APPENDIX C

MTA SERVICE DELIVERY POLICY

Nashville Metropolitan Transit Authority

August 27, 2009

Nashville MTA

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1 The Need for a Service Delivery Policy

The objective of this *Service Delivery Policy* is to provide a written policy and a set of standards which can be used to evaluate MTA service as well as requests for service. The policy can also help guide MTA in making service changes when merited by budget or to increase service efficiency and effectiveness. While service policies are all a little different, they cover similar things like geographic coverage, span of service, service frequency, and performance in terms of service effectiveness, cost effectiveness and cost efficiency.

In the application of the policy and standards, several overriding considerations must be recognized. First, it must be recognized that an overall evaluation of MTA services must be made with consideration of the cost of service and available funding. Second, it must be recognized that MTA is unlikely to fully meet all the standards. Third, it must be recognized that certain intangible factors, including the perceived value of the transit service to the Davidson County, may influence the services to be implemented, eliminated or changed. Because transit service is a valuable and necessary service, the County may decide to initiate or retain certain services regardless of performance or cost. The *Service Delivery Policy* is thus a guide to good practice, but can't be used to cover all circumstances.

MTA keeps close tabs on service effectiveness and performance, with monthly reports to the Board which show passengers per hour by route, and also survey results which track customer satisfaction. For service effectiveness, the bus routes have been divided into different service classes, and within each class, the routes are ranked by average passengers per hour. Each different class of service has a minimum standard for passengers per hour. If a route falls below this standard, it may be a candidate for reducing service or other remedial action. MTA uses another approach when determining which routes to cut in the case of budget shortfalls. It uses an average ranking of routes on four indicators: ridership, revenues, passengers per hour and revenue per hour. Thus MTA prioritizes routes that represent the most riders and revenue, and are also the most productive in terms of riders or revenue per hour of service provided.

While these measures are a good way to judge the effectiveness of each route, there are other factors which can provide guidance when considering modifications to bus service in Nashville-Davidson County and in the greater region. In particular, these other measures will be helpful in determining where to put service when Nashville-Davidson County is ready to expand public transportation.

2 Nashville MTA Service Delivery Policy

2.1 MTA Mission and Service Objectives

The mission statement of MTA is:

> The mission of MTA is to provide public transportation services to our community and its visitors so they can achieve greater mobility and experience a cleaner, healthier environment with less traffic congestion.

One of the significant steps that the MTA Board has taken to provide greater mobility to residents within the community is to provide expanded AccessRide services at the same hours as the fixed route system. AccessRide is a publicly funded para-transit service which operates specialized van services for persons with disabilities who are unable to use regular fixed-route buses. AccessRide provides door to door para-transit service within Davidson county if the pickup and drop-off locations are within 1.5 miles from a regular fixed route, excluding commuter or express service. This distance is double the federal requirement of .75 miles and effectively covers the entire county.

In an effort to achieve the goals of the mission statement such as attracting customers in order to reduce traffic congestion and improving the environment, MTA has established a number of *Service Objectives* which are:

- *Temporal Availability:* Service should be operated at convenient times and frequencies.
- *Geographic Availability:* Services should be geographically available throughout the community.
- *Competitive*: Services should operate at a speed which is competitive with an automobile.
- *Comfort and Image*: Services should offer a pleasant and comfortable riding environment.
- *Ease of Use*: Services should be easy to use.
- *Cost and Service Effectiveness:* Services should be tailored to target markets in a financially sound and cost effective manner.

Prior to discussing service standards and guidelines to implement these objectives, the different classes of service should be clarified. Following is a discussion of MTA service classes.

