Executive Summary

The purpose of the *Strategic Transit Master Plan* for the Nashville Metropolitan Transit Authority is to set forth a set of guiding principles and policies for improving public transportation in Nashville/Davidson County, as well as describe actions and projects for the short, medium and long term.

Current Conditions and Trends

The Middle Tennessee region has been growing both in employment and population for the past several decades, and that growth is projected to increase through 2035. Nashville/Davidson County has also been growing, although its growth is at a slower pace than for the outer counties. Within Davidson County, growth is occurring more quickly in outer areas—indeed, many of the zones expected to grow greater than 100 percent between 2002 and 2030 were located to the south in Davidson County beyond the central service area of the MTA.[i] Employment in Davidson County was shown growing in outer areas as well as part of the core, thus continuing to disperse along with population.

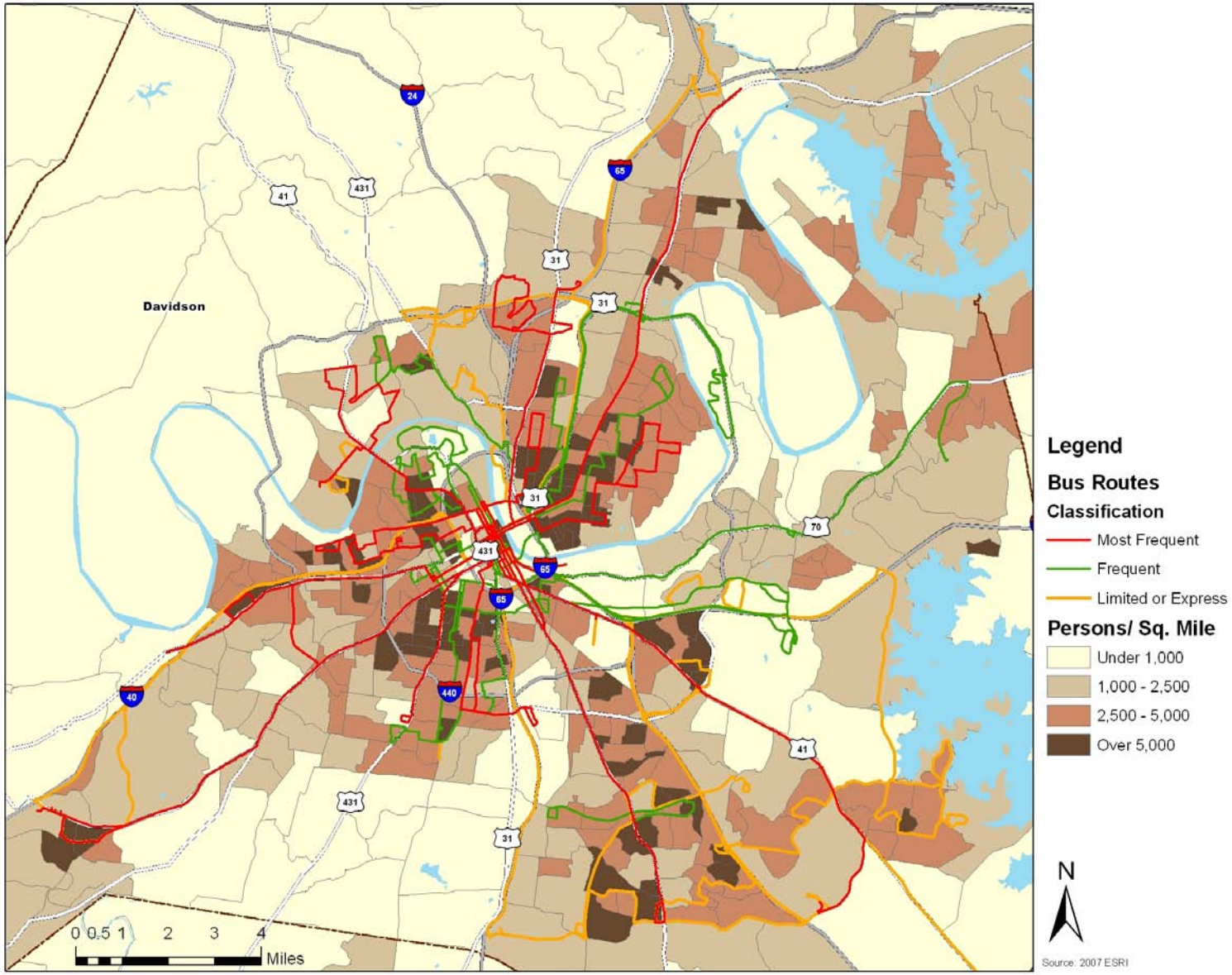
A major challenge for the MTA in Davidson County and for transit in the greater Middle Tennessee region is that the population density is much lower than for similar regions. A list of the top 100 transit cities in the United States in terms of passengers per capita ranked Nashville 48th in population—so right in the middle of the list. In terms of density, Nashville/Davidson County ranks as 85 out of 100.

