moving forward

transit solutions for our region

2016 report
moving forward coordinating committee roster

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# Table of Contents

I. About Moving Forward (page 5)

II. Executive Summary (page 7)

III. Key Recommendations (page 9)

IV. The Region’s Current Transportation Landscape (page 10)

V. A Transit Plan for Our Region: Routes, Network & Modes (page 14)
   a. Why Transit is Important (page 14)
   b. The nMotion Process (page 14)
   c. Moving Forward: Our Transit Values and Vision (page 14)
   d. Specific Recommendations on the Regional Transit Plan (page 16)
   e. Smart Technology Platform (page 21)
   f. Shared Mobility (page 26)
   g. Autonomous Vehicles (page 28)

VI. A Regional Conversation on Transit: Public Engagement (page 32)
   a. The Engagement Landscape (page 32)
   b. Moving Forward’s Role (page 32)
   c. nMotion Public Engagement (page 33)
   d. Goals for Public Engagement (page 34)
   e. Future Conversations (page 35)
   f. Moving Forward Speaker Series events (page 36)

VII. Paying For Mobility: Revenue & Finance (page 37)
   a. How Transit is Funded (page 37)
   b. State Funds (page 37)
   c. Federal Funds (page 38)
   d. Fare Revenue (page 39)
   e. Local Dedicated Funding (page 40)
   f. Public-Private Partnerships (P3) (page 42)

VIII. Appendices (page 46)
   a. nMotion Transit Scenario Maps (1, 2 & 3) (page 46)
   b. Moving Forward Task Force Rosters (page 49)
moving forward: transit solutions for our region

The purpose of Moving Forward is to ensure the creation of a regional transportation solution through a cohesive community effort. Ideas for the Moving Forward effort were first discussed during the transit portion of the Nashville Area Chamber of Commerce’s Leadership Study Mission to Salt Lake City, Utah in April 2015. Delegates on the trip were impressed with the level of regional collaboration around mass transit in Salt Lake City and saw the need for a similar approach in Nashville after the controversial demise of the proposed Amp bus rapid transit project. The activity for Moving Forward would be grounded in the values of regionalism, accountability, urgency and collaboration.

Nashville Chamber staff discussed potential goals for making progress toward a regional transit system with dozens of public agencies, elected leaders, community organizations and stakeholders over the course of several months. As a product of those conversations, Moving Forward launched on August 4, 2015 with five objectives:

• Support the completion of an RTA and MTA Strategic Plan update within one year (2016)
• Support the identification and passage of state and federal government revenue enhancements for transit within two years (2017)
• Ensure at least 30,000 engagements with Middle Tennesseans in the transit conversation within two years (2017)
• Identify and secure a local dedicated funding source for transit in the region within three years (2018)
• Support breaking ground on the first rapid transit project in the region within five years (2020)

Moving Forward announced the intention to monitor and report annual progress toward meeting these goals, as well as producing a report offering recommendations to the responsible parties and the interested public. To accomplish these tasks, Moving Forward organized a Coordinating Committee and three task forces composed of community volunteers. Representatives from elected government and public agencies participated in task force meetings as resources and nonvoting participants. A Routes, Network & Modes Task Force was charged with envisioning the transportation system our region needs. The Public Engagement Task Force focuses on educating the public about forward-thinking transit solutions. The Revenue & Finance Task Force has the responsibility of investigating funding sources for transit. In addition, a Moving Forward Advisory Forum was formed in early 2016 to accommodate volunteers who may not have been able to serve on one of the task forces, but wanted to provide input into the process. Residents in the region interested in participating in Moving Forward are encouraged to visit movingforwardmidtn.com.

In its first year, 118 volunteers from across the region have participated in these Moving Forward committees and task forces, totaling 182 meeting-hours. This first Moving Forward report represents the culmination of their efforts.
Gary Garfield, chair of the Moving Forward Coordinating Committee, at the launch of Moving Forward on August 4, 2015 at the Adventure Science Center.
As Nashville and Middle Tennessee experience spectacular growth, investment and opportunity, it is urgent that we take steps to preserve the quality of life that makes our region special. Our community is dynamic, creative, friendly and compassionate, and people are moving here every day to be a part of it. But as we continue to grow in population, it is time for us to act on the kind of life we want in a future that is just around the corner.

One possibility is that our population continues to swell, but we don't invest in new ways for millions of residents to get around. A Murfreesboro commuter regularly misses a child's bedtime because of traffic gridlock. Businesses no longer add jobs in Williamson County because it is too difficult for employees to get to work. Sumner County residents who enjoy the outdoors find that the air quality triggers asthmatic attacks, and it's just safer to stay inside. A single parent and an entrepreneur starting a business find themselves without a place to live because the cost of housing and owning a car pushes them out of their neighborhood. This is our future without transit investment.

There is another potential future, but we need to act now. We can build a transit system for our region that is comprehensive and innovative. It would be multi-modal and "future-ready," able to adapt to the newest technology and innovation in the public and private sectors. Middle Tennesseans would be able to take transit safely and easily to get to work, education, recreation and commerce. People choosing to ride freeway bus rapid transit or light rail would be able to know with certainty how long it will take to arrive at their destination. The transit system in this future would be investment-focused, helping to spark the creation of more jobs and economic opportunity. But it would also be fiscally responsible, guided by performance metrics such as ridership, system efficiency and travel times. Our future transit system would be inclusive and equitable, connecting all our communities to opportunity and each other, moving beyond a past when transportation projects sometimes divided our neighborhoods. This is the transit future that the leaders of Moving Forward envision for our region.

Of the three regional transit scenarios proposed by Metropolitan Transit Authority (MTA) and the Regional Transportation Authority (RTA) as part of the nMotion planning process, we believe scenario 1, the “comprehensive regional transit system,” should serve as the starting point for a completed plan that includes a longer-range vision for our transportation future. We believe the long-range vision should include the eventual expansion of high-capacity transit, such as rail, to Gallatin, Murfreesboro, Franklin/Spring Hill and Clarksville as those communities approach a density level and land use policy that justifies the investment. Several of the regional corridors are likely to start with dedicated-lane, freeway Bus Rapid Transit (BRT) as their first transit mode. We recommend that our transportation investments be engineered so that they can be converted to higher-capacity service relatively easily in the future.

Once it is known how transit navigates downtown, a High-Capacity Transit Conceptual Corridors Study will engage the public to determine the precise location and mode and feasibility for transit on a number of corridors. Charlotte, Gallatin, Murfreesboro, Nolensville, Dickerson, West End, 21st/Hillsboro and, we would suggest, Jefferson Street, are the likely candidates for this detailed study which should be completed by the end of 2017 in order to meet the goal of breaking ground on a new mass transit project by 2020. Ultimately, we believe MTA and elected leaders should prioritize corridors for transit based on which communities support updated land use policies and zoning, spurring the intensity of development that will support the service.

Moving Forward volunteers spent considerable time thinking about what the long-term future could look like. We recommend local and state leaders should build upon the Nashville Metropolitan Planning Organization's freight studies and explore, with CSX, the possibility of relocating the Radnor Yards rail facility to the outer edges of the region; it would be a game changer for commuter rail prospects between Nashville and Franklin, Murfreesboro and Gallatin. We also recognize that the full impact of autonomous vehicle technology may not be felt until several decades into the future, but we must begin planning for its arrival and look for ways to incorporate new innovations into our transit plans. We can't afford to wait to see what the future holds in transportation, but our plan does need to be flexible in order to meet changing circumstances and needs.
As we work toward implementing major mass transit projects, the Moving Forward Routes, Network & Modes Task Force has identified a number of important, initial steps that must be taken. These recommendations vary from launching mobile payment for bus fares, to expanding the use of transit signal prioritization to make our buses run more efficiently and reliably, to quantifying the resources necessary to implement an intelligent transportation system in each jurisdiction in the region, to launching bus-on-shoulder service on the I-24 corridor. Because most transit routes will connect through Nashville, it is imperative that the Mayor’s Office convene stakeholders to determine a detailed mobility plan for downtown that identifies transit priority corridors by the end of the 2016 calendar year. Moving Forward believes it is critical that the public be actively engaged in the regional transit discussion, setting a goal of ensuring at least 30,000 engagements with Middle Tennesseans by the end of 2017. Moving Forward’s Public Engagement Task Force monitored the efforts of MTA/RTA, providing counsel and support. As of June 2016, the nMotion process has logged 17,110 substantive engagements such as completing a survey or providing a specific comment. This is in addition to meeting attendance and digital reach. Meanwhile, the Nashville Area Metropolitan Planning Organization (MPO) has engaged more than 11,000 people in meetings, surveys and committee member dialogue. In an effort to continue this robust dialogue, we recommend RTA and the Transit Alliance of Middle Tennessee (TAMT) host interactive public conversations on transit regularly in the future, at least twice per year, within each of the counties adjacent to Davidson County. We must also recognize that, despite considerable effort, some minority groups remain underrepresented in the total engagements, meaning future outreach efforts should include the creation of a task force or committee specifically focused on outreach to these communities.

Investing in our transit future won’t be cheap, but we will pay a heavier price in lost time, productivity and economic opportunity if we do nothing. MTA/RTA estimated the cost of capital construction for scenario 1 to be $5.4 billion over 25 years, and that number is likely to increase with the final plan once the necessary sidewalk and connecting infrastructure is considered. Operating a scenario 1 system would cost $311.5 million per year, nearly three times as much as we currently spend on transit. Our regional transit plan will need to be funded from a combination of local, state and federal revenue sources. In 2015, Congress passed the FAST Act, which provides stable funding for the federal Highway Trust Fund and mass transit through 2020. Tennessee’s Highway Trust Fund, relying on a per-gallon gas tax rate that hasn’t increased since 1989, is faced with a $6 billion backlog of road projects. Gov. Haslam and the state legislature will need to make changes to the state’s funding method, and Moving Forward plans to engage with policymakers during 2017 to ensure any solution includes resources and tools to expand mass transit. These types of measures are critical to preserve growth in Middle Tennessee and, equally important, both a high quality of life and improved equity in our region. Moving Forward’s Revenue & Finance Task Force spent much of the past year studying the use of public-private partnerships (P3s) as potential tool to implement and finance transit projects. With a groundbreaking new law authorizing transit P3s now in place in Tennessee, we believe the state should create an Office of Public-Private Partnerships within the next year to ensure that governments in our state are ready to accept and administer future P3 proposals. Ultimately, our regional transit plan will not become a reality without local, dedicated revenue that can pay off bonds for capital projects and draw down large federal grants. 2017 will need to be a year to get that funding in place if we are to have new mass transit service in place across the region in the next decade. Moving Forward intends to research potential local funding options over the coming months and will publish findings in our 2017 report.

2016 is the year for the Nashville region to have a completed transit plan in place so we can begin to take action. A year from now, we will be asking public agencies to share with us which of our recommendations have been implemented. Our communities will need to come to a decision about how to pay for the system we need in 2017. Transit projects take a long time to design and build, so we need to break ground on our first new mass transit project by 2020 in order to transform our infrastructure within the next 10 years. This report contains our findings and recommendations for moving forward today.
2016 key recommendations

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. (page 15)

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. (page 15)

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. (page 16)

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. (page 17)

5. MTA should include a direct connection to the Nashville International Airport to the proposed light rail line on Murfreesboro Road between downtown Nashville and Bell Road. (page 17)

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. (page 20)

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. (page 44)

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. (page 33)

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. (page 25)

10. MTA/RTA should incorporate into 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. (page 29)
Middle Tennessee’s transportation infrastructure is complex—its physical form, its interconnectivity across modes, and in the uses and users it serves. Various aspects of the transportation network are managed and regulated by different public and private entities. Meanwhile, several advocacy groups have formed to promote and protect their use of the transportation infrastructure.

It should come as no surprise, then, that there are many organizations involved in creating the successful transit system of the future in Middle Tennessee. Moving Forward is by no means alone in this work, and, in fact, was created to support, challenge, critique and champion the work of public-sector leaders while coordinating and rallying the efforts of other transit-supportive groups. Each of these public and private partners plays a critical role in our regional transportation landscape.

### a. public-sector transportation partners

Moving Forward works with four crucial public-sector partners in addition to county and municipal governments—the Tennessee Department of Transportation (TDOT), the Nashville Area Metropolitan Planning Organization (MPO), the Nashville Metropolitan Transit Authority (MTA) and the Regional Transportation Authority of Middle Tennessee (RTA). The U.S. Department of Transportation also plays an important role in planning for Middle Tennessee’s future transit network.

TDOT has oversight management and administers state and federal grant programs for public transportation throughout Tennessee. As a multimodal transportation agency, TDOT is a stakeholder in transit issues even though the bulk of the agency’s resources are directed toward planning, constructing and maintaining the highway system. Currently, TDOT’s role in transit is primarily as a funding partner, making state matching funds available to transit agencies statewide, but in the future, there will be a growing role for TDOT as a partner in regional transit. As the owner of key regional corridors, TDOT can potentially partner with local transit agencies to add transit capacity within those corridors.

