MEMPHIS AREA TRANSIT AUTHORITY

SHORT RANGE TRANSIT PLAN

APPENDICES

June 2012

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APPENDICES

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APPENDIX A

MATA SRTP
Summary of Public Outreach Activities

Appendix A
MATA SRTP
Public Outreach Activities

- Created SRTP website
  - Contents included project goals and objectives, study timeline, calendar of events and comment board
  - Website was active throughout project and comments were submitted periodically. Majority of all individuals who posted a comment received response.
- Created MATA Facebook Fan page
  - Used Fan page to encourage participation in meetings, surveys and encourage review of study materials
- Conducted interviews with staff to understand needs and opportunities
  - Held meetings with MATA drivers, customer service representatives, union representatives and MATAplus drivers
- Conducted stakeholder interviews
  - Held in-person interviews with 19 organizations in Memphis and Shelby County
- Developed SRTP newsletter/fact sheet
- Created "Trade-off" survey to understand passenger preferences
  - Collected over 500 surveys from MATA riders at stops and stations
  - Collected over 300 surveys through online surveying techniques
- Collected ridecheck survey, where passengers were counted by route, by stop and by time of day.
- Held public meetings as part of Memphis MPO Long Range Transit Planning process
  - Four meetings held in late May in Memphis, Shelby County and Desoto County MS
- Participated in "Pizza with Planner" workshop organized by Livable Memphis and targeted to the SRTP
- Made numerous presentations to MATA Board
  - 2011: March, June, July, August, September

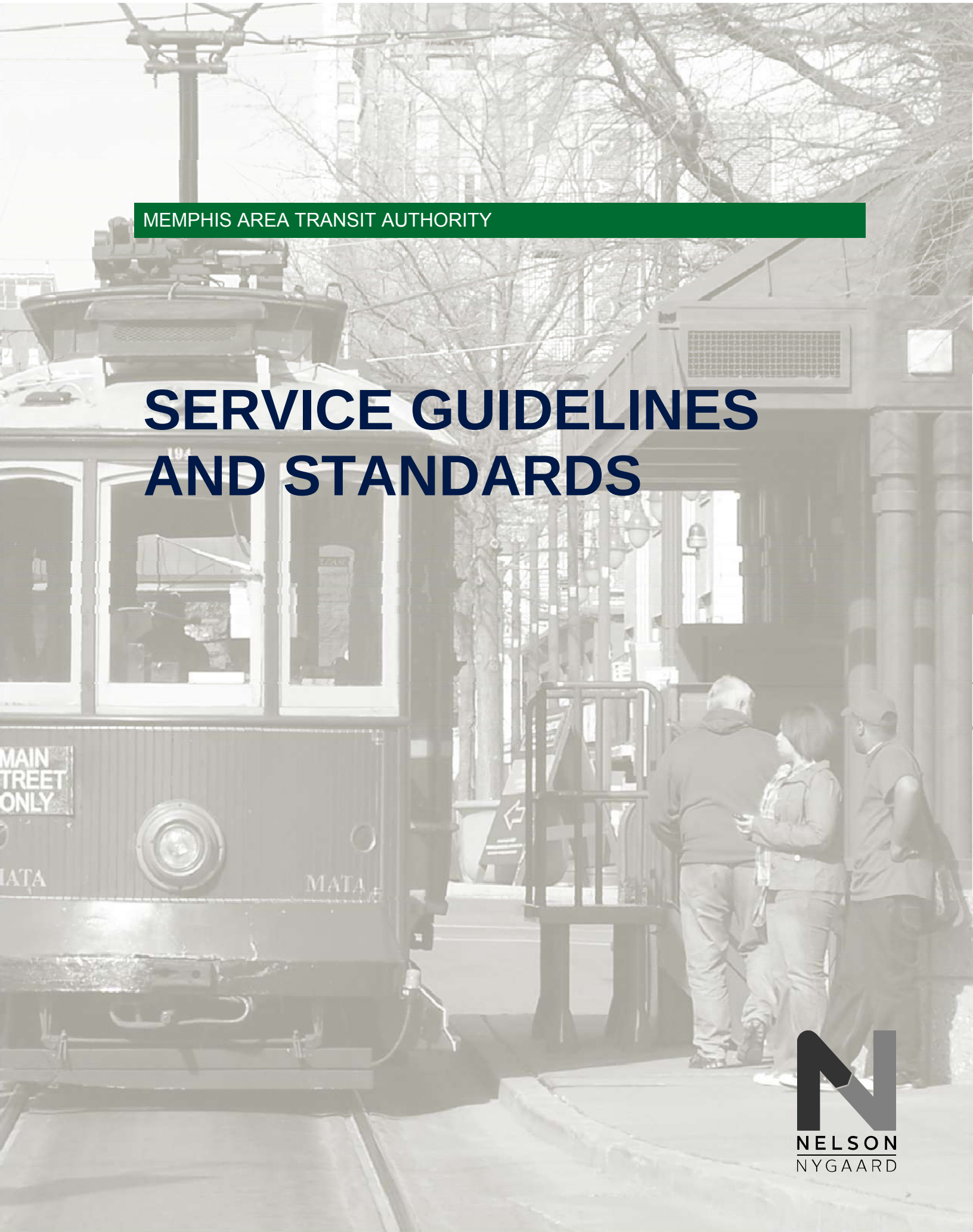
  - 2012: February
- Collected input from MATA leadership and staff during scenario development process.
  - Held meetings with MATA Board members individually.
  - Held meetings with MATA drivers, MATA union representatives and customer service representatives.
- Held public meetings to encourage input on potential service scenarios
  - Advertisements included posters on all bus and at transit centers, eblast to all study stakeholders, placed"robo" calls to over 20,000 households, and flyers passed out to MATA riders as they boarded events
  - Held four public meetings between November 7th and 11th
  - Staffed information tables at North End Terminal and American Way Transit Center. Staff was available for five time slots for morning and afternoon sessions
- Held comment period (March 15th – April 30th) for review and discussion on SRTP draft recommendations
  - Developed summary materials for distribution and posting on SRTP website. Copies were available upon request and at the North End Terminal
  - Posted announcements about availability of summary materials on all MATA vehicles and at MATA Terminals
  - Sent email blast to SRTP contacts database
  - Posted several announcements on Facebook
  - Staffed hotline
  - Accepted comments via regular mail, email, text massage and hotline