An analysis of households and employment compared to MTA service in Davidson County shows that the current service comes close (distance-wise) to a majority of current households, employers and other key destinations. In total, around 60 percent of households are within ½ mile of MTA routes and 80 percent of employers and employees are within ½ mile. Industry standards would say that an area should have a density equivalent to 5000 persons per square mile to justify fixed route service, and in Davidson County, most of the census block-groups with densities greater than 5000 persons per square mile have some MTA route within ½ a mile. Density of households and attractions is important in transit, because most customers walk to transit, and the more customers within walking distance, the more successful a system can be in attracting ridership. Figure E-1 shows Davidson County, the population per square mile in each of its census block groups in 2007 and the MTA route system.

Despite the challenges due to a low population density, the Nashville MTA has been improving service and growing ridership. MTA ridership has been growing steadily since 2002, reaching 9.4 million riders in Fiscal 2008, however, ridership has receded somewhat with the current economic slowdown. The MTA has also been providing service effectively. In fact service effectiveness (as measured by passengers per hour) has been growing constantly over this decade—and that improvement can be seen in MTA corridor routes, neighborhood routes and commuter routes alike.

Indeed, in comparison with an average of 17 other peer transit agencies, Nashville MTA does quite well. Although we are challenged due to the lower density of population in the service area compared to most of the 17 peer agencies, Nashville MTA has done a good job of putting service where it can be best used. The result is that MTA has a higher level of service effectiveness than its peer average as measured by passengers per vehicle hour. This number is computed by dividing an estimate of yearly ridership by the total vehicle hours in a year. Total vehicle hours reflect service hours and time to get buses to and from the bus garage, both of which drive service costs.

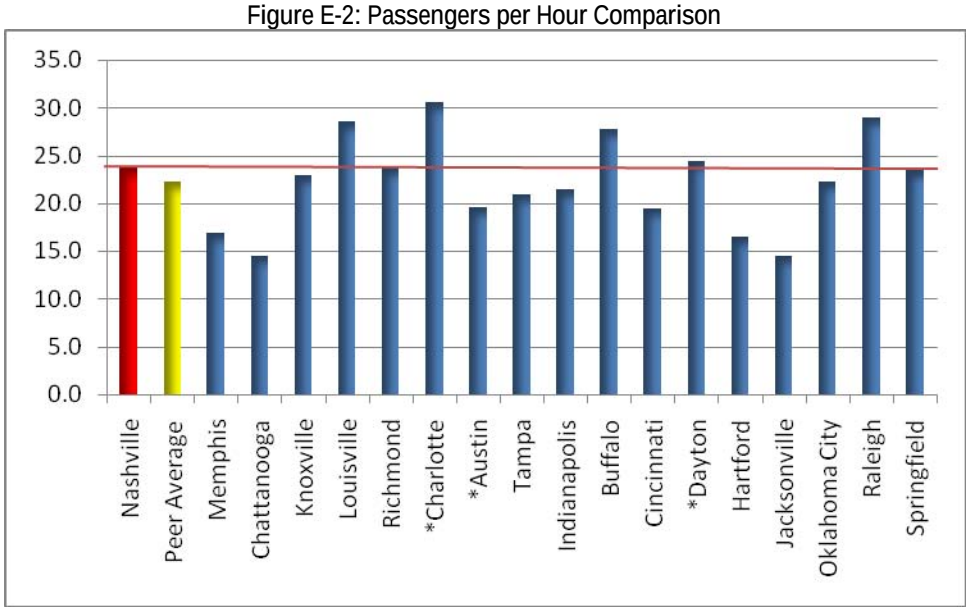
Figure E-1: Persons per Square Mile in 2007 (based on Census Block Groups)



The amount of transit service provided in Nashville/Davidson County is still small compared to other communities of similar size. On the list of 100 top transit cities, Nashville ranked 74 out of 100 in terms of hours of service provided per person living in the service area. Looking only at the 17 peer agencies, the peers provide on average 40 percent more hours of service on a per capita basis. Correspondingly, the peers spend around a third more per capita than Nashville.