The Nashville Area MPO facilitates strategic planning for the region’s multimodal transportation system by serving as a forum for collaboration among local communities and state leaders. MPO develops policies and programs that direct public funds to transportation projects that increase access to opportunity and prosperity, while
promoting the health and wellness of Middle Tennesseans and the environment. The MPO’s regional transportation plan, which includes roadway projects, is the gateway for federally funded projects and services in Middle Tennessee. In addition to other transit partners, the MPO coordinates with four main transit agencies within its seven-county planning area: Nashville MTA, RTA, the Franklin Transit Authority, and the Murfreesboro Rover. RTA also coordinates with the Clarksville MPO in Montgomery County and the Tennessee Rural Planning Organization in Cheatham and Dickson counties.

MTA is a unit of Metropolitan Nashville Davidson County Government providing transit services within Davidson County, including local bus, Bus Rapid Transit Lite and AccessRide (paratransit services). In 2015, MTA launched nMotion, an update to Nashville/Davidson County and the region’s strategic plan for transit. Once adopted, this plan will become the vision for MTA and RTA’s future transit work. It will be refined through further study by MTA/RTA and by the Nashville Area MPO to finalize routes and modes, and to seek funding for implementation of transit projects.

RTA is an independent authority created by state legislation. While MTA and RTA are technically two separate entities, the Nashville MTA is contracted to manage RTA services. RTA is responsible for inter-county services over a 10-county area, which includes Cheatham, Davidson, Dickson, Maury, Montgomery, Robertson, Rutherford, Sumner, Williamson and Wilson counties.

The U.S. Department of Transportation supports, through technical and financial assistance, state and local governments as they design, construct and maintain the nation’s highway system.

For a more comprehensive understanding of the interaction between these groups on planning and funding transit, see The Transportation Planning Process Key Issues document created by the Federal Highway Administration and the Federal Transit Administration and available on the Nashville Area MPO website at nashvillememo.org/docs/FHWA_MPOBriefing.pdf.

b. private-sector transportation partners

Our region’s transportation infrastructure has many, diverse users—including commuters, visitors, walkers, cyclists and freight. These users are supported by a myriad of advocacy groups seeking to ensure that our current and future transportation network meets their needs. Moving Forward works with many of these groups to coordinate and seek consensus or compromise on how to create the transportation network of the future.

Transit Alliance of Middle Tennessee (TAMT) is a nonprofit dedicated to building support for funding regional transit by mobilizing community leadership. TAMT has a regional reach and a track record of training community leaders across the region about transit through its Transit Citizen Leadership Academy and recently launched transit education program for elected and appointed officials. In 2015, TAMT, in coordination with Cumberland Region Tomorrow, led regional outreach efforts for nMotion, engaging more than 1,000 Middle Tennesseans in the communities surrounding Davidson County.

Transit Now is a nonprofit whose mission is to engage the Nashville community to promote a vibrant transit system. The group conducts events and trainings to educate Nashvillians and increase transit ridership. These range from Transit Month events in April to education of local college students on Nashville/Davidson County’s transit system. Transit Now also advocates for improvements and expansion to Nashville/Davidson County’s current transit system.

Walk Bike Nashville is a nonprofit working to build a more walkable, bikeable, and livable Nashville. There has been much discussion during nMotion about how every transit rider is—at some point—a pedestrian. Since 1998, Walk Bike Nashville has offered educational programs focused on walking and cycling safety, along with grassroots advocacy.

The Tennessee Public Transportation Association (TPTA) is a nonprofit, statewide organization dedicated to improving public transportation in all Tennessee communities. Its members include transportation operators, suppliers and contractors, local governments, and a myriad of users and
supporters including major employers, small businesses, community organizations and chambers of commerce. TPTA acts as a resource by distributing research, information and best practices on public transportation. The group also advocates for increased funding for public transportation.

The Tennessee Road Builders Association is an association of businesses involved in building and maintaining Tennessee's roads with the goal of advocating for the expansion and maintenance of Tennessee's road network.

c. elected officials

With funding, design, construction, maintenance and regulation of Middle Tennessee's transportation network occurring at all levels of government, there is an extensive list of elected officials that are partners in designing the transit system of the future. The following list is not exhaustive, but highlights groups of elected officials that are key to Middle Tennessee's transportation system and future transit solutions.

With constituents across the Middle Tennessee region growing increasingly frustrated by congestion and time lost to traffic, members of the Tennessee State Legislature are becoming more attuned to our transportation system's shortcomings. Some state legislators are taking the lead by passing legislation that creates more options for transit. In 2016, the Tennessee General Assembly passed legislation allowing jurisdictions to engage in public-private partnerships (P3) to design, build, operate, maintain and finance transit improvements. The state legislature also passed legislation to enable jurisdictions to pursue "bus-on-shoulder" transit, a first step to offering better mobility choices to Middle Tennesseans suffering from our region's growing traffic congestion.

The Middle Tennessees' Mayors' Caucus is a collaborative of 40 mayors across 10 counties in Middle Tennessee. Formed in 2009 after leaders learned of a similar effort during the Nashville Chamber's Leadership Study Mission to Denver, the Mayors' Caucus convenes periodically to discuss issues of shared concern, including transportation. The forthcoming nMotion final plan will propose transit options that traverse the region, impacting—but also relying on coordination among—numerous jurisdictions. The Mayors' Caucus is a crucial partner in taking the nMotion vision from plan to reality.
These same jurisdictions have additional layers of elected officials making land use and capital investment decisions that can facilitate or slow the creation of transit. Local councils, aldermen and county boards of commissioners represent a group that must be more fully engaged in the future. The work of TAMT (described above) will be critical to this effort.

**d. land use planning**

Finally, as highlighted elsewhere in this report, local land use planning, zoning and the resulting development are key to creating a successful transit network in the future. In the Middle Tennessee region, land use planning and zoning primarily occurs at the local level through local planning and zoning departments. These efforts are aided by the following regional groups.

The Greater Nashville Regional Council (GNRC) is a regional organization including the counties of Cheatham, Davidson, Dickson, Houston, Humphreys, Montgomery, Robertson, Rutherford, Stewart, Sumner, Trousdale, Williamson and Wilson and the cities within these counties. Among its other programming, GNRC offers long-range planning and transportation planning assistance.

Cumberland Region Tomorrow (CRT) is a regional nonprofit working across the public and private sectors to plan for the future economic health and livability of the region. CRT launched in the early 2000s with its groundbreaking Report to the Region outlining the sprawl-based land use taking place in the region and its future impact. The Report to the Region offered an alternative growth pattern to maintain Middle Tennessee’s economic advantage, quality of life and quality of place and character. In 2016, CRT is working to update this report with findings from the past 15 years and an assessment of the future. CRT also hosts the annual Power of Ten summit, which in 2015 focused on transportation and transit.

Taiwo Jaiyeoba, transit lead of the Mid-Southeast region for AECOM, presents “Identifying Models of Success: A Look at Success and Failures of Other Communities Facing Transit Opportunities and Challenges” at the Oct. 15, 2015 Moving Forward Speaker Series event.
a. why transit is important

The Nashville region is projected to grow by more than a million people by the year 2040. While this population expansion to nearly 3 million residents reflects a vibrant and prosperous community, this growth will make it more difficult for people, goods and services to move around the region. The Texas Transportation Institute estimates that traffic congestion in the United States now costs $160 billion annually in wasted fuel and productivity, and that in 2014, commuters in the Nashville region spent nearly 39 million hours in morning and afternoon rush hour traffic delays. While our freeways and major corridors are already congested, the Nashville Area MPO predicts our travel times will double over the next 25 years. Our state and local officials have stated that widening our interstates and commercial corridors isn’t feasible and would only create more gridlock. Simply relying on our current transportation infrastructure poses a serious threat to our region’s economic competitiveness and our residents’ health, quality of life and access to opportunity.

But getting our transportation infrastructure right isn’t just about traffic. It’s also about catalyzing economic activity, connecting Middle Tennesseans to opportunity in education and employment, and competing with other regions for talented and creative people. Transit can impact quality of life by improving air quality, promoting healthy physical activity, reducing time spent commuting, and lowering the cost of a family’s transportation budget. Moving around by automobile, with or without a human driver, will still be the dominant mode for the foreseeable future. But demographic shifts and changes in generational attitudes increasingly mean that retirees and young professionals, and the generations in between, will choose to live in a community that provides an array of transportation options. And as Todd Litman of the Victoria Transport Policy Institute observed at a Moving Forward Speaker Series forum in May 2016, homeowners that spend less on personal transportation and are able to invest that savings into a transit-oriented development residence can build wealth in a community as their asset appreciates over time.

b. the nMotion process

Since January 2015, the RTA and the MTA have been engaged in a public process to develop a plan for regional transit, called nMotion. After a year of developing values, principles and 21 transit improvement strategy briefings to help educate interested residents, nMotion has invited public commentary on three potential transit scenarios that feature varying degrees of investment. The first scenario, titled “comprehensive regional transit system,” would represent a significant expansion of public transit, with the possibility of light rail, streetcar or bus rapid transit on eight commercial corridors and premium transit service added between downtown Nashville and Murfreesboro, Gallatin, Franklin and Clarksville. The second scenario, “bus-focused expansion,” would be a significant expansion of the current bus service, but would forego new rail service. The third scenario, “modest improvements,” outlines incremental enhancements to the existing transit service that could be accomplished without new, dedicated funding for transit, relying instead on increases in funding as the population grows. Once public input on the three scenarios is complete, RTA and MTA are expected to present a new, 25-year transit plan to their boards for approval in late summer 2016.

c. moving forward: our transit values and vision

Moving Forward, a collection of more than 100 community volunteers from across Middle Tennessee, believes it is imperative that we begin now to develop and build a mass transit system that meets the needs of our growing region. The recommendations in this report reflect a vision for transit that is anchored in the following six values, created during the Moving Forward review of the three scenarios:

• Comprehensive: The plan should be regional, multimodal, and have projects we can implement in the next 1-3 years, the next 3-10 years, and longer-term projects and initiatives beyond the next 10 years.
• **User-friendly:** Transit should be attractive, safe, convenient and easy to navigate.

• **Inclusive:** The plan should provide affordable mobility options for riders who depend on public transportation, and choice riders, to equitably connect communities to work, education, recreation and commerce.

• **Fiscally responsible:** Plan implementation should be guided by performance metrics, such as ridership, system efficiency and travel times through a transparent, public process.

• **Investment-focused:** The plan should maximize transit’s potential to spur economic activity, development and jobs, with corridors prioritized based on the surrounding community’s willingness to encourage density and transit-oriented land use.

• **Innovative:** The plan should be creative and future-ready, using the latest advances in technology, as well as being able to adapt and connect to new service models from the private and public sectors.

Moving Forward’s Routes, Network & Modes Task Force has spent six months reviewing the three transit scenarios proposed by nMotion. To gain the best possible understanding of the scenarios and what they offer, a Service Enhancements subcommittee of this Moving Forward task force held a series of meetings with MTA/RTA and with its consultant, Nelson Nygaard. MTA/RTA management and Nelson Nygaard are to be commended for their availability and willingness to discuss the reasoning and methodologies behind each of the scenarios. Moving Forward volunteers had the opportunity to probe deeply, question assumptions, and come away with a great deal of insight into how each of the scenarios could help solve mobility challenges and create economic opportunity.

Taking into account the six values we would like to see reflected in a completed transit plan, **Moving Forward recommends that the MTA and RTA complete a regional transit plan that uses nMotion’s “comprehensive regional transit system” (scenario 1) as the starting point for developing a bold, regional transit plan.** Moving Forward believes that the other two nMotion scenarios should be considered stages of implementation toward the eventual achievement of the comprehensive regional transit system. The transit agencies should move ahead with elements of the “modest improvements” (scenario 3), such as expanding rapid bus service on major corridors, or “Rapid Bus” (BRT Lite) as funding is available. And while the “bus-focused expansion” (scenario 2) would likely require a new transit funding source, many of the corridors slated for light rail in the “comprehensive” scenario may rely on bus-based service until the necessary residential and employment density is in place to support rail.

Moving Forward recognizes that Davidson County is extensively developed and that we must match transit with existing land use patterns even as we increase residential and employment density on key transit corridors to support eventual rail options. Conversely, in surrounding counties, there is a tremendous opportunity to pair land use and transit to shape development and use development to improve quality of life. Each regional transportation corridor has different characteristics and needs, and how we achieve our transit goals in alignment with our values will differ between communities and routes. This could lead to more than one mode for each corridor depending on the community’s needs and goals. During the Nashville Area Chamber of Commerce’s 2016 Leadership Study Mission to the Twin Cities, for example, we learned that parallel transit modes run in close proximity between Minneapolis and St. Paul. Bus Rapid Transit (BRT) is planned on I-94, serving commuters seeking a quick route between the Twin Cities. Meanwhile, light rail currently exists on University Avenue, which runs parallel just to the north of the freeway, serving shorter trips and generating significant economic development. A similar set of parallel routes—serving different community goals—could be imagined on I-24 and Murfreesboro Pike, for example.

