

Chapter 8 Opportunities for Improving MTA Service and Image

Chapter 8 provides an overview of the opportunities for service improvement. These opportunities include service opportunities as well as opportunities to be a better environmental citizen. Following is a discussion of the opportunities in each priority category as well as the environmental opportunities.

Bring Service Frequency to Meet Service Policy Minimums

While the geographic coverage of the MTA service is good, the frequency of service provided should be increased (given adequate funding) so all routes have headways less than the minimum frequencies specified in the *Service Delivery Policy*, with the exception of those routes that have very low ridership or revenue compared to the service provided (those routes falling in the bottom 10 percent in service and cost effectiveness as discussed in Chapter 5).

A comparison in Chapter 5 of MTA service versus the *Service Delivery Policy* showed times and days when service on particular routes throughout the system should be improved to bring service to minimum standards for frequency. Chapter 5 also identified certain routes which require further study because their service or cost effectiveness is at the bottom 10 percent of MTA routes. Excepting the routes designated for further study, Table 8-1 shows the routes recommended for frequency improvements to bring them up to standard.

Table 8-1: Routes Recommended for Frequency Improvements to Meet Minimum Frequency Standards

Route No.	Route Name	Proposed Service Class	Span of Service Needing Improvement	Current Frequency (in minutes)	Proposed Frequency (in minutes)
2	Belmont	Frequent	Weekday Midday	70	60
			Weekday Evening	70	60
6	Lebanon Road	Frequent	Weekday Midday	90	60
			Weekday Evening	70	60
8	8th Avenue South	Frequent	Saturday	60-120	60
			Sunday	60-120	60
23	Dickerson Road	Most Frequent	Weekday Midday	35	30
24X	Bellevue Express	Commuter	Weekday Peak	20-45	30
28	Meridian	Most Frequent	Weekday Midday	50	30
33X	Hickory Hollow - Hickory Plaza Express	Commuter	Weekday Peak	30-60	30
35X	Rivergate Express	Commuter	Weekday Peak	10-40	30
37X	Tusculum Express	Commuter	Weekday Peak	90	30
38X	Antioch Express	Commuter	Weekday Peak	25-60	30
41	Golden Valley	Commuter	Weekday Peak	60	30

Figure 8-1: MTA Routes Recommended for Headway Improvements to Meet Standards

Figure 8-1 provides a picture of the MTA service with routes shown in dark brown that are recommended for frequency improvements. Figure 8-1 also shows Route 26 Gallatin Road which will be improved with the BRT. While the MTA's ability to make these improvements will depend upon financing of service, these are the types of improvements needed to make public transportation viable as an alternative to the private automobile, at least for trips to downtown and that are reachable with the current route configuration. These improvements will affect 44 percent of households which are located within ½ mile from each route that is improved.

The improvements in these eleven routes have the following benefits:

- Provide additional express service for some of the outer areas of the county that have been growing and are expected to increase in density in the future.
- Increase service in the midday on Dickerson Road, the route with the highest level of service effectiveness.
- Except for the commuter routes, recommended service increases are in off-peak times which do not increase peak vehicle requirements. Research indicates that greater percentage increases in ridership can be expected at these times.¹ This is likely due to the prevalence of discretionary travel in the off-peak.

