowed voters in the six most populous counties in the 10-county *nMotion* region to approve local, dedicated funding for transit from six potential sources: sales tax, wheel tax, hotel/motel tax, business privilege tax, residential development fees and car





rental tax. The legislation stipulated that, to get on the ballot, a program of transit projects and the proposed revenue sources must be vetted by an independent accounting firm and approved by the local legislative body.

Each county in our region will now need to decide when to put a transit improvement program and financing plan on the ballot for voter approval. Nashville Mayor Megan Barry has announced her intention to seek voter approval for a transit plan and funding in 2018, perhaps as early as the May 1 general election in Davidson County. Moving Forward fully supports an election on this question to meet the goal of having a local, dedicated funding source for transit in place by the end of 2018. Other counties in Middle Tennessee continue to engage their citizens and consider their options. Looking ahead to the 2018 legislative session, Moving Forward recommends that the Tennessee General Assembly add Cheatham, Dickson, Maury and Robertson counties to the list of local governments that can adopt a transit improvement program and financing through voter referendum so that every county in the *nMotion* region has this option.

The state legislature also considered transit-related legislation on tax increment financing (TIF) and public-private partnerships (P3s) during its 2017 legislative session. The Tennessee General Assembly adopted legislation allowing housing authorities to use TIF to help finance transit infrastructure and transit-oriented development in corridors slated for mass transit projects. However, a bill creating a state office of public-private partnerships failed to advance beyond the finance committees of both houses despite being a recommendation in the 2016 Moving Forward report. There continues to be a pressing need for such an office and the technical expertise it would provide, given the 2016 state law that allows for transit projects to be designed, built, maintained and financed through P3s.

In September 2016, the Nashville Metropolitan Transit Authority (MTA) and the Regional Transportation Authority of Middle Tennessee (RTA) adopted *nMotion*, the region's long-term plan for transit, incorporating a number of Moving Forward's recommendations from the 2016 report. *nMotion* looks 25 years into the future, envisions a transit system that connects the entire region and outlines the steps needed to achieve the vision through a combination of immediate and long-term actions.

The adopted *nMotion* plan includes:

- Increased frequency and span of MTA bus service – the most frequent local routes would have buses arriving every 15 minutes from 5 a.m. to 1 a.m.
- 11 “crosstown” connections within Davidson County and a “cross-region” route connecting Franklin/Cool Springs and Murfreesboro.
- Within Davidson County, light rail transit (LRT) on Gallatin, Murfreesboro, Nolensville and Charlotte Pikes and bus rapid transit (BRT) on Dickerson Pike and parts of Broadway/West End Avenue and 21st Avenue South/Hillsboro Pike.
- Bus on shoulder in the near-term on I-24 West, I-65 North, I-40 East, and I-65 South during periods of peak congestion
- Freeway BRT – buses operating in dedicated or managed lanes within the right of way of the freeway – is planned for I-65 South, Ellington Parkway/Hwy 386 and I-24 East.
- Commuter rail from Nashville to Clarksville and extending the length, hours of operation and frequency for the existing Music City Star rail line that connects Nashville to Lebanon.

In addition, the *nMotion* plan includes critical, short-term steps to make the region's current transit system efficient, effective, convenient and attractive. Several of the needed short-term steps are included in Metro Nashville's operating budget for 2017-2018.

In 2016-2017, the Routes, Network & Modes Task Force studied two transportation technologies that are complements to a regional mass transit system: AccessRide and autonomous vehicle technology. AccessRide is the paratransit system offered by Nashville MTA for riders who are unable to board, ride or exit fixed route transit vehicles due to physical or mental impairments. In fiscal year 2017, AccessRide represented 20 percent of the total operating budget for MTA, with its ridership growing by 211.6 percent between 2004 and 2016 compared to fixed route ridership growth of 42.7 percent. To make the service more efficient, Moving Forward recommends that MTA take steps to enhance the capability of the mobile data terminals in place for AccessRide drivers. While mobile data terminals were installed in 2016 to digitize the routing system, new software upgrades could make better use of real-time information to provide a more efficient dispatch and usage of AccessRide service.

Metro Nashville and Davidson County government has signaled its intent to welcome autonomous vehicle (AV) technology. The *Moving the Music City* transportation action agenda released by Mayor Barry's office in May 2017 states that AVs should be "shared, electric and carefully integrated to buttress mass transit..." The Routes, Network & Modes Task Force's study of peer and aspirational cities, however, shows that other cities have more clearly defined the vision and role of AV and have more thoroughly integrated AV into land use and transportation planning. Experts continue to debate how AVs will impact traffic congestion as there is the potential for greater roadway efficiency, but also greater demand for rides in single-occupant vehicles. Moving Forward sees a role for AV technology in supplementing mass transit, such as addressing first mile and last mile barriers in addition to other challenges,

and recommends an AV pilot project linked to one of the two transit planning efforts currently underway in Nashville: the Downtown Mobility Study or the Gallatin Pike Light Rail study.

Moving Forward's Public Engagement Task Force tracks the public discussion of transit across the region, with the goal of at least 30,000 engagements with Middle Tennesseans by the end of 2017. These engagements include participating in public forums and providing written feedback. The public engagement and comment around the draft *nMotion* plan generated nearly 20,000 interactions with residents when the plan was adopted in September 2016. The Public Engagement task force provided regular and substantive feedback regarding *nMotion*'s public outreach throughout the process. There have now been 28,173 public engagements related to the transit conversation in the region. The WalknBike planning process in Nashville, the efforts of Moving Forward volunteers, the Transit Alliance of Middle Tennessee (TAMT) and Cumberland Region Tomorrow (CRT) have contributed significantly to those totals over the past year. We recognize that there is still significant public engagement that should take place with constituencies, businesses and neighborhoods impacted by the *nMotion* plan, even as we near our goal. This important work continues across the region, with TAMT and CRT working under a new contract with RTA to host town hall transit discussions in the counties surrounding Nashville. In addition, TAMT will graduate approximately 75 individuals from the Transit Citizen's Leadership Academy in 2017, bringing the total to 300 residents in our region who are equipped to engage deeply in a transit conversation as the result of this program.

Moving Forward is pleased to report that in the past year, our region has made great strides toward our goal of providing transportation options to our residents and visitors. Moving Forward's business and community leaders are committed to finding regional transportation solutions. This report presents our findings and our recommendations for the next year of action.

2017 KEY RECOMMENDATIONS

In light of Moving Forward's goals and the progress made in the prior year, Moving Forward makes the following recommendations. Further discussion of each is included in the body of the report.

- Page 22** The Nashville/Davidson County Mayor's Office should complete the plan for downtown access and mobility across all modes by the end of the 2017 calendar year.
- Page 14** The counties in the Middle Tennessee region that were not included in the IMPROVE Act – Cheatham, Dickson, Maury and Robertson Counties – should be included in the legislation in the coming legislative session and permitted to allow their residents to decide if and how to fund transit.
- Page 16** The State of Tennessee should develop and staff an Office of Public-Private Partnerships within the next year to ensure that governments in our state are prepared to accept and implement future P3 proposals.
- Page 24** Moving Forward recommends that MTA implement software upgrades to its mobile data terminals for the AccessRide paratransit service, allowing for dynamic scheduling and improving dispatch and routing efficiency.
- Page 33** As a complement to the mass transit network envisioned in *nMotion*, Nashville should undertake an Autonomous Vehicle pilot through one of the two transit studies underway - the Downtown Mobility Plan or the Gallatin Pike Transit Study.

REVENUE & FINANCE

STUDYING LOCAL, DEDICATED FUNDING FOR TRANSIT

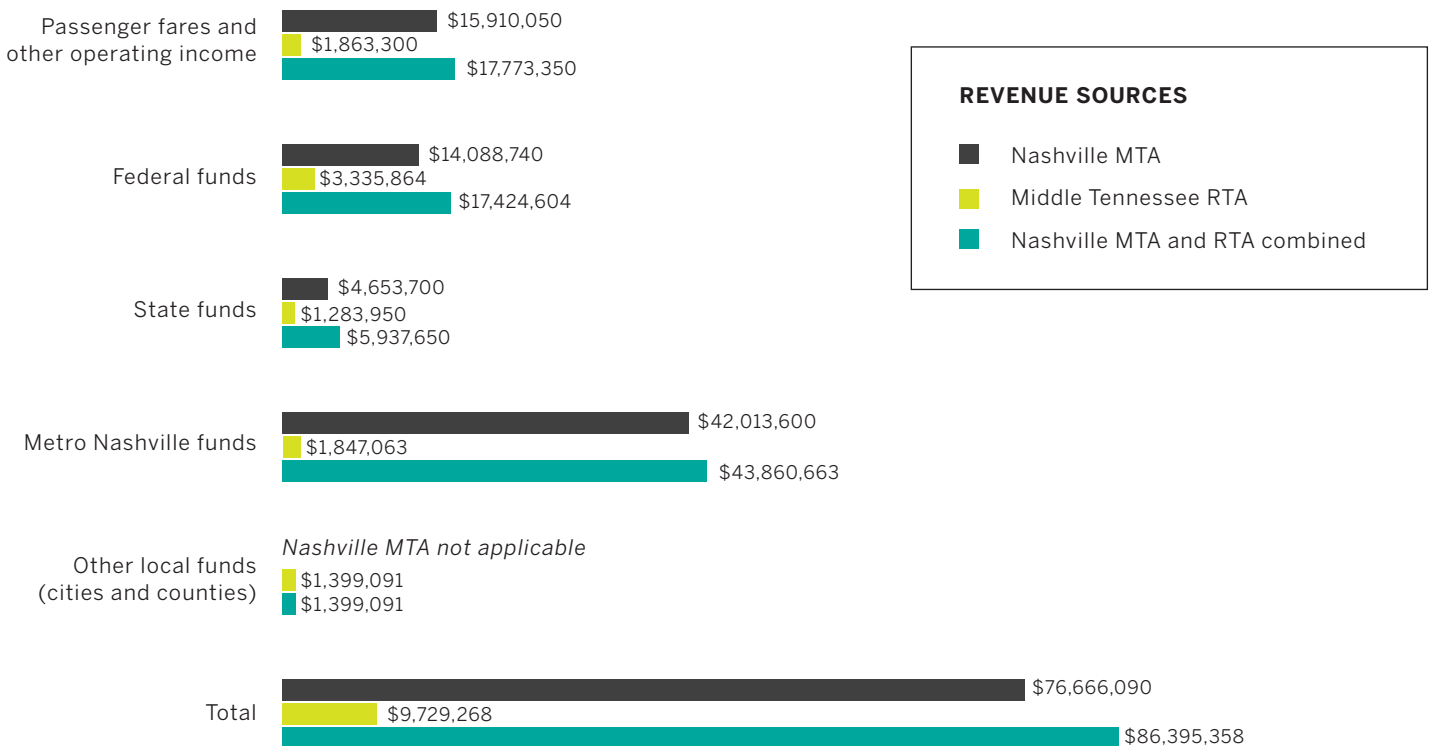
MTA and RTA transit service is limited by its current revenue structure. The Nashville region is one of the few metropolitan areas in the country without a local, dedicated funding source for transit. Consequently, MTA depends on annual appropriations from the mayor and Metro Council for a majority of its \$76.6 million operating budget. These allocations can vary based on fiscal pressures facing city government or political considerations. RTA's budget is only one-seventh the size of MTA, with its revenues distributed more evenly among contributions from member local governments, state government and federal funds.

Counties in Middle Tennessee will need to create local, dedicated funding for transit to implement the regional *nMotion* plan to vastly increase the frequency and span of existing bus service, as well as create new commuter service in the region and high-capacity transit in the urban core. As recommended in Moving Forward's 2016 report, the Revenue & Finance Task Force commissioned a study of potential local funding sources for transit. The Victoria Transport Policy Institute (VTPI) and principal Todd Litman have conducted numerous studies on transit funding, parking management and sustainability. VTPI conducted the study during the summer and fall of 2016, meeting with public officials from across the region at the local and state level and working with the volunteer members of the Revenue & Finance Task Force.

The VTPI revenue study, which can be found at movingforwardmidtn.com, analyzed 20 different potential revenue sources through the lens of eight criteria: potential to generate revenue, predictability and sustainability of the revenue source, how a revenue source impacts equity among residents, the extent to which non-residents contribute, impact on travel behavior, impact on economic development, public or political acceptability and ease of implementation. In addition, members of the Moving Forward Revenue & Finance Task Force contributed to the report by building working models for many of these funding sources to estimate their revenue potential in the region.

NASHVILLE MTA AND RTA REVENUE SOURCES 2016-2017

Source: Nashville MTA and RTA, 2017



Potential local revenue sources studies by VTPI

- Advertising
- Development/impact fees
- Discounted bulk passes
- Employee levy
- Expanded parking pricing
- Fare increases
- Gasoline/fuel tax
- Land value capture
- Parking tax
- Property tax
- Road tolls
- Sales tax
- Sin taxes
- Station air rights
- Station rents
- Tourist or hotel/motel tax
- Utility levy
- Vehicle-mile tax
- Vehicle/wheel tax

The results of the 65-page VTPI study were presented in November 2016 at the Cumberland Region Tomorrow Power of 10 Summit in Nashville. The study concluded that 7 of the 20 potential local revenue sources merited further analysis and discussion based on the evaluation criteria and stakeholder input. While not an endorsement of any particular tax, these seven revenue sources for further study include:

- Property tax
- Sales tax
- Tourist or hotel/motel tax
- Gasoline/fuel tax
- Vehicle fee/wheel tax
- Parking tax/fee
- Land value capture

Property tax

In Tennessee, property taxes are levied by county and city governments and some special school districts. Commercial and industrial property owners pay taxes on 40 percent of the assessed value of real and personal property, and residential owners pay tax on 25 percent of the assessed value of their property. The 10 counties in the *nMotion* region generate, collectively, about \$2.3 billion in property tax revenues each year. The revenue

potential of the property tax is high, since local governments have full authority to raise the rate without any cap on the amount (although the Metro Government charter for Davidson County requires voter approval to raise the rate beyond \$4.69 per \$100 of assessed value). A one-cent property tax increase across the 10-county region would generate about \$5.2 million, with a little more than \$2 million of that coming from Nashville/Davidson County. In addition, with reappraisals taking place every four or six years, property taxes are relatively stable over time despite fluctuations in the economy.

One of the primary drawbacks to a property tax for transit is that the cost is borne almost solely by residents. Property tax increases also tend to be controversial and politically difficult. Another complication is that the property tax is the primary funding source for most of the functions of local government, including K-12 education. Local elected officials may be reluctant to pursue a property tax increase for transit if doing so limits their future ability to raise revenue for the other core functions of local government.