This report advocates for and encourages RTA and MTA to complete a comprehensive, regional transit system plan that builds upon nMotion scenario 1. It is the best and boldest approach to transit solutions in the region, but we believe it needs to go further and include several additional transit options. **Moving Forward recommends that the long-term vision for regional transit include high-capacity transit service, such as rail, between Nashville and the cities of Clarksville, Franklin/Spring Hill, Gallatin, Lebanon and Murfreesboro as those communities approach a density level and land-use policy that justifies the investment.** In developing a completed plan, we ask that RTA and MTA take
into account the following observations, recommendations and longer-term challenges and opportunities:

d. specific recommendations on the regional transit plan

i. Downtown Access and Mobility

Review of nMotion’s scenario 1 makes clear that, because most of the proposed transit in the region will travel through downtown Nashville, a specific plan for mobility in, around and through downtown is critical. Without efficient and effective movement through downtown—including the consideration of transit priority, where the movement of transit vehicles is given priority in some lanes over other modes of transportation—the region’s interlocking transit routes will not work as a system. Put another way, until we know how the bus or rail from Murfreesboro, Franklin, Gallatin, Lebanon or Clarksville makes its way into and through downtown, none of these transit lines can be fully realized. Downtown Nashville is, however, home to a variety of stakeholders and users, including residents, corporations, employees, tourists, entertainment destinations and merchants, each with their own access and mobility goals. Many times, these goals compete with each other. In addition, the unprecedented development and construction boom in our downtown area makes the need for settling this issue more urgent with every passing month.

With this in mind, Moving Forward recommends that the Mayor’s Office develop a plan for downtown access and mobility, across all modes, by the end of the 2016 calendar year. This plan should be the product of a study that includes the active engagement of all the diverse stakeholders in downtown, with the specific goal of determining the transit-priority corridors and the necessary transit infrastructure needed in the downtown area to ensure a successful, reliable, regional transit system. All options for enhancing downtown mobility should be considered, including dedicated lanes, corridors closed to vehicular traffic, and the feasibility of creating a transit corridor underground. The 2016 deadline for completing the plan brings a needed urgency to the discussion, recognizing that most of the other transit projects in the region must await its resolution.

ii. Transit for residential and commercial corridors

nMotion scenario 1 proposes seven residential and commercial corridors in Davidson County to receive BRT or light rail. These corridors will, of course, need further study to determine exact routes, modes and how transit can work on the corridor. MTA intends to follow the adoption of nMotion with a High-Capacity Transit Conceptual Corridors Study—an opportunity to look at transit in greater detail on some of these corridors within Davidson County and engage the community in considering routes, modes, preliminary thoughts on transit design, and land use implications. The current list of corridors for study include:

- Charlotte
- Gallatin
- Murfreesboro
- Nolensville
- Dickerson
- West End
- 21st Avenue/Hillsboro

We recommend that MTA add an additional corridor for premium transit consideration on or near Jefferson Street between Tennessee State University and Germantown. Moving Forward supports this next level of study and the commitment to engaging the community to understand the implications of transit on these corridors and the tradeoffs inherent in transit decisions. Tradeoffs include understanding what level of residential and employment density is needed to support a particular mode of transit, and understanding how limited right-of-way is allocated. Not all corridors can or should be studied at one time. We do believe, however, that the High-Capacity Transit Conceptual Corridors Study should have intensive community engagement, but not be drawn out. We believe that once the corridors for study are selected later in 2016, the study should be completed before the end of 2017 and should prioritize the projects to be undertaken so implementation can begin. nMotion has demonstrated that the community is ready for action.

Determining which of these corridors will ultimately be the first to get high-capacity transit service may still be difficult. Factors such as ridership and cost-benefit analysis
must be considered. **In addition, we recommend that project prioritization be based upon the surrounding community’s demonstrated willingness to encourage density and transit-oriented land use on the corridor.** Unanimity is not likely, but intentional conversation can reveal areas of agreement that benefit the corridor and the larger area. During the High-Capacity Transit Conceptual Corridors Study, MTA will need to partner with the Metropolitan Planning Department and other city agencies to engage neighborhood associations, area businesses and institutions, and elected officials on the steps they would need to take in order to compete for the next transit investment. Community leaders who are willing to tackle the difficult issues around zoning, land use, construction and right-of-way acquisition will see their corridors lead the way. Those who are resistant to change or unable to overcome the inevitable obstacles that surface in any transit project should move to the back of the line.

### iii. Connecting the region

More than half of the region’s residents cross county lines to get to their place of work. Moving Forward endorses the *nMotion* scenario 1 proposal to implement new premium, fixed-guideway transit service between Nashville and Murfreesboro, Franklin, Gallatin, and Clarksville, as well as improved service to Lebanon via the existing Music City Star commuter rail line.

#### 1. Southeast Corridor/Murfreesboro

In the event light rail is chosen as the transit mode for Murfreesboro Pike between downtown and the Crossings/Bell Road, we recommended the following:

- **Moving Forward recommends that the proposed light rail line from downtown Nashville to Bell Road include a direct connection to the Nashville International Airport.** A light rail connection from the airport to downtown would serve Nashvillians, Middle Tennesseans and visitors to Nashville as a convenient and effective means to travel to the downtown area and access to the broader region. The Airport Authority has indicated interest in this connection and should include this proposal in its future master plans.

- ***nMotion* Scenario 1 calls for freeway BRT in dedicated transit lanes on I-24 between Nashville and Murfreesboro. The right-of-way acquisition, construction and operating costs are currently more feasible for freeway BRT than for**
commuter rail on an interstate corridor where ridership is mostly limited to morning and afternoon commutes. But given that the southeastern portion of the region is projected to continue experiencing significant population growth, it would be wise to begin planning for some type of rail service in the future. In addition to the possibility of placing new tracks near the current CSX-operated rail line used for freight, Moving Forward recommends exploring rail service between Nashville and Murfreesboro that would involve extending the proposed light rail line on Murfreesboro Pike to La Vergne, Smyrna and Murfreesboro, potentially terminating at Middle Tennessee State University, the largest undergraduate institution in the state. While a longer-term possibility, this kind of rail project would have the potential of spurring economic development along the line, as well as focusing future residential growth and density around major transit infrastructure. Of course, this possibility would be contingent upon Davidson County, Rutherford County and its cities, altering land use policies, zoning and building complementary multimodal infrastructure—such as street networks, sidewalks, bikeways and crosswalks—to make the project feasible.

- During the 2016 legislative session, the Tennessee General Assembly adopted Public Chapter 967, which authorizes TDOT to promulgate rules governing how public transit agencies could operate buses on the shoulder of state highways during times of peak congestion. The value of “bus-on-shoulder” transit is due mostly to the relative ease of implementation and lower capital investment required compared to other modes of mass transit. At least 12 other states have implemented a bus-on-shoulder program, with the nation’s first such program in Minneapolis enjoying a near-spotless safety record since its inception in 1991. Moving Forward recommends that TDOT and RTA begin immediately implementing a bus-on-shoulder program on the I-24 corridor between Nashville and Murfreesboro to serve this route in the near term.

2. Northwest Corridor/Clarksville

An “alternatives analysis” study is required of all major transportation projects that will eventually seek federal funding. The RTA has been conducting such a study of the northwest corridor between Nashville and Clarksville at the same time as the nMotion process, and its findings will be folded into the final nMotion plan. Other corridors in the final nMotion plan will need to undertake similar studies in order to determine the right location and mode for transit service. The Northwest Corridor study has examined several routes and modes connecting downtown Nashville to Ashland City and Clarksville. The most popular route—among the public—has been the proposal to have commuter rail on an existing underused Nashville and Western rail line. BRT on I-24 west of downtown Nashville, with construction of additional managed lanes, has also been studied, among other options.

Based on Moving Forward’s conversations with the engineers from Parsons Brinckerhoff, the firm that is conducting the study, it is likely that the projected ridership between Nashville and Clarksville will be below what would generally qualify a commuter rail project for federal funding. However, projected ridership would increase by extending the line through downtown Nashville. Given this, we recommend that the potential Northwest Corridor commuter rail line remain in the nMotion plan. The availability of existing track between Nashville and Ashland City, the potential for commuter rail to complement and aid in expanding the successful Bicentennial Trail in Ashland City, and the economic development potential of the line—in North Nashville, Cheatham County and Clarksville—warrants keeping the route under consideration. There is also the possibility in the future that the project will proceed with local and state funds, rather than federal grants. In the near term, we also recommend the following:

- To lay the groundwork for a future commuter rail service, we recommend right-of-way be purchased where it is missing between Ashland City and Clarksville, and that these jurisdictions update land use plans and implement zoning to create the density needed to support an eventual commuter rail line.

- Before the Northwest Corridor study is finalized, continue to discuss with residents, employers and elected officials in the community how the Northwest Corridor commuter rail option could begin in Davidson County, potentially connecting Bordeaux to Fisk/Meharry and eventually to the
Nashville Farmers’ Market on existing Nashville and Western railroad lines. The planning should also include options for extending this line to the Gulch area, and downtown proper, as defined in the proposed Downtown Mobility Study.

• Since North Nashville has more bus routes than any other area in Nashville/Davidson County, immediate improvements should be made to sidewalks, crosswalks and bus stops. These improvements should provide real-time information, enhanced safety, and be complemented with increased hours of service and frequency.

3. Northeast Corridor/Gallatin
Moving Forward finds the current nMotion scenario 1 proposal for the Northeast Corridor ready for implementation. The freeway BRT using managed transit lanes on SR 386 (Vietnam Veterans Boulevard) and I-65 will serve as a reliable commuter option for travel between Gallatin to Nashville. Because most of the necessary right-of-way for this project on Vietnam Veterans Boulevard is already in place, the Northeast Corridor may be ideally positioned to be Middle Tennessee’s first new regional transit project since the Music City Star. The light rail line proposed for Gallatin Pike between Nashville and the Rivergate area would spur additional economic development in Madison and along this corridor. In addition, in the longer term, this light rail could be extended into Hendersonville in Sumner County if zoning and land use brings about the necessary density.

While it is not included in any of the nMotion scenarios, Moving Forward recommends incorporating an extension of an existing Nashville and Eastern rail line with a new bridge across the Cumberland River into final nMotion plan. Currently, there is a line that splits off where the Music City Star runs in Donelson and goes north into Hadley Bend, terminating at the Cumberland River. Extending this line with a multimodal bridge (train, bike, pedestrians and car) over the Cumberland River would provide connectivity to Old Hickory, with the possibility of connecting further to a mass transit station in Sumner County. A variation of this proposal was included in the 2011 Northeast Corridor Study and was eliminated as not being viable at that time. But connection to future transit infrastructure and the connectivity allowed by the multimodal river crossing could bring new benefit that warrants additional study. While likely a longer-term project, such an extension would create a closed loop between Nashville, Donelson, Old Hickory and Gallatin, creating a more complete regional system.

4. South Corridor/Franklin
nMotion’s proposal of a new freeway BRT system for the south corridor should be adopted as proposed. Studies show that two-way commuter traffic between Franklin and Nashville will be well served by a system that conveys people quickly between the two points. Following the completion of the nMotion plan, the MPO will be conducting a South Corridor Feasibility Study, which will evaluate the possibility of major transit investments along the corridor between downtown Nashville and Franklin. Commuter rail may not be feasible at this time due to lack of access to the existing CSX rail line. In addition, any rail option in the longer term would likely need to be accompanied by changes in land use and density along the corridor (such as in our recommendation regarding Murfreesboro Pike) in order to ensure sufficient ridership and spur new economic development. Also in the long term, plans should anticipate a future extension of any commuter service to Spring Hill to accommodate future expected growth.

5. East Corridor/Lebanon—Music City Star
nMotion’s proposal to improve the Music City Star service between Nashville and Lebanon in Wilson County is appropriate. It includes expanding the service further east to Lebanon and the Wilson County Expo Center on the existing track, double tracking, adding additional stations, extending hours of operation and providing more frequent service. In addition to increased ridership, these improvements are likely to further encourage transit-oriented development around stations.

iv. Strategic Opportunities

1. Future-ready
In addition to the specific recommendations related to the 25-year regional transit plan, Moving Forward believes that our long-term transit investment and plans must include the assumption of rail or some type of high-capacity transit service from Nashville to all outlying cities. In order to
prepare for future needs, we recommend that any transit projects be designed and engineered to convert to a higher-capacity service relatively easily in the future. For example, where appropriate, acquisition of additional right-of-way beyond the immediate project need is advised, as is engineering BRT so that it can be converted to light rail at a future date. As much as possible, transit planning and implementation must be flexible enough to incorporate future technologies.

2. Partnership with CSX

\textit{nMotion} scenario 1 is a solid basis for an actionable 25-year plan, but our region’s transit vision must extend farther into the future. One piece of that vision is the potential partnership with CSX, a private company which operates class 1 railroad lines between the south, southeast and northeast corridors of our region. While CSX has stated they are not currently in a position to share freight lines, existing freight traffic is reaching capacity and is likely to increase in the future. This continued growth of rail freight presents challenges, but also an opportunity for future track expansion that could benefit both freight and passenger service.

To be clear, Moving Forward sees opportunities with CSX as a longer-term strategy. Rather than wait for a partnership with CSX to happen, we believe we should take immediate steps to implement the transit investments outlined in the completed \textit{nMotion} regional plan. Moving Forward believes, however, that future areas of collaboration with CSX could include:

- Some CSX rights-of-way include enough room to construct additional rail lines. CSX and area governments could discuss ways to share the right-of-way instead of using current rail lines, as well as the possibility of purchasing adjacent right-of-way to create enough to serve both freight and passenger service.