APPENDIX B

Service Design Guidelines

MEMPHIS AREA TRANSIT AUTHORITY

SERVICE GUIDELINES AND STANDARDS



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1. INTRODUCTION

The Memphis Area Transit Authority (MATA) strives to provide quality transit service in a cost-effective manner that is consistent and equitable. To do so, MATA must make a number of competing decisions on where demand is greatest, which types of service would work best and be most appropriate, and where limited resources can and should be used. These transit service guidelines are intended to guide this process setting a structure for:

- Service design
- Appropriate service levels
- Minimum levels of service performance
- Service performance measurements
- Bus stop spacing and amenities

These service guidelines have been developed as part of the MATA Short Range Transit Plan (SRTP) and are intended to guide future service expansions and contractions. They should also be used as a structure for ongoing service evaluation and to ensure services are well matched to demand under changing conditions.

In this way, the service guidelines define minimum thresholds that must be met for continued operation of the service. However, the guidelines are also designed to provide flexibility and to respond to varied customer needs throughout the MATA service area.

Finally, it should be noted that adherence to these service guidelines is dependent upon resource availability, and in particular, the amounts of funding provided by MATA's local, state and federal partners. In the event of constrained resources, MATA will meet these guidelines as closely as possible and will work to achieve consistency as resources permit.

2. MATA SERVICES

The SRTP includes recommendations that organize MATA fixed-route bus service around a hierarchy that is intended to match service levels with demand, and set reasonable expectations on productivity based on the type of service provided. The proposed hierarchy of services includes:

- Key Corridor Routes
  - Emerging Key Corridor Routes
- Mainline Routes
- Express Routes
- Feeder Routes
- Shuttle and Flex services
- Special event (mainly game day) services

The specific routes (as proposed in the SRTP) included in each category are shown in Appendix A.

KEY CORRIDOR ROUTES

The key corridor routes are MATA's most productive services and form the "backbone" of the MATA system. They operate along Memphis' most dense and widely traveled corridors, and serve the highest volume of riders. They also provide the highest level of service in terms of service frequency, service span (hours of the day) and operate seven days of the week. Any new higher speed or higher capacity services, such as Bus Rapid Transit (BRT) that might be developed by MATA in the future would be drawn from this category of service.

Key Corridor Routes

A second category of routes within this group are Emerging Key Corridor Routes. The sub-category of service is created due to MATA's resource limitation that makes it financially impossible at the present time for MATA to operate all routes identified as Key Corridor Services with the prescribed frequencies and service hours. The Emerging Key Corridor Routes are routes that operate along important travel corridors in Memphis, but are slightly less productive as

compared to the Key Corridor Routes. As additional resources become available, MATA may consider increasing frequencies and hours of operation to meet the demand along these corridors.

MAINLINE ROUTES

Mainline Routes form the secondary network of service that serves corridors and neighborhoods in Memphis that have lower densities and less demand. Most Mainline routes will provide service between neighborhoods and key activity centers as well as connections to the Key Corridor Route network. As a result, they serve downtown Memphis (and the North End Terminal) and MATA's other hubs (Airways Transit Center or American Way Transit Center). These routes typically operate at least five days per week, and up to six days per week (Monday – Saturday). In general, they will operate with shorter service spans and frequencies as compared with the key corridor services.

EXPRESS ROUTES

Express routes are designed primarily to provide direct and fast commuter service to and from downtown Memphis and large activity centers at the edge of MATA's service area. These routes generally operate on weekdays and during peak-periods only. Express routes also typically serve at least one park and ride facility.