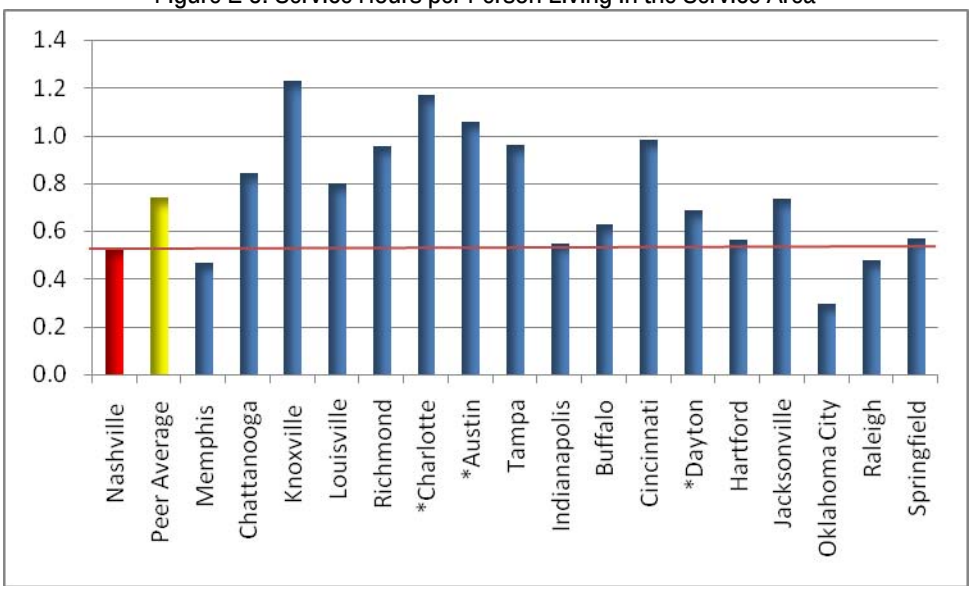
Figure E-2 and Figure E-3 show the comparison between Nashville and 17 peer agencies for passengers per hour, and hours of service per person per year in Davidson County. In these figures, the red horizontal line shows Nashville's performance value so that it can be compared with each of the other areas. Asterisks indicate areas with dedicated funding sources.

Figure E-2: Passengers per Hour Comparison



*Regions with Dedicated Funding for Public Transportation

Figure E-3: Service Hours per Person Living in the Service Area



*Regions with Dedicated Funding for Public Transportation

The Strategic Transit Master Plan Process

In addition to researching current conditions and trends, an important part of determining what improvements are needed in public transportation came through the public process for the *Strategic Transit Master Plan*. The project included five public workshops in November of 2008 as the project was getting underway, five workshops in January of 2009 with a report on the market analysis and initial opportunities, and a meeting of a large number of MTA stakeholders in December of 2008 which considered priorities and alternative futures for the MTA. A set of final public meetings was held in July of 2009 to consider the *Strategic Transit Master Plan*.

Part of the approach to determining what transit improvements are needed was to create a proposed *Service Delivery Policy* for the MTA based on similar policies adopted by transit agencies around the United States, but giving consideration to Nashville's unique condition. A *Service Delivery Policy* (included as Appendix C) was used to assess current service.

The Need for Transit Improvements

Re-establish Basic Levels of Transit Service

One conclusion from the master planning process was the need to re-establish base levels of transit service throughout the MTA system. In all of the public processes undertaken for the *Strategic Transit Master Plan*, increasing frequency of service appeared most important. People asked for more buses to eliminate overcrowding, and for more service throughout the day, in the evenings and on weekends.

Research based industry guidance states that bus service that is provided less than once per hour is unattractive to all riders.[ii] For service to be attractive to those who have automobiles available, it should be provided at a minimum half hour, and preferably, every 15 minutes. While service in peak hours may seem to be the most critical for transit service, research shows that there is considerable payback to overall ridership when good service is provided throughout the day, extended into the evenings and available through the weekends.[iii] This is because if customers can generally count on the service being available, they won't get in the habit of finding alternatives. Also, later evening trips allow people to use transit during the day who need to return in the evening. Therefore, adding service outside the peak period can be expected to increase ridership in the peak as well. Alternatively, removing service in the evenings and on weekends, or even midday may improve service effectiveness in the short term, but can be expected to hurt in the longer run.