- \textit{Middle Tennessee’s} mayors, the State of Tennessee and other stakeholders should support the planned efforts to discuss the potential of moving the Radnor Yard rail facility from South Nashville near I-65 to a location in an outlying county. This move would have the potential of freeing up the existing rail lines from downtown to cities in surrounding counties for passenger service, and would benefit CSX by removing the urban barriers to their business and providing them with more space to expand their facility and capacity. This possibility was outlined in the Nashville MPO’s 2010 Freight Study (which is being updated in 2016). In addition, TDOT’s most recent statewide multimodal freight plan estimated a cost of $767 million to relocate the Radnor Yard operation to a new location southeast of Smyrna. Other cities, such as Denver, Houston, Boston and Memphis, are planning or have taken the step to relocate their intermodal rail facilities from the urban core to other locations. Such a move would not only represent a transit opportunity for the Nashville region—it could also be a game-changing economic development opportunity for the State of Tennessee.

3. Supportive Planning, Zoning and Development are Key

Middle Tennessee’s transit system must be founded on sound planning, zoning and complementary infrastructure investments. To that end, we recommend that all counties and cities in the region prepare or update short- and long-term land use and zoning plans to increase density in locations where transit is planned to levels that can support appropriate transit. These plans will allow for informed decisions on where higher-capacity transit options like light rail will be most effective, and will give the region’s cities an opportunity to think about the economic development and community development opportunities inherent in some forms of transit.

Furthermore, communities and businesses will need to support the transit plan with complementary policies, investment and collaboration. Policies that cities should consider range from incentivizing affordable housing near transit to policies creating “complete streets” with space for pedestrians, cyclists, individual motor vehicles and transit. Meanwhile, proactive collaboration with businesses affected by transit construction is critical. These businesses will need to be consulted about the impact to their businesses during construction so they can plan for the disruption and communicate with their customers. After construction, these businesses could benefit from guidance on how to encourage employees and customers to use transit.
e. smart technology platform

As we develop and implement a plan for a comprehensive regional transit system, it is important that we take full advantage of existing and future advances in technology. In particular, it will be critical to build a technology infrastructure that allows innovative technologies to work together seamlessly. A smart technology platform is envisioned to be an online system that would allow people to seamlessly use one app on their phone, tablet or laptop to meet multiple, complementary transportation needs, across different modes. “Smart technology” includes all the ways that a user can interact through technology to meet their transportation needs. The platform brings all of these tools together and is built with the assumption that most users will connect to the platform through mobile devices.

i. Benefits of Smart Technology

A smart technology platform would simplify and enhance an individual user’s experience, while also providing the city with integrated data useful for real-time problem solving, safety and long-range planning. Potential transportation-related modes and services available to users on the platform should include, but are not limited to:

- Finding available parking, payment for parking and being able to add additional time remotely, allowing merchants to pay for parking for customers, and modernizing citation management;
- Accessing real-time information on transit offerings and purchasing fares;
- Accessing real-time information on “first- and last-mile” services such as Lyft, Uber, ride-share, car-share and bike-share, with the ability to purchase these services; and
- Easy integration with new transportation modes as innovation occurs.

For the individual user, a smart technology platform provides convenience and ease of use by having numerous transportation-related options literally at one’s fingertips.

By finding available parking on an app, the user saves time circling a commercial area looking for parking and the community’s air quality benefits from fewer emissions from the user’s vehicle. Paying a transit fare through mobile payment saves the user time and expedites the boarding process. Meanwhile, a smart technology platform has the potential for useful applications beyond transportation, such as accessing library materials or signing up for classes at the community center.

In addition to enhancing the individual user’s experience, the smart technology platform can help the providers of these transportation services improve their operational efficiency by allowing access to usage data across all modes. Governments can use this information to spot trends as they consider future transportation and land use planning and budgeting. Private providers could use the data to create new information products and services. All transportation operators can use the data gleaned from the smart technology platform to make real-time adjustments to parking, transit and transportation operations. This allows providers to constantly improve upon the individual’s transportation experience and contribute to the overall efficiency and success of the region’s transportation network.

ii. Davidson County’s Smart Technology Efforts

The Technology & Innovation subcommittee of the Moving Forward Routes, Network & Modes Task Force has found that other cities are pursuing mobile platforms that combine multiple transportation-related actions—finding and paying for parking, buying transit fares or securing first-mile or last-mile transportation. In addition, numerous departments and agencies within Metropolitan Nashville Davidson County government are working on individual elements of a smart technology platform, mostly in isolation. Davidson County could, however, be a leader in integrating all of these transportation-related activities.

Davidson County is well-positioned to tackle the challenges of a smart technology platform, given its recent work competing for a U.S. Department of Transportation (USDOT) grant. The USDOT Smart City Challenge offered up to $40 million to a mid-sized city that could best demonstrate how to integrate emerging transportation data, technologies and applications with existing systems in a city to address transportation challenges. While Nashville was not among the grant finalists announced in March
2016, Mayor Barry’s administration intends to reach as many of their grant goals as possible through the efforts of an interdepartmental working group called Connected Nashville. We commend this proactive approach and believe that the smart technology solutions should be applied immediately to transportation and transit issues.

Because leadership will be essential to the success of this initiative, Moving Forward recommends that Connected Nashville assume an implementation structure that charges Metro Information Technology Services (ITS) with leading smart technology efforts to meet the city’s overarching goals. Understanding that each participating department and agency must contribute its expertise, Metro ITS should take the lead in ensuring that Smart City efforts are coordinated and support one another. Metro ITS is already taking a lead in working with private partners, such as the Smart City Center of Competence and Excellence at Vanderbilt, a partnership that has allowed Metro ITS to provide the center with proof-of-concept grants to test ideas. Metro ITS is the natural leader in ensuring that smart technologies—regardless of what department they are in—meet basic standards to ensure data can be shared, efficiencies are created, and the user experience is optimized.

### iii. Smart Technology in the Region

While Connected Nashville has been a Davidson County effort to date, we believe the initiative shouldn’t stop at the county line. Just as the user expects technology to work while traveling, every effort should be made to have smart technology platforms work across jurisdictions. The MPO will soon begin a Regional Smart Cities Assessment to evaluate current intelligent transportation systems across the region and develop recommendations for how to upgrade current infrastructure to improve performance and prepare for emerging technologies. Moving Forward recommends the Nashville Area MPO lead the effort of engaging regional partners toward the goal of creating a smart region infrastructure.

### iv. Smart Technology initiatives

During the course of our research, Moving Forward examined a number of individual transportation-related technology projects with the potential to help build a “smarter” transportation system. Moving Forward has considered these efforts and offers the following observations and recommendations.
1. MTA’s Real-Time Transit Information App
Real-time transit information is critical to an improved transit experience and should be incorporated into any smart technology platform. In late 2015, the MTA launched the Music City Transit Tracker, its first-ever app for mobile users, providing real-time information on MTA’s buses. While MTA is to be commended for its efforts to improve navigability and the rider experience, user reviews of the app’s performance have been mixed. Moving Forward users found a number of challenges with the Music City Transit Tracker app and found it unsuitable for building a technology platform in its current state. Current challenges include:

- When opening the app, iPhone users found the interface to be built for an earlier-generation model, so the screen for the app was smaller than the actual phone screen.
- Common points of interest such as “Gulch,” “Midtown” or “Franklin, Tennessee” were not available through the search function.
- “Current location” was available as a starting point, but was not the default setting. While choosing current location was an option, it was not easily located within the app.
- When routing to the destination, there was a detour alert on any road closures, which was helpful; however, there were no clear indications of how that impacted the route or what the user needed to do differently, if anything.
- The real-time information about late or on-time buses was not clear. Furthermore, when a rider was on a transit ride, there were not step-by-step directions (as there would be in a Google Maps route) alerting the rider that the destination or stop had been reached.
- The app appeared to have limited interoperability. It did not integrate with other devices, such as Apple Watch, nor did it integrate with first- and last-mile ride-sharing apps such as Lyft or Uber.

To their great credit, MTA leadership has taken the position of making its real-time GPS data available to privately developed software applications in order to assist MTA riders. One such app, Transit Tracker, which is available in Nashville and in communities across the country, has many of the capabilities that were found lacking in the MTA app. We believe that MTA should continue to provide its data to technology providers, allowing the private sector to come up with innovative solutions that benefit riders.

2. Mobile Payment System
The ability to pay through a mobile device for parking, transit fares and other mobility options can be an attractive option for users. Mobile payment can also yield dividends for transportation providers, decreasing boarding time as transit riders pay without having to fumble for exact change.

As part of its 2016-2017 budget request, MTA requested funding to create a mobile payment system that would allow users to purchase transit fares on a mobile app, but also allow the user to pay for first-mile and last-mile services like Lyft and Uber in the same transaction. Moving Forward commends this approach—especially the vision to provide payment options that link a public transit trip with other forms of transportation—and urges MTA to also consider linking to parking and other mobility services. Moving Forward sees the mobile payment system design as an opportunity to truly break down silos surrounding smart technology applications in our region.

3. Smart Signalization
a. Overview
Over the past three decades, the fundamental logic and operations of traffic signal controllers have basically remained unchanged. These signal systems primarily rely on inductive loop and video-based detectors in fixed locations to detect traffic and extend signal phases. Signal systems rely heavily on the expertise of the traffic engineers who operate them. This is not a sustainable model for cities, considering the significant increases in traffic flow and congestion that are projected for the future. According to TomTom, a navigation technology firm, commuters throughout the U.S. spent an average of 66 more hours stuck in traffic in 2014 than they did just a year earlier.
A new paradigm focused on traffic signal efficiency will be required in order to mitigate the traffic congestion of the future.

The term “smart signalization,” or ITS (intelligent transportation systems), refers to traffic management systems that provide real-time information to users and operators and can adapt immediately to changing traffic conditions. Future smart signal systems will also allow communication among vehicles and transportation infrastructure. This can take the form of signals adjusting their timing based on changes in traffic patterns or roadside devices warning drivers of safety issues. In addition, vehicles will be able to warn each other of accidents, breakdowns and other hazards such as poor road conditions and bad weather, enabling drivers (or their automatic driver assistance systems) to adjust their driving.

Currently, ITS offers an opportunity to have a connected transportation grid, linking vehicles and road users together in an integrated way. With ITS, we can adjust to roadway incidents, give priority to transit and emergency vehicles, and adapt to the variable traffic conditions the Nashville region often experiences. Well-timed signals will help ease congestion, reducing travel times, fuel costs and air pollution. In addition, a comprehensive ITS would yield accurate traffic pattern data for planning budgets and capital investments. Finally, integration of the smart signalization system with other smart transportation-related technologies, such as smart parking, transit and, eventually, autonomous cars would ensure a more seamless transportation system for the future.

b. Adaptive Signal Control Technology
Franklin, Murfreesboro and Brentwood have ITS systems with live video cameras and traffic management centers. These municipalities use the cameras to monitor traffic conditions, make adjustments to traffic signals, collect traffic data and provide live video feeds. Franklin currently has 24 cameras, Murfreesboro has 32 and Brentwood has 11. Two cities—Mt. Juliet and Franklin—are already in the process of installing “smart” adaptive signal control technology (ASCT) on selected arterial streets. Metro Nashville is in the early stages of evaluating where ASCT may be appropriate.

ACST, which is just one example of ITS and smart signalization, uses real-time data from traffic sensors to identify current traffic conditions and incrementally adjust signal timings in response to traffic demand and system capacity at any given time. In these systems, sensors collect traffic data, which is then sent to the traffic control equipment. Next, the traffic data is evaluated by an algorithm that develops and then implements signal timing improvements based on a model of traffic behavior. Depending on the type of ASCT, this process is repeated between every few seconds to every few minutes. Various ASCT systems, such as SCOOT, SCATS, ACS Lite and InSync, are currently in use around the world.

The Smart Signalization subcommittee of the Moving Forward Routes, Network & Modes Task Force researched ASCT in detail, surveying 12 other cities around the country that use this tool. Responses indicate that most municipalities have been building their connectivity system (traffic management center/unified network) in hopes of adaptive signal technology for many years. This connected infrastructure investment has led to the implementation of adaptive signals at a fairly low cost for these municipalities. Minneapolis outfitted 46 intersections in its central business district at a capital cost of $6.4 million. But cities that aren’t prepared to provide the necessary capacity to staff and support these new systems may be better off sticking with their manually timed traffic lights. In Alabama, Huntsville abandoned their 13-intersection ASCT system after barely trained engineering and traffic staff could not make adjustments to the system without engaging costly consulting assistance.