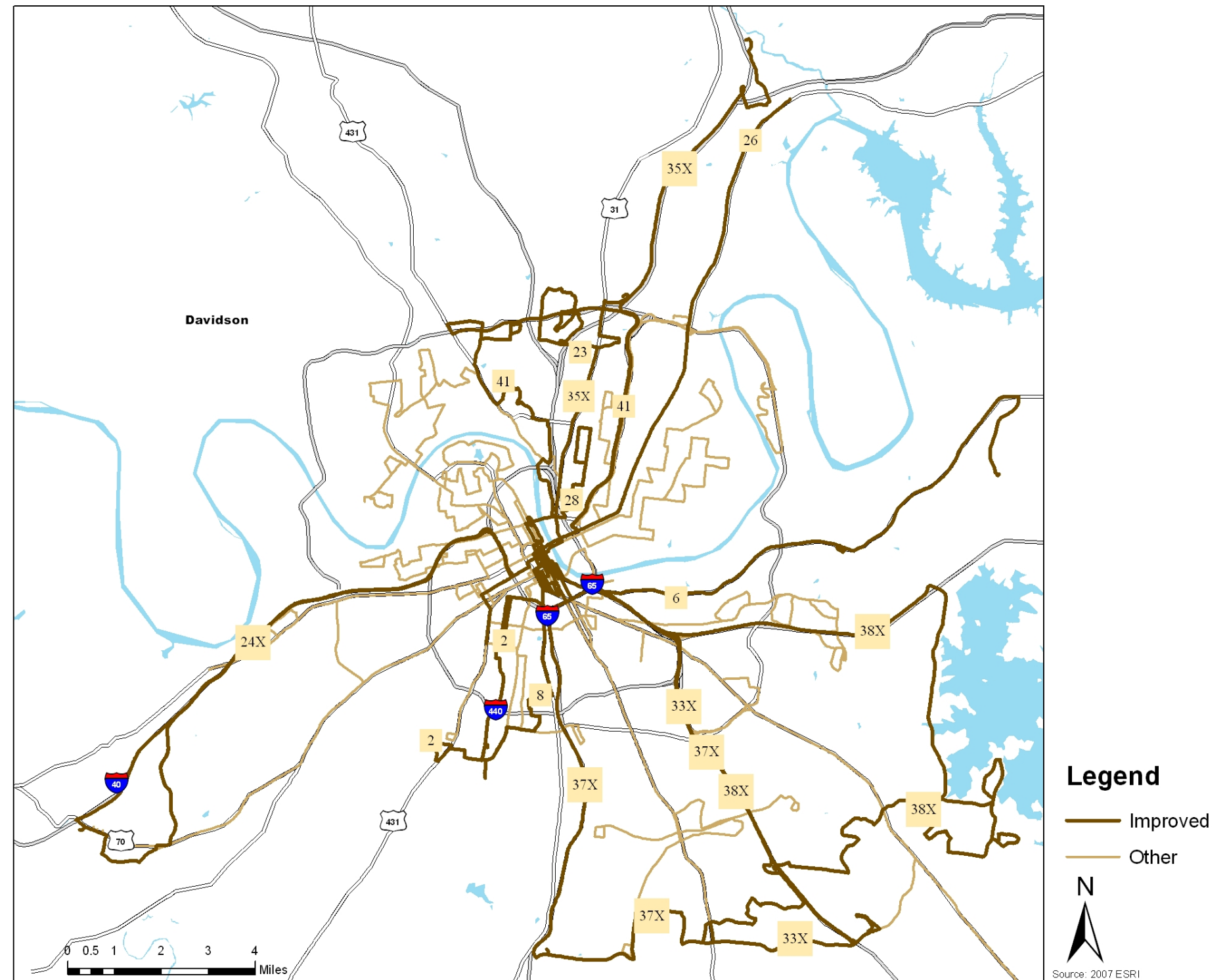


Table 8-2 and Table 8-3 show the total capital and operating cost estimates for bringing the services up to minimum standards. The total yearly operating cost to bring these routes to standard is \$1,156,000 and the capital cost for an additional 17 buses at \$300,000 per bus is \$5.1 million. The main contributor to additional capital cost is additional peak hour service for commuter routes, where additional trips requires additional vehicles. Service improvements are spread throughout the day and evening, with small amounts on weekends to bring services offered up to standard.

Table 8-2: Cost to Bring Service up to Frequency Standards Listed By Service Type

Proposed Service Class	Service Cost Per Year	Capital Cost
Most Frequent	\$297,000	\$0
Frequent	\$498,000	\$0
Commuter	\$361,000	\$5,100,000
Total	\$1,156,000	\$5,100,000

Table 8-3: Costs to Bring Service up to Frequency Standards Listed By Service Time

Proposed Service Class	Service Cost Per Year	Capital Cost
Weekday Peak	\$361,000	\$5,100,000
Weekday Midday	\$552,000	\$0
Weekday Evening	\$234,000	\$0
Saturday	\$4,000	\$0
Sunday	\$5,000	\$0
Total	\$1,156,000	\$5,100,000

Improve Speed of Transit

Improving the speed of transit service is another critical component to making a system that can compete better with the automobile and that can provide a viable alternative to those who don't have automobiles to rely on. Speed improvements should be aimed at the routes with highest ridership to have the greatest impact on the most passengers. There are several opportunities for improving the speed of transit service.

Bus Rapid Transit (BRT) in Key Transit Corridors

Nashville is preparing to implement a BRT in its heaviest corridor for bus ridership on Gallatin Road. (This opportunity was discussed in much detail in Chapter 7) While the BRT design suggested in Chapter 7 does not include exclusive right of way along most of the corridor, it does use other techniques to improve service such as traffic signal priority for buses, the elimination of stops to speed service, and possibly a dedicated lane on the Victory Memorial Bridge.

Another key opportunity is to extend BRT to Music City Central Station and the West End/Vanderbilt area. The large number of trips between these destinations could benefit from the addition of a higher capacity transit service, particularly one connected to the highest ridership Route 26 Gallatin Road.

In addition to the development of a BRT along Gallatin Road, other routes should be considered for speed improvements such as traffic signal priority (TSP), exclusive right of way and limited stops. These include:

- **Route 15 Murfreesboro Road:** This is the second largest route in the MTA system, carrying over 71,000 passengers in February 2009. It serves an area expected to grow in population density over the next 25 years. Recommendations from the 2003 Transit Development Plan for the MPO recommended express bus service on Murfreesboro Road using bus only contra-flow lanes. Recommendations from the SE Corridor Study recommended express and limited stop service along Murfreesboro Road as the locally preferred alternative.
- **Route 12 Nolensville Road:** This is the third largest route in the MTA system, carrying over 43,000 passengers in February of 2009. It runs along a corridor which is expected to increase in population density by 2035. Recommendations from the 2003 Transit Development Plan for the MPO recommended express bus service on Nolensville Road using bus only contra-flow lanes.
- **Route 23 Dickerson Road:** This has often been the route showing the highest level of passengers per hour and would benefit from additional service and faster service. Although its overall ridership is less than half of Gallatin Road, the yearly average passengers per hour for Dickerson Road was over 44 as of February 2009. Projected development in 2035 shows employment development beyond the current terminus of the route, indicating that an extension may be warranted in the future.