Sales tax

According to VTPI, sales taxes are the most common dedicated local transit funding source in the United States. In Tennessee, the state levies a 7 percent sales tax on most retail purchases (groceries are taxed at a lower rate), and counties and cities can levy a local option sales tax up to 2.75 percent. Because they are applied broadly, sales taxes generate significant revenue. In 2015, the local option sales tax generated \$672.5 million across the 10-county *nMotion* region. A half-cent sales tax generated approximately \$143 million across the region, with \$68 million of that amount coming from Davidson County.

While the sales tax is considered regressive, in that lower-income residents pay proportionately more of their income than wealthier payers, Tennessee's constitutional ban on a state income tax prevents that more progressive system of taxation from being considered. Because

there is no state income or property tax, Tennessee's sales tax is among the highest in the country with three of the ten counties in the *nMotion* region already at the maximum combined state and local rate of 9.75 percent. State legislation passed in 2017 would allow the six most populous counties in Middle Tennessee to levy a new sales tax surcharge of up to 2.75 percent through voter referendum—in addition to the existing local option sales tax cap of 2.75 percent – for the sole purpose of funding a transit program. Sales tax revenues are moderately stable, but proceeds fluctuate more than property tax revenues in changing economic conditions.

Sales taxes tend to be more politically viable because they are typically collected in small amounts, and all visitors to a jurisdiction pay the tax, as well as residents, when they make purchases. According to the Center for Transportation Excellence, about one-third of the 78 transit-related ballot measures held in the United States in 2016 included a sales tax measure.

Tourist or hotel / motel tax

Hotel/motel taxes in Tennessee are assessed and collected by local governments. Purchasers of a hotel room night typically pay a percentage tax on the cost of that room, in addition to state and local sales tax. In the 10-county region, this leads to a combined hotel/motel tax rate ranging from 12.25 percent in the unincorporated areas of Rutherford County, to a high of 18.25 percent in the cities of Mt. Juliet and Goodlettsville. Davidson County has a 15.25 percent combined hotel/motel tax rate, plus a \$2.50 per room night fee. Increasing the rate by an additional 1 percent in Davidson County would raise about \$13 million in additional revenue.

The hotel/motel tax tends to be politically popular with residents, outside of the hospitality industry, since the tax is mostly paid by visitors. While there is little research to suggest that hotel/motel tax rates negatively impact the travel decisions of individuals, a high rate in a

location such as Nashville, which has a sizable convention business, may affect its ability to compete with other convention destinations. The 2017 state legislation permitting for a transit surcharge through a voter referendum allows for a hotel/motel tax dedicated to transit, but caps the possible combined hotel/motel rate at 20 percent. However, even if voters approved a hotel/motel transit surcharge up to the combined 20 percent tax rate, it would not generate enough annual revenue to be the primary funding source for the *nMotion* plan. Furthermore, raising it to such a level would likely diminish the city's ability to compete for convention business.

Gasoline / fuel tax

The gasoline tax has aspects of a user fee, to the extent that motorists paying a gasoline tax to fund transit benefit from mitigated traffic congestion. The gas tax was recommended for further consideration by the VTPI study because there was already a provision in Tennessee state law (T.C.A. 67-3-10) that allowed local governments to impose a one-cent gasoline tax for public transportation through a voter referendum. Although this provision has been in state law since 1997, only Shelby County/Memphis has attempted to implement this provision, which voters rejected in 2012. Based on state fuel usage data, a one-cent gasoline tax in the 10-county *nMotion* region would have generated approximately \$10 million, which would not be enough revenue to be the primary funding source for the region's transit plan.

The implementation costs of a local gasoline tax would be considerable. Because the state gasoline and diesel tax is assessed and collected at the wholesale level, there is no current process to collect a per-gallon gasoline tax within a local jurisdiction. Irrespective of this challenge, the 2017 IMPROVE Act passed by the Tennessee General Assembly removed the statute allowing for a local one-cent gasoline tax through referendum, even as the legislation also created the potential for a new local transit surcharge through six other possible revenue sources.

Wheel tax

Each of the counties in the *nMotion* region assess a local fee for each registered vehicle, often referred to as a "wheel tax." Commercial and privately-operated vehicles are assessed at different rates, and this local tax is in addition to the state vehicle registration fee that a vehicle owner pays. There are currently about 1.3 million registered vehicles in the region, and, based on 2012 figures, each dollar of additional wheel tax levy brings in about \$1.3 million across the ten counties. Wheel tax rates on the region range from a low of \$25 in Maury and Wilson Counties to a high of \$85.25 in Robertson County. Davidson County's wheel tax of \$55 for private vehicles and \$65 for commercial vehicles generated nearly \$24 million in 2012.

The wheel tax is considered a stable revenue source, with the Nashville Area Metropolitan Planning Organization projecting that the number of vehicle registrations may grow between 60-80 percent (Nashville Area MPO, 2016). This expected growth, however, will not fully materialize should there be significant changes in car ownership patterns due to technology advances over the coming decades. Like the gasoline tax, a wheel tax imposes a fee on the root cause of traffic congestion. This encourages the use of other modes, including public transit.

The 2017 IMPROVE Act adopted by the Tennessee General Assembly allows local governments to levy a wheel tax transit surcharge through a voter referendum, so long as the combined wheel tax rate in a county does not exceed \$200. While a significant wheel tax increase could be a primary transit funding source for many of the *nMotion* counties, a \$145 wheel tax transit surcharge in Davidson County, placing that jurisdiction at the \$200 limit, would still generate less revenue than a half-cent sales tax increase. In addition, visitors would not pay the wheel tax—only residents.

Parking tax / fee

There are a variety of ways that jurisdictions across the country raise

revenue from parking. Generally, increasing the cost of parking encourages the use of other transportation modes, including public transit. Since most of the existing paid parking in the region is in the urban core, parking taxes and fees are only a viable transit revenue source in Davidson County.

According to the Nashville Area MPO, there are over 31,000 privately-owned parking spaces in downtown Nashville. Taxing each of those spaces \$50 annually would generate about \$1.57 million in new revenue, although enabling state legislation may be required.

Another approach to parking revenue is to assess a special fee on all commercial parking transactions. The city of Chicago assesses a range of flat surcharges for daily parking, weekly parking and monthly parking. Because this surcharge does not currently exist in Nashville, implementation costs are likely to be moderate and the revenue potential is not currently readily available.

A third approach to parking revenue examined in the VTPI report is expanding the price of public parking. This can be done by increasing the amount of metered on-street parking, as well as raising the rates for current metered spots and public parking. There is already evidence in downtown Nashville that the cost of a parking ticket for an expired meter is cheaper than paying for all-day commercial parking, indicating that existing public parking and the cost of violations are underpriced. While appropriately pricing the cost of parking can have a beneficial impact on vehicle usage and traffic congestion, parking revenue is unlikely to be a significant source of revenue to expand mass transit.

Land value capture

This strategy allows for tax revenues in a defined area around transit to be dedicated to supporting transit infrastructure and operations. There are two primary ways this is done: creation of an additional assessment district or implementation of tax increment financing (TIF) around

transit-oriented development. The use of a special assessment district essentially creates an additional property tax levy within proximity to new transit infrastructure, usually with the approval of a certain percentage of landowners within the proposed assessment district. Revenues from this special assessment district are earmarked for transit infrastructure or other neighborhood improvements. In the Washington D.C. area, a special assessment district along portions of the new silver Metro line to Dulles Airport helps finance capital construction. Municipal and metropolitan governments in Tennessee have the ability to create special assessment districts to offset the cost of new public infrastructure by a vote of the city's legislative body (T.C.A. Title 7, Chapter 32).

While a special assessment is a new, additional tax, tax increment financing simply dedicates the growth in property tax revenue from new development around transit to a specific purpose, such as paying for transit infrastructure. The use of tax increment financing by public agencies to fund redevelopment is restricted to certain types of parcels. In 2017, the Tennessee General Assembly passed legislation that expanded a housing authority's eligible uses of TIF to include redeveloping high capacity transit corridors that are "transit deficient."

In March 2017, the Moving Forward Advisory Forum and Revenue & Finance Task Force partnered with engineering firm WSP to host Mark Briggs, one of the nation's leading experts in land value capture and tax increment financing. Briggs shared examples from around the country where land value capture was generating significant revenues to support transit and new development. Denver's Union Station Redevelopment was a \$500 million project, \$300 million of which was financed through federal loans. Denver created a TIF district in the area around Union Station that dedicated new tax revenues from \$1.6 billion in new development toward an early repayment of the federal loans. The North Potomac Yard project in Virginia was an expansion

from 600,000 square feet of existing retail space. A special tax district was created in this area to collect new revenues from a proposed \$7.5 million worth of mixed-use development. The district was divided into two tiers of assessment: a 20 cent per \$100 value of new development and a 10 cent per \$100 value of new development, based on the location of the land parcels. The key to a successful special assessment district, Briggs advised, is to demonstrate to landowners the rent premium that will be achieved through the transit investment, and ensuring that the tax rate is fair and equitable and does not adversely affect rents or land sales.

Once the VTPI revenue study was completed in November 2016, the Moving Forward Revenue & Finance Task Force announced plans to commission a second revenue study to provide 30-year projections for several of the seven revenue sources in each of *nMotion's* 10 counties. Anticipating an effort to pass a law allowing local governments to create dedicated funding for transit during the 2017 legislation session, Moving Forward chose to delay the start of the second revenue study until the adjournment of the Tennessee General Assembly in May 2017, to make sure the studied revenue sources were still viable.



2017 STATE LEGISLATION: LOCAL TRANSIT FUNDING, TIFS, AND P3S

Transportation funding dominated the agenda during the first year's session of the 110th Tennessee General Assembly. While the legislature formally convened on January 10, 2017, Governor Bill Haslam had been making a strong case for addressing a \$10 billion backlog of state road and bridge projects since the summer of 2015. Accompanied by his transportation commissioner, John Schroer, Governor Haslam has travelled the state, noting that the purchasing power of Tennessee's 21.4 cent per gallon tax on gasoline has lost half of its value since the tax was last increased in 1989. Cars are now much more fuel efficient and rising construction costs, along with annual inflation, meant that gas tax revenues were no longer keeping pace with the state's roadway needs. Issuing bonds for road construction projects was not an option, as Tennessee's pay-as-you-go policy of constructing roadways meant there was no state transportation debt issued or available.

IMPROVE Act and local transit funding

Announcing the IMPROVE Act (Improving Manufacturing, Public Roads and Opportunities for Vibrant Economy) on January 18, Governor Haslam proposed a gasoline and diesel tax increase, along with an increased fee on electric and alternative-fuel vehicles, generating an estimated \$278 million each year for roadway projects. The Governor also proposed a nearly equal amount of tax cuts on groceries, the franchise & excise tax and the Hall income tax. Ultimately, the version of the IMPROVE Act (Public Chapter 181, 2017) passed by the legislature on April 24 and signed by the Governor two days later raises the gasoline tax to 27.4 cents per gallon and the diesel tax to 28.4 cents per gallon over a three-year period. Owners of electric vehicles will pay an additional \$100 annual registration fee and all other vehicle owners will pay an additional \$5. These changes will generate about \$350 million a year in new revenue by the year 2019 and allow the state to address 962 road and bridge projects outlined in the legislation,

including 164 projects totaling \$3.2 billion in the 10-county *nMotion* region. These new revenues were more than offset by approximately \$410 million in tax cuts, including reducing the sales on groceries to 4 percent, cutting the Hall income tax by 1 percent, and changing the franchise & excise calculation for manufacturers to be more in line with neighboring states.

As important as these transportation improvements are, the most important component of the IMPROVE Act for Moving Forward was the inclusion of a provision allowing local governments to create dedicated funding for transit. With the Middle Tennessee Mayors Caucus taking a leadership role in advocating for a local transit option to be included in the governor's bill, Haslam's initial announcement of the legislation in January included local governments being able to create a sales tax transit surcharge if approved through a voter referendum. The Governor received spontaneous applause from the audience when discussing the local surcharge provision for transit during his annual address to the Nashville Chamber of Commerce in early February. "Everybody knows we have to do something," said the Governor, referencing the continued population growth, and traffic congestion, in Middle Tennessee. Having the local transit funding option in the IMPROVE Act bill from the start was important, but discussion among stakeholders during the month of February centered upon whether the local transit surcharge could be broadened to include other potential revenue sources, beyond sales tax, to meet the particular needs of each local community.

The actual bill language for the IMPROVE Act was first unveiled the day before it was scheduled to be heard by the House Transportation Subcommittee on February 22. Initially, the legislation allowed any county in the state and the largest cities to levy a transit surcharge through a voter referendum from eight potential revenue sources, two of which, property tax and tourism development zone business tax, were later amended out of the final bill.

No limits were initially placed on the potential local transit surcharges, since it was thought that the political difficulty of voter approval would naturally limit the amount of any surcharge.

The local option transit surcharge provisions were changed one final time in the Senate State and Local Government Committee on March 21, in response to stakeholder feedback. As signed into law, the transit surcharge opportunity is limited to the 12 most populous counties and the 4 largest cities in the state. This left the four RTA and *nMotion* counties of Cheatham, Dickson, Maury and Robertson unable to consider a transit surcharge, an exclusion that Moving Forward will seek to rectify during the 2018 legislative session. The referendum ballot language must be limited to a 250-word description of the transit program and revenue sources approved by the local government's legislative body and must include a sunset date for the surcharge. Prior to the county commission or city council voting on the transit program and funding, the plan must undergo a third-party review of financial feasibility from an independent certified public accounting firm approved by the Comptroller of the Treasury.

The six potential transit surcharges and their limits are:

Sales tax: capped at 2.75 percent (in addition to any existing state and local sales tax)

Hotel/motel tax: capped at a 20 percent aggregate rate of existing sales taxes, hotel tax & surcharge

Business privilege tax: capped at 20 percent of the current rate in the jurisdiction

Residential development fee: capped at 20 percent of the current rate in the jurisdiction

Local car rental tax: capped at 20 percent of the current rate in the jurisdiction

Wheel tax: capped at a \$200 aggregate of existing taxes and surcharge



Once a local government's legislative body has approved the transit program and revenue source, the county election commission schedules the referendum vote for a general or special election.