ASCT systems can be particularly effective for corridors that experience highly variable or unpredictable traffic flows, such as special event traffic, throughout the course of a day. However, as the Huntsville case demonstrates, they are more complex and require a greater time commitment and a higher level of expertise for proper operation and maintenance, making them more expensive. It is important to note that adaptive signal control is not the best solution for all situations. Generally, conditions that may not be a good fit for ASCT include:

- Networks consisting of a tight grid may operate better with time-of-day fixed-signal timing where the signal phasing is consistent. Fixed-signal timing creates predictable patterns of progression in these environments.
• Most adaptive systems do not have algorithms to adjust to over-capacity conditions, which can lead to situations in which traffic from one intersection backs up into the adjacent intersections and blocks other traffic flows.
• Locations with many constraints limiting signal timing modifications that could be made by an adaptive system; for example, signals with long pedestrian times limit the ability of adaptive control to optimize signal operation, because these pedestrian signal phases can take up a significant part of each traffic signal cycle.
• Areas without the staffing and budgetary commitment to operate and maintain an adaptive system

As a result, even though the benefits of ASCT are considerable, a thorough evaluation is needed to determine specific corridors and areas where the adaptive control systems are appropriate and cost-effective options. Fortunately, the Nashville Area MPO will be commissioning an evaluation of current ITS infrastructure across their seven counties. The goal of the technology study will be to understand how best to upgrade existing systems and prepare for emerging technologies such as connected vehicles and integrated communications systems. The scope of this study will include an inventory of all ITS equipment and facilities across the region, an evaluation of practices and products that could be deployed on prioritized corridors, and an identification of revenue sources - such as federal grants - that might fund solutions. Moving Forward recommends that the MPO study quantify the capital investment required to implement a modern ITS system 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 its 2040 plan adopted in February 2016, the MPO established a new transit and technology fund—which will provide more than $132 million over 25 years to accelerate deployment of ITS and emerging technologies in the region.

c. Efforts and Challenges in Davidson County
Metro Nashville’s outdated signalization infrastructure represents a challenge that must be addressed immediately, as it could take a decade or more for a city the size of Nashville to convert its current traffic control system to a comprehensive smart signalization system with continual upgrades. Metro Government currently manages approximately 850 traffic signals. The majority of those signals communicate to a central computer server via a copper wire infrastructure that offers limited bandwidth for data transfers. Signals in the Central Business District are managed by a central system. Outside downtown, the traffic signals along the arterial streets such as Murfreesboro Road, Eighth Avenue/Franklin Road, Nolensville Road, Gallatin Road, West End Avenue, Charlotte Avenue and Lebanon Road are connected via multiple voice-grade modems to individual master controllers, which communicate with an office-based computer.

Because most of this traffic signal hardware, software and communications infrastructure needs to be upgraded to more current technology, Metro Nashville’s current signalization practices do not have the ability to take advantage of “smart” adaptive sensor-based technology to manage traffic flow. Approximately 10 years ago, there were plans to connect the Metro’s traffic signal systems via fiber wire and establish a traffic management center, but the project was never funded. Currently, Metro Nashville is upgrading its central business district system to an Ethernet-based system, which will provide state-of-the-art communication capabilities that can be upgraded in the future as technology changes. Metro is also attempting to combine their two traffic management software systems into one.

While Metro Nashville/Davidson County is making numerous improvements and upgrades to road and intersection infrastructure, there remains significant work to be done to create an effective, future-ready road and intersection infrastructure. Moving Forward recommends that Metropolitan Nashville allocate the necessary capital and operating funds to properly operate a major city smart traffic signal system. Design and construction for new signals and maintenance of existing signals comes from a $3 million annual budget that also covers restriping, bike lanes, pedestrian crossings, pedestrian signals, engineering studies and technology. Currently in Metro Nashville, three traffic engineers handle the entire city’s traffic signal responsibilities. Yet, the Federal Highway Administration’s Traffic Signal Operations and Maintenance Staffing
Guidelines (2009) recommends that “one traffic engineer is needed to properly operate and maintain every 75 to 100 signals and one technician is needed to operate and maintain every 40 to 50 signals.” Based on these guidelines, Metro should have approximately 11 traffic engineers and 22 technicians for its 850 signals. Similarly, other municipalities within the region typically lack the necessary staff to adequately operate and maintain their traffic signal systems. These new resources could be organized and established as a traffic management center that incorporates all modes of travel, making significant upgrades to traffic signal equipment, software and communication infrastructure to capitalize on smart signalization efforts.

While Metro is deploying transit signal priority (TSP) along Murfreesboro Road and Nolensville Road, Moving Forward recommends expanding TSP along additional bus corridors to improve transit travel times and make transit a more desirable travel option. To maximize the benefits of TSP, Metro should determine appropriate locations for queue jump lanes for buses and dedicated bus lanes. Also, it is critical that Metro ensure that the TSP systems incorporate the most up-to-date traffic signal equipment and software so that future flexibility with other smart signal concepts is assured.

d. State Efforts
Over the past 15 years, TDOT has made significant strides in developing a comprehensive intelligent transportation system (ITS) along TDOT-maintained interstates and highways in the Nashville, Memphis, Chattanooga and Knoxville regions. This system, called SmartWay, uses advanced wireless communication technologies linked to live video cameras to monitor interstate highways from traffic management centers (TMCs) located in these four major cities. The SmartWay system in the Nashville region has 234 detectors, 178 cameras and 70 dynamic message signs which are used to provide live video feeds, monitor traffic flow, calculate travel times, count traffic, enhance incident management capabilities, and provide urgent traffic notices and safety information to drivers. The Nashville region Smartway system is focused on the interstate system, with cameras located on I-40, I-65, I-24, I-440, Briley Parkway, Ellington Parkway, State Route 840, and Vietnam Veterans Boulevard. The TMCs are also the communication hub for TDOT’s HELP program, which features the yellow trucks that travel on the interstates to help stranded motorists in order to minimize the negative impacts of traffic incidents on the freeways.

e. The Future
In the future, effective traffic management systems are likely to operate consistent with the internet of things (IoT) concept, where devices communicate with each other without human interaction. These smart signal systems would analyze real-time traffic data dynamically and have the ability to interact with smart cars and other smart traffic management devices, such as traffic cameras, dynamic message signs, lane control signs, fare collection systems and speed control signs. Meanwhile, smart cars would communicate with each other, creating a dynamic loop of vehicle-to-infrastructure and vehicle-to-vehicle interaction. This system will require state-of-the-art infrastructure and software, including high-speed communications that use self-adaptive algorithms to interface with vehicles and the transportation infrastructure. It will be multimodal, connecting cars, buses and other transit vehicles, emergency vehicles, freight fleets, pedestrians and bicyclists. Ultimately, smart signals will interact with autonomous vehicles, leading to more efficient travel through real-time data sharing.

f. shared mobility

i. The Opportunity for Transit
Shared mobility is a term used to describe mobility and transportation options that are shared among a wide group of people. These include ride-sharing (enhanced carpooling), car-sharing, bike-sharing, traditional public transit options such as buses or trains, taxis, shuttle services and other on-demand transportation services. Shared transportation has developed and grown in recent years, becoming more flexible, easier and more efficient, due to innovations in technology. Some of the benefits of shared mobility include reducing transportation costs and improving air quality. Shared mobility can also serve as the “first mile” and “last mile” of any given transit trip and provide options for those who cannot afford or do not want to buy and maintain a vehicle. Recent and future innovations in shared mobility will be an important component of our regional transportation system.
Quite a few shared mobility options exist in the current transportation landscape of Middle Tennessee. Most visible are the options provided by Nashville MTA and RTA: buses, the Music City Star commuter train and paratransit vanpooling service. Our region also has a growing Lyft and Uber presence, providing on-demand car-sharing. Nashville B-cycle has several bike-sharing stations across Davidson County. Enterprise CarShare has cars located in prime areas to provide an option to drive yourself through a short-term car rental. Even beyond this, apps are currently being developed that will allow people to organize carpools to move about our region.

Through our partnership with TransitCenter, Moving Forward hosted a speaker series discussion featuring Sharon Feigon, executive director of the Shared-Use Mobility Center in Chicago; Matthew George, CEO of Bridj; Erin Hafkenschiel, with Mayor Barry’s office; and Tom Maguire of Uber. This conversation yielded the following insights into shared mobility:

• The more people use shared modes, the more likely they are to use public transit, own fewer cars and spend less on transportation overall. “Supersharers,” or those people who routinely use several shared modes, save the most money and own half as many household cars as people who use public transit alone.
• Shared modes complement public transit, enhancing urban mobility. Ride-sharing services are most frequently used for social trips between 10 p.m. and 4 a.m., times when public transit runs infrequently or is not available. Shared modes substitute more for automobile trips than for public transit trips.
• While a number of regulatory and institutional hurdles complicate partnerships in this area, technology and business models from the shared mobility industry can help drive down costs of paratransit service, increase service availability and improve rider experience.

ii. Shared Mobility and Paratransit Services
One of the areas in which Moving Forward sees immediate promise for shared mobility is in the area of paratransit services for riders with a disability who are unable to use regular, fixed-route buses. MTA’s current paratransit service, AccessRide, requires that requests for a ride pickup be made at least one day in advance. In addition, paratransit riders are given a pickup window of two hours. AccessRide also does not accommodate same-day changes unless deemed an emergency. Shared mobility technology, however, has the potential to allow riders to request, track and pay for services more easily, often being able to make a reservation for service the moment they need it. In addition, users typically have the ability to see real-time arrivals and departures.

While Moving Forward commends the Nashville MTA for providing paratransit service countywide, beyond the minimum federal requirements, we believe that reliability and dependability can be improved through MTAs potential partnership with other forms of shared mobility for paratransit trips. Shared mobility may also help AccessRide operate more efficiently through route optimization with multiple riders. We also believe that shared mobility can play an important role as a first- and last-mile provider, if the technology exists to provide a smooth transition between modes. For these reasons, in addition to encouraging formal partnerships between MTA/RTA and car-sharing service providers to provide first- and last-mile service, Moving Forward recommends that MTA should continue to explore partnering with a ride-sharing provider to improve the current AccessRide paratransit service.

iii. Car-sharing as an Equity Strategy
Transportation costs can become a significant burden to a family with an income that does not allow car ownership. Not only does this affect a family’s ability to go to work or get an education, it can drastically affect quality of life. Shared mobility can offer a variety of transportation options for lower-income households with the proper planning and execution.

The Shared-Use Mobility Center, in partnership with the California Air Resources Board and the City of Los Angeles, recently launched a car-sharing pilot program focused on serving low-income residents in Los Angeles. This unique project places 100 electric and hybrid car-sharing
vehicles and more than 100 charging stations in lower-income communities around Los Angeles. This car-sharing project works to increase access to transportation in disadvantaged communities, while also educating residents about the benefits of electric vehicles and improving air quality. While this car-sharing project is a developing idea, Moving Forward recommends that our region’s cities research the feasibility of car-sharing projects in lower-income neighborhoods to increase access to a multimodal transportation system. As technology innovations continue to reshape the world and how we move around, it is important that we develop strategies to ensure there are not communities that get left behind.

g. autonomous vehicles

Fully autonomous vehicles (AVs) have the potential to dramatically change mobility. The ability of a driverless car outfitted with cameras and computers to carry its passengers safely without supervision is likely to revolutionize travel behaviors and opportunities. The full impact of this new technology will not be understood until further into the future, posing both challenges and opportunities as we plan on how to meet our current and future transportation infrastructure needs.

AVs are truly a disruptive technology that brings questions about how government and society should accommodate it, how it can be structured to benefit all members of society, and how it should be regulated. Added to this is the challenge that, at this point, much of the thought and expectation surrounding AVs is speculative. The Moving Forward Task Force believes that private- and public-sector entities must plan to the best of their ability for this technology and be willing to advocate for innovation so that the region can harness this technology to thrive and prosper. While Moving Forward does not see AVs as a silver bullet that solves all our future transportation needs, we believe it will be part of the solution.

i. Autonomous Vehicles in Tennessee

In April 2016, the Tennessee General Assembly adopted AV legislation (Public Chapter 927). Moving Forward volunteers were active participants in tracking the progress of SB 1561/HB 1564 and also participated in Sen. Mark Green’s Autonomous Vehicle Task Force. The legislation defined “autonomous technology” as technology installed on a motor vehicle that “has the capability to drive the motor vehicle without the active physical control or monitoring by a human operator;” or “has the capability to drive the vehicle on which the technology is installed in high or full automation mode, without any supervision by a human operator...”. The purpose of the legislation was to signal Tennessee as a state open to this new technology, in the hope of bringing a growing AV industry to Tennessee and encourage AV testing. The legislation has sparked conversations among manufacturers, business leaders, public agencies, and other stakeholders on a local and national level, and provides a platform for future discussions in the industry that have the potential to position Tennessee as a leader in AV transportation. However, the debate surrounding the legislation also revealed challenges. Automakers and technology developers generally did not believe legislation was needed to allow testing in Tennessee. Furthermore, automakers are concerned that in the absence of federal AV guidelines, a patchwork of local and state laws governing the use of AVs might make it more difficult, rather than easier, to test and launch AV business models. Collaboration among automakers is also made challenging because automakers are developing their own technologies on their own timelines, which may make consensus-building difficult. Competitive pressures and proprietary technological development are likely to restrict the level of collaboration among automakers and technology developers.

Nevertheless, there are likely to be additional proposals in the Tennessee legislature in the years ahead that will seek to shape the advancement of AV technology in our state, such as:

- Truck platooning—Current state law (TCA 55-8-124(d)) requires 300 feet of separation between tractor-trailers traveling on state highways. With AV technology, it may soon be possible to platoon trucks much more closely, but this will require a change in current law. More efficient movement of freight will decrease congestion and improve overall traffic flow.
- Grant programs—A grant program to incentivize the development of AV at public or private...
universities within the state, potentially leading to the creation of a structured curriculum focused on AV technology.