Downtown Circulator

Although MCC is located in the heart of downtown Nashville, many customers need to transfer to reach their ultimate downtown destinations. A route that would offer very frequent service could speed the distribution of MTA customers after they reach downtown. In addition, such a route could serve many other purposes including distribution of Music City Star riders to downtown destinations, and providing mobility to tourists and other downtown visitors between sports venues, the convention center, downtown hotels and other attractions.

Figure 8-2 shows the existing downtown shuttles including the downtown shuttle route for the Music City Star and the lunchtime shuttle. Figure 8-3 shows one of several options developed as concepts for a Downtown Circulator. While this *Strategic Transit Master Plan* was not tasked to develop a downtown circulator route, a number of concepts were developed to demonstrate the type of service that could be provided.

To be attractive to downtown users, the Downtown Circulator would have to be very frequent—a headway of every 10 minutes was assumed for this service. In addition, it would have to run from early morning to distribute Music City Star riders and other commuters until late in the evening to serve tourists, bars and entertainment locations. A model for this is the Hartford Star Shuttle route, which is a 1-way loop connecting the convention center with other attractions, particularly restaurants and bars. The Hartford Star Shuttle runs approximately every 12 minutes from 7:00AM to 11:00PM weekdays and 3:00PM to 11:00PM on Saturdays.

Allowing for a four vehicle system operating weekdays and Saturday and Sunday, the cost of a Downtown Circulator providing 10 minute service for Nashville is estimated at \$1.8M for operation and \$1,300,000 for vehicles and specially signed bus stops.

Figure 8-2: Existing Downtown Shuttles

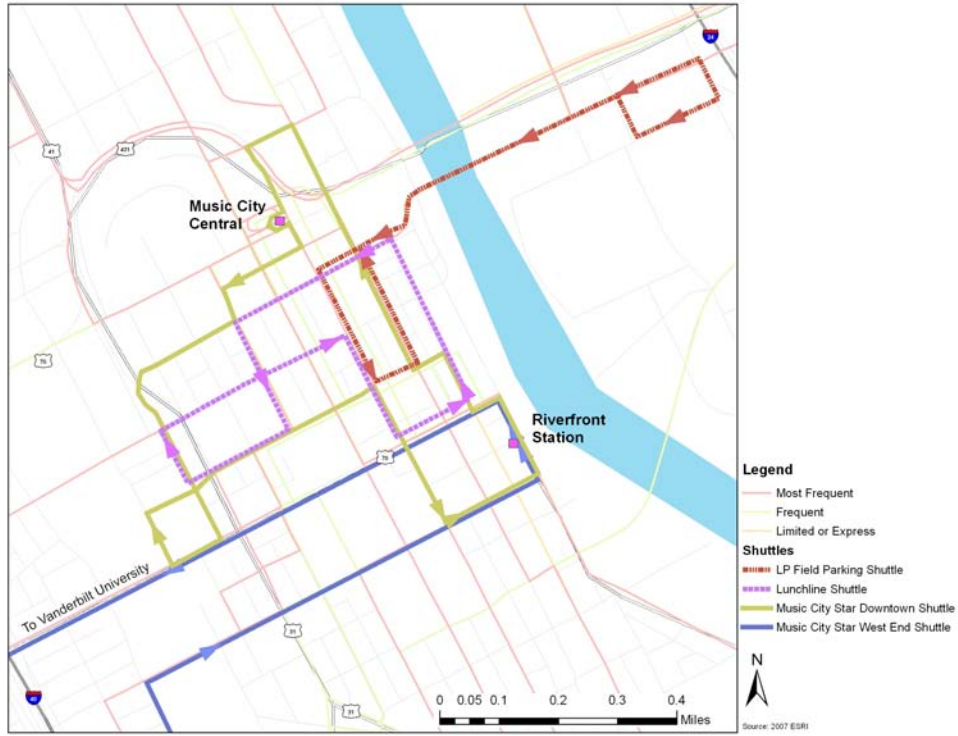
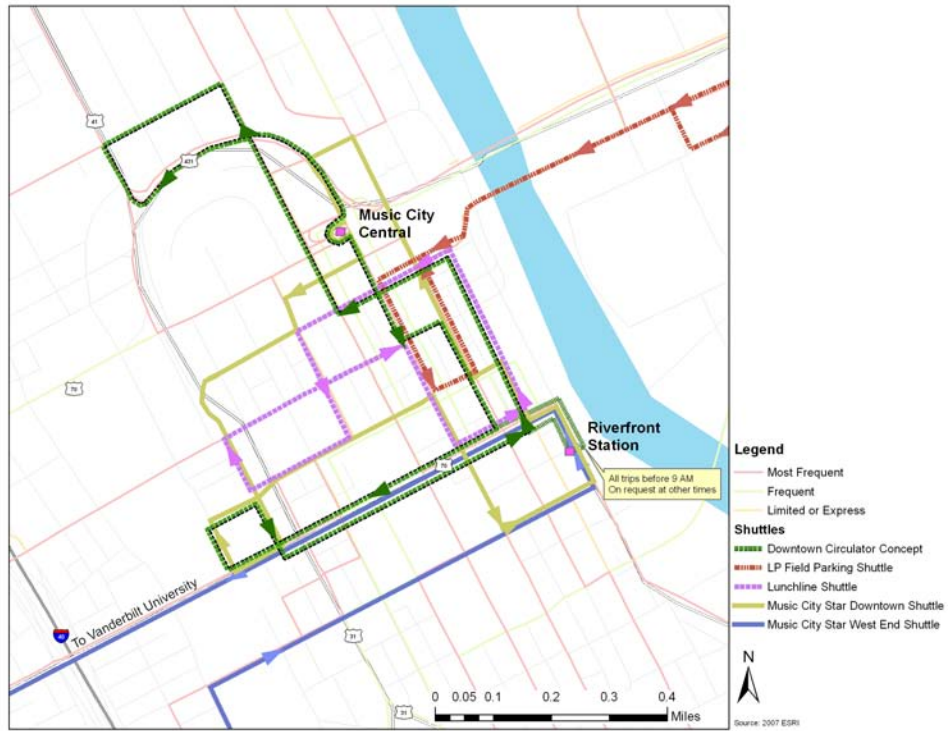