Improve Competitiveness of Transit

Another need raised in the *Strategic Transit Master Plan* process was the need for transit to be more competitive to the automobile. This can be couched in terms of speed of travel or overall trip time for transit versus the automobile and also in terms of availability of space on the buses. This need was expressed in public meeting participant requests for faster service and for cross-town routes to avoid a downtown transfer, and in responses to questionnaires about the types of service improvements needed. Faster transit is needed to reduce automobile trips thus reducing congestion, pollution and greenhouse gases. Also, public meeting participants complained about crowded buses, especially during peak periods.

Serve Those in Unserved Areas

Some of the complaints expressed at public meetings were from neighborhoods that had lost transit service when routes were cut in July of 2008, as well as those who lost evening service. And while industry guidelines would say that most areas that lost service would not have met density standards for even hourly transit provision, there are still many individuals who were hurt by the loss of service. MTA is experimenting with a flexibly routed service in Madison, which may be a better way to serve areas with insufficient density to justify fixed route service.

Attract New Users

To continue to serve Davidson County and be supported financially, MTA will need to grow along with the population in the service area. To grow, MTA will need to increase usage in its core areas as well as provide services in the newer developing areas. In other words, it will have to continually attract new users. The key to attracting new users, in addition to providing service that is competitive with the automobile and that can meet basic service needs, is to make transit easier to use and to improve the image of transit. For those who seldom use public transportation, it can be difficult to figure out how to interpret schedules and how to pay the fare, for example. Potential new customers have to be convinced that riding transit will be a pleasant experience, and people like themselves use transit.

Five Priority Areas for Transit Investment

The needs expressed by the public, by transit stakeholders and through other research and analysis led to recommendations that the MTA focus funding for improving transit on five priority areas.

- More buses more often (increase frequency of buses)
- Faster transit trips (fewer bus stops, traffic signal priority, avoid going downtown to transfer)
- Serve new or unserved areas (connect to areas that do not have service today)
- Make service easier to use (signage, better access to information, "How to Ride" training, simpler schedules, simple fare payment methods)
- Improve the image of transit (marketing, nicer buses, nicer shelters & benches at stops)

The suggested approach for using the five priority areas is to try to make progress in each of these whenever there is opportunity to make service improvements. Given that there is reasonably good transit coverage in Davidson County, the major part (60 to 80 percent) of new funding for operations and capital will be aimed at frequency improvements and speed improvements. Some funding, however, should be reserved to serve unserved areas, to make service simpler, and to improve the image of transit. The *Service Delivery Policy* provides more guidance for designing service in some of these priority areas.

Application of the Service Delivery Policy

The *Service Delivery Policy* was used to examine MTA service in the areas of temporal availability, geographic availability, and service and cost effectiveness. In terms of temporal availability, the policy sets forth minimum standards as well as goals for service. These standards and goals describe the headways to be provided by time of day, and also the span of service by day of the week.

The frequency standards in the *Service Delivery Policy* were used to assess current MTA service, and an analysis was done to determine the cost of bringing services not meeting the standard into compliance. The geographic availability standards in the *Service Delivery Policy* were also used to assess current service. Although there were a few places that were unserved that should be served, most areas were well covered.

The performance of the current service was ranked according to cost and service effectiveness measures using the policy. The routes with the top and bottom 10 percent ranking were noted, and a process was recommended for taking corrective action with the routes in the bottom 10 percent. Corrective action will require good data on the routes so that different patterns and time of day can be assessed. Automatic passenger counters (APCs) expected in the summer of 2009 will help in this process. Other steps to be taken could include marketing of service, restructuring service, and if all else fails, reduction or elimination of service.

Opportunities for Transit Investment in the Short Term (2009-2015)

Following along the theme of five priority areas for investment, MTA has identified the following projects for the short term.