2.2 Service Classes

MTA provides several different types of service in the region. The MTA system map defines routes as *Most Frequent* – daytime frequencies 30 minutes or less; *Frequent* – daytime frequencies 30-60 minutes; *Limited* – Limited and Express routes; and *Other* – the Downtown Shuttle, Music City Star West End Shuttle and Music City Star Downtown Shuttle. The designations are represented on the system map and bus schedules by different colors: *Most Frequent* (red), *Frequent* (green) and *Limited* (gold). Internally, MTA uses a different set of service classes: *Corridor Routes*, *Neighborhood Routes*, *Commuter Routes* and *Other Routes*. Different minimum service standards are set for each of these classes. Most of the *Corridor Routes* are included in the *Most Frequent* service category and all *Commuter Routes* are *Limited service*. Addendum A shows the correspondence between the categories. To clarify the *Service Classes* for performance measure review there will be one classification system—largely based on the public one used in the system map and timetables. In addition the classification system will include new services that MTA is considering, such as bus rapid transit (BRT), a downtown circulator which could replace existing shuttle services, and flexible route services. Figure 1 below provides the suggested classification scheme. Note that Route 34X Opry Mills Express is reclassified as a Frequent route since it provides service for much more than regular commuting hours.

- *Most Frequent* – Routes that have daytime frequencies less than 30 minutes. This will include most but not all of the *Corridor* and certain *Neighborhood* routes. These key routes generally operate longer hours and at higher frequencies to meet higher levels of passenger demand in high-density travel corridors. The *Most Frequent* bus routes ensure basic geographic coverage of frequent service in the densest areas of the city's core and Davidson county.
- *Frequent* – Routes that have daytime frequencies 30-60 minutes. This will include the remainder of the *Neighborhood Route* and some *Corridor Routes*.
- *Commuter* – Most *Limited* and *Express* routes.
- *Circulator* – This class will include potential future Downtown *Circulator* service.
- *Bus Rapid Transit* – Service that carries a high volume of passengers with limited stops, special articulated buses, traffic signal priority, real-time information on bus arrivals and additional amenities.
- *Flexible Route Services* – Service aimed at lower density neighborhoods that provides neighborhood circulation and connection to other MTA services. The service may have no fixed route, but may have fixed time-points.

Figure 1: Consolidated MTA Classification Scheme and Performance Indicator Types

Route Number	Route Name	Class
2	Belmont	Frequent
3	West End	Most Frequent
4	Shelby	Most Frequent
6	Lebanon Road	Frequent
7	Hillsboro	Most Frequent
8	8th Avenue South	Frequent
9	Metrocenter	Frequent
10	Charlotte	Most Frequent
12	Nolensville Road	Most Frequent
14	Whites Creek	Frequent
15	Murfreesboro Road	Most Frequent
17	12th Avenue South	Most Frequent
18	Airport Express - Elm Hill Pike	Frequent
19	Herman	Most Frequent
20	Scott	Frequent
22	Bordeaux	Most Frequent
23	Dickerson Road	Most Frequent
24X	Bellevue Express	Commuter
25	Midtown Connection	Frequent
26	Gallatin Road	Most Frequent
28	Meridian	Most Frequent
29	Jefferson	Most Frequent
30	McFerrin	Frequent
33X	Hickory Hollow - Hickory Plaza Express	Commuter
34X	Opry Mills Express[1]	Frequent
35X	Rivergate Express	Commuter
37X	Tusculum Express	Commuter
38X	Antioch Express	Commuter
41	Golden Valley	Commuter
42	St. Cecilia - Cumberland	Frequent

2.3 Temporal Availability

The headway standard establishes a maximum waiting time (or headway) between buses. By most measures the cores of urban transit systems should have a maximum of 30 minutes for the headway. This means that weekday service on key routes should have buses arriving every 30 minutes or less.[2] A goal for service should be 10-15 minute headways, depending upon the type of service. Passenger loads should be the indicator of the need to increase service from the 30 minute headway towards a 15 minute headway. Outside the system core and in hours other than daytime periods, headways could be longer, but in no case should be longer than 60 minutes. If ridership cannot support a 60 minute headway, another way of

[1] Note that Route 34X behaves more like a Frequent Route than a Commuter Route in that it runs throughout the day and on weekends. It is suggested, therefore, that 34X be reclassified.