Because there is not a mechanism in the IMPROVE Act, or elsewhere in state law, to allow a transit funding referendum to take place across an entire region, Middle Tennessee's implementation of the *nMotion* plan is likely to look more like the experience in Raleigh, North Carolina than in Denver, Colorado. Denver's Regional Transit District (RTD) has taxing authority, subject to voter approval, so the 2004 FasTracks referendum was a single election across a seven-county region, which allowed RTD to build their regional system once the referendum was approved. In North Carolina, Orange County passed a sales tax for transit projects in 2011, and neighboring Durham County followed suit in 2012. Wake County's passage of a half-cent sales tax in November 2016 will fund improvements to their transit services, as well as a 37-mile commuter rail line to Durham.

In Metropolitan Nashville Davidson County, Mayor Megan Barry has already stated her intention to seek voter approval for a transit plan in the May 1, 2018 general election, in which there will be primaries for several constitutional offices, such as sheriff and register of deeds. General elections are also scheduled in all Tennessee counties for August 2 and November 6, should other counties in the *nMotion* region choose to put a transit measure on the ballot in 2018.

Tax increment for financing for transit

The Transit-Oriented Redevelopment Act (Public Chapter 254, 2017), sponsored by Representative Darren Jernigan and Senator Steve Dickerson of Davidson County, became effective on May 2, 2017. This legislation authorizes housing authorities, such as the Metropolitan Development and Housing Agency (MDHA) in Nashville, to carry out redevelopment projects in transit deficient areas to encourage the development of mixed-use projects around high-capacity transit

facilities. "Transit-deficient areas" are defined as areas where high-capacity transit facilities are currently lacking and could be used to help eliminate traffic hazards, implement regional solutions to ease traffic congestion and improve traffic. The local housing authority may acquire and prepare a property for redevelopment, which could include installing, constructing or reconstructing privately-owned affordable housing or work force housing and the public infrastructure surrounding it. The legislation also authorizes housing authorities to utilize TIF to finance the costs of a transit-oriented redevelopment plan.

State office for public-private partnerships (P3)

In 2016 the Tennessee General Assembly adopted legislation allowing the use of public-private partnerships to design, build, finance, operate and maintain mass transit projects (Public Chapter 975, 2016). Originally, the bill also created an office of public-private partnerships within state government that would be charged with vetting and managing P3 proposals, as well as providing technical assistance to local governments considering the use of P3s. Because such an office necessitated the hiring of staff that would require funding in the state budget, the P3 office was ultimately amended out of the bill to eliminate the cost of the legislation and thus ease its passage.

In 2017, legislation (SB0559/HB1374) to create an Office of Transportation Public-Private Partnership (OTP3) was filed by Senator Bill Ketron of Rutherford County and Representative Charles Sargent of Williamson County. Though administratively attached to TDOT, the OTP3 would be an entity independent of state government, with the executive director appointed by the governor for a five-year term. The bill's fiscal note, which estimates the cost of the legislation to government, anticipated a \$665,800 annual budget for the office, mostly to support eight full-time positions. A subsequent amendment sought to remove the cost to state government by stating

that the provisions of the bill would only take effect if funding for the office came from "nonstate funds," although the amendment did not elaborate on how those funds would be solicited and received. While the bill passed in the transportation committees in the House and Senate, the legislation did not advance in the finance committees, having failed to receive a second in Senate Finance Ways and Means on April 18, 2017. Moving Forward recommends that the state of Tennessee should develop and staff an Office of Public-Private Partnerships within the next year to ensure that governments across Tennessee are prepared to accept and implement future P3 proposals.

As Tennessee continues to consider the creation of a new P3 office within state government, there are a number of potential models from other states. The Virginia Department of Transportation's Office of Public-Private Partnerships was created in 1995 as part of legislation that authorized the use of public-private partnerships for roads and transit. The main impetus for the P3 approach was to finance and accelerate the construction of major transportation projects that would not be feasible due to the lack of state capital dollars and federal grants. The P3 projects facilitated by the office have created tens of thousands of jobs and injected billions of dollars into Virginia's economy, with an estimate of every public dollar invested in P3 projects creating a return of \$7 on that investment. Virginia's P3 office has completed two projects and is currently working on ten additional projects in various stages².

Texas's P3 efforts initially focused on highway construction and maintenance. These are led within TxDOT by the Strategic Project Division, with financial expertise provided by the Office of Innovative Finance and Debt Management and legal assistance from the Office of General Counsel. While there was not initially dedicated staff for managing P3 projects, the department has centralized P3 efforts as the number of complex projects has grown³. In addition, the Texas legislature created a Center for

Alternative Finance and Procurement within the Texas Facilities Commission in 2015 to provide technical assistance to government agencies on P3 projects in sectors beyond transportation.

The District of Columbia's Office of Public-Private Partnerships (OP3) offers an example that most closely resembles a local government approach to supporting P3s. Authorized in 2014 and launched November 2015, the office is charged with spurring collaboration between the private sector and government, primarily by advising city government agencies on how to streamline the procurement process for potential P3 infrastructure and transportation projects⁴.

If Tennessee wants to pursue a P3 strategy, local governments in the *nMotion* region will need to consider how to assemble the necessary staffing to adequately support P3 projects due to the absence of a P3 office within Tennessee state government. Moving Forward believes a P3 approach to transit infrastructure is an important option for our region and will continue to advocate for the creation of an office in Tennessee state government to realize its potential.

tax, property tax, hotel occupancy tax and wheel tax at various rates. These revenue sources were selected based on local governments' ability to levy them, availability of historical data and their revenue potential. In addition, the study will include commentary about how the revenue projections might be impacted by widespread adoption of autonomous vehicle technology.

Results from the study will be publicly available and a database of the projections will allow the task force, elected leaders and community stakeholders to create customized projections by modifying the tax rate. The study is scheduled to be completed in August 2017 so that local governments have the information in time for the third-party review of a proposed transit and financing plan by a public accounting firm, as required by the IMPROVE Act, should the local government want to place their transit plan on the ballot in 2018. Once the phase II revenue study is published, the Moving Forward Revenue & Finance Committee's work will be complete. In the future, volunteers with finance and legal expertise will be convened by Moving Forward to examine issues or proposals on an as-needed basis.

PHASE II REVENUE STUDY: CREATING 30-YEAR PROJECTIONS

Moving Forward's Revenue & Finance Task Force announced a second phase to their study of potential transit revenue sources on May 11, 2017. "Now that we know what potential funding sources are available to local communities for transit through the IMPROVE Act," said task force chair Don Abel, "the time is right to dig deeper into studying their revenue potential." A team of researchers led by economist Dr. Bill Fox and The Boyd Center for Business and Economic Research at the University of Tennessee, Knoxville, will conduct the study.

The study will forecast the economic conditions over a 30-year period in each of the ten *nMotion* counties, and estimate the potential annual revenue from an increase in the sales



ROUTES, NETWORKS & MODES

*n*MOTION – MIDDLE TENNESSEE'S TRANSIT PLAN

As Moving Forward's vision is to ensure the creation of a regional transportation solution through cohesive community effort, the Routes, Network and Modes Task Force tracked the creation of the *nMotion* transit plan closely in 2016. The Task Force provided feedback to policymakers and presented their findings and recommendations on the final plan as part of Moving Forward's first report, found at movingforwardmidtn.com. The *nMotion* plan was formally adopted by the transit agency governing boards in September 2016, achieving Moving Forward's goal of having an updated regional transit plan completed by the end of 2016. *nMotion* looks 25 years into the future, envisions a transit system that

connects the entire region and outlines the steps needed to achieve the vision through a combination of immediate and long-term actions.

Increased frequency and span of service

nMotion calls for significant increases in the frequency of service, or how often the bus or train arrives, and the span of service, which is how many hours the transit runs a day and how many days within a week. Within Nashville, *nMotion* calls for "earlier and later service, including more weekend service and more frequent service throughout the day, on nearly all routes." This means the most frequent local routes would have buses arriving every 15 minutes from 5 a.m. to 12 a.m. Meanwhile, at its most frequent, the light rail and bus rapid transit (BRT) would

roll from 5 a.m. to 1 a.m. arriving every 10 minutes.

On the regional level, *nMotion* calls for all-day, seven-day-a-week service on major routes, including high capacity transit. In addition, more frequent service would be provided on MTA and RTA express routes, including midday and early evening service⁵. Regional commuter rail, freeway BRT and regional rapid bus would arrive every 30 minutes from 5 a.m. to 11 p.m.

Crosstown and cross-region connectors

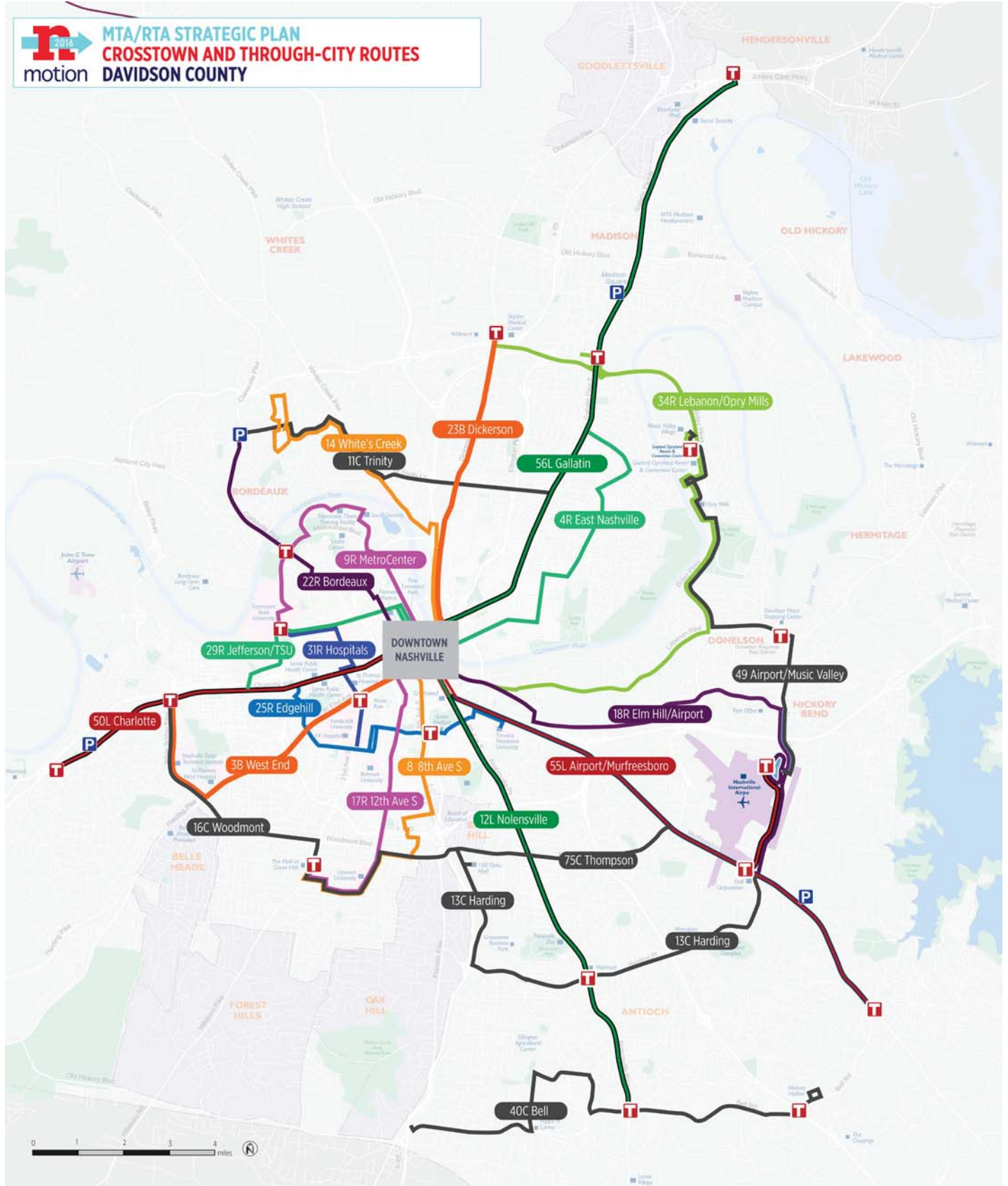
In addition to more frequent service for more hours in the day, *nMotion* also envisions a system that is easier to use by adding routes that create "crosstown" and "cross-region" connections.

*n*MOTION PROPOSED WEEKDAY SERVICE SPANS AND FREQUENCIES (NASHVILLE MTA AND RTA)

Source: Nashville MTA and RTA, 2017

Service type	Span of service	Service frequencies in minutes			
		Peak periods	Mid-day	Evening	Early / late
Local routes					
Frequent all day	5 a.m. - 12 p.m.	15	15	15	30
Frequent peak	5 a.m. - 12 p.m.	15	30	30	30
Local 30 day	5 a.m. - 11 p.m.	30	30	30	30
Local 30 peak	5 a.m. - 11 p.m.	30	60	60	60
Local 60 all day	5 a.m. - 9 p.m.	60	60	60	60
Circulator	5 a.m. - 7 p.m.	30	30	60	n/a
Lifeline	9 a.m. - 3 p.m.	n/a	60	n/a	n/a
Regional routes					
Commuter rail	5 a.m. - 11 p.m.	30	60	60	60
Freeway BRT	5 a.m. - 11 p.m.	30	60	60	60
Commuter / express	5 a.m. - 9 p.m.	30	120	120	n/a
Frequent transit network					
Light rail	5 a.m. - 1 a.m.	10	10	10	20
BRT	5 a.m. - 1 a.m.	10	10	10	20
Streetcar	5 a.m. - 1 a.m.	10	10	10	20
Rapid bus	5 a.m. - 1 a.m.	10	10	10	20
Regional rapid bus	5 a.m. - 11 p.m.	30	30	30	60