Gallatin Road BRT

Implement a BRT service for Gallatin Road. MTA is planning to use hybrid 60 foot long articulated BRT vehicles, as used by the Los Angeles MTA on its Orange Line BRT, on an new BRT along Gallatin Road. The proposed BRT will have stops around every ¾ mile with enhanced stop amenities such as electronic signs giving the arrival time of the buses in real time, enhanced shelters and amenities. Weekday service will be every 15 minutes all day and 30 minutes off-peak. The system will include traffic signal priority for the buses to give them some additional green time as they proceed along the corridor.

The BRT service will improve service frequency in the Gallatin corridor, increase speed of many trips, improve signage, and improve the image of transit. In short, the BRT will make improvements in 4 out of the 5 priority categories. The increased operating cost for the recommenced service is $2.3M per year. The increase in capital cost will be $9.4 M.

Increase Frequency of Service

Provide frequency improvements on eleven routes to bring them up to minimums as described in the Service Delivery Policy. Note that many of these suggested service additions are in off-peak hours which do not require additional vehicles, and which can provide an excellent boost to ridership. The total operating cost per year for these improvements is estimated at $1,156,000 and the capital cost for new buses at $300,000 each is $5.1 M.

With the addition of improvements on Route 26 Gallatin Road, altogether 12 routes are recommended for frequency improvements. These frequency improvements will affect 44 percent of households which are located within ½ mile from each route that is improved. Frequency improvements on express routes will greatly increase the availability of higher speed transit to outer areas of the county. These are areas that are growing—and since ridership per trip on the existing express routes is quite good, providing additional trips should be an effective way to draw new riders.

Downtown Circulator

Institute a Downtown Circulator. A Downtown Circulator will provide better connections between transit facilities such as Music City Central and the Music City Star, as well as connect state office buildings, downtown businesses/residents, and tourist destinations. The Downtown Circulator will speed transit service as it will provide very frequent pickups for any passenger arriving in the downtown.

While the exact routing(s) have not yet been established the service can be estimated to require 4 buses to provide a very frequent level of service. Operating 17 hours a day weekdays and 8 hours a day on Saturdays and Sundays would cost around $1.8 M for operations and $1.3M for vehicles and specially signed bus stops.

Service to New or Unserved Areas

Reserve funding for service to a new or unserved area. While the densities in most unserved neighborhoods are not sufficient to recommend fixed route services, MTA will continue to refine the flexibly routed services concept, BusLink, that can link neighborhoods with important destinations and other fixed route services. In particular, neighborhoods with densities of greater than 2500 persons per square mile with a pedestrian environment that would encourage walking to transit stops would be good candidates for a pilot project. A budget of $700,000 would allow for two buses operating 12 hours weekdays and 10 hours on Saturday.

Marketing

Provide an additional marketing budget to help non-users learn how to use the service. This effort will continue the work done by Transit Now on a video for helping non-users to learn how to use the service. A budget of $30,000 is recommended for this project. Note that BRT implementation also calls for a special marketing budget of $50,000.

The table below summarizes the short-term list of projects along with the five areas for improvement: As can be seen, all of the priority areas are affected by the improvements. The total of the recommended service improvements comes to around $6M in additional operating funding and $16M in capital funding.

Table E-1: Recommended Short-Term MTA Improvements and Priority Areas

Service	Operating Cost ($1000)	Capital Cost ($1,000)	Increase Frequency	Faster Transit	Serve New Areas	Easier to Use	Improve Image
Gallatin Road BRT	$2,305	$9,400	X	X		X	X
Frequency improvements on 11 routes to bring to minimums	$1,156	$5,100	X			X	
Downtown Circulator	$1,800	$1,300	X	X		X	X
Service to new or unserved areas (undesignated)	$700	$250			X		
Program to show new users how to use the service	$30					X	X
Total	$5,991	$16,050	X	X	X	X	X

Opportunities for Transit Investment in the Mid Term (2016-2025)

In the mid term this plan assumes that MTA, working with the Mayor's Office, Metro Council, Tennessee DOT, the Nashville MPO, Cumberland Region Tomorrow and other stakeholders will have been successful in finding a new source of funding for regional transit services. If this is the case, it is likely that the MTA will be able to offer additional regional service. Recommendations for Nashville/Davidson County include:

- Extend the Gallatin BRT service from the Music City Central (MCC) to Vanderbilt/ West End.
- Improve night service on certain routes to continue in the same pattern as during the day. Routes affected would be Routes 2 Belmont, 4 Shelby, 7 Hillsboro, 19 Herman, 20 Scott, 28 Meridian, 29 Jefferson, and 30 McFerrin.
- Establish mini-hubs at Clarksville Pike and Gallatin Road.
- Provide signal priority and BRT elements for other corridors including Route 15 Murfreesboro Road, Route 12 Nolensville Road, and Route 23 Dickerson Road.
- Add park and ride capacity for Routes 35X Rivergate Express and 41 Golden Valley.