[2] Detroit Department of Transportation Service Standards, December 2007, p. 19
Denver Regional Transit District Service Standards, November 2002, p. 6
AC Transit Short Range Transit Plan FY 2003-FY 2012,May 2004, p. 3-8

providing service should be used, such as flexibly routed service or other non-fixed route options such as vanpools. The proposed standards are shown in Figure 2 by type of service.

Span of service identifies the times that service is provided each day of the week. The times proposed in Figure 2 are a suggested minimum policy goal for each class. The span of service of service should meet the needs of riders for each service class. For example, most *Commuter* riders will need service between the hours of 6 am to 6 pm (the peak periods) while riders on the other services will need longer hours. Service in the evenings and on weekends helps strengthen overall system ridership as it makes it easier for passengers to count on MTA.

The maximum headways shown in Figure 2 are set to be clock-face headways, which makes service easier for customers to remember, and can enhance the ability of the system to permit coordinated transfers. Research has shown that when system transfers are above 25 percent, 60 minute headways may be preferable to 45 minute headways, for example.[3]

[3] Graham Currie, "Setting Long Headways for Coordination and Service Timing Benefits—When Less Is More," November 11, 2008, presented at the TRB 2009 Annual Meeting.

Figure 2: Proposed Span of Service and Minimum Frequencies by Service Class

Service Class	Span of Service	Minimum Frequency	Goal Frequency	Goal for Hours of Service Provided
Most Frequent	Peak (Monday-Friday 6am-9am and 3pm-6pm)	30 minutes	15 minutes	18 Hours
	Midday (9am – 3pm)	30 minutes	20 minutes	
	Evening	60 minutes	30 minutes	
	Saturday	60 minutes	30 minutes	18 hours
	Sunday	60 minutes	30 minutes	12 hours
Frequent	Peak (Monday-Friday 6am-9am and 3pm-6pm)	60 minutes	30 minutes	17 Hours
	Midday (9am – 3pm)	60 minutes	45 minutes	
	Evening	60 minutes (if service is provided)	30 minutes	
	Weekends	60 minutes (If service is provided)	30 minutes	17 Hours Saturday, 10 hours Sunday
Commuter	Peak (Monday-Friday 6am-9am and 3pm-6pm)	30 minutes	30 minutes	6 Hours
Circulator	Daytime (Monday-Friday 6:30am--8pm)	10 minutes	10 minutes	17 Hours
	Evenings (8pm to 11:30pm)	15 minutes	10 minutes	
	Saturday and Sunday	15 minutes	10 minutes	8 Hours
BRT	Peak (Monday-Friday 6am-9am and 3pm-6pm)	10-15 minutes	10-12 minutes	18 Hours
	Midday (9am – 3pm)	15-30 minutes	10-15 minutes	
	Saturday	15-20 minutes	10-15 minutes	13 Hours
	Sunday	30 minutes	15 minutes	13 Hours
Flexible Route Services	Weekdays (Monday-Friday 6am--8pm)	N/A	N/A	14 Hours
	Saturday (10am – 8 pm)	N/A	N/A	10 hours

2.4 Geographic Availability

MTA will strive to serve as much of Davidson County as possible as long as the service meets cost and service effectiveness standards. This part of the service policy is characterized as guidelines rather than standards because uniform geographic coverage cannot always be achieved due to constraints such as topographical and street network restrictions. In addition, coverage in some areas may not be possible due to the infeasibility of modifying existing routes without negatively affecting their performance.

Geographic Availability will have several parts:

- *Distance to transit* – the area within a decent walking distance to the bus stop. Many cities define this as ¼ mile of a bus stop while others like Chicago use ¼ mile for high density and ½ mile for low density. Since the MTA service area has a low density (when compared to its peers and overall) the ½ mile standard will be used. Another industry standard is that a population density of around 3 dwelling units per acre is needed to justify fixed route transit, which translates to around 5000 people per square mile. MTA will strive to provide transit service within a ½ mile to residents of areas with a population density of over 5000 persons per square mile. In determining whether such service can be offered, MTA will consider other factors such as the likely performance of the service that might be provided. Request for service from such areas can be another indication of whether such service is needed.
- *Pedestrian Access* – the ability of customers on foot to access transit. The pedestrian environment is an important component of the availability of transit since in most bus systems, 75%-80% of riders walk to transit. Lack of pedestrian access lowers the area of service coverage and potential ridership. Excellent pedestrian environment means available sidewalks, protection from traffic, safe crossings for roadways and a pleasant walking environment. Because an excellent pedestrian environment will encourage transit ridership, the 5000 persons per square mile standard cited above could be relaxed in areas with an excellent pedestrian environment. MTA will strive to provide service within a ½ mile to residents of areas with an excellent pedestrian environment with a population density as low as 2500 persons per square mile. Service may be flexibly routed or fixed bus service.
- *Transit Supportive Areas* – areas with densities and usage that support and encourage transit use, such as: universities, colleges, shopping centers, major employers, major destinations. MTA will strive to provide transit service within ¼ mile to all universities, medical centers, major malls and employers with over 1000 employees. Service will be provided directly to the doors of these institutions whenever possible.
- *Park and Ride Access* – Ridership for routes in areas of low density is driven by access to parking. The *Transit Capacity Manual* notes that park and ride facilities are most successful when they are at least five miles from the major destination. MTA will strive to provide park and ride lots every 5 miles outside the Briley Parkway/I-40/I-440 where MTA has *Commuter* service.