2014 **MTA/RTA STRATEGIC PLAN**
CROSTOWN AND THROUGH-CITY ROUTES
DAVIDSON COUNTY



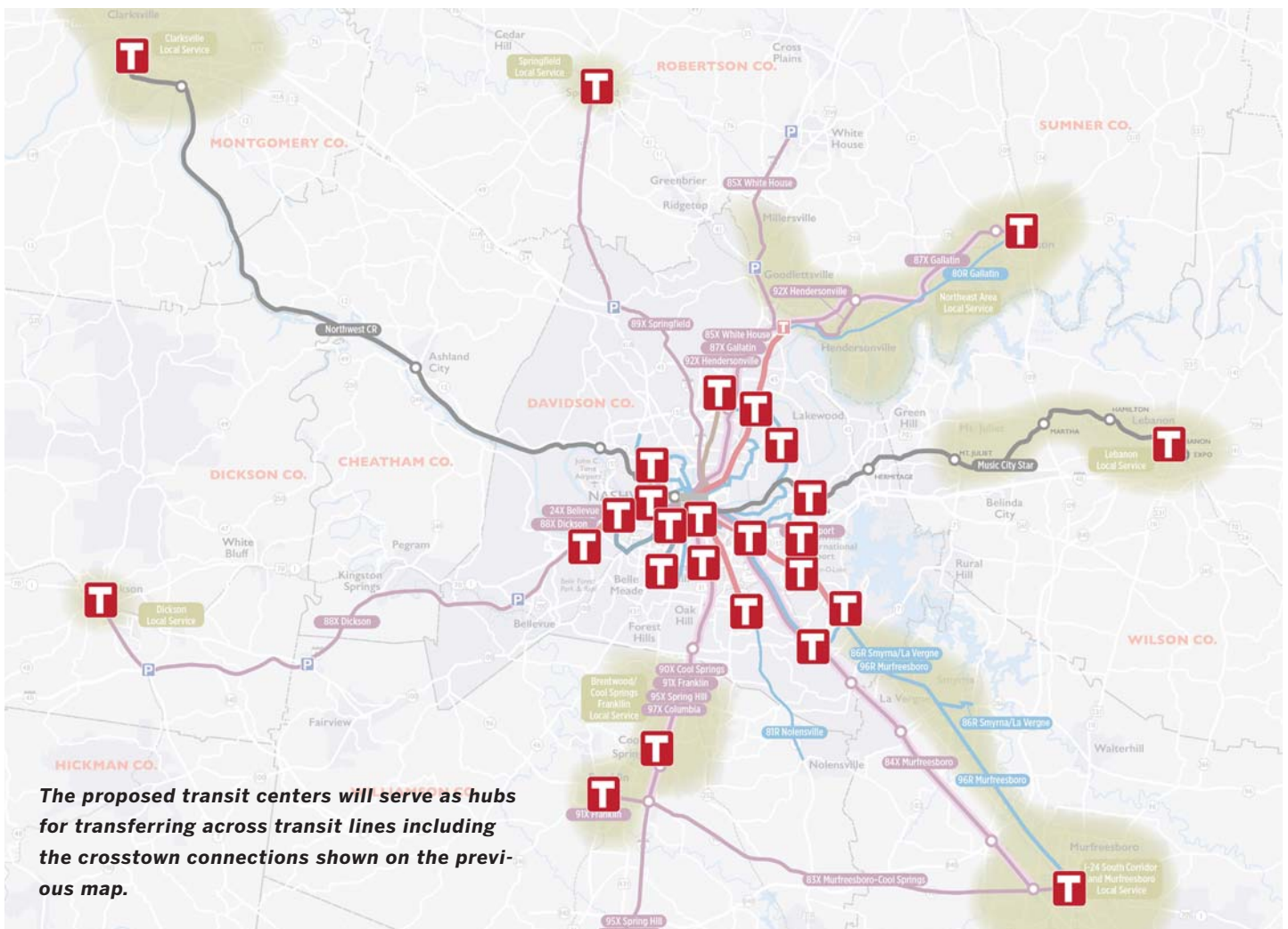
Source: nmotion2015.com

For example, rather than taking the #55 bus north from Antioch on Murfreesboro Pike in the southeastern part of the city into downtown Nashville and then transferring to the #17 bus heading back south to 100 Oaks for a health care appointment, a rider could take the #77 crosstown connector, launched in April 2017, running east and west along Thompson lane between those two radial routes. In addition to the Thompson Lane connector, the other proposed connectors include:

- Bordeaux and Gallatin Pike via Trinity Lane
- 100 Oaks Mall and Murfreesboro Pike via Harding Place
- Charlotte Avenue and 100 Oaks Mall via Woodmont Avenue and the Mall at Green Hills
- Murfreesboro Pike and Nashville International Airport (with continuing service to downtown)
- Charlotte Avenue and Trevecca Nazarene University via Edgehill Avenue
- Jefferson Street and Blakemore Avenue via Metro General Hospital, Saint Thomas Midtown Hospital and Vanderbilt Medical Center
- Gallatin Pike and downtown Nashville via Opry Mills
- I-65 at Old Hickory Boulevard and Hickory Hollow via Old Hickory Boulevard and Bell Road
- Nashville International Airport and Opryland/Music Valley via Donelson Station⁶

The same strategy applies to a proposed cross-region connector from Murfreesboro to Cool Springs on State Highway 96. The crosstown and cross-region connectors will be made accessible and convenient with the construction of a regional network of transit centers, which are hubs for transferring across transit lines. Depending on the location, some will feature parking facilities and all are planned to feature strong pedestrian connections to surrounding neighborhoods, bike facilities, space for rideshare services and comfortable waiting areas with real-time transit information.

MTA/RTA STRATEGIC PLAN - TRANSIT CENTERS



Source: nmotion2015.com

High Capacity Transit Corridors

Increased frequency and span of service help build the ridership and confidence to launch high capacity transit in the form of Commuter Rail, Light Rail Transit (LRT), Bus Rapid Transit (BRT) and Rapid Bus Service.

Commuter Rail Service

nMotion describes commuter rail as designed “to transport large volumes of passengers over long distances in a fast and comfortable manner. The primary market for commuter rail service is usually commuters to and from city centers.” In Middle Tennessee, the primary owner of existing rail lines from city center to city center is CSX, which is experiencing very high freight traffic volumes and seems unlikely to have space on its tracks for commuter rail. While Moving Forward encourages continued discussion regarding the use of existing CSX rail lines in the event the Radnor Yard freight facility can be relocated, *nMotion* recommends the use of two lines where there is space to add commuter volume; expanding the Music City Star service between Nashville and Lebanon and implementing new commuter rail service on the Nashville and Western line from the northern area of downtown Nashville to Clarksville⁷.

Light Rail Transit (LRT) is described in *nMotion* as “electric urban rail service that typically operates in exclusive rights of way. Most often, it uses one-to-three car trains and is designed to serve high-volume corridors at higher speeds than a local bus or streetcar service.” *nMotion* calls for LRT on four corridors in Nashville/Davidson County: Gallatin Pike, Murfreesboro Pike (Airport), Nolensville Pike and Charlotte Pike⁸.

Bus Rapid Transit (BRT) is planned for three corridors: Dickerson Pike, 21st Avenue South/Hillsboro Pike and Broadway/West End Avenue. While Dickerson Pike is envisioned for full BRT with dedicated lanes, the BRT service on the Hillsboro Pike and West End Avenue would have longer sections without dedicated bus lanes. A detailed comparison of the features of regular

(local) bus service, BRT and Rapid Bus is found on page 27 of chapter 3 in the *nMotion* plan at nmotion2015.com.

Rapid Bus Service is envisioned to be BRT with limited or no bus-only lanes. Rapid Bus Service would be used as the extension of the end of three of the light rail transit lines, until the light rail lines are expanded in the future, and along I-24:

- From the city of Gallatin to the outer end of the Gallatin Pike light rail line at the RiverGate commercial district.
- From the city of Nolensville to the outer end of the Nolensville Pike light rail line at Harding Place.
- From the cities of Smyrna, La Vergne and Murfreesboro to downtown Nashville via Murfreesboro Pike and I-24⁹.

Freeway BRT is recommended by *nMotion* to the south along I-65, the southeast along I-24 and northeast along Ellington Parkway and Route 386 in Middle Tennessee. Freeway BRT would operate in dedicated or managed lanes within the right of way of the freeway and stations directly linked to the freeway¹⁰. In the fall of 2017 a transit feasibility study will take place along the I-65 south corridor to determine the locally-preferred option for transit.

Bus-on-Shoulder is a mode currently used in more than 12 other states. It allows the bus to travel on the shoulder of the freeway when congestion on the interstate slows the general traffic to a specific speed, and then the bus is only allowed to travel relatively faster on the shoulder. *nMotion* proposes to have MTA and RTA work with the Tennessee Department of Transportation to implement bus-on-shoulder service on I-24 West, I-65 North, I-40 East and I-65 South¹¹.

Immediate Action Steps and Funding Status

In the coming five years, *nMotion* calls for numerous actions to strengthen and expand the current transit system in

Nashville and the surrounding region, with the goal of building public satisfaction with MTA and RTA’s service and increased ridership. Critical to this goal is the funding of MTA to sustain its core services. In FY2018, Mayor Megan Barry proposed more than \$49 million in local funds, a \$7 million increase from 2016-2017, and a capital budget of \$36.58 million for MTA, an increase of \$10 million from the prior year. While the capital funds were approved in full, the Metropolitan Council reduced the proposed MTA budget by \$377,700, which will likely impact the scope of MTA’s mobility on demand pilot project.

The final allocation from Metro of \$48.6 million in operating funds and \$36.5 million in capital will sustain current services and allow for a number of near-term improvements outlined in the *nMotion* plan. The short-term goal, the specific improvements to achieve the goal, and the FY2018 funding status for the improvements are described here.

Better bus service

Mayor Barry’s FY2018 budget includes funding to allow for free transfers between buses and to reduce prices for multiple trip passes (\$2,750,000 in operating funds). The FY2018 budget also includes extension of the free Music City Circuit to Jefferson Street and Tennessee State University (\$542,000 in operating funds). Finally, the FY2018 budget includes funding for a rebranding initiative designed to simplify service and awareness across MTA and RTA, expansion of the EasyRide program and providing local match funds for a travel demand management grant awarded to Metro Planning (\$90,217 in operating funds and \$150,000 in capital funds).

Better bus stops and new transit centers.

The FY2018 budget includes capital funding to design and construct a neighborhood transit center adjacent to Tennessee State University, including electric bus charging stations for the Music City Circuit extension (\$1,800,000 in capital funds).

Simpler ways to pay your fare.

The FY2018 budget includes funding to complete the advanced fare collection system that MTA initiated in FY2017 (\$7,200,000 in capital funds).

Seamless connections to other transportation providers.

The FY2018 budget includes funding to create an app for integration of MTA real-time services with rideshare services with the goal of addressing first mile/last mile challenges to using transit (\$300,000 in capital funds).

Expanded and improved AccessRide services.

In addition to expanding AccessRide capacity to address increasing demand, funding in the FY2018 budget is intended to improve service reliability through tools such as real-time information and the ability for clients to call ahead for dispatch of AccessRide (\$720,000 in operating funds).

Improved pedestrian connections will appear in more and more neighborhoods to improve access to an expanded mass transit system.

The WalknBike strategic plan for sidewalks and bikeways places an emphasis on constructing and expanding sidewalks to provide connections to transit. The FY2018 capital budget adopted by the Metro Council includes \$30 million for new sidewalks and \$5 million for new bikeways.

Exploration of opportunities for future development of rapid transit services.

The FY2018 budget includes two items to advance this action: program management services to manage the overall *nMotion* capital improvement program (\$1,500,000 in capital funds) and funding for planning and design fees for high capacity corridors on Gallatin, Nolensville, Murfreesboro, Charlotte and/or Dickerson Pikes (\$2,000,000 in capital funds).

Recommended actions to extend transit service hours, streamline service through downtown Nashville and make improvements in regional travel corridors were not funded in MTA's 2017-2018 budget.

The *nMotion* plan called for two significant place-based studies in 2016-2017. The Downtown Mobility Study and the High Capacity Transit Corridors Study were anticipated to be a significant focus for Moving Forward's Routes, Network & Modes Task Force. Both studies, however, have experienced continuous delays. The Downtown Mobility Study is currently underway, but the public engagement portion has yet to be launched. And while some initial work was performed on the High Capacity Transit Corridors Study, the focus has now shifted to the light rail transit study on Gallatin Pike, as announced by Mayor Megan Barry in her April 26 State of Metro address. Moving Forward continues to feel the urgency of the region's transportation challenges, believing that the plan for how transit flows through downtown Nashville is the necessary precursor to expanding the rest of the

system. For this reason, Moving Forward is disappointed that the public engagement portion of the Downtown Mobility Study is not underway as of the publication of this report. We remain committed to bringing business and community volunteers into the conversation. We urge Metro Government to begin engaging the public on the Downtown Mobility plan. The plan for how transit moves into, around and through downtown should be completed by the end of 2017.

With the public engagement on these studies delayed, the Routes, Network & Modes Task Force has spent considerable time the past two years studying transportation solutions that are *complementary* to expanded mass transit. Many of these solutions were discussed in detail in Moving Forward's 2016 report. Land use and planning are key drivers in increasing population density, which makes mass transit more feasible. Transportation Demand Management (TDM) is a set of strategies that seeks to reduce the demand for travel on our roads by single-occupancy vehicles. Nashville's Planning Department recently received a TDOT grant to work on TDM solutions within Davidson County. Recognizing that all transit trips begin or end with walking or biking, WalknBike, the recently-completed pedestrian and biking plan, is an important piece of a multimodal transportation system. But the 2016 Moving Forward report identified two particular complementary transportation solutions for further task force study – AccessRide and autonomous vehicle technology.

ACCESSRIDE

In its inaugural report in 2016, Moving Forward commended MTA for providing paratransit services countywide beyond the minimum federal requirements, but also recommended that the agency should continue to explore partnerships with a ride-sharing provider to improve the current AccessRide paratransit service. In 2017, the Routes, Network & Modes Task Force convened an AccessRide subcommittee to research the program and develop recommendations. As a result of this work, Moving Forward believes AccessRide can best be strengthened in the near-term through the use of technology upgrades and the improved design of infrastructure.

Eligibility

Providing paratransit services for disabled residents is a federal requirement. The Rehabilitation Act of 1973 required all transit programs receiving federal financial assistance to comply with federal regulations governing access for the disabled to public transit or for alternate paratransit services. With the passage of the Americans with Disabilities Act (ADA) of 1990, these requirements for access were expanded to all public transit systems, irrespective of federal funds, and transit agencies were required to have ADA-compliant services in place by 1997. MTA created the AccessRide program to ensure compliance with ADA, operating specialized van services for disabled and elderly people unable to use a fixed-route service.

Paratransit services, such as AccessRide, are available to individuals who are unable to board, ride or disembark fixed-route vehicles due to a physical or mental impairment¹². To become eligible to use AccessRide, an individual must undergo a functional assessment conducted by an eligibility specialist to determine whether the nature and degree of impairment would prevent the individual from using Nashville MTA's bus system on a temporary or permanent basis¹³. The nature of a rider's impairment generally falls into one or more of the following criteria: physical or cognitive dysfunction

that prevents independent navigation of the transit system, inability to access a vehicle due to lack of boarding equipment or the characteristics of certain stops, or a person's disability creates a significant impediment in traveling to and from boarding and disembarking stops¹⁴.