Figure 8-3: One Concept for a Downtown Circulator



Connections Outside of Downtown Nashville

Many of the concerns about taking public transportation voiced at the public meetings included the need to reach cross-county destinations without having to travel downtown. Indeed, cross-county routes might be a solution to improving travel time for MTA customers. However, MTA has not had a good ridership experience with cross-town routes in the past. Its existing cross-town route, Route 25 Midtown, is not particularly strong, and the service effectiveness measure for 12 months ending February 2009 averaged only 16.3 riders per hour. The problem is that most other destinations in the county are so much smaller than downtown Nashville where over 45,000 workers are destined.ⁱⁱ Thus it is difficult to get a density of trips along cross-town routes to justify such services. The MTA Service Analyzer identified a cross-town need to service the Opry-Mills area, but a prior MTA attempt to serve did not prove successful.

Another approach to reducing the travel time for some cross-town trips is to look for places distant from downtown Nashville which could serve as a meeting place for several routes, thus enabling transfers without going downtown. The idea of mini-hub comes from the following arguments:

- Provide some crosstown connections without going downtown to transfer
- Connect routes that are already close together
- Focus service on significant destinations (malls, neighborhood centers, BRT stops)
- Facilitate existing trips and create new opportunities

Note that mini-hubs may be more effective than crosstown routes as they are likely to have lower cost than new crosstown routes and they serve a greater variety of markets. However a transfer is still required. The MTA currently has a mini-hub at Lipscomb University. This is a heated and cooled shelter served by two bus routes.

Six different mini-hub locations were examined as shown in Figure 8-4. Table 8-4 summarizes the mini-hub locations and routes affected. The MTA Service Analyzer was used to test all of the mini-hub concepts simultaneously. Of the various mini-hubs proposed, the Clarksville Pike mini-hub appears to be a winner in attracting 5 percent additional riders for very little cost (\$1.19/new rider). The Gallatin Road mini-hub also attracts 4 percent additional riders, but the cost to detour the service increases substantially, so the cost per new rider is not attractive (over \$8 per new rider). The other mini-hubs did not appear to be winners under current conditions.

The MTA Service Analyzer will be able to analyze changes in the attractiveness of the mini-hubs as development occurs. It can also be used to explore other options for rerouting to serve potential mini-hub locations to improve the rider benefits and minimize the cost. For example, the Gallatin mini-hub will grow in attractiveness as the BRT is implemented. The mini-hub proposed at 100 Oaks will grow in attractiveness as that facility becomes more active.