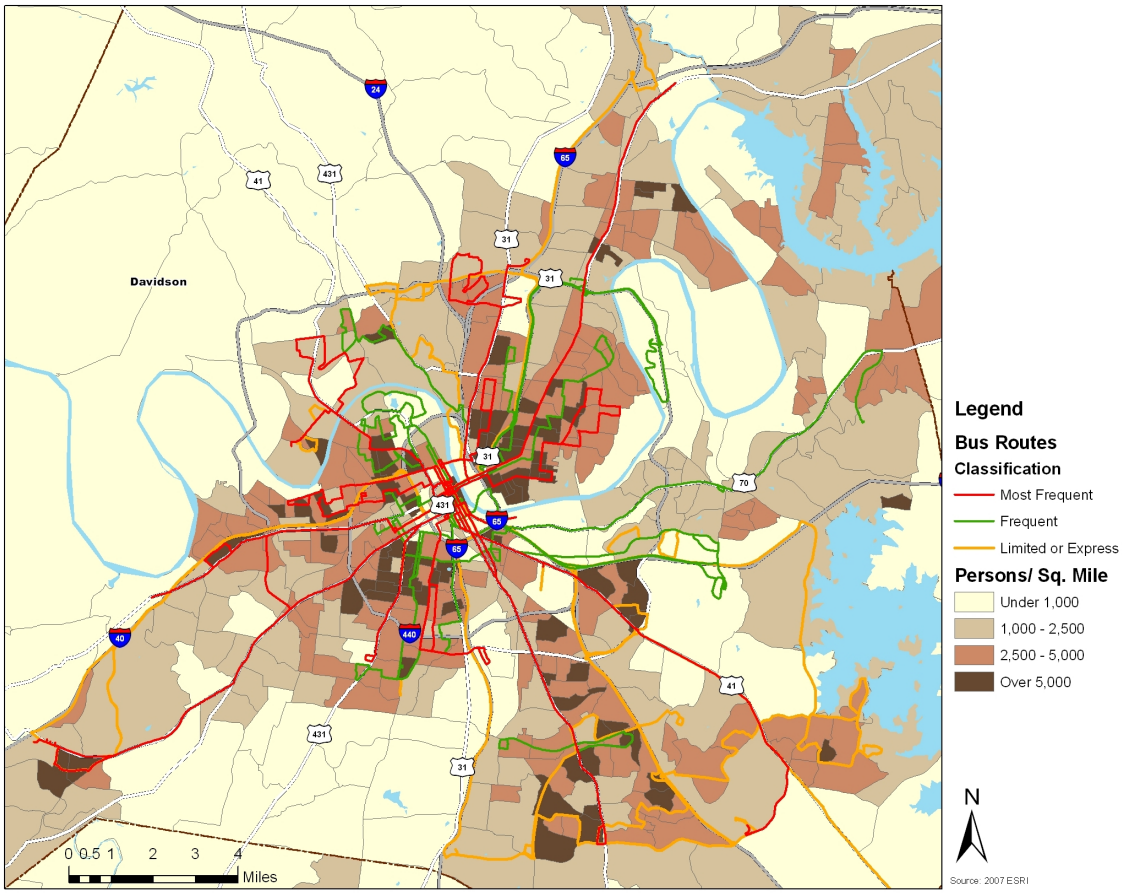


Figure 3: 2007 Population Density by Block Group and Current Service Classes

2.5 Competitive

For MTA to grow ridership, its customers need a service that is competitive with other modes. This part of the service policy is characterized as guidelines rather than standards because doing a comparison with auto travel is not straightforward. However MTA Ridership Model should be able to assist in making this comparison.

Evaluating transit performance originated in the 1965 Highway Capacity Manual where it is called the *Level of Service*.[4] Performance is divided into ranges and each range represents a letter grade. The travel time of a transit rider and motorist can be compared from a system perspective. Studies show that ridership increases as speed increases. Figure 4 provides a Level of Service grading for MTA which is adopted from TCRP Report 100.[5]

Figure 4 Level of Service Grading Transit vs. Automobile

Perception Grade	Travel Time Difference (min)	General Comments
A	0	Transit faster than automobile
B	1-15	Transit and auto trips close to equal
C	16-30	Tolerable for "choice" riders
D	31-45	Round trip at least one hour longer by transit
E	46-60	System cannot compete for "choice" riders
F	Greater than 60	Unacceptable to most riders

Viewing this table, MTA should strive to make most trips with a perception grade of C or above. While some trips this is not possible the number of possible trips in the E grade should be kept to a minimum. The most financially prudent way to address this is to target a C grade for all trips below one hour during peak periods. MTA can tackle speed of service by reducing stops, implementing exclusive right of way, implementing signal priority for buses, and looking for ways to make service more direct for large flows of customers. Priority for speed improvements should be given to those routes carrying the largest numbers of passengers.

MTA's ridership model can be used as a tool to compare public transit trips to automobile trips between particular origins and destinations and for the system as a whole. In reviewing service, the competiveness of transit compare to automobile trips should be kept as a "reality check" to determine if transit is a viable option for people, especially those that have access to automobiles for their trips.

[4] Transit Cooperative Research Program (TCRP) Report 100: Transit Capacity and Quality of Service Manual, 2nd Edition, 2003. p 3-22

[5] Transit Cooperative Research Program (TCRP) Report 100: Transit Capacity and Quality of Service Manual, 2nd Edition, 2003. p 3-50

2.6 Comfort and Image

One measure of comfort for transit passengers is the number of passengers on a bus compared to the number of seats. The bus load factor is the ratio of passengers on board a bus compared to the number of seats available. A load factor of 1.0 means that all seats on a bus are used and there are no standing passengers. The bus load standard should differ for each service class due to the nature of the service. A MTA customer that commonly has to stand on a *Commuter* route for a 45 minute trip will most likely look for other alternatives, while a customer on a *Most Frequent* route will endure a 20 minute trip because of the average shorter trip. Figure 5 shows the standards for bus loading.

Figure 5: Maximum Bus Load Standards

Service Class	Peak Load Factor	Peak Bus Environment	Off Peak Load Factor
BRT	1.33	Standees crowded	1
Circulator	1.25	Standees	1
Most Frequent	1.25	Standees crowded	1
Frequent	1.25	Standees	1
Commuter	1	No standees	N/A

The load factors for each class will differ with the type of bus and the time of day. On a BRT bus which seats approximately 60 people, a 1.33 load factor will imply a maximum of 20 people standing during the peak. A *Frequent* route operating a 40 foot bus that seats 42 would have a maximum of 11 customers standing (with a load factor of 1.25) during the peak. In off peak service, all customers should be accommodated with seating.