- Extend and expand park and ride service to Rutherford, Sumner and Williamson Counties. In particular, offer half hour service during the peak hour to Murfreesboro and Hendersonville. Institute park and ride service to Franklin.
- Expand service to unserved areas including new fixed route or flexible service in areas meeting density standards such as:
    - Two neighborhoods to the east of Gallatin Pike and just north of the new Madison Bus Link area. These might be served by expanding BusLink service northward to Anderson Lane.
    - An area between Routes 3 West End and 7 Hillboro, part of the Hillsboro-West End area. This area would be a candidate for a neighborhood route or flexible route connecting to the Mall at Green Hills.
    - A area south of I-440 between MTA Route 12 Nolensville Road and I-24. Feeder routes could connect neighborhoods north of Route 72 Edmondson Pike Connector with the 100 Oaks Shopping Center.

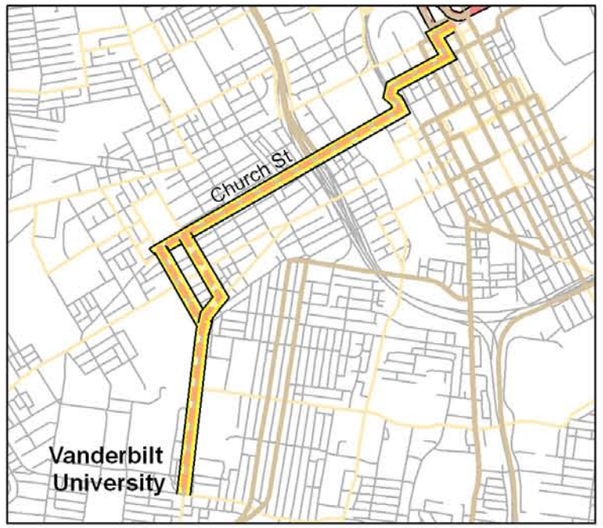
Opportunities for Transit Investment in the Long Term (2026-2035)

Long-term (2026-2035) project recommendations include providing high capacity transit service beyond Davidson County (BRT or commuter rail) to Rutherford, Sumner and Williamson Counties, further improving transit capacity between Nashville and the West End with streetcar or dedicated bus lanes, extend current route services to reach developing residential and employment centers, and institute additional mini-hubs to improve connections.

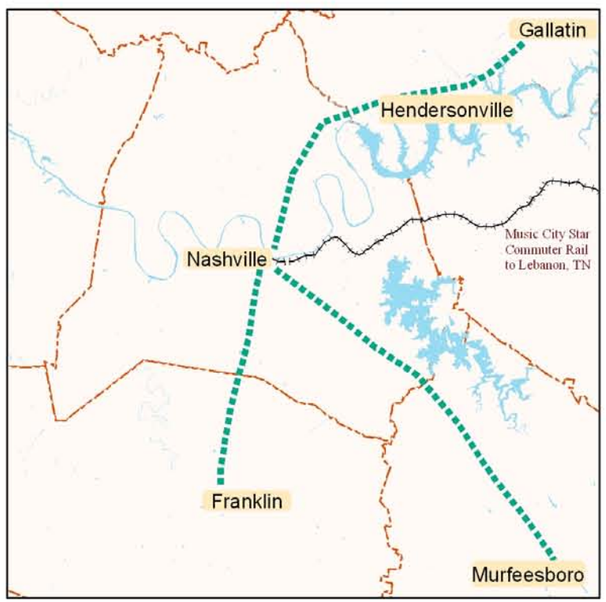
- Extend Route 23, Dickerson Road to reach emerging employment areas north of the current service area.
- Extend Route 6 southward to reach new developing communities and employment areas, including Summit Medical Center.
- Further improve transit capacity between downtown Nashville and the West End with light-rail or if BRT, with dedicated bus lanes and/or queue jump lanes.
- Provide high capacity service (BRT, light rail or commuter rail) to Rutherford, Sumner and Williamson Counties. If BRT service, improve existing right-of-way for buses with exclusive lanes or queue jump lanes.
- Provide additional service to the developing neighborhoods currently served by Route 37X Tusculum/McMurray Express and Route 38X Antioch Express. These neighborhoods are expected to reach densities that would justify more than peak hour service. The express bus services could be expanded throughout the day and into the early evening or alternatively, the service could be used to connect with the regional high capacity service.
- Institute an additional mini-hub at 100 Oaks to improve connections.