Figure 8-4: Schematic of the Mini-Hub Concept

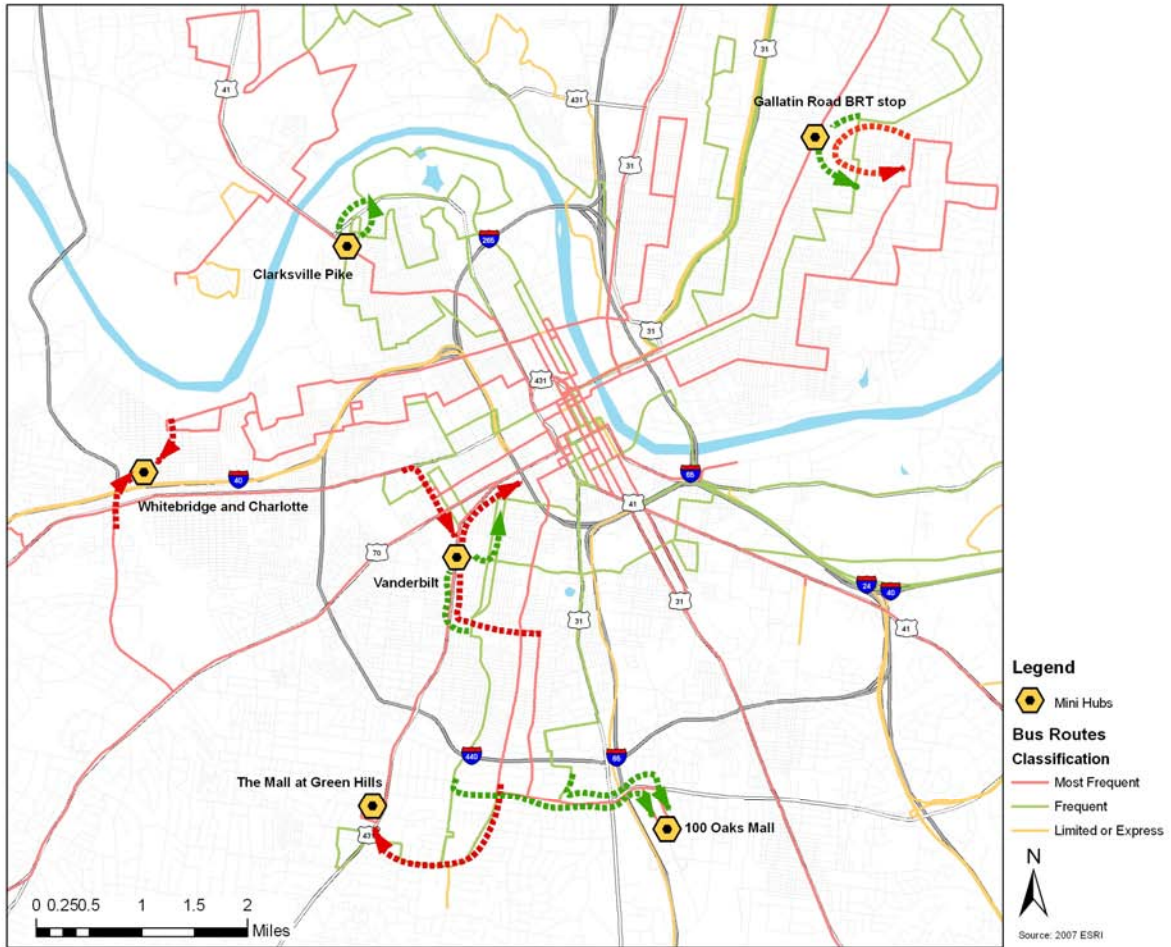


Table 8-4: Mini-Hubs Concept and Routes Served

Mini Hub Location	Routes Served
Gallatin Road BRT stop	Routes 4, 20 and 26
Clarksville Pike	Routes 9, 22 and 42
Whitebridge and Charlotte	Routes 3, 10, 19 and 29
Vanderbilt	Routes 2, 3, 7, 10 and 17
The Mall at Green Hills	Routes 7 and 17
100 Oaks Mall	Routes 2 and 8

Serve New or Unserved Areas

Areas within Davidson County

There were strong concerns expressed at public meetings from those who had lost service in July of 2008, but most of the routes eliminated served areas of lower density, where fixed route bus service would not be recommended. MTA is providing a new flexibly routed service (BusLink) in Madison—this type of service is more appropriate in low density neighborhoods. Since flexibly routed services work well in some neighborhoods and not as well in others, MTA's approach is to test it in different neighborhoods as appropriate.

The MTA *Service Delivery Policy* suggests providing fixed route service where there is a household density of at least 5000 persons per square mile, but also says that service could be provided in areas with density as low as 2500 persons per square mile as long as there are excellent pedestrian conditions to allow walking longer distances. The geographic analysis of service coverage provided in Chapter 5 showed that overall, there is good coverage of MTA service of residences and attractions in Davidson County. There were some isolated areas or attractors that would qualify for fixed route service, but most of these would be difficult to serve with the current route configuration. Following are recommendations for serving some of the unserved areas of greater than 5000 persons per square mile.

Two areas with density greater than 5000 persons per square mile that are beyond a half mile of MTA route service are to the east of Gallatin Pike and just north of the new Madison Bus Link area. These might be served by expanding BusLink northward to Anderson Lane. A caution is that because Madison Park divides the two unserved areas from the present Bus Link service area, it may be difficult to expand BusLink (at its current set of vehicles) without a deterioration of the service. Accordingly, in August 2009 MTA has determined to expand the BusLink service area to include a smaller portion of the recommended expansion.

Another denser area falling outside the ½ mile buffer is an area between Route 3 West End and Route 7 Hillsboro, 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.