System image is affected by many things including the quality and cleanliness of buses and facilities. MTA should work continually to insure that buses are kept clean and up to date, and that stations, shelters and signed stops are clean and attractive. The Music City Central Station is an example of a facility that helps improve the MTA image.

2.7 Easy to Use

This part of the service policy is also provided as guidance rather than as a standard. However, the easier the system is to use, the greater chance it will have of attracting new riders and riders that are not familiar with public transportation. Ease of use will be enhanced by:

- Using clock-face headways so that service schedule is easy to remember.
- Using new technology to provide on-line access to schedules and real-time information on service schedule by location.
- Simple fare collection methods (extensive use of passes and payment by credit cards)
- Routes that run consistently throughout the day with minimum variations.
- Information or training to help new users learn how to use the bus

2.8 Cost Effectiveness and Service Effectiveness

Measures

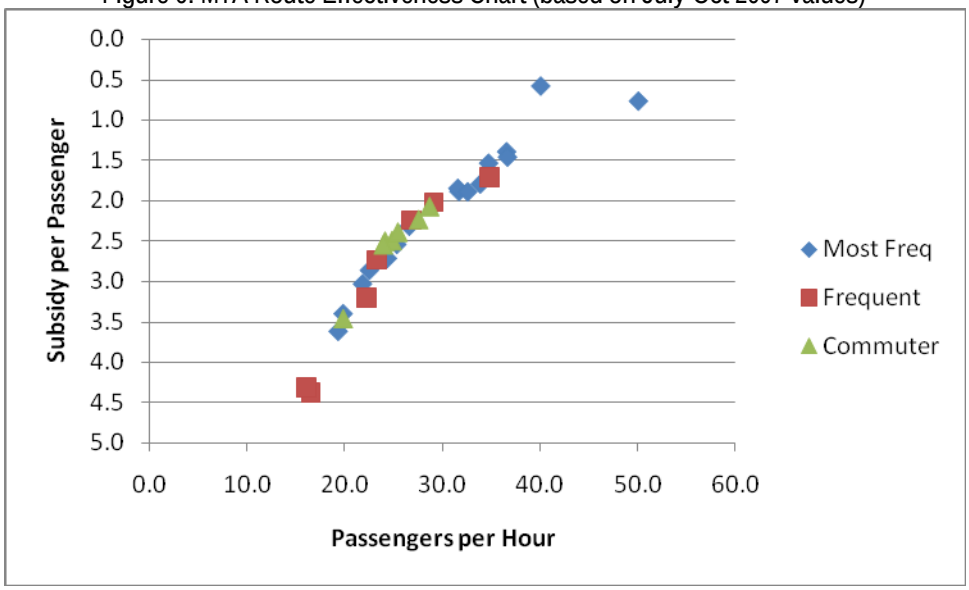
Cost and service effectiveness have to be a concern for transit systems which are dependent upon operating funding from taxpayers. The following measures are recommended for MTA. [6]

- Passengers/hour (service effectiveness for *Most Frequent*, *Frequent, BRT* and *Circulator Routes*)
- Passengers/trip (service effectiveness for *Commuter* routes)
- Subsidy/passenger (cost effectiveness)

The subsidy per passenger combines fare revenue and total costs to produce a metric that reflects the public cost of the service. A route that carries a higher number of passengers per hour or per trip is very desirable as is a route that requires a lower subsidy per passenger. These two measures of effectiveness (service effectiveness and cost effectiveness) probably are highly correlated, but don't have to be. A commuter route may have a higher cost per passenger than other services, but with a higher fare, the subsidy per passenger may be similar to other services. Both criteria will be used for the MTA.