Table E-12 and Figure E-4 following illustrates the short, mid and longer term recommendations for service improvements for the MTA.

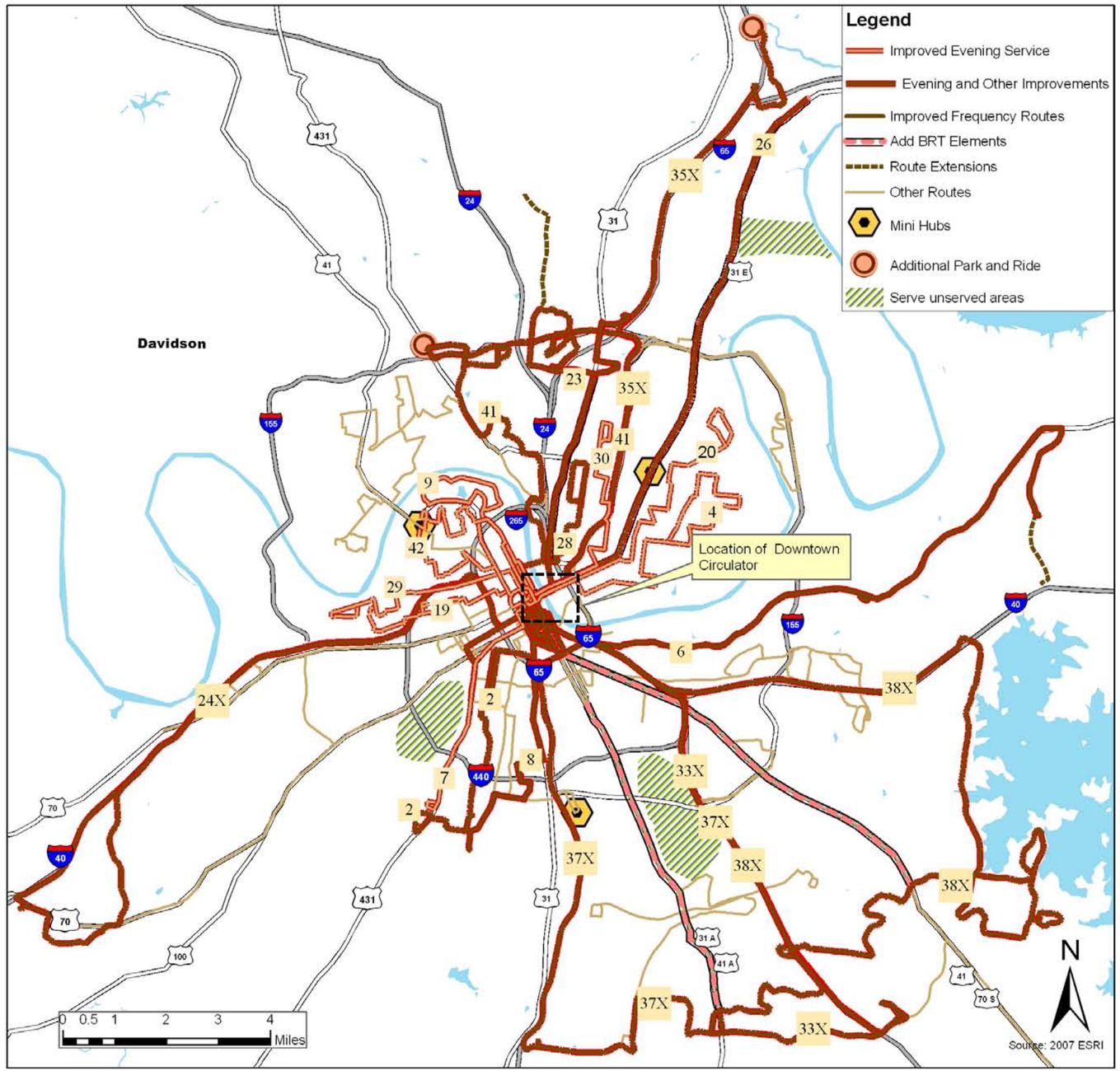
Figure E-4: Short, Mid and Long Term Recommendations