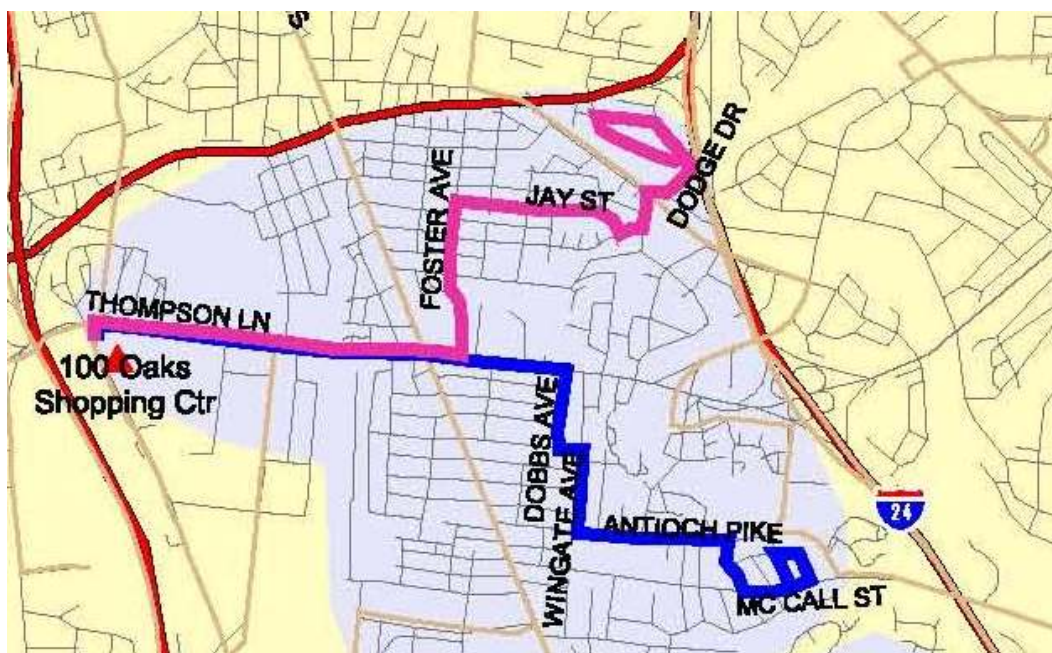
There is also part of the block group south of Huntington on Route 37 Tusculum/ McMurray Express which falls outside the service area for Route 37 Tusculum/ McMurray Express in the area of the Villages of Brentwood. Also, there is an area of greater than 5000 persons per square mile along Bell Road just north of J. Percy Priest Lake. This area is quite some distance from the MTA service area may be infeasible to serve in a cost/effective manner currently, but it will need to be served in the future given growth projections.

One area of higher density where service might be appropriate is located to the south of Route I-440 between Nolensville Road and I-24. As of April 2009, some of this area receives service from MTA Route 72 Edmondson Pike Connector. A set of feeder routes or flexibly routed services would be appropriate to connect neighborhoods north of Route 72 Edmondson Pike Connector with the 100 Oaks facility.

Two routes were suggested previously in the Transit Development Plan which are still appropriate. These are a Woodbine-100 Oaks route and a Glenclyff route. The Woodbine-100 Oaks route would connect the Woodbine neighborhood to the 100 Oaks Shopping Center via Jay Street, Foster Avenue, and Thompson Lane. The Glenclyff route would connect the Glenclyff neighborhood via Antioch Pike, Wingate and Dobbs Avenues, and Thompson Lane. If operated as an interlined service (where the buses alternate between the two routes), two buses would be required to provide 45-minute service between 6:30AM and 8:30PM weekdays and Saturday service from 9:00AM to 7:00PM.

The operating cost for service would be around \$700,000 annually and the capital cost for two buses would be \$250,000 assuming smaller buses. Figure 8-5 shows the Glencliff and Woodbine Routes.

Figure 8-5: Glencliff and Woodbine Routes



As Davidson County continues to grow, and as areas develop at the fringes of MTA service, there will need to be additional service provided. Current MTA express bus routes to the southwest (Route 37X Tusculum/McMurray Express and 38X Antioch Express) cover areas that are increasing in density, so may merit at least *Frequent Route* service in the future. Route 23 Dickerson Road will need to be extended further north to serve growing employment areas. Route 6 Donelson will need to be extended south of the Hermitage Commuter Rail Station to serve the Summit Medical Center and growing residential areas.

Park and ride lots are another way for the MTA to provide service to suburban areas of lower density. Most of the MTA park and ride lots have capacity, but at 90 percent utilization, the Goodlettsville lot is closest to capacity. Given the high utilization of Route 35X Rivergate Express, the MTA should look for additional capacity along that route, especially if the park and ride lot at Rivergate grows from the 60 percent utilization. *Commuter* Route 41 Golden Valley is one that does not have a park and ride lot, and might benefit from one near White's Creek and Green.

Areas Outside Davidson County

The need for transportation connections does not stop at the county boundary, and there are several opportunities for expanding regional connections. The MTA/RTA is providing *Commuter* service to Gallatin and Murfreesboro via Routes 92X Gallatin/Hendersonville Express and 96X Nashville/Murfreesboro Relax and Ride. With additional resources, the frequency of these services could be improved to the half hour frequency standard for peak periods, and park and ride lots added if there are capacity constraints. Also, service commuter service to Franklin would appear to be warranted as growth continues in Williamson County continues.