Finite budgetary resources require MTA staff to make an accurate eligibility determination. Eligibility specialists must, however, avoid denying eligibility to qualified applicants or demanding they undergo an overly onerous process to become ADA paratransit eligible¹⁵.

If certain conditions such as pathway barriers or weather prevent travel in some instances and not others, AccessRide may certify an individual as conditionally eligible to ride¹⁶. AccessRide's resources are conserved by screening each trip made by conditionally eligible riders to ensure the service is warranted in each instance. For example, conditional eligibility may be conferred during phases of sidewalk construction or when the heat index is predicted to rise above a certain point¹⁷.

Service

AccessRide must provide service that is accessible to disabled customers on a basis that is equivalent in responsiveness to its regular services¹⁸. Of equal importance to being able to receive federal funding, MTA follows regulatory guidelines to respect the rights of disabled persons, to protect the safety of the public and its staff and to promote good will in the community. The ADA requires transit agencies to furnish accessible transit to:

- Areas within ¾ mile of the agency's fixed-routes
- Areas between the agency's ¾ mile fixed-route corridor
- Within one day following an eligible person's request
- At a charge of no more than twice the full fair for regular bus or rail service

In addition, accessible service should be available during the same hours scheduled for regular transportation, excluding commuter and express services, and cannot be restricted due to the purpose of a trip, the number of trips or lack of capacity resulting in waitlists¹⁹.

MTA AccessRide services the entirety of Davidson County, rather than just serving customers within the federally mandated ¾ mile area around fixed-routes, and this has resulted in growing ridership. In 2016, AccessRide provided 442,234 door-to-door passenger trips, with MTA anticipating 3 percent growth in passenger trips in 2017²⁰.

ACCESSRIDE TRIPS

Source: Nashville MTA and RTA, 2017

Year	Number of trips
2004	141,907
2005	170,214
2006	202,057
2007	211,268
2008	315,188
2009	336,153
2010	318,728
2011	345,122
2012	381,128
2013	385,349
2014	381,945
2015	414,589
2016	442,234
2017 est.	456,000

Between 2004 and 2016, total Nashville MTA ridership increased by 42.7 percent, while the AccessRide participation grew by 211.6 percent. Since the MTA system relies primarily on busses, Nashville's paratransit service hours per capita is higher than other peer cities that have more mass transit options like light rail.

AccessRide service is provided by a fleet of 80 Nashville MTA-operated paratransit vehicles, with a single source taxi subcontractor, Allied Cab, providing additional capacity during peak periods²¹. MTA is currently working on the improved identification of AccessRide stops at large venues such as Bridgestone Arena, Nissan Stadium, the Grand Ole Opry, the Green Hills Mall and various local hospitals to make the connection between the customer and the AccessRide driver easier.

Challenges

AccessRide's door-to-door service and reservation and routing system is much costlier than MTA's fixed route service. The current fare for a single AccessRide trip is \$3.40, while a single trip costs the agency an average of \$43, for a fare recovery ratio of 8 percent. In contrast, about 24.9 percent of the cost of MTA's regular bus service is recovered through passenger fares²². AccessRide service expenditures account for \$8.4 million or 11 percent of MTA's \$76.6 million operating budget in 2016-17. Approximately 20 percent of AccessRide's total costs are related to fleet maintenance.

Current challenges faced by the AccessRide program include:

- Attracting and retaining qualified drivers who are required to hold a commercial driver's license.
- Limited number of AccessRide vehicles that are more difficult to fill in a single trip as more and more customers live farther away from the urban core.
- The eligibility process for riders can be lengthy and time consuming.
- Continued growth of AccessRide participation, due to a growing elderly population, will stress the current system.
- Fixed-route bus/commuter service and AccessRide services increasingly compete for limited resources.

- Creating AccessRide routes a day in advance results in inflexibility to changing traffic patterns or accidents, which potentially lengthens the distance and time of trips.

In response to these challenges, Moving Forward recommends continued investment in technology to realize greater efficiency, as well as targeted infrastructure improvements to make MTA's fixed route service more accessible to riders currently dependent on AccessRide.

Technology and Innovation

Intelligent Paratransit, a report published by the Wagner Rudin Center at New York University in 2016, outlines a number of ways transit agencies can improve the service and efficiency of their paratransit through technology. "Ride reservations should be available through multiple channels: phone, apps, SMS messaging, physical infrastructure on the street and wearable technology for riders," the report suggested. "Services connecting riders to transit should feature real-time, in-vehicle data integration with transit services to optimize accessibility of trips."²³

During the past year, MTA has installed and initiated the use of Mobile Data Terminals (MDT's) on its AccessRide van fleet. MDT's convey passenger pickups and drop offs to drivers in real-time, accurately recording the progress on each route. The MDTs provide MTA with more accurate performance metrics and diagnostic tools for van dispatching and scheduling. In the coming year, we recommend that MTA upgrade the software for this new system to eliminate the current need to run a backup paper system and to allow for dynamic scheduling, which is the ability to adjust a route at any time in response to traffic or weather conditions. In addition, MTA should advance integration of this system with the pending work on "mobility on demand" projects to take advantage of excess van capacity at certain times during the day and address issues like first mile/last mile service, better crosstown connections and, potentially, after hours

services. Modernizing operations in this way should result in faster, safer and more accountable service to AccessRide's customers.

The *Intelligent Paratransit* report highlights several technology-related best practices from across the globe. In Spain, transit riders in Barcelona are furnished with a wearable device through which the users can summon a ride wirelessly by the press of a button²⁴. In crowded areas, beacons and smartphone sensing could help riders to locate pick up areas or, conversely, help vehicle operators to spot riders. PACE transit in Chicago installed solar powered LED lights at stops that can be activated by riders to flash so drivers can be alerted to stop²⁵. The Massachusetts Bay Transit Authority (MBTA) in Boston is an example of an advanced paratransit fare system. Users may pay into their ridership account with cash, check or credit card through online, phone, or in-store payments. Digital payment can speed up boarding and eliminate the need for riders and drivers to carry cash. Currently, the Nashville MTA is evaluating four software platforms for its AccessRide reservation system and is in the process of beta testing, anticipating the launch of a new platform in 2018²⁶. Moving Forward recommends that MTA implement software upgrades to its AccessRide mobile data terminals to permit dynamic scheduling, improving dispatch and routing efficiency.

As recommended in the 2016 Moving Forward report, partnering with ridesharing companies to provide more efficient paratransit service remains an unrealized opportunity. The technology offers great promise. Software offered by Waze tracks and maps traffic data in real-time to help drivers avoid road congestion. Lyft Line, a ride-share service, uses a modified algorithm that incorporates data about origin, destination, schedules, vehicle types and numbers of riders to automatically match rides to aggregate demands. While there are cities throughout the country that are piloting partnerships with ridesharing services to provide paratransit services, a key hurdle

is driver eligibility. Federal regulations require any AccessRide drivers to undergo background checks and drug testing. While taxi drivers already satisfy this requirement, Lyft and Uber do not place this requirement on their drivers. An MTA AccessRide partnership with ridesharing companies is likely to depend upon drivers' willingness to be vetted. In addition, the use of personal vehicles in the ridesharing business model makes it less likely those vehicles are equipped for wheelchair accessibility.

Infrastructure Improvements

One way to curb the growth of AccessRide ridership, and its considerable cost, without restricting mobility is to improve the infrastructure around fixed-route transit to make it more accessible, thus allowing more current AccessRide users to use fixed-route transit. The federal ADA law requires fixed-routes transit agencies to make stop announcements at transfer points, major intersections, destination points and intervals along the route to allow disabled passengers to be oriented to their location²⁷. On board signage devices should also be used to aid hearing impaired passengers in navigating the transit system.

It is important to use these features consistently, since it may not be apparent to vehicle operators which of their riders have a disability. While MTA employs these features, automated announcements in transit stations and on busses can be inaudible or malfunctioning. By investing in maintenance and expansion of its fixed-route vehicle announcement and identification technology, MTA may enable some of its AccessRide users to migrate back to the regular bus system.

Another opportunity to help those with disabilities or impairments access MTA's fixed-route service would be through design modifications to infrastructure around transit stations and stops. Zurich, Switzerland built raised lines on the sidewalks and streets near transit, transit stops, inside stations and leading to public services, which makes transit more accessible to visually-impaired travelers.

Moving Forward recommends greater coordination between MTA and Metro Public Works on the needed infrastructure to make fixed-route transit more accessible to AccessRide users. When AccessRide's eligibility process uncovers infrastructure barriers, such as steep curb cuts or poor visibility at a transit stop, it is important for that information to be shared with Public Works and prioritized as future projects are decided.

AUTONOMOUS VEHICLE TECHNOLOGY

There is consensus within Moving Forward that autonomous vehicles (AVs) will have a transformative effect on our transportation system and future mobility. AVs will increase transportation options, likely save countless lives by reducing traffic accidents and make our travel time more productive. AVs also have the potential to change the way we design and build our city and how we use travel data to improve our transportation infrastructure. There is less certainty, however, around when this transformation will ultimately take place and how it will play out. Of particular interest to Middle Tennessee is future research on whether AVs can reduce traffic congestion. Many cities are concerned that AVs could *increase* the number of single- or no-occupancy vehicles on the road and worsen congestion if they are not used in a shared mobility model (where multiple users share one autonomous vehicle). The use of AV technology to aid with the “first mile” and “last mile” challenges of getting passengers to traditional transit stops and the use of AV shuttles to supplement traditional transit are both intriguing models being considered by AV manufacturers and by cities alike. Moving Forward is convinced that AV technology can be a supplement to mass transit, but transit investment is needed to move the sheer volume of current and future Middle Tennesseans around the region.

Wishing to think proactively about autonomous vehicles and their role in our mass transit system, Moving Forward included connected and Autonomous Vehicle technology (AVs) in its 2016 report. Over the past year, the AV Subcommittee has researched potential applications for AV technologies in Middle Tennessee. This research includes a review of AV policy and practice in peer cities and states, an examination of the companies planning to use AV technology, the current use of AVs in Tennessee and suggestions for advancing AV in the Nashville region.

WHAT IS AN AUTONOMOUS VEHICLE?

The following designations are from SAE International, a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries.

At SAE Level 0, the human driver does everything

At SAE Level 1, an automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving task;

At SAE Level 2, an automated system on the vehicle can actually conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task;

At SAE Level 3, an automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests;

At SAE Level 4, an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions; and

At SAE Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them.

Policy and Practice

Peer cities

Subcommittee members conducted research on numerous peer and aspirational cities. The summary of findings is included in the chart on the next page. A more detailed discussion of the work of a few pioneering cities (Columbus, Denver, Houston, Portland and San Francisco) and how they are incorporating AV into their transit plans is found in the in-depth summary of the AV Subcommittee's work, found at movingforwardmidtn.com.

Some common features among cities integrating AV into their transportation/transit systems:

Private Partners: Many peer cities have partnered with educational and research institutions to help with the development and/or funding of AV technologies.

Government Involvement: Several peer cities received monetary and/or legislative assistance from state and federal governments, as listed below.

AV Enterprise Involvement: Most peer cities have private enterprises that are pursuing AV testing and/or have launched AV technologies.

Vision for AV/Stated Use: Many peer cities state a specific use for AV in their transit systems.

Corridor Testing: One strategy used by peer cities is to slowly roll out AV technologies by assigning specific testing corridors for AV use case testing.

Smart City Finalist: The U.S. DOT Smart Cities Challenge spurred cities to think critically about connected and autonomous vehicles. There are cities that applied, and some that didn't, that are leading the way on AV.



PEER CITY SUMMARY

Source: National Conference of State Legislatures, 2017

Peer City	Institutional Involvement	Government Involvement
Austin, TX	Texas A&M	US DOT Texas DOT Austin City Council
Charlotte, NC	None	US DOT State Level Legislation pending
Columbus, OH	Transportation Reseach Center Ohio State University Wright-Patterson AFB Case Western Reserve University	\$15 million for "Smart Mobility Corridor" Ohio DOT Ohio DOPS Ohio Turnpike and Infrastructure Commission
Dallas, TX	University of Texas - Arlington Texas A&M Transportation Institute University of Texas - Austin Southwest Research Institute	US DOT
Denver, CO	Colorado School of Mines Colorado State University	Colorado DOT (RoadX Program) Mayor's Office Governor's Office
Detroit, MI	University of Michigan	State level legislation - allows self-driving on all roadways, autonomous trucking fleets and autonomous ride-sharing
Houston, TX	Texas A&M Transportation Institute University of Texas - Austin Southwest Research Institute Texas Medical Center University of Houston Texas Southern University	METRO Office of Innovation Texas Automates Vehicle Proving Ground Partnership City of Houston Port of Houston Houston-Galveston Area Council Gulf Coast Rail District Harris County Texas DOT
Indianapolis, IN	Indiana University Energy Systems Network	IndyGo Initiative - Local
Las Vegas, NV	None	Regional Transportation Commission of Southern Nevada City of Las Vegas Nevada DOT State Legislation enacted
Pittsburgh, PA	Carnegie Mellon	US DOT State Legislation Enacted
Portland, OR	Portland State University Arizona State University	Federal Transit Authority Grant Oregon DOT Portland Bureau of Transportation
Raleigh, NC	North Carolina State University University of North Carolina - Chapel Hill	US DOT
San Francisco, CA	Too many to list	Too many to list State Legislation Enacted
Opportunities for Nashville, TN	Tennessee Tech Vanderbilt University Oak Ridge National Lab	US DOT TN DOT Metro Transit Authority State Legislation Recently passed