High Capacity Improvements (Light Rail or BRT Queue Jumps/Reserved Lanes)



High Capacity Regional Connections



Conclusions

During most of the first decade of the 21st century, the Nashville MTA has been improving along several dimensions. Ridership has grown in response to service improvements and partnerships with Nashville employers. Service effectiveness (rides provided per each vehicle hour) has been increasing. The downtown Music City Central Station now provides a modern facility to shelter bus passengers and provide convenient transfers. Support from Nashville Metropolitan Government will allow further service improvements, such as a BRT on Gallatin Road. Also, the state of Tennessee now has enabling legislation to permit a larger regional solution to providing public transportation.

Nashville MTA is thus poised to take another step forward by increasing the level of service provided so that MTA will rise to the upper levels of some of our peer regions. One step along that path has been to produce this *Strategic Transit Master Plan* to help establish policies and future goals for the agency. This plan proposes a five dimensional approach to improving service which includes improving service frequency, improving speed of service, serving unserved areas, making service easier to use, and improving the image of transit. This plan also proposes the use of a *Service Delivery Policy* to guide the way that service is changed. Finally, this *Strategic Transit Master Plan* suggests a list of opportunities that the MTA will pursue in the short, medium and long range time frames.

Table E-2 Summary Table of Actions/Opportunities for Nashville MTA

Short Term Actions (2009-2015)
Adopt a Service Delivery Policy
Pursue a dedicated funding source for public transportation
Implement 'green' building practices and continue to acquire hybrid buses
Implement BRT on Gallatin Road
Increase frequencies on eleven routes to bring them up to minimum standards
Implement a downtown circulator
Provide service to a new or unserved neighborhood
Provide a budget for increased marketing to help non-users learn how to use the MTA service. Provide a targeted marketing campaign for the Gallatin BRT.
Mid Term Actions (2016-2025)
Reallocate service using trip by trip ridership data from the Automatic Passenger Counters
Extend the Gallatin Road BRT from the Music City Central to West End/Vanderbilt
Improve night service on routes currently paired routes: (Routes 4 Shelby and 20 Scott, 28 Meridan and 30 McFerrin, 2 Belmont and 7 Hillsboro, and 19 Herman and 29 Jefferson.)
Institute mini-hubs on Clarksville Pike and Gallatin Road to serve multiple routes
Implement BRT service elements such as fewer and nicer stops, traffic signal priority, better buses and increased service on Murfreesboro Road, Dickerson Road and Nolensville Road.
Expand park and ride capacity for Route 35X Rivergate Express near Kmart-Goodlettsville. Add park and ride capacity to Route 41 Golden Valley. Provide and improve park and ride service to Rutherford, Sumner, Williamson and Davidson Counties.
Expand the Madison Bus Link northward to Anderson Lane. Add fixed or flexible service from the Hillsboro-West End area to connect to the Mall at Green Hills. Add fixed or flexible service from the Glencliff and Woodbine neighborhoods to 100 Oaks Mall.
Revise downtown system map to clarify routes in the downtown. Provide a targeted marketing campaign for new and improved services.
Long Term Actions (2026-2035)
Extend Route 23, Dickerson, to reach employment areas north of the current service area.
Extend Route 6 Lebanon Road to developing communities and Summit Medical Center
Further improve transit capacity between downtown Nashville and the West End with dedicated or queue jump lanes or streetcar service
Provide high capacity service (BRT with queue jumps, light rail or commuter rail) to Rutherford, Sumner and Williamson Counties).
Provide Frequent service to developing neighborhoods served by Route 37X Tusculum/McMurray Express and route 38X Antioch Express.
Institute a mini-hub at 100 Oaks.

[i] 2030 Long Range Transportation Plan, Nashville Area Metropolitan Planning Organization, Amended November 14, 2007, p. 66.

[ii] Transit Capacity and Quality of Service Manual, 2nd Edition; Transit Cooperative Research Program (TCRP) Report 100:2003, Exhibit 3-12, p. 3-30.

[iii] Graham Currie, et. al., High Ridership Growth from Extended Transit Service Hours—an Exploration of Causes, Monash University, Australia, presented at the 2009 TRB Annual Meeting.