Moving Forward volunteers will continue to monitor and participate in the state policy discussion around AV technology in the months and years ahead.

### ii. Transit Planning and Autonomous Vehicles

As Moving Forward volunteers have researched how AV technology may be incorporated into transit services in the future, we find that the *nMotion* regional transit scenarios do not adequately discuss or conceptualize how AVs might be integrated into the larger public transportation framework. The task force believes there is opportunity to advance the discussion of future technologies and integration with the city’s mass transit service.

For instance, while AV is generally thought of in terms of individual vehicles, the technology could also be applied to transit vehicles from buses and trains to the use of smaller vehicles—minivan or passenger van size—that could efficiently serve small areas, special populations or unique routes. These potential opportunities should be referenced in the *nMotion* report and future planning. In addition, AVs are likely to dramatically drive down the cost of using shared mobility providers, making the first- and last-mile gaps in transportation more affordable in all neighborhoods, including low-income neighborhoods with lower car ownership.

While AVs can be useful for all of the opportunities mentioned above, they do not, in the near term, solve the roadway capacity issue facing Middle Tennessee. In most cases, Middle Tennessee’s major corridors and highways are incapable of being widened to accommodate more traffic. The number of cars on the road is likely to rise significantly as more people move to Middle Tennessee. And while AVs will likely create more efficient traffic flow, as cars travel safely together in much closer proximity, more vehicles will still be needed on the roadways to get a growing population to their destinations.

However, it is possible that riders in the future will consider longer commutes less onerous if they can work, read, or watch television while an AV tends to the driving. While capacity issues likely will not be solved by AVs any time soon, the assumption that long commutes will remain undesirable for commuters may not hold true in the future, pointing toward the need to constantly review and update any 25-year transit plan to account for new technology and innovation.

Any future transit plans should carefully evaluate the potential cost savings and better service AVs might provide, as well as equity concerns around a transportation strategy that relies on privately owned AVs at the expense of public transit. A successful transit model for the future will have to balance the needs of a wide range of user needs and financial capabilities. This may not be the primary mission of private-sector AV development. As such, the public-sector agency has to understand and plan for the technology so as to continue to provide viable service for all users.

There is certainly a profound opportunity for AVs to reshape future land use regulations and decisions around parking in dense, urban areas. After all, your car will be able to go park itself at a more distant location or give rides to other riders while you aren’t using it. With reduced need for inner-city parking, city center land can be repurposed and redeveloped for more economically productive uses. And as transportation expert Gabe Klein observed at a November 2015 Moving Forward speaker series discussion, residential developers would be able to decrease the amount of costly parking spaces they have to build and instead fill that space with more affordable housing stock.

Moving Forward recommends that MTA/RTA include a reference to how future AV technologies could potentially be integrated into the overall transit service strategy for the region in the *nMotion* process. Ideally, this would be the product of a needed, active and ongoing dialogue on the part of local governments in the region, the State of Tennessee, and the players in AV development. This discussion should include, but not be limited to, use of AV technology in transit vehicles, use of AV for shared mobility, and planning for AV to be one of many options for transportation in the future, which will impact transportation, but also land use.
In the near term, we recommend local jurisdictions work with AV manufacturers to identify “AV testing corridors” in the region. These would allow for focused testing of autonomous vehicles in a limited area until test results prove promising enough for a wider roll-out for AV usage in a larger capacity. Potential testing ideas could include specific areas such as a commercial corridor with limited parking availability nearby, or an eventual dedicated transit lane on an interstate that also allows AV. Testing could also be tied to meeting overall transportation network goals, such as AVs’ ability to meet the transit plan’s first- and last-mile needs.

h. Areas of Focus for Moving Forward in 2016-2017
The adoption of a plan for transit in Middle Tennessee is the most immediate of Moving Forward's five goals. The work of Moving Forward's Routes, Network & Modes Task Force will not, however, end with the adoption of the completed regional transit plan nMotion. The following issues will be on the task force’s agenda in the coming year:

• AccessRide—MTA/RTA’s paratransit program, AccessRide, provides critical door-to-door van service for persons unable to get to or from a bus stop, unable to get on or off a bus independently, or who are otherwise unable to independently ride the bus. With 18.7 percent of the U.S. population experiencing some type of disability (56.7 million people as per the 2010 U.S. Census), independent mobility is a challenge that faces many Middle Tennesseans, limiting their ability to reach jobs, education, retail and recreation. AccessRide has not been referenced in the nMotion proposals for the future transit network, even though the service continues to grow in ridership. Moving Forward will be assessing AccessRide’s current service, industry best practices and potential innovations for service improvement. Moving Forward looks forward to working with MTA/RTA and TDOT on this effort.

• Transit performance metrics—Once the regional transit plan is adopted, it will be necessary to consider new performance metrics for accountability and transparency. Moving Forward intends to research best practices in this area in partnership with MTA/RTA.

• Transit study engagement—Moving Forward intends to track, participate and respond to the Downtown Mobility Study and the High-Capacity Transit Conceptual Corridors Study referenced in recommendations above. Moving Forward recommends that the Downtown Mobility Study be completed by the end of 2016 and that the Corridors Study be completed within a year, resulting in the identification—in 2017—of the first three transit lines to be implemented.

• Walknbike—The update of the Nashville-Davidson County Strategic Plan for Sidewalks and Bikeways—an initiative called walknbike—was launched in April 2016 and is intended to be finished by the end of the 2016 calendar year. Moving Forward will track, participate and respond to the study, especially with regard to the intersection between transit, walking and biking.
Panelists Courtney Crowder (Crowder Consulting); Mark Fisher (Indy Chamber); and Abby Albrecht (Salt Lake Chamber) present on “Building a Community Vision for an Effective Transportation System: Lessons Learned from Three Innovative Cities” at the fifth Moving Forward Speaker Series event on December 9, 2015.

Dr. Beverly Scott, former transportation chief in Atlanta, Sacramento and Massachusetts, speaks at the Moving Forward Speaker Series “Getting Transportation Right: People and Communities Matter” at Fisk University on November 4, 2015.

Mayor Megan Barry and Leadership Study Mission delegates prepare to ride light rail during the Nashville Chamber’s visit to Minneapolis in April 2016.

James Corless, director of Transportation for America, presents at the Moving Forward Speaker Series in September 2015.
Transit issues are part of the public dialogue in Middle Tennessee now more than ever, as Middle Tennessee continues to see increased economic activity, population growth and, consequently, increased traffic congestion. Forty-four percent of Middle Tennesseans said they got stuck in traffic jams on a daily or frequent basis in 2015, a 10-percentage-point increase from just a year earlier, according to the Nashville Region’s Vital Signs poll. One out of every three residents in the region also responded that road conditions and other factors made it difficult to get to and from work. While the personal automobile will be the preferred way to travel for most Middle Tennesseans, attitudes are changing. Half of those polled in 2015 said they would use other types of transportation if they had more convenient options.

During the past year, the Moving Forward’s Public Engagement Task Force has seen a major shift in the public’s thinking about transit. We’ve noticed that the conversation has shifted from a question of if we need to do something about transit to what we should do and when we should start. Because transit affects all of us, and the system will need to cross county lines, we need the engagement of people across the region. Because transit benefits all Middle Tennesseans by offering more mobility choices, we need the engagement of people across all demographics and socio-economic levels to make transit a reality, whether or not they are or will be transit users. Meanwhile, transit plans are years in the making due to the process of land acquisition, project design and construction. Plans will be updated throughout the process to reflect technology innovation, the creation of funding mechanisms, changing population projections, community input, and as specific routes and modes are studied in more detail. They are dynamic plans that will be modified along the way and will need public input at every step.

a. the engagement landscape

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 MTA/RTA, the Nashville Area MPO, GNRC, local planning departments and TDOT, there are several other organizations focused on outreach around transportation and transit issues, including TAMT; CRT; Nashville Downtown Partnership; Leadership Middle Tennessee; Council on Aging of Middle Tennessee; Nashville Area Chamber of Commerce Area Advisory Councils; Nashville Civic Design Center; Nashville Convention & Visitors Corporation; Tennessee Public Transportation Association; Tennessee Road Builders Association; Walk Bike Nashville and Transit Now. Part of the impetus for launching Moving Forward was to create a platform for all these groups to coordinate their efforts.

b. 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, this has meant monitoring MTA and RTA 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. Since September 2015, Moving Forward has hosted nine events in a speaker series, all open to the public, on various aspects of the transit conversation, from economic development to equity concerns to the disruptive forces brought by technological innovation.
c. nMotion public engagement

The nMotion regional transit planning process began in January 2015 by asking community members to identify the values and guiding principles behind the transit network of the future. Beginning in July 2015, a series of transit improvement strategy papers were posted online to help educate the public about various transit modes. Through an iterative process, MTA/RTA and consultant Nelson Nygaard then created the three nMotion regional transit scenarios based on the initial community input. These transit scenarios contain examples of possible projects across the region designed to paint the overall picture of what different levels of investment in the system would yield. In reviewing the three scenarios, the public was not asked to simply pick their favorite scenario. Rather, the goal was to show community members the different options available (routes, modes, levels of service), understand the benefits and tradeoffs of these options, and gauge their personal interest in, and commitment to, different types of transit.

In March 2016, nMotion released information on the three scenarios and offered the public multiple ways to comment. nMotion’s online presence has been impressive. The website is informative and user-friendly, and the MetroQuest survey tool has allowed nearly 8,000 users to understand and provide input on the three scenarios. Moving Forward recommends that future engagement efforts should build on this success by offering materials and activities that are interactive, whether online or in person. As the transit conversation moves into later stages with more specific plan information and more complex decisions, interactive meetings and tools can help the public better understand the tradeoffs. For example, as transit is considered on specific corridors with right-of-way constraints, community members should wrestle with what that means for more vehicle lanes, bike lanes, wider sidewalks and on-street parking. Interactive tools can help the public get past the technical jargon and get a truer sense of what they are supporting or opposing.

The nMotion process has truly been a regional one, with TAMT and CRT helping RTA to draw more than 1,400 Middle Tennesseans to meetings outside of Davidson County. These efforts must continue and shift from a focus on targeted outreach and updates to a commitment to ongoing conversation and relationship-building. To accomplish this, Moving Forward recommends that future transit conversations take place regularly, at least twice per year, within each of the counties adjacent to Davidson County. Topics and scheduling should be based on the input of county leaders, but could include implications of the adopted nMotion transit plan for each county, prioritization of projects, and discussion of potential dedicated funding sources. Because RTA does not currently have staff resources to undertake this vision of continuous contact and relationship building, the public agencies should consider contracting with organizations like TAMT, CRT and Leadership Middle Tennessee to sustain these efforts.

It is clear nMotion has worked hard to reach people where they are and provide them with meaningful information on how transit can impact their lives. MTA/RTA hosted 27 nMotion community meetings across the region, often bringing an actual nMotion bus to allow Middle Tennesseans to experience the inside of the vehicle as they provided input on the transit system of the future. nMotion’s 83 “transit talks,” in which transit officials attend regularly scheduled community meetings and speak on the topic of nMotion and the three regional transit scenarios, have been especially successful in reaching groups of people that aren’t inclined to attend public agency community meetings. Examples include a Sunnyside neighborhood meeting, a visit to McGavock High School, a discussion at the Kurdish Creative Lab and a talk at Trevecca Towers retirement home.

There has also been considerable effort to make sure nMotion reaches diverse groups within the community. Among other efforts, MTA/RTA met with the Contributor vendors, representing the homeless community, and talked with providers of services to the disabled community in order to get insight into the needs of those residents. As part of their intentional efforts, nMotion reached out through places of worship, such as African American and Hispanic churches. nMotion also used media to reach various communities by working with The Tennessean, Nashville Pride, 92Q, WFSK, La Campana, El Crucero, and HOLA TN. nMotion provided its initial survey in English and Spanish and developed a Spanish version of the transit scenario survey in May 2016. Moving Forward assisted by organizing two speaker series events with national transit expert Beverly Scott focused on equity in transit planning—one in North Nashville in partnership with
United Way of Metropolitan Nashville, and the other in South Nashville partnering with Conexión Americas—to engage more African Americans and Hispanics in the discussion.

Despite these efforts, the responses to the nMotion surveys have not matched the demographics of Davidson County or the region, with African Americans and Latino residents being underrepresented. Throughout the various stages of the nMotion public engagement process, the survey response rate for African Americans has ranged between 8 and 12 percent, and for Latinos 2-4 percent. Moving Forward recommends that future transit outreach efforts should include the creation of a task force or committee specifically focused on engaging populations and age groups that are typically underrepresented in surveys. This group should be comprised of a diverse group of leaders from the targeted communities in order to identify effective ways to reach these stakeholders. In addition, future transit conversations should seek to provide information and materials in additional languages beyond English and Spanish, reflecting our growing cultural diversity.