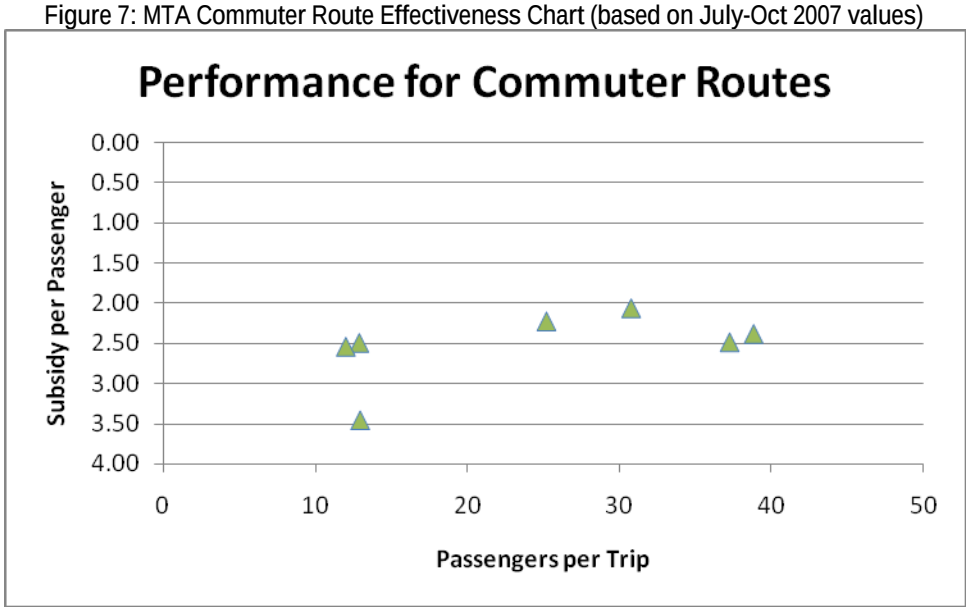
The MTA route effectiveness chart (Figure 6) shows cost effectiveness on the vertical axis and ridership per hour on the horizontal axis for the service classes as suggested in Addendum A. The *Most Frequent* routes in the MTA system are represented by blue diamonds, the *Frequent* routes by red squares and *Commuter* routes by green triangles. In this chart the better performing routes are those with values further to the right and higher vertically. Figure 7 shows the *Commuter* routes using the passengers per trip measure. Figure 7 is shown because ridership for commuter routes is limited to the seated capacity of the bus for each trip made. Ridership per trip then provides a measure of how well a commuter route is doing versus the best it can do (the seating capacity of the buses).

Figure 6: MTA Route Effectiveness Chart (based on July-Oct 2007 values)



[6] Denver Regional Transit District Service Standards, November 2002, p. 5

Figure 7: MTA Commuter Route Effectiveness Chart (based on July-Oct 2007 values)



Process

MTA will focus on trying to improve service and cost effectiveness of all of its routes by looking at the top and bottom 10 percent of routes in terms of subsidy per passenger and passengers per hour, considering all route classes together. If budget allows, routes performing at the top in these measures should be targeted for frequency improvements, particularly if crowding is an issue. When a route is targeted for evaluation due to it being ranked lowest in these measures, several actions should be taken to help increase the effectiveness of the route.

The first action is to conduct market research to determine what might be causing a loss in ridership. The most recent survey done by MTA customer service should be evaluated. Ride check information or information from Automatic Passenger Counters (APCs) should be analyzed. Also bus operator input could be sought to help investigate a routes condition.

An option to help increase the effectiveness of a route is to increase marketing. Customers and potential customers may not know the service and destinations that a route serves. Many transit users are not familiar with service that is outside of their normal travel patterns. Additional marketing, such as the distribution of information about the route for those living along it can help highlight the advantages of a route. Distribution of "free ride" tickets is another way to help introduce a route to new passengers.

Route restructuring is a tactic that can improve a route's performance. Route restructuring will entail a review of where, who and what times a route serves. This could result in the change of streets served or a reduction of the length of a route, based on data that shows ridership by route segment and time of day.

Headway adjustment is a strategy that can impact a route's effectiveness. A route may provide too much service and the reduction of the headway could result in a more effective route. Headway adjustments might cause a route to be re-classified if its revised headway puts it into a different service class. This tactic, while able to improve a route's effectiveness, could cause long term harm to the route by making it a less attractive service.

All of these options can be used together (Figure 8) or separately. Some of the strategies in this section may have previously been implemented and are more effective than others. Different strategies will have a different effect on each route.