The need for higher capacity (BRT, light rail or commuter rail) transit service between Davidson County and surrounding counties is continuing to be studied. It is likely that such service will be needed at some point in the future, especially if the groundwork is set with good quality bus linkages.

Make Service Easier to Use

MTA has taken many steps to increase the user-friendliness of transit. One key step is to make pass use widespread—which eliminates the problem of figuring out what the fare is. MTA was the first in the nation to pilot a program to accept credit cards on all buses. The program was successful overall but MTA determined the technology still had too many limitations and ended the program until further development is made by the farebox and credit card companies.

MTA also has up-to-date system maps with substantial information on routes, schedules, park and ride lots and key destinations. The downtown insert on this map is complex however, and should be improved. Implementation of a Downtown Circulator could help clarify issues of downtown circulation. The available information on routes and schedules on-line is also very helpful.

The installation of ITS equipment expected summer 2009 will provide the capacity to provide customers with real-time information on bus service. This will also make service easier to use by letting customers know when buses are running off schedule. Especially when service is scheduled infrequently, this information will help customers feel less concerned about missing their bus.

MTA will look to provide an additional marketing budget for helping non-users learn how to use the service. This effort has already begun with an excellent video created by Transit Now which is available on the MTA website. This effort should be expanded to include information about particular routes—for example, how to read a particular route map. It might also indicate how to get to important destinations such as the airport. Finally, this video should be marketed to MTA employer partners and through other MTA email lists. A marketing program that regularly reminds people to use transit through promotions and other techniques can be very cost effective as well.

There has been concern expressed that the MTA system is too complex—that there are too many route branches and patterns. However, two experienced TranSystems schedulers examined the system and find that it is much less complicated than most systems.ⁱⁱⁱ The assessment from these analyses is that the services provide excellent coverage, especially given the low population densities in Davidson County. The services are also relatively simple—having fewer branches and patterns than those of similar systems.

When APCs become widely available for counting passengers, the MTA may want to revisit the various branches that it currently has. For example, although Route 17 is in the “Most Frequent” category, service on its two branches does not meet the minimum standard of service every half hour during the day. Solutions for improving the service effectiveness of Route 17 include combining the branches so that service would be more frequent, adding service so the branches have better service, or reducing service all around so that it moves into the “Frequent” category. Good data on ridership by route segment and time period is needed to determine if any of these options makes sense.^{iv} Given development at 100 Oaks Mall, the future for Route 17 should be strong.

A final key recommendation for making the system more simple does require additional funding. In the past in order to cut service without eliminating coverage, the MTA combined pairs of routes in the evening—increasing the complexity of service to keep some service available. Routes 4 Shelby and 20 Scott, 28 Meridan and 30 McFerrin, 2 Belmont and 7 Hillsboro, and 19 Herman and 29 Jefferson are still combined in the evening so that one route is outbound and another inbound. Passengers may have to ride out on one route and back in part-way to reach their destination. MTA has been undoing those pairs as funding permit and sees this as an important step to increase service simplicity as well as the speed of service.

Improve the Image of Transit

The MTA has already taken many steps to improve the image of transit. The Music City Central Station is a new state-of-the-art facility that replaced our street level transfer site which resulted in crowded downtown sidewalks. The well lit areas, with heated customer waiting areas, provide a new look for downtown transit.

The new buses being utilized for BRT service will also improve the image of transit. Similarly better bus stop designs for the BRT service will help.

MTA's widespread program to provide transit passes through employers means that more people may see themselves as potential transit riders which improves the general image of transit customers as "being like me."

Research has shown that for all transit a continued and targeted message to identified sub-markets of the user and potential user population is essential for continued growth of the system. Segmented and targeted marketing augments the strong public relations and advertising that is currently done by the MTA. In particular, the MTA should develop a targeted marketing campaign to help get out the word for the Gallatin Road BRT and any new services.

Environmental Opportunities

MTA can contribute greatly to providing an environmentally friendly lifestyle in Nashville and a focus by MTA on improving the environment can also have financial benefits. This Strategic Transit Master Plan focuses on both of these issues.

The first focus is concerned with reducing the adverse impacts of transit operations on the environment. The MTA has already taken steps in this direction such as ordering six hybrid articulated buses and utilizing several hybrid vehicle fleet cars. In addition, the MTA provides bike racks to allow customers to combine green modes.