MTA/RTA have also reached out to current riders as part of the nMotion engagement process. The agencies conducted approximately 20 hours of surveying over six outings with riders aboard the bus, and collected 300 surveys through outreach at the Music City Central bus station. nMotion public meetings and the online scenario survey were promoted through flyers and in-bus advertising, as well as on the information screens at Music City Central. The origin of these surveys has been noted so that MTA/RTA can discover insights that relate specifically to current riders.

d. goals for public engagement

Moving Forward has set a goal of ensuring at least 30,000 engagements with Middle Tennesseans in the transit conversation by December 31, 2017. Despite the challenges, our region is on pace to meet and exceed that goal. As of June 2016, the nMotion process has logged 17,936 substantive engagements such as completing a survey or providing a specific comment. This is in addition to meeting attendance and digital reach. Meanwhile, the Nashville Area MPO has engaged more than 11,000 in meetings, surveys, and committee member support. Moving Forward commends MTA/RTA and the MPO for their commitment to regional outreach efforts, believing they have set a new expectation for future planning efforts. But if expectations are now higher, we must acknowledge that extensive, innovative community engagement requires resources in terms of funding and personnel, and these resources must be built into agency budgets. There is no question that the region’s awareness of transportation issues is higher than ever, which makes future public engagement all the more critical.
e. future conversations

After the adoption of nMotion by the MTA and RTA boards, MTA should lead education on the adopted nMotion plan, its relationship to other plans (such as the Nashville Area MPO’s Middle Tennessee Connected) and the next steps needed to implement Middle Tennessee’s transit future. Communications from MTA/RTA should move from solely communicating with riders to marketing the entire system, especially as upgrades to service, frequency and higher-order transit types occur. To this end, MTA should maintain the nMotion website and create a space for continuous conversation—and questions and answers—about transit-related projects and initiatives, such as the mobile payment system, the downtown mobility plan, the update of the Nashville/Davidson County Strategic Plan for Sidewalks and Bikeways, and the upcoming High-Capacity Transit Conceptual Corridors Study. All of those topics deserve significant outreach and engagement.

Looking beyond the efforts of MTA/RTA on nMotion, Moving Forward sees improvement in many aspects of transportation in Nashville/Davidson County—from safety improvements to specific intersections with poor safety records, to study of more than 500 intersections to see what efficiency improvements can be made, to the update of the sidewalk and bikeway plan, to the creation of mobile payment of transit fares. These efforts—and similar efforts in cities and counties across the Middle Tennessee region—are setting the stage for higher-order transit by making more efficient and effective use of Middle Tennessee’s existing infrastructure. More can be done by Metro Nashville/Davidson County and outlying cities and counties to tell the story of how all of these improvements lay the groundwork for a more comprehensive, multi-modal transportation system.

Future transit conversations should also place more emphasis on the connection between affordable housing, social services, employment and transit. During nMotion, the MTA staff worked with providers of social services such as United Way and Empower Tennessee, which encompasses providers of services to the disabled community. Future transit conversations should also engage stakeholders such as Neighbors Organizing for Action and Hope, the Mayor’s Office of Economic Opportunity and Empowerment and the Tennessee Development Housing Agency. More can be done to craft messages for the public about the link between transit and affordability, opportunity, and prosperity. Looking beyond the efforts of MTA/RTA on nMotion, cities and counties across the Middle Tennessee region can and must tell the story of how transit and non-transit improvements fit into a comprehensive, multi-modal transportation system.
moving forward speaker series events

September 9, 2015
Why World-Class Public Transportation is Key to a Competitive Economy
James Corless, Transportation for America, and Stephanie Lotshaw, TransitCenter

October 15, 2015
Identifying Models of Success: A Look at Success and Failures of Other Communities Facing Transit Opportunities and Challenges–Taiwo Jaiyeoba, HDR ICA, now with AECOM

November 5, 2015
Getting Transportation Right: People and Communities Matter–Beverly Scott, former transportation chief for Massachusetts, Rhode Island, Atlanta and Sacramento

November 6, 2015
Startup City: Inspiring Private & Public Entrepreneurship, Getting Projects Done and Having Fun–Gabe Klein, former transportation chief for Chicago and Washington, D.C., author of Start-up City, 2015

December 9, 2015
Building a Community Vision for an Effective Transportation System: Lessons Learned from Three Innovative Cities–Abby Albrecht, Salt Lake City Chamber of Commerce; Courtney Crowder, Crowder Consulting of Raleigh, North Carolina; and Mark Fisher, Greater Indianapolis Chamber of Commerce

April 5, 2016
Shared-Use Mobility and Nashville’s Transportation Future–Sharon Feigon, executive director, Shared Use Mobility Center; Matt George, Bridj; Erin Hafkenschiel, Mayor Megan Barry’s Office; Shin-pei Tsay, TransitCenter; and Thomas Maguire, Uber

April 11, 2016
Moving Forward: Transit–The Ride to Opportunity, South Nashville & New Americans–Beverly Scott

April 12, 2016
Moving Forward: Transit–The Ride to Opportunity, North Nashville–Beverly Scott

May 6, 2016
The Business Case for Transit Investment–Todd Litman, Victoria Transport Policy Institute
a. how transit is funded

Current funding for transit services in the Nashville region is complex and composed of multiple sources. These sources include fare revenue, annual contributions from local governments, grant funds from the State of Tennessee and funding from the federal government. The necessary dollars to run a transit service fall into two categories of expenditures: operating and capital. Operating funds are budgeted each year to cover the cost of operating the service, paying for such items as drivers, fuel, maintenance and repayments of any debt. Capital dollars, which are one-time expenses, are used to purchase new buses, equipment, facilities or land. While dollars for capital projects can come from available cash, the large amounts of funding needed for mass transit projects are often produced through bonds that are repaid over the course of several decades.

The Nashville MTA, a unit of Metropolitan Nashville Davidson County government, has a $73.6 million operating budget (fiscal year 2015-2016) to provide transit service within Davidson County. The RTA is an independent authority created by state legislation with an operating budget of $9.9 million in 2015-2016 to provide inter-county services connecting Cheatham, Davidson, Dickson, Montgomery, Robertson, Rutherford, Sumner, Williamson and Wilson counties. There are currently four primary revenue sources for funding transit in the Nashville region: local government contributions, state grant funding, federal funds and agency-generated revenue, such as fares and advertising.

About 54 percent of the MTA budget, or $40 million, comes from Metro Government in the form of an annual appropriation from the Mayor and Metro Council. It is important to note that there is not currently a revenue source specifically dedicated to transit, so this contribution, representing about 2 percent of the overall city budget, competes with other city priorities as part of the yearly budget process. Local government contributions also represent the largest revenue source for the $9.9 million RTA operating budget, at 31 percent. Davidson County provided $1.8 million of this local government funding, with other jurisdictions in Middle Tennessee contributing the remaining $1.3 million. These funds are also subject to the potential volatility of the annual appropriations process.

RTA had to adjust the route for its 91X bus route in 2015 between Nashville and Franklin when the Brentwood City Council decided to end its $19,847 contribution toward the service.

b. state funds

Both MTA and RTA receive a proportionately small, but important, contribution from state government for transit services. Grant funds from the TDOT made up 6 percent of MTA's budget, at $4.6 million. RTA received $1.3 million, or 13 percent of their operating budget, from the state.

Statewide, TDOT allocated $47.6 million for transit in the 2015-2016 state budget. These funds are distributed to local transit agencies as part of a required federal match, and are also available as state matching funds for competitive federal grants.

TDOT's budget is funded by a 21.4 cent-per-gallon tax on gasoline and a 18.4 cent-per-gallon tax on diesel fuel, generating about $700 million a year in revenue to pay for the state's transportation infrastructure. Tennessee pays for its transportation investments as it receives revenue, rather than borrowing through the issuance of bonds. While Tennessee's population grew by 14 percent and GDP grew by 57 percent between the years 2000 and 2013, gas tax revenue has remained relatively flat, reflecting increases in fuel efficiency. Tennessee's tax on gasoline has not been increased since 1989, while general inflation has increased 85 percent since that time, resulting in higher construction and raw materials costs. A consequence of the eroding purchasing power of Tennessee's current transportation revenue structure is a growing $6 billion backlog of state highway road projects. Gov. Haslam has signaled that he will ask the legislature to make changes to the state's funding method, and Moving Forward plans to engage with policymakers during 2017 to ensure any solution includes resources and tools to expand mass transit.
Federal transportation dollars fund planned projects in Middle Tennessee as approved by the Nashville Area MPO. The MPO has the authority to plan, prioritize and program federal funding for transportation projects across a seven-county region in Middle Tennessee. These funds are appropriated through the Federal Highway Administration and Federal Transit Administration. Projects that are contained in the MPO’s regional transportation plan are implemented by TDOT or local governments. Federal dollars managed by the Nashville Area MPO help fund four main transit agencies within their seven-county planning area: The Nashville MTA, RTA, the Franklin Transit Authority and the Murfreesboro Rover. MTA received $12.2 million in federal funds in 2015-2016, 17 percent of the operating budget. Federal funds in the amount of $3.7 million accounted for the largest portion of the RTA budget, 37 percent.

The Federal-Aid Highway Act and the Highway Revenue Act in 1956 established the Highway Trust Fund in order to creating a federal funding mechanism for roadway improvements. Today, the Highway Trust Fund allows federal funds to go to projects beyond roadways, such as pedestrian and bicycle facilities and transit projects. The revenue that goes into the Highway Trust Fund comes primarily from the collection of federal gas taxes and are distributed back to jurisdictions by the Federal Highway Administration and the Federal Transit Administration. In 2015, Congress passed a new transportation bill, the FAST Act, which maintains a consistent amount of federal funding available for transportation projects through the year 2020.

Federal transportation funds are distributed to states, local agencies and transit agencies in three primary ways. Formula funds are allocated by predetermined formulas composed of such factors as population or gas tax receipts. Once the funding arrives, the state has full power to use these funds as they see fit, as long as the expense meets program requirements and aligns with regional priorities identified through coordination with local communities and the MPO’s regional transportation plan. The second method of allocation of federal funds is through direct suballocation. These funds are administered through varying formula grant programs that are required by Congress to be distributed to urbanized areas to ensure that a minimum level of investment is made in these locations. The third type is discretionary funds, which are dollars that can be allocated nationwide through a competitive or merit-based process by agencies of the U.S. DOT. These include the Transportation Investment Generating Economic Recovery Program (TIGER), the Fixed Guideway Capital Investment Program (“New Starts”) and the Transportation Infrastructure Finance and Innovation Act (TIFIA), among others. To be seen as competitive for these discretionary grants, regions
must follow certain criteria and procedures, as well as
display a strong plan, an ability to financially maintain the
project once completed and prove the ability to provide the
required match for federal dollars.

In February 2016, the Nashville Area MPO adopted a
new regional transportation plan allocating $8.5 billion in
projected federal transportation dollars over the next 25
years to its seven-county planning area based on current
funding levels authorized by Congress. This $8.5 billion,
allocated across a 25-year horizon through 2040, includes:

- **$1.2 billion** for regional fixed-guideway transit
  projects—This is the MPO’s first-ever allocation for
dedicated lanes for transit along regional corridors
  and within the urban core.
- **$1.32 million** for technology upgrades—Another
  first for the MPO, this new fund will target new
  solutions to manage traffic and provide real-time
  travel information about parking and transportation
  options.
- **$3.2 billion** for roadway capacity expansion—
  roadway extensions and additional lanes on
  interstates, state routes and other federal-aid
  streets, incorporating new sidewalks and bicycle
  lanes where appropriate.
- **$2.7 billion** for U.S. interstate improvements—
  new and improved interchanges, additional general-
  purpose lanes, and designated lanes for carpools and
  transit where appropriate
- **$1.0 billion** for roadway reconstruction and
  multi-modal upgrades—non-capacity upgrades to
  existing roadways to improve traffic operations,
  incorporate drainage and streetscaping, and
  enhance safety for drivers, pedestrians and cyclists
- **$916 million** for local and regional transit
  improvements—preventive maintenance, vehicle
  acquisition and replacement, transit facilities,
  vanpool programs and rural services.
- **$396 million** for dedicated safety improvements—
  intersection and roadway safety improvements as
  they arise over the next several years
- **$269 million** for improvements to reduce vehicle
  emissions—diesel engine retrofits and the expansion
  of non-motorized modes and public transit to
  address air quality concerns
- **$206 million** for dedication to active
  transportation projects—expanded access to safe
  walking and bicycling facilities

**d. fare revenue**

The last major category of revenue for transit agencies is
self-generated funds, which primarily consist of farebox
recovery. For MTA, $16.8 million, or 23 percent, of its
operating budget comes from self-generated funds.

Nationally, the average percentage of farebox recovery for
transit agencies was 32.5 percent in 2013, although that
number represents great variation in transit capacity, from
New York City’s system to rural providers. For the rider
on a Nashville MTA bus, the average passenger fare per
trip (taking into consideration regular and reduced fares) is
$1.10. The average cost of that rider’s trip on a bus for the
Nashville MTA is $4.42. Farebox revenue rarely covers a
majority of the operating expenses for transit systems in the
United States. There is the consideration that dramatic fare
increases would negatively impact ridership, and thus fare
revenue, having a counterproductive effect. Urban areas also
recognize that all residents benefit from increased public
transit ridership through less traffic congestion and cleaner
air, and thus should share in the cost.

For Nashville MTA’s AccessRide program, which provides
transportation services countywide to residents who cannot
access the fixed route system due to disability, the difference
between the average passenger fare and the average cost
per trip is much greater. The average passenger fare per trip
is $3.84, while the average cost for AccessRide per trip is
$47.98. As a result, on an AccessRide trip, only 8 percent
of the trip cost is covered from passenger fares. This high
cost of service, coupled with uneven customer satisfaction,
highlights the AccessRide program as an area of study for
Moving Forward over the next year and points toward
our recommendation in this report for MTA to explore
innovative partnerships with ride-sharing providers for this
program.