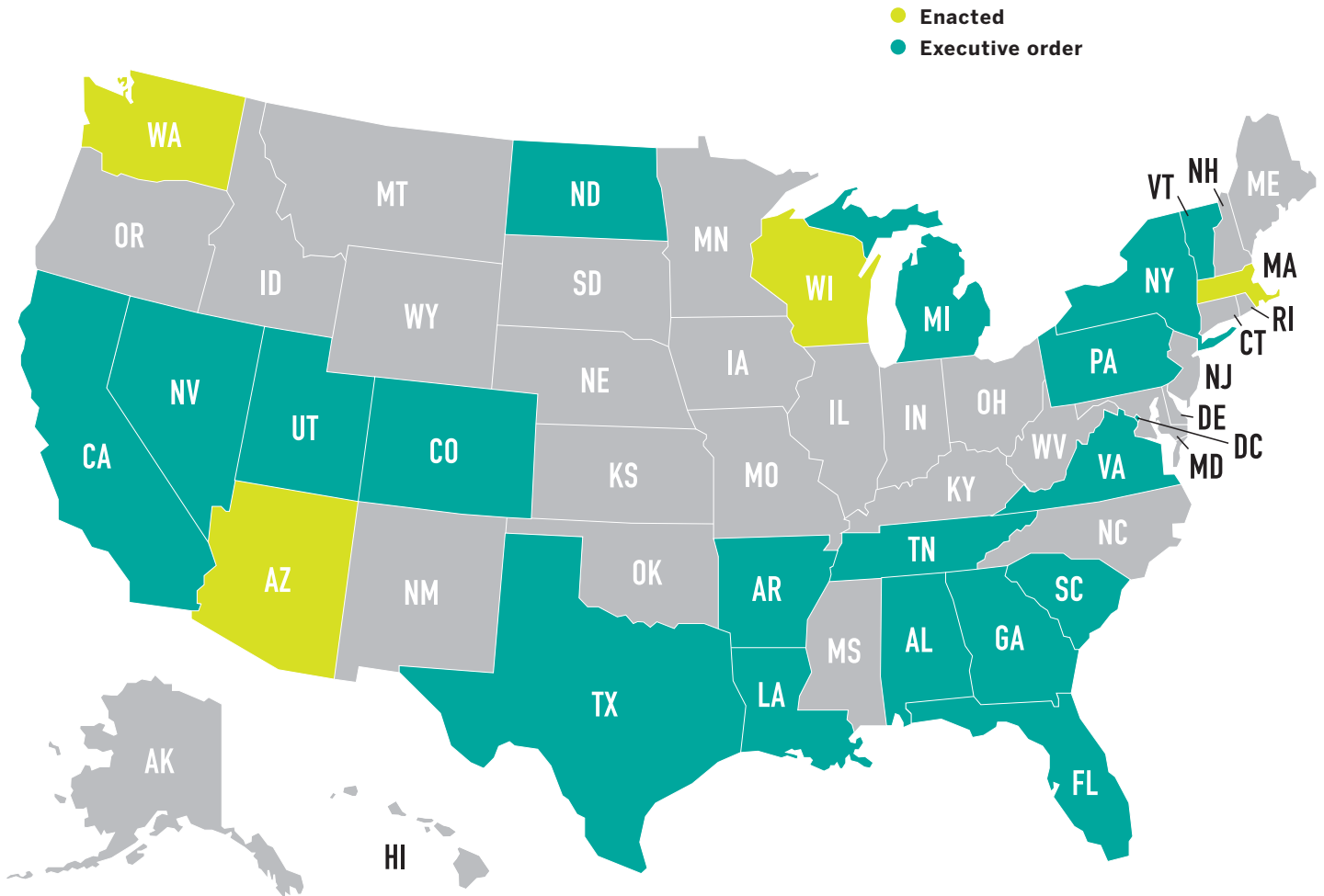
Company Involvement	Stated Use Cases	Corridor Testing	Smart City Finalist
Waymo (Google) Audi	N/A	Yes	Yes
In talks with GM	First and Last Mile	Yes	No
None	Full Av Driving Fixed Route	Yes	Yes - winner
None	N/A	Yes	No
Panasonic (Pena Station) Xcel Energy (Pena Station) Fulenwider (Pena Station) Lockhead Martin	Full AV Driving	Yes	Yes
Ford GM/Lyft	First and Last Mile Shared Vehicles Trucks	No - Full Use	No
None	Testing First	Yes	No
None	N/A	Yes	No
Audi Local Motors Keolis Uber Lyft	Fixed Route Paratransit Multi-Modal Solution	No	No
Uber Ford	Full AV Driving	No - Full Use	Yes
Uber Lyft	N/A	No	Yes
None	N/A	Yes	No
30 companies approved for AV testing	Full AV Driving	No - Full Use	Yes
GM/Lyft Local Motors VW Nissan	Full AV Driving	Opportunity	No

Peer states

Significant information is available via the National Conference of State Legislatures as related to AV laws and rules²⁸. NCSL reports that since 2012, 41 states and D.C. have considered legislation related to autonomous vehicles and 18 states ultimately enacted legislation. The map below illustrates the states that have enacted AV legislation. Among our peer states, subcommittee members found two to be worthy of discussion, Michigan and Florida. A more detailed discussion of the work of these states is found in the in-depth summary of the AV Subcommittee's work, found at movingforwardmidtn.com.

STATES WITH ENACTED AUTOMONOUS VEHICLE LEGISLATION

Source: National Conference of State Legislatures, 2017



National AV Policy and Guidance

Many stakeholders believe that national policy guidance on connected and autonomous vehicles is needed to create a transparent, level playing field for this quickly changing technology. The National Highway and Transportation Safety Administration (NHTSA) issued a policy for the safe development of highly autonomous vehicles (HAVs)²⁹. The policy includes four parts: vehicle performance guidelines, model state policy, NHTSA's current regulatory tools and possible new regulatory actions NHTSA believes could be helpful in ensuring the safe deployment of HAVs.

The National Association of City Transportation Officials (NACTO) has also published a policy on Autonomous Vehicles³⁰. Key points include emphasis on how AVs can improve safety, the importance of incentivizing and prioritizing shared AVs and electric vehicles, using AVs to build on broader planning and land use goals, using AV to support mass transit in less dense areas, emphasizing how AVs could improve mobility/access equity, rethinking how AVs will impact how we fund transportation and considering how AVs will allow management and repurposing of existing right of way.

Companies using AV technology

In addition to new players in the automotive industry such as Tesla, Apple and Google, many of the older, traditional car brands are pursuing AV technologies. The timeline to the right shows a list of companies that have publicly stated they will be pursuing AV technologies and their timelines for the expected launch of Level 4 (fully automated self-driving, but not connected) autonomous vehicles.

Every company listed in the timeline has begun testing and many, including Tesla, Uber, Waymo and Local Motors, have already publicly released many of the early features that will advance into fully autonomous feature sets. The listed companies have collectively logged several million miles of fully autonomous, real-world testing. *Some of the leading AV companies and their current efforts include:*

Waymo, which was spun out as an independent company from Google in 2016, has logged more than 2.5 million miles of fully autonomous driving in real-world settings.

Local Motors, a Knoxville-based car manufacturing company that uses state-of-the-art 3D printing equipment to build cars in a matter of hours, has already launched Ollie, a low-speed, fixed route autonomous bus, in cities across the U.S and Europe.

Tesla has publicly released several of its autonomous features in its current line of Model S cars and Model X SUVs, including Autopilot, which steers cars without assistance in highway driving.

Uber has launched real-world autonomous test cars across Pittsburgh, where much of their technology team is located. They have also released a fleet of test vehicles in Arizona.

General Motors (GM) announced in early 2017 that they will release 300 self-driving cars through their Lyft brand in 2017. With a local employment presence and new state legislation paving the way for manufacturers to release AVs in Tennessee, Nashville is a prime candidate for an allotment of these vehicles.

To make reparation for its recent emissions scandal, Volkswagen was ordered to spend \$4.7 billion on programs that will progress low-emission vehicle technology innovation. Tennessee has access to, and should utilize, this capital to pursue AV technologies.

STATED MARKET RELEASE OF FULLY AUTONOMOUS VEHICLES

2018

drive.ai
Faraday Future
nuTonomy
Tesla
Waymo
General Motors
Honda

2020

Audi
Baidu USA
Delphi
Apple
Local Motors
Mercedes-Benz
Nissan
Toyota
Volkswagen
Zoox

Post-2020

BMW
Ford
Lyft
Subaru
Uber
Volvo

While the focus of most cities and states has been on cars with AV technology, the University of Nevada Reno's Living Lab Coalition has recently welcomed Proterra, a US-based manufacturer of battery-operated buses, to the coalition. While the initial focus of the coalition's work will be on creating algorithms that attempt to address the complexities and challenges that face buses in their daily routes, Proterra has committed to working on an autonomous bus pilot project with the Regional Transportation Commission of Washoe County, which provides bus service for Sparks and Reno, Nevada.

AVs in Tennessee

As the largest owner and operator of Tennessee's roadway network, TDOT must proactively prepare for future transportation technologies. TDOT has partnered with offices of emergency management (OEMs) as a creator of pilot programs that will advance the technology, and is an active collaborator with the Federal Highway Administration (FHWA), local jurisdictions and technology companies. TDOT sees its role as a researcher of technologies and seeks to foster communications and information sharing so that work in one area of the state can be reviewed and applied elsewhere in Tennessee. In addition, state legislators continue to debate and adopt legislation at the state level to keep Tennessee at the forefront of regulation to welcome AVs.

At the regional level, the Nashville Area MPO's 2040 Regional Transportation Plan (RTP), *Middle Tennessee Connected*, set a goal of coordinating the region's systems and technologies to ensure the transportation experience in Middle Tennessee remains as efficient and seamless as possible. The MPO understands that corridors will be reimagined to utilize integrated technologies such as AVs, and that technological connectivity provides opportunities to improve traffic operations, increase safety and grow productivity.

The Nashville Area MPO's regional parking study, *Enhancing Parking in Middle Tennessee* (to be released in

2017), examines how the introduction of AVs will impact parking needs. Shared AVs will serve people more efficiently, which will lower the number of cars on the roads and reduce the need to supply parking at current levels. Existing parking garages may be repurposed for housing or commercial spaces and remaining AV garages will pack in an estimated 60 percent more vehicles than conventional garages.

In Metropolitan Nashville and Davidson County, Mayor Barry released *Moving The Music City*, a transportation action agenda for 2017-2020 in May of 2017. *Moving The Music City* includes initial thoughts on the city's vision for autonomous vehicles stating, "AVs are coming to American cities, but in Nashville we want them to be shared, electric and carefully integrated to buttress mass transit..."³¹ Although Nashville was not successful in securing grant funds under the 2016 U.S. DOT Smart Cities initiative, Mayor Barry's smart cities taskforce, Connected Nashville, continues to explore integration of AV in greater detail. Connected Nashville's "Smart Mobility" group will soon release draft recommendations for public comment including:

- Continuing work with the state to create safety and registration policies for the manufacturing, testing and operation of AVs.
- Working with industry leaders to test AVs traveling in urban contexts on fixed routes.
- Establishing partnership between fixed-line transit and first mile/last mile connection via AVs.
- Implementing a prioritization of modes for people movement by making transportation system decisions according to the following ordered list: 1) walking, 2) bicycling, 3) transit, 4) fleets of electric, fully automated, multiple passenger vehicles, 5) other shared vehicles, 6) low or no occupancy vehicles and fossil-fueled non-transit vehicles.

- Evaluating the potential impacts of AV on traffic and travel by modeling parking, right of way allocation and management of development impacts.
- Plan for and pilot right of way technology that anticipates the communications and navigational needs of AV³².

More information can be found at nashville.gov/government/connected-nashville.aspx.

Finally, Nashville's efforts on connected and autonomous vehicles are aided by two national partnerships. Nashville is participating in Transportation for America's Smart Cities Collaborative where resources, strategies, and best practices around smart cities are shared between participants. Nashville is active in the data analytics/performance measures group and the shared mobility group. The collaborative also contains an AV component, providing an opportunity to learn from peer cities. Nashville was also selected by the Bloomberg Philanthropies as one of five global cities to participate in an autonomous vehicle initiative³³. The initiative is expected to connect Nashville with Bloomberg resources that will enable our city to pursue AV utilization in our transit system. The city is currently determining how it will coordinate those resources for use with an AV plan.

Recommendations to Regional Leadership

Moving Forward recognizes autonomous vehicle technology as one piece of the transportation solution needed by our region. In our 2016 report, *Moving Forward* recommended that MTA/RTA's *nMotion* transit plan include guidance on how autonomous vehicles could be incorporated into the region's transit service strategy. While *nMotion* referenced autonomous vehicles and the *Moving The Music City* action plan hints at a vision, neither Nashville/Davidson County nor the surrounding counties have offered a comprehensive vision for how autonomous vehicles can complement the transit

system and add to transportation choices for residents. The 2016 Moving Forward report also recommended that local jurisdictions work with AV manufacturers to identify “AV testing corridors” in the region. This has not occurred.

These missing pieces put our region further behind in capitalizing on AV technology. With consideration of the current efforts and resources available in the region, and with a sense of urgency based on our findings from peer cities and states, Moving Forward offers the following suggestions for incorporation of AV in transportation and transit planning:

Let’s get something going! Many peer cities are undertaking pilot projects to get AV on the roads. Nashville should undertake a pilot through one of the two transit studies underway: the Downtown Mobility Plan or the upcoming Gallatin Pike Transit Study. The Downtown Mobility Plan could include a ‘transit innovation zone,’ such as a pilot project to convert one or more of the Downtown Circulator shuttles to an autonomous shuttle or a pilot to use AV technology for first mile and last mile access to transit. Within the ‘transit innovation zone,’ innovative, technology-focused projects should be supported by a small pool of local funding to support minor infrastructure improvements, as well as an expedited path to launch with little red tape for project approval. Alternately, the Gallatin Pike Transit Study could include a pilot for use of AV technology for first mile and last mile access to transit.

Create a vision. Many peer cities are clear in how they seek to use connected and autonomous vehicles, such as for first mile/last mile trips or through fixed route autonomous shuttles. In this capacity, AV technology could prove especially helpful for youth, the elderly and low-income residents in reducing barriers to use of the region’s mass transit system. The initial thoughts on an AV vision for Nashville are found in *Moving The Music City* and in *Connected Nashville*, but the vision needs to be fleshed out. This could be a charge of the new Division of Transportation in

Metro Public Works: to evaluate emerging technologies and articulate how they can be deployed to advance the mobility goals and objectives of the city.

Include AVs in future planning. Metro should consider emerging technologies such as AVs, and the infrastructure needed to support them, in all transit planning. In addition, if AVs are primarily used in a shared mobility sense then there will be a diminished need for parking and valuable land can be better utilized. This is just one example of how AVs could disrupt land use planning and urban design. Connected Nashville calls for evaluating the potential impacts of AVs on traffic and travel by modeling management and development impacts, right of way allocation and parking. Moving Forward supports this action.

Public-private partnerships. Nashville and the Middle Tennessee region have private sector leaders and institutions of higher learning that are engaged in AV and are ready to invest. The city should reach out to them to let them know they can work on AV right here in their own back yard.