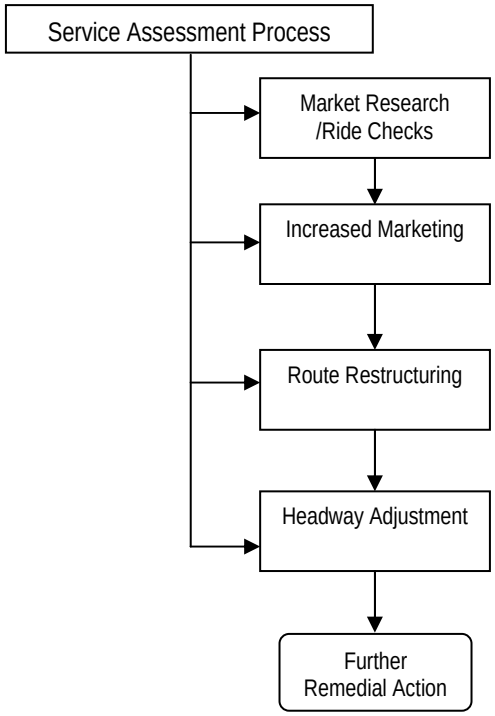


Figure 8: Flow Chart of Route Evaluation Process

Timeframe

MTA should allow a minimum of four months to allow a strategy to work. If there is some improvement, but not enough to move the route above last place in its class, it is recommended that the strategy be allowed two additional months of implementation. If none of these strategies results in the increase of the effectiveness of a route, then the route becomes a candidate for further remedial action such as route elimination or replacement of the route with a flexibly routed service.

3 Implementing the Service Delivery Policy

Service policies help support the goals and objectives of MTA. For these policies to be most effective they should be applied to service on a bi-annual schedule. Comparisons should be made so that service can be adjusted twice a year. Performance measures should be monitored on a monthly basis so that problems can be identified quickly. The Policy itself should be updated every two years to insure that it reflects current reality for MTA.

Addendum A: Correspondence between MTA Classification Schemes

Route No.	Route Name	Public Type	Perfomance Indicator Type
2	Belmont	Frequent	Neighborhood
3	West End	Most Frequent	Corridor
4	Shelby	Most Frequent	Neighborhood
6	Lebanon Road	Frequent	Corridor
7	Hillsboro	Most Frequent	Corridor
8	8th Avenue South	Frequent	Corridor
9	Metrocenter	Frequent	Neighborhood
10	Charlotte	Most Frequent	Corridor
12	Nolensville Road	Most Frequent	Corridor
14	Whites Creek	Frequent	Neighborhood
15	Murfreesboro Road	Most Frequent	Corridor
17	12th Avenue South	Most Frequent	Neighborhood
18	Airport Express - Elm Hill Pike	Frequent	Neighborhood
19	Herman	Most Frequent	Neighborhood
20	Scott	Frequent	Neighborhood
22	Bordeaux	Most Frequent	Corridor
23	Dickerson Road	Most Frequent	Corridor
24X	Bellevue Express	Limited	Commuter
25	Midtown Connection	Frequent	Neighborhood
26	Gallatin Road	Most Frequent	Corridor
28	Meridian	Most Frequent	Neighborhood
29	Jefferson	Most Frequent	Neighborhood
30	McFerrin	Frequent	Neighborhood
33X	Hickory Hollow - Hickory Plaza Express	Limited	Commuter
34X	Opry Mills Express	Limited	Commuter
35X	Rivergate Express	Limited	Commuter
37X	Tusculum Express	Limited	Commuter
38X	Antioch Express	Limited	Commuter
41	Golden Valley	Limited	Commuter
42	St. Cecilia - Cumberland	Frequent	Neighborhood
44	M.T.A. Shuttle	Most Frequent	Other
50	Downtown Shuttles		Other
93	Music City Star West End Shuttle	Limited	Other
94	Music City Star Downtown Shuttle	Limited	Other
96X	R.T.A. Murfreesboro Express	Limited	Other