RTA receives $1.9 million in self-generated revenue, about
19 percent of its annual budget. For RTA commuter buses,
the average passenger fare per trip averages around $2.80,
while the average cost for RTA per trip is $14.56. For the
Music City Star commuter rail, the average passenger fare per trip is $3.56, while the average cost for RTA per trip is $19.71. The farebox recovery rates for these two modes are nearly identical, at 18 to 19 percent.

**e. local dedicated funding**

The Nashville Area MPO has compared our region’s investment in transit with a number of peer regions, such as Austin, Charlotte, Denver, Louisville, Memphis and Orlando. On average, residents from these other regions pay $136.23 per capita, with $78.26 coming from a local funding source. In contrast, the Middle Tennessee region only pays an average of $87.58 per capita, with about $44.20 coming from local government operating budgets, which are not dedicated and can be unpredictable. Nashville’s MTA sits alongside Orlando and Washington, D.C., as the one of the few large transit agencies in the country without a local dedicated funding source. This lack of local, dedicated funding limits MTA’s and RTA’s ability to expand service coverage and frequency in ways that would increase ridership. This opportunity is underscored by the fact that ridership increased by 24 percent on the Gallatin Road MTA route when BRT Lite, a faster service, was added in 2009. Lack of a local funding source also hampers our region’s ability to compete for large federal grants that can provide as much as 40 to 50 percent of the capital cost of constructing a fixed guideway transit line. Finally, the absence of a reliable, dedicated revenue stream makes it difficult to borrow capital.

One of Moving Forward’s five goals leading to the creation of a regional transportation solution is to identify and secure a local dedicated funding source for transit in our region by the end of 2018. To meet that goal, **Moving Forward recommends there be a study of funding options for transit projects in the Middle Tennessee region.** In work over the next year, Moving Forward’s Revenue & Finance Task Force will take a leadership role in examining the possibilities.
budget and revenues at a glance
(fiscal year 2016)

MTA
Operating budget:
$73.6 million

Revenue:
MTA self-generated: $16.8 million—23%
Local funding (Metro Nashville): $40 million—54%

State funding:
$4.6 million—6%

Federal funding:
$12.2 million—17%

RTA
Operating budget:
$9.9 million

Revenue:
RTA self-generated: $1.9 million—19%
Local funding (Davidson County): $1.8 million—18%
Other local jurisdictions: $1.3 million—13%

State funding:
$1.3 million—13%

Federal funding:
$3.7 million—37%
Public-private partnerships, commonly known as P3s, are an innovative alternative for financing large infrastructure projects. P3s are contractual arrangements between public entities and private companies where parties share risk, rewards and responsibilities for delivering infrastructure projects. The private sector is involved in all or a combination of the design, build, finance, operations and maintenance required. A “design-build” project, an approach used in Tennessee for a number of years, has a separate procurement method with different advantages and uses, but it almost never provides any different financing options. As such, Moving Forward believes that simply relying on the design-build method of procurement does not meet the growing transportation needs of Middle Tennessee.

Transportation investments of all kinds require a funding source to pay for upfront capital costs, improvements and ongoing operation and maintenance. One of the most widely held misconceptions about P3s is that the private sector somehow provides the funding for the project and that this funding is a source of “free money” for the public entity. In reality, private partners may provide a portion or all of the financing for a project, but these funds must be repaid from a revenue source. Private partners can help to assemble financing packages that may include such things as public and private loans, and public bonds. Private partners may also look to fund the upfront capital costs from their own pocket. All of these processes of financing do require the public entity to repay the private sector. After all, it is the public partner that retains long-term ownership of the transportation asset.

As seen in a number of P3 examples and projects throughout the United States, repayment is often done through a secure, sustainable and long-term funding source which can come from a combination of user fees, dedicated tax revenues or a variety of other sources. A local dedicated funding source for transportation in Middle Tennessee would serve as a source of repayment for future P3 projects and increase the attractiveness of our region for P3 proposals, in addition to providing matching funds for federal grants.

P3s have a multitude of benefits when used to develop transportation projects, which include:

- Reduced costs due to design innovations, use of technology and single-source procurement, often not able to occur through a public entity
- Quicker project delivery due to collaboration between design and construction
- Reduced risk for the public entity due to the private sector being contracted to deliver the total project
- Long-term public ownership of assets

Private partners may provide an equity stake in the project, which, while requiring a reasonable rate of return on the investment, also builds incentive to design, build, finance, operate and maintain the asset in a timely and cost-effective manner, with the private sector assuming much of the upfront risk.

I. Nashville’s History With P3s

The Nashville of 1870 was very different from the Nashville region of today, but some things have stayed the same: the need for mass transit, and the P3s that make some forms of mass transit possible. Much has been said about Tennessee's historic turnpikes. Between 1829 and 1875, the Tennessee General Assembly approved the incorporation of 17 private companies that built and maintained toll roads running through Nashville. Many of these turnpikes became the ancestors of today's public highways and pikes. But turnpikes are not the only example of P3s in the history of mass transit in Nashville.

Before buses, there were streetcars. Lately, streetcars have reentered the public imagination, in part due to recent renovation of the trolley barns on Rolling Mill Hill, which began as a Works Progress Administration project in the 1930s. It is fitting to dream of streetcars during a time in which Metro is reimagining solutions to its present public transportation needs. In the 19th century, Nashville's streetcars were owned and operated by private companies that were capitalized by private investors. Rail expansions, line acquisitions and related roadway improvements were financed by the companies, but the right-of-way and franchise rights were granted by public ordinance by the mayor and city council of Nashville.
The earliest streetcars were mule-drawn and were quickly followed by horse-drawn competitors. The first such company, the South Nashville Street Railway, was chartered in 1860 on the eve of the Civil War, but did not become operational until war’s end. Other companies followed, including electric streetcar companies in 1889. From the end of the Civil War to the end of the 19th century, some 30 different streetcar companies had operated in Nashville. The streetcars did more than just transport people. In a wider sense, they stimulated development, both on the private side and on the public side. The streetcars made suburban expansion possible, and by 1872, mule-drawn streetcars linked Nashville with Edgefield, spurring development there. When streetcar companies expanded their lines, development blossomed soon after in adjacent areas. Neighborhoods such as Belmont Park, West End, Acklen Park, Richland and Belle Meade emerged as a result of line expansions, and streetcars were emblazoned with real estate advertisements.

Even further, so-called “trolley parks” were important to promoting development. Victorian-era citizens enjoyed picnicking and strolling in parks on weekends. Recognizing this interest in parks, real estate developers of the 1880s set aside green space at the end of streetcar lines, creating “trolley parks” that became weekend destinations for many Nashvillians. Some of these trolley parks were substantial, being more than 80 acres in size and containing attractions such as sulfur springs, public concerts, lakes, bandstands, dances, and, in one case, a monkey cage. The trolley parks stimulated traffic on streetcar lines and served as a way to show off new developments to potential residential buyers and commercial vendors.

These trolley parks were, in some ways, the ancestors of Metro’s public parks system. By 1900, public interest in the trolley parks had sparked demand for permanent public parks. In 1901, a Parks Board was established, and a year later, in 1902, the mayor of Nashville struck a deal with Percy Warner, a principal in a prominent streetcar company, to convey 72 acres of Centennial Park to the Parks Board, as well as a percentage of the streetcar company’s gross receipts. As these historical examples prove, mass transit made possible through P3s is not a new thing. As our region wrestles with a way to solve its current transportation issues and to stimulate future development, it is worth keeping in mind the private streetcar companies of our past.
**ii. Tennessee P3 Legislation**

P3s require authorizing legislation at the state level, as these complex, high-dollar projects require a defined statutory framework creating a predictable business environment. During the 2016 legislative session, State Sen. Bill Ketron (R-Rutherford) and State Rep. Charles Sargent (R-Franklin) introduced legislation authorizing the use of P3s to design, build, finance, operate and maintain all transportation projects in Tennessee. The bill was amended in committee to apply only to mass transit projects, specifically excluding roadways and bridges. Moving Forward supports future discussions to broaden the use of P3s to all transportation projects, as we believe these projects can benefit from this innovative approach. The legislation, Public Chapter 975, does allow for unsolicited proposals and calls for rules to be promulgated by the commissioner of transportation. State and local governments, as well as other public agencies, are authorized to enter into transit P3 projects after the effective date of the bill, October 1, 2016. Tennessee is the 34th state to authorize P3 legislation.

Key in the development of this new legislation was a visit to Nashville in December 2015 by Paul Lewis, vice president of policy & finance with the Eno Center for Transportation. At the invitation of the Moving Forward Revenue & Finance Task Force, Lewis discussed the Center's 2014 report, Partnership Financing: Improving Transportation Infrastructure through Public Private Partnerships, with the task force’s P3 Subcommittee, state legislators and policymakers. Moving Forward volunteers testified on behalf of the legislation, and many of the best practices found in model P3 legislation highlighted in the Eno Center report were incorporated into Tennessee’s bill. The bill’s sponsors are to be commended for passing a solid, very complex piece of legislation in a single legislative session. One provision, however, that did not make it into the final version was the creation of a state P3 office to provide guidance and technical support to parties, both public and private, undertaking a P3 process. **Moving Forward recommends that the State of Tennessee develop and staff an Office of Public-Private Partnerships to ensure that governments in our state are fully ready to accept and oversee future P3 proposals.**

News of Tennessee’s P3 law is spreading, already gaining coverage in industry publications, such as P3 Bulletin, and through a conference hosted in May 2016 in Nashville through a partnership with the Association for the Improvement of American Infrastructure (AIAI) and Moving Forward. As we look forward to our first transit P3 project in Tennessee, it’s worthwhile to consider a number of successful P3 projects in other states.

**iii. Transportation P3 Projects in other States**

1. **Denver, Colorado**

The Eagle Light Rail Public-Private Partnership project is a part of the Regional Transportation District’s (RTD) 2004 voter-approved Fast Tracks plan to expand transit across the Denver metro region. This particular $2.2 billion project comprises the East Rail and Gold lines, the first segment of the Northwest Rail Line to Westminster, the procurement of 54 commuter rail cars and a rail maintenance facility, all scheduled for completion in 2016.

The Denver RTD entered into a 34-year agreement with Denver Transit Partners (DTP) to operate and maintain the system. DTP is the selected concessionaire for the Eagle P3 project and is comprised of a partnership among Fluor Enterprises Inc., Denver Rail Holdings Inc. and Aberdeen Infrastructure Investments. Other team members include Balfour Beatty Rail Inc., ACI, Ames Construction and HDR. Funding for Eagle P3 comes from federal grants and loans, RTD sales tax proceeds and the private partners’ $450 million financial contribution. In addition, the project received a $1.03 billion full funding grant agreement from the Federal Transit Administration.

2. **Baltimore, Maryland**

Purple Line Light Rail Project: The Maryland Purple Line Light Rail Project (the Purple Line) is a 16.2-mile, 21-station, east-west, light rail transit (LRT) Transitway that will extend from its western terminus just west of Wisconsin Avenue and the Bethesda Metro Station in Montgomery County to its eastern terminus at the New Carrollton Metro Station in Prince George’s County, located just inside the I-495/Capital Beltway in the Washington, D.C. metropolitan area. The Maryland Department of Transportation and the
Maryland Transit Administration have selected Purple Line Transit Partners as the concessionaire to design, build, finance, operate and maintain the Purple Line over a 36-year term. The Maryland Board of Public Works approved the P3 contract for the Purple Line on April 6, 2016. Construction is expected to begin in late 2016 with passenger service to open in early 2022.

3. State of Virginia
Virginia has had an established P3 program since 1995 and has currently the highest number of P3 transportation projects procured. The State of Virginia has established an Office of Transportation Public-Private Partnerships, a dedicated unit outside of the Virginia Department of Transportation. Four such projects include:

- 1-95 express way ($940 million)
- Midtown Tunnel ($2.09 billion)
- 1-495 express lane ($1.4 billion)
- Hampton Roads Bridge-Tunnel ($4 billion)

4. Louisville, Kentucky and Southern Indiana
An example of great regional collaboration of a P3 project for transportation improvement is the Louisville-Southern Indiana Ohio River Bridges project. This project was designed to improve safety, alleviate traffic, connect highways and create economic development for the entire Louisville-Southern Indiana region. This project called for the building of two bridges and the highways that connected them. Both states worked together—Kentucky being responsible for the downtown crossing and Indiana being responsible for the east end crossing.
appendix a: nMotion transit scenario maps
appendix b: moving forward task force rosters

routes, network & nodes task force

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Net population growth by county between 2010 and 2040 (projected)

Source: Middle Tennessee Connected: 2016-2040 Regional Transportation Plan, Nashville Area MPO, 2016
Funding per capita for transit service compared with Nashville MTA

Source of revenue for transit service - peers vs. Nashville MTA

Peer average = $136.23 per capita

Nashville MTA = $87.58 per capita

Source: National Transit Database, Federal Transit Administration as reported in Nashville Region Vital Signs, 2014
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sources