There are, however, a wide range of other possible actions. The FTA has established a "Clearinghouse of Transit Agency Sustainable Practices" which currently provides information on the practices of nine agencies. Sample practices from these agencies include:

- Supporting sustainable development practices
- Green building practices:
 - using environmentally "friendlier" (e.g., low VOC paints and calks) materials
 - using recycled materials in construction (e.g., using fly ash in the concrete)
 - using more energy efficient materials
 - redesigning paint booths to minimize paint waste and VOC emissions
 - installing photovoltaic panels to generate clean energy at main facilities and at remote bus stops
 - increasing the use of natural day lighting
 - using heat recovery units to pre-warm incoming air using warm exhaust air (At one NY garage and maintenance facility this reduced heating energy costs by 48%)
 - increasing the use of natural ventilation to minimize the need for mechanical ventilation
- Conserving electricity through the use of LEDs and fluorescent lighting
- Conserving water through rainwater collection and "grey water" (e.g., bus wash water) reuse
- Increasing the use of "clean fuels" such as ultra-low sulfur diesel fuel, bio-diesel, and natural gas
- Using cleaner bus engines and technology such as four-stroke rather than two-stroke engines, diesel particulate filters, and hybrid-electric power systems

Most of these sustainable practices can result in operating and maintenance cost savings to a transit agency. Examples of practices with cost savings include efforts to conserve electricity and water, and the use of photovoltaic panels and heat recovery units. Even projects like the redesign of the paint booths can reduce costs by reducing the amount of wasted paint, and therefore the agency's cost of supplies.

The second focus is environmentally related financing of transit. There are three principal categories of activities:

- Using funds allocated to improving the environment to fund transit improvements
- Using taxes related (directly or indirectly) to the generation of pollution to fund transit
- Selling carbon credits derived from transit operation

Using funds allocated to improving the environment is the concept that has long been behind using CMAQ funds for transit. More recently, California passed a referendum to fight global warming that provides funds which can be used for transit. Similarly, in 2006 the Canadian government shifted some environmental funding to providing a 15.25% income tax credit for the cost of monthly, bus, subway, train, or ferry passes.

Using taxes which are indirectly related to pollution to fund transit has also been used in the United States. Two such taxes are gas taxes and parking taxes. Gas taxes are favored by many as a source of funding as they can increase transit ridership (by raising the cost of auto travel); thereby reducing the pollution of congestion caused by auto travel, while simultaneously providing the revenue required by transit. Parking taxes, especially in the downtown or other congested areas, provide a similar set of benefits, but more targeted to reducing congestion and pollution in downtown, the region best served by transit. A final type of tax or fee would be congestion or cordon pricing, such as charging vehicles to enter downtown, or another specified area, whether or not they park. Such a fee can vary by day of week and time of day, or even based on the current congestion level downtown. These fees have been successful in many cities around the world, including London and Stockholm; however they have not yet been adopted in any US city. New York City Mayor Bloomberg proposed a congestion pricing plan last year with 100% of the revenues going to fund transit. This required approval by the state legislature, which was not obtained, due in large part to objections by legislators from the outer boroughs of New York City as well as from surrounding areas.

One promising source of financing for transit in the future is income that could be derived from sales of carbon credits. This has been successfully implemented in Milan, Italy, where carbon credits were sold on the basis of carbon savings from implementing their BRT service. Such an approach has not been implemented elsewhere due to a lack of consensus regarding the method for computing the carbon credits, e.g., who should get credit for a trip switching from single occupancy vehicle to transit and how should the carbon savings from that trip be calculated. The American Public Transit Association (APTA) has argued to Congress, and in other forums, that transit should receive revenues for reducing greenhouse gas emissions through carbon credit or cap-and-trade programs and has been working with the Climate Registry, a nonprofit collaboration of North American governments and companies, to develop a protocol for reporting carbon and greenhouse gas reductions.

MTA can help to set the stage for claiming credits by documenting the value of various actions and investments taken by the MTA, following the protocols that are ultimately adopted by the Climate Registry, and including environmental weighting in the evaluation of future actions. The MTA Service Analyzer will be an excellent tool for estimating the change in mode split from auto to transit given various actions by the MTA.

Summary of Opportunities

Chapter 8 discussed the various types of opportunities for the MTA to pursue to improve transit in Nashville/Davidson County. These start with bringing service to standards proposed by the *Service Delivery Policy* though frequency improvements. Other opportunities discussed are ways to speed service, serve new areas, simplify service and improve the image of transit. Environmental initiatives can also help improve the MTA's green image. Finally, the regional environmental impact of actions taken by the MTA in improving service may have value if a future financial market rewards reduction of greenhouse gases.

ⁱ TCRP Report 95 Traveler Response to Transportation System Changes, Chapter 9, Transit Scheduling and Frequency, TRB, 2004.

ⁱⁱ Downtown Community Plan, Current Conditions Chapter, Metro Planning Department. Adopted Feb 22, 2007, p. 33. Downtown Nashville had 45,000 workers in 2005 and was expected to have 55,000 in 2010.

ⁱⁱⁱ James Wensley of TranSystems helped plan the service changes for the MTA Central Station. He has done successful routing and scheduling studies throughout the United States (Honolulu, Washington DC, San Juan, Sevierville, Bridgeport, Kalamazoo, among others). David Phillips of TranSystems worked for years as a scheduler for the Chicago Transit Authority.

^{iv} The MTA will receive passenger counters in the summer of 2009 and these should be used to get a detailed reading on routes that are underperforming as well as those that might be exceeding loading standards.