PUBLIC ENGAGEMENT

With the region's continued population growth and economic vitality, traffic congestion and concerns about mobility are now top-of-mind for Middle Tennessee residents. Engaging Middle Tennesseans across different demographics and socio-economic levels in the transit conversation, whether or not they are or will be transit users, is crucial to making a comprehensive transit system a reality in Middle Tennessee. While transit plans can be years in the making due to the process of land acquisition, project design and construction, there must be public buy-in in the beginning stages and as plans are updated throughout the process to reflect technology innovation, the creation of funding mechanisms, changing population projections, community input and as decisions about specific routes and modes are made. These are complex plans that will be modified along the way and will need public input throughout the process.

There are many organizations within the region that play a role in engaging the community around transportation issues. In addition to the work of public agencies such as the Nashville MTA, RTA, the Nashville Area MPO, Greater Nashville Regional Council (GNRC), local planning departments and TDOT, there are several other organizations focused on outreach around transportation and transit issues including: the Transit Alliance of Middle Tennessee, Cumberland Region Tomorrow, Nashville Downtown Partnership, Leadership Middle Tennessee, Council on Aging in Middle Tennessee, Nashville Area Chamber of Commerce Advisory Councils, Nashville Civic Design Center, Nashville Convention & Visitors Corporation, Tennessee Public Transportation

Association, Tennessee Road Builders Association, Walk Bike Nashville and Transit Now. Moving Forward continues to serve as a coordinating entity in bringing these groups together.

Moving Forward's role

In its first year, Moving Forward's Public Engagement Task Force focused on two primary objectives. The first was to provide feedback and support to public agencies regarding their community engagement around transportation planning. Specifically, that meant monitoring the Nashville MTA and RTA's efforts to engage the public during their *nMotion* transit planning and providing recommendations on how to improve and enhance community engagement when the task force felt that engagement efforts were falling short of reaching specific groups. The task force's second objective was to help educate the public about mass transit, laying the groundwork for future support for a comprehensive, regional transit plan in Middle Tennessee.

During this sophomore year, the task force has continued to assist in educating the public about mass transit through public presentations and communications. Moving Forward also served as a reliable source of timely and accurate information during the legislative session, especially related to the passage of the IMPROVE Act.

Moving Forward has set a goal of ensuring at least 30,000 engagements with Middle Tennesseans in the transit conversation by December 31, 2017. As of June 2017, there have been 28,173 substantive engagements such as completing a survey

or providing a specific comment along with tallies from public meeting attendees and digital reach. This represents an increase of nearly 10,000 engagements from the time of the publication of the 2016 Moving Forward report. Over the past year, most of these engagements have come as part of the WalknBike planning process (7,250) and through the outreach efforts of Moving Forward volunteers (911) and the Transit Alliance of Middle Tennessee (328). In addition, TAMT will graduate approximately 75 individuals from the Transit Citizen's Leadership Academy in 2017, bringing the total to 300 residents in our region who are equipped to engage deeply in a transit conversation as the result of this program

The effort to reach residents of Middle Tennessee has been a successful one due to working with partner agencies and organizations such as the Nashville MTA and RTA through the *nMotion* process, the Nashville Area MPO, the Transit Alliance of Middle Tennessee, Cumberland Region Tomorrow and others. Moving Forward's Public Engagement task force has put a significant emphasis on reaching past the "usual suspects." As Middle Tennessee continues to grow, and the backgrounds and habits of people change and evolve, the number of people that needs to be reached grows too. While public meetings are still an effective tool, they cannot be the only way to reach Middle Tennesseans. The agencies and organizations involved in the transit conversation understand this and have done a good job of working to meet people where they are, but there is always more work to be done in this area.

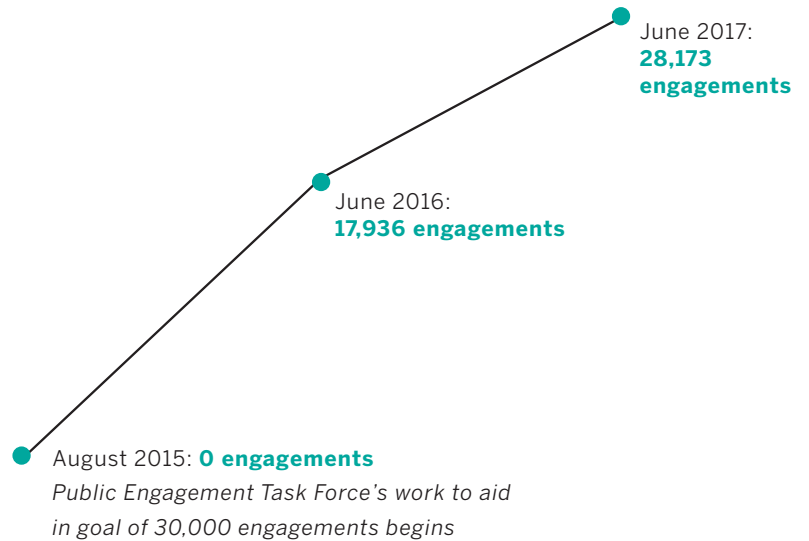
In the coming months, there will be additional public engagement opportunities in Middle Tennessee. The most immediate and high-profile possibilities are:

- The Transit Alliance of Middle Tennessee and Cumberland Region Tomorrow's transit briefings in counties across the *nMotion* region;
- Mayor Megan Barry's announcement of a significant transit project on Gallatin Road;
- Studies of high capacity transit corridors throughout Davidson County; and
- Nashville's Downtown Mobility Study.

As Middle Tennessee counties begin to consider specific transit projects and discuss funding options due to the passage of the IMPROVE Act, Moving Forward will play a role in facilitating those regional conversations and providing a platform for discussion and information sharing.

MOVING FORWARD'S ENGAGEMENT GOAL

goal: 30,000



APPENDIX A: STATUS OF 2016 KEY RECOMMENDATIONS

Below is the status of the June 2017 key recommendations published in the 2016 *Moving Forward* report.

1. The Regional Transportation Authority (RTA) and the Metropolitan Transit Authority (MTA) should begin with *nMotion's* “comprehensive regional transit system” (scenario 1) as the starting point for developing a bold, regional transit plan.

Implemented. In September 2016, the boards of both the Regional Transportation Authority (RTA) and the Metropolitan Transit Authority (MTA) unanimously approved the *nMotion 2016 Strategic Plan*, which most closely resembled the boldest, most aggressive draft plan – the “Comprehensive Regional Transit System” (scenario 1).

2. MTA/RTA's long-term plan for regional transit should include high-capacity transit service, such as rail, between Nashville and the cities of Clarksville, Franklin/Spring Hill, Gallatin, Lebanon and Murfreesboro by engineering transit projects to be convertible to a higher-capacity service in the future.

Not Implemented. The *nMotion* plan addressed the need to start the development of longer-term improvements, beginning with the High Capacity Transit Development plan, *nMotion2015.com*. This study looks at five “high capacity transit corridors” within the boundaries of Davidson County: Dickerson Pike, Gallatin Pike, Nolensville Pike, Murfreesboro Pike and Charlotte Pike. In the adopted *nMotion* plan, Dickerson Pike is slated to include bus rapid transit. The other four pikes, Gallatin, Nolensville, Murfreesboro and Charlotte, are slated to have light rail. The upcoming study of these corridors will consider how higher order transit could work on these corridors with the current right-of-way and ability to also include vehicle, bicycle and pedestrian traffic. It is important to note, however, that in the adopted *nMotion* plan these high capacity transit corridors terminate within the boundaries of Davidson County.

Work on the regional high capacity transit projects will be pursued, in conjunction with the Regional Transportation Authority and the Nashville Area MPO. The *nMotion 2016 Strategic Plan* calls for two commuter rail projects. First, the Music City Star, the current commuter rail that connects downtown Nashville to Lebanon, will be upgraded to run seven days-a-week and will extend service to Lebanon’s planned Expo Center. Additionally, the Norwest Corridor Rail, a longer-term project, will provide service between Clarksville and downtown Nashville, in partnership with potential bus-on-shoulder operation and expanded commuter bus services in the interim. The Nashville Area MPO will also be initiating a South Corridor Study between Davidson, Williamson and Maury counties in 2017 that will consider a variety of transit modes, including the possibility of rail.

3. The Nashville/Davidson County Mayor's Office should develop a plan for downtown access and mobility across all modes by the end of the 2016 calendar year.

Not Implemented. The Mayor’s office and Metro Public Works have begun work on the Downtown Mobility Plan, with hopes of releasing a draft plan in 2017, but the Downtown Mobility Plan was not completed by the end of the 2016 calendar year. The Downtown Mobility Study that is currently underway is limited to considering how to move current transit - buses - more efficiently through downtown. A longer-range vision for moving higher-order transit including bus rapid transit and light rail transit will be included in the list of projects to be considered by voters in the transit funding referendum in 2018.

4. Public agencies should prioritize transit projects based upon a community’s expected density level and land use policy, support of which are critical to the viability of transit infrastructure investment.

Partially implemented. The city of Nashville has identified the Gallatin Road corridor as the first to receive high-capacity transit service, which has high density in plans and zoning and has the highest existing transit ridership. However, Metro has not set a formal policy for how land use and density affect the prioritization of transit projects. In addition, the counties surrounding Nashville would need to adopt density and land use policies along the high capacity transit corridors emanating out of Davidson County to make some transit modes, such as light rail, more viable.

5. MTA should include a direct connection from the Nashville International Airport to the proposed light rail line on Murfreesboro Road between downtown Nashville and Bell Road.

Implemented. One of the recommendations in the *nMotion* plan is the development of multiple high capacity and rapid services between downtown Nashville and the Nashville International Airport, with the airport used as a transit hub. The Nashville International Airport embraced this concept in their “BNA Vision,” a comprehensive plan designed to enable the airport to meet the needs of record growth. This plan includes a new parking and transportation center and the potential for a multi-modal connector to link the airport to Middle Tennessee’s future transit system.

6. Middle Tennessee’s mayors, the State of Tennessee and other regional stakeholders should support the planned efforts to discuss the feasibility of moving the Radnor Yard rail facility from south Nashville near Interstate 65 to a location in an outlying county.

In progress. While conversations about moving Radnor Yard are continuing, there has been no direct action taken on moving the Radnor Yard facility. This possibility was discussed initially in the Nashville Area MPO’s 2010 Freight Study. The issues surrounding Radnor Yard were examined in more detail in *A Vision for Freight in Middle Tennessee*, the Nashville Area MPO’s 2016 regional freight and goods movement study. TDOT’s multi-modal freight study also investigated the relocation of Radnor Yard and estimated the cost of relocation to be \$767 million (2015 dollars).

7. The State of Tennessee should develop and staff an Office of Public-Private Partnerships within the next year to ensure that governments in our state are ready to accept future P3 proposals.

Not Implemented. Legislation (SB0559/HB1374) was introduced during the 2017 legislative session by Senator Bill Ketron (District 13 – Murfreesboro) and Representative Charles Sargent (District 61 – Franklin). This bill would have created a state office dedicated to providing expertise and assistance to state and local governments regarding public-private initiatives to develop, redevelop or operate transportation facilities under the Public-Private Transportation Act of 2016. This bill, however, failed to advance beyond the finance committees of both houses.

8. RTA and the Transit Alliance of Middle Tennessee should host public conversations on transit regularly in the future, at least twice per year, within each of the counties adjacent to Davidson County.

In progress. On December 12, 2016, the Regional Transportation Authority issued an RFP for community education and engagement efforts in RTA's 10-county region. The primary work of the successful bidder would be to actively engage the public, business community and regional transportation stakeholders to raise awareness about existing and future commuter options. The vendor would also help educate the public regarding the importance of transit and shared mobility options to the region's air quality.

The RTA awarded a two-year contract to the Transit Alliance of Middle Tennessee in partnership with Cumberland Region Tomorrow to conduct the work. The RTA Board approved this contract at their meeting on February 15, 2017, and the first community meeting on transit took place in Wilson County on June 8, 2017.

9. The upcoming MPO technology study should quantify the capital investment required to implement a modern intelligent transportation system (ITS) in each city and county in the region, as well as the number of trained staff needed to properly operate and maintain the system, in time for the 2017 budget process.

Not Implemented. The Nashville Area MPO has not yet issued the RFP for the technology study.

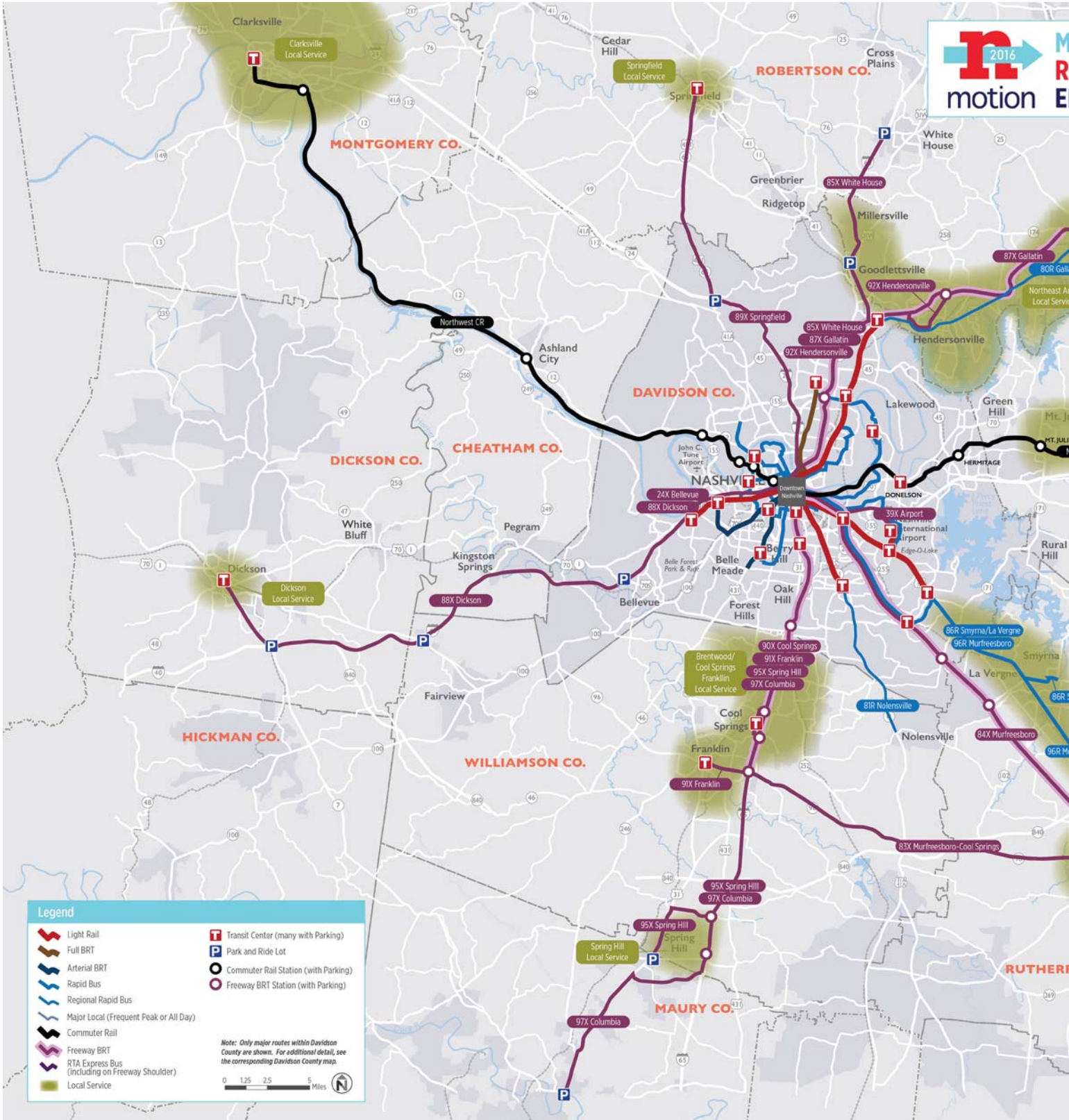
10. MTA/RTA should incorporate in the completed *nMotion* plan a reference to how future autonomous vehicle technologies could potentially be integrated into the overall transit service strategy for the region.

Implemented. Autonomous vehicles were referenced in the recommendations coming out the final *nMotion* Strategic Plan. The *nMotion* plan recognized that autonomous technology will likely have a connection to future transit service and infrastructure. An example *nMotion* references is fully autonomous vehicles could jointly use "managed lanes" with BRT and emergency vehicles. The *nMotion* plan also recognizes that further recommendations would need to progress and be responsive to developments in the autonomous vehicle industry as these vehicles begin to make their way onto the roads.

In the Metropolitan Transit Authority's proposed budget and list of projects, as agreed upon by the MTA Board and presented to Mayor Barry in her round of preliminary budget hearings, the MTA requested capital funding around autonomous technology. This capital would fund a one-year demonstration of automated shuttle bus technology, which would be used to understand the "State of the Practice" and begin to gauge potential future applications. However, this proposal was not funded in the 2017-2018 Metro budget.



APPENDIX B: ADOPTED nMOTION PLAN



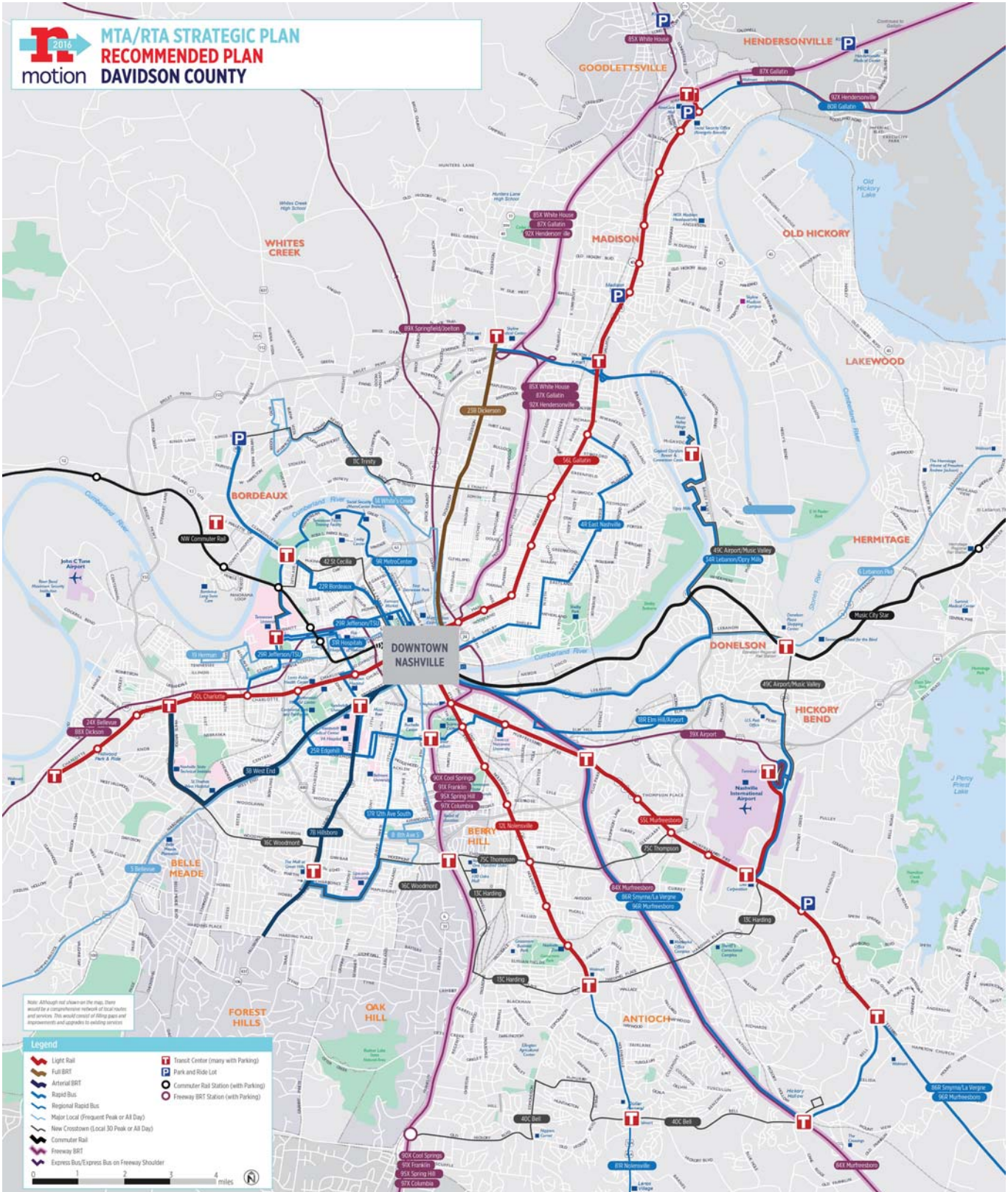
MTA/RTA STRATEGIC PLAN RECOMMENDED PLAN ENTIRE REGION



Source: nMotion2015.com



MTA/RTA STRATEGIC PLAN RECOMMENDED PLAN DAVIDSON COUNTY



Note: Although not shown on the map, there would be a comprehensive network of local buses and services. This would consist of filling gaps and improvements to existing services.

Legend

- Light Rail
- Full BRT
- Arterial BRT
- Rapid Bus
- Regional Rapid Bus
- Major Local (Frequent Peak or All Day)
- New Crosstown (Local 30 Peak or All Day)
- Commuter Rail
- Freeway BRT
- Express Bus/Express Bus on Freeway Shoulder
- Transit Center (many with Parking)
- Park and Ride Lot
- Commuter Rail Station (with Parking)
- Freeway BRT Station (with Parking)

0 1 2 3 4 miles

APPENDIX C: MOVING FORWARD TASK FORCE ROSTERS

REVENUE AND FINANCE TASK FORCE

Don Abel, chair, NXG Strategies

Mary Cavarra, vice chair, Ingram Industries

Kasey Anderson, American Council of Engineering Companies of Tennessee and Tennessee Society of Professional Engineers

Jamie Brown, Bass, Berry | Sims

Ron Chance, AECOM

Terry Clements, Nashville Convention and Visitors Corporation

David Cripe, Skanska USA Building

Eric Deems, CBRE

Morgan Dent, Williamson, Inc.

Bob Duthie, Duthie Learning

Tom Feeney, Bank of America Merrill Lynch

Margot Fosnes, Robertson County Chamber of Commerce

Mark Hamilton, DeKalb Office

Brett Holladay, Symphony Strategic Consulting

Mary Anne Howland, Ibis Communications

Mia Keller, CBRE

Tom Lampe, Messer Construction Co.

David Lewis, Butler Snow

Rob Lyons, City of Murfreesboro

Kevin Michael, Bradley

Jeff Oldham, Bass, Berry & Sims

Neil Parrish, Hastings Architecture Associates

Brackney Reed, Gresham Smith & Partners

Nick Shackell, Enterprise Holdings

Jason Spain, Tennessee Public Transportation Association

Daniel Spann, Barge, Waggoner, Sumner & Cannon

Jarron Springer, Greater Nashville REALTORS

Ryan Stanton, community volunteer

Turney Stevens, community volunteer

Tom Stumb, Truxton Trust Company

Tom Trent, Bradley

Mason Worthington, Transit Now

PUBLIC ENGAGEMENT TASK FORCE

Hannah Paramore-Breen, chair, Paramore Digital
Gini Pupo-Walker, vice chair, Conexión Américas
Jeger Ali, Metropolitan Nashville Public Schools
Greg Bailey, Bailey & Company Public Relations
Alyson Bennett, Paramore Digital
Jeff Bradford, The Bradford Group
Jeff Bredeson, community volunteer
Ed Cole, Council on Aging of Middle Tennessee
Beth Curley, Nashville Public Television
Regena Davis, Bordeaux-North Nashville Chamber of Commerce
Amanda Foster, community volunteer
Gary Gaston, Nashville Civic Design Center
Kristy Hairston, Great Nashville REALTORS
Joe Harkins, Harkins Marketing Advisors
Ginger Hausser, Tennessee Board of Regents
Shanna Hughey, Think Tennessee
Dr. Shanna Jackson, Columbia State Community College
Candy Joyce, Middle Tennessee Association of Realtors
Paul Latture, Rutherford County Chamber of Commerce
Alex Macias, Conexión Américas
Daniel McDonell, Walk Bike Nashville
Layton Meng, Gresham, Smith and Partners
Bill Nigh, community volunteer
Neil Parrish, Hastings Architecture Associates
Bill Phillips, Bill Phillips Company
Allison Plattsmier, NeedLink Nashville
Matia Powell, Alignment Nashville
Lee Rucks, Leadership Middle Tennessee
Mary Vavra, Transit Now/Barge Waggoner Sumner & Cannon
Dan Wilson, Cambridge Swinerton Builders

ROUTES, NETWORK & MODES TASK FORCE

Bert Mathews, chair, The Mathews Company
Rev. Dr. Judy Cummings, vice chair, New Covenant Christian Church
Victor Alexander, Alexander and Associates, Inc.
Tayo Atanda, Bone McAllester Norton
Brandon Bell, Gresham, Smith and Partners
Christian Bruckman, Hytch
Matt Bullard, TTL
Ron Chance, AECOM
Mark Cleveland, Hytch
Michael Cochrane, TTL
Ryan Doyle, ONECITY
John Fee, Regions
Ben Freeland, Freeland Chevrolet Superstore
Richard Fulton, Colliers International
Douglas Ghertner, Change Healthcare
Travis Groth, Maury County Chamber and Economic Alliance
Tove Gunnarson, Berkshire Hathaway HomeServices
Luvenia Harrison, State of Tennessee Department of Health
Kelly Hodges, Gresham, Smith and Partners
Tony Holt, Cushion Employer Services Corp.
Dr. Willi Honegger, community volunteer
Jimmy Johnston, Forward Sumner
Stan King, HDR|ICA
Cheryl Lewis, Lifeway Christian Resources
Tommy Lewis, Change Healthcare
Ed Mahoney, Wolverton & Associates
Michelle McCain, Mid-TN Supported Living
Jim Morinec, community volunteer
Van Pinnock, Fisk University
Viv Pocek, community volunteer
Ilex Pounders, High Note Gifts
Mary Probst, community volunteer
Emily Schneller, Katz & Associates
Eric Scowden, Mollenkopf Design Group
Ryan Seibels, Elmington Capital Group
Tom Sharp, Metropolitan Public Health Department
Katy Sheesley, GHP Environmental + Architecture
Phil Shmerling, InCrowd Capital
Charlie Smith, Barge Waggoner Sumner & Cannon
Saul Solomon, Klein Bussell
Steve Sparks, Robertson County Chamber of Commerce
Scott Troxel, Keller Williams Realty Nashville
Tom Turner, Nashville Downtown Partnership
Brad Winkler, WSP
Ron Yearwood, Nashville Civic Design Center

ADVISORY FORUM

Rob McCabe, chair (2016), Pinnacle Financial Partners
Todd Rolapp, chair (2017), Bass Berry | Sims
John Agee, Terracon
Jacky Akbari, NCAC/Council on Workforce Innovation
George Anderson, Anderson Benson
Greg Bancroft, Thrivent Financial
Steve Berger, Uber
Haley Bredeson, ESa
Meredith Cebelak, Gresham, Smith and Partners
Denise Costanza, American Heart Association
Lisbeth Couser, Renewal House
Sam Davidson, Batch Nashville
Eric Deems, CBRE
Persis Elavia, Uber
Gina Emmanuel, Centric Architecture
Kate Read Ezell, Ezell Consulting
Jill Forbert, Vanderbilt University Medical Center
Joe Freedman, Music City Tents & Events
David Goodridge, Vanderbilt Executive Development Institute
Beth Gwinn, Beth Gwinn Photography
Andy Hammons, Ryan, LLC
Haley Haverstock, ESa
Eve Hutcherson, Frost Brown Todd
Mickey Jordan, Parallon Business Performance Group
Tom Jurkovich, Nashville International Airport
Mia Keller, CBRE
Nora Kern, Walk Bike Nashville
Don Klein, Price CPAs
Michele Knight, Plumlee & Associates
Stephen Kulinski, CBRE
Tammy LaPoint-O'Brien, The University of Tennessee at Knoxville
Nancy Leach, Facility Planners
Justin Lowe, Centric Architecture
Wanda Lyle, UBS Financial Services
Daniel McDonell, Walk Bike Nashville
Janet Meek, AppleOne
Marsha Moffitt, JP Morgan
Michele Nanna, community volunteer
Ann Ozier, Alex S. Palmer & Co.
Jim Phillips, XMi Holdings
Linda Radar, Radson Company
Chris Rhodes, Kimley-Horn and Associates
Karen Roach, The Wilson Group Real Estate Services
John Rowley, Fletcher Rowley
Chris Simonsen, Greater Nashville REALTORS
Saul Solomon, Klein Bussell
Leigh Anne Strickland, Anderson Benson
J. Michael Sullivan, Gresham, Smith and Partners
Mike Towle, Win-Win Words
Ted Townsend, TN Development of Economic and Community Development
Tom Vaughn, Crown Corporate Housing
Rob Wigington, Nashville International Airport
Rachel Zolensky, Project Return

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