FEEDER ROUTES

Feeder routes provide connections between transit hubs and lower density, but higher ridership neighborhoods and/or employment areas. Feeder routes tend to travel shorter distances and have more stops as compared to other routes. They also typically operate during weekdays, although some may also operate on weekend days and/or during evenings. Feeder route are a new classification of MATA services that were identified as part of the SRTP.

Feeder routes will not always meet the standards set for the mainline routes but are maintained to meet critical needs.

SHUTTLES AND FLEX SERVICE

The SRTP recommends two new service types for Memphis: shuttles and flex services. Shuttle routes are short services that provide connections between closely spaced locations. They typically operate as "headway" based rather than scheduled service, so that a bus arrives every 15 or 20 minutes.

Flex services are a form of scheduled demand response services where a bus will meet some scheduled time points but not follow a set route. Flex services allow MATA to provide connections from Key Corridor Routes to neighborhoods that have a high demand for service but

are not able to support regularly scheduled fixed-route service. Flex routes offer riders comparable convenience to fixed-route services with long headways and a lower level of service

SPECIAL EVENT/GAME DAY SERVICES

MATA currently has a series of routes specifically designed to provide service to/from special events, mainly college and professional basketball games. The routes are designed to meet a specific demand and help alleviate traffic and parking congestion. Because these routes are specifically designed around special events, they are not subjected to service design standards.

3. SERVICE DESIGN GUIDELINES

MATA works to serve as many people as possible with the resources it has available. As a result, MATA needs to serve a wide variety of customers; trip types, and demands, many of which conflict with each other. For example, most riders want fast service, but also want convenient bus stop locations. The result is often very frequent bus stops, making service slower. Thus, service elements that will attract one type of rider to transit can deter other riders, and MATA must balance these types of competing demands.

To serve as many different types of riders as possible, MATA provides different types of service. These services are intended to meet the basic needs of residents in developed areas who cannot drive and to provide compellingly good options to those who can drive. For both types of riders—and those in between—there are certain service design principles that will improve service for nearly all riders.

SERVICE SHOULD BE SIMPLE

First and foremost service should be designed so that it is easy to understand. In this way, potential riders can learn about the options that are available to take them where they want to go and when they want to go without experiencing frustration and problems. Most of the guidelines in this chapter are aimed at making service intuitive, logical, and easy to understand.

ROUTES SHOULD OPERATE ALONG A DIRECT PATH

The fewer directional changes a route makes, the easier it is to understand. Conversely, circuitous alignments are disorienting and difficult to remember. Routes should not deviate from the most direct alignment without a compelling reason (e.g., looping to turn around at the end of a route)

ROUTE DEVIATIONS SHOULD BE MINIMIZED

As described above, service should be relatively direct, and to make service direct, the use of route deviations, such as multiple or irregular trip patterns, should be minimized.

There are, however, instances when the deviation of service off of the most direct route is appropriate, for example to provide service to major shopping centers, employment sites, schools,

isolated neighborhoods etc. In these cases, the benefits of operating off of the main route must be weighed against the additional time required, safety, and inconvenience caused to passengers already on board. *Route deviations should be implemented only if:*

1. *Overall route productivity (in terms of passengers per revenue vehicle hour) would be equal to or better than without the deviation.*
2. *The number of new passengers that would be served is equal to or greater than 25% of the number of passengers who would be inconvenienced.*
3. *The deviation would not interfere with the provision of regular service frequencies and/or the provision of coordinated service with other routes operating in the same corridor.*

In most cases, where route deviations are provided, they should be provided on an all day basis. Exceptions are during times when the sites that the route deviations serve have no activity—for example buses should not serve shopping malls before the mall is open for employees or shoppers.

MAJOR TRANSIT ROUTES SHOULD OPERATE ALONG ARTERIALS

Potential transit users have at least a basic knowledge of an area's arterial road system and use that knowledge as points of reference. The operation of bus service along arterials therefore makes transit service easier to figure out and to use. It also makes service faster. *Key Corridor routes should operate on major roadways and should avoid deviations off of these routes to provide local circulation.*

ROUTES SHOULD BE SYMMETRICAL

Routes should operate along the same alignment in both directions to make it easy for riders to know how to get back to where they came from. *All routes should operate along the same alignment in both directions except in cases where such operation is not possible due to one-way streets or turn restrictions. In the case of Memphis, an example is provided in downtown where circulation patterns mean most buses travel on Front Street, or travel on either of the two one-way paired streets of North 2nd Street or North 3rd Street.*

ROUTES SHOULD SERVE WELL DEFINED MARKETS

To make service easy to understand and to eliminate service duplication, service should be developed to serve clearly defined markets. *Ideally, major corridors should be served by only one route of each route type—for example, one key corridor route and one express route, and not by multiple key corridor routes or multiple express routes. However, exceptions can and should be made when multiple routes should logically operate through the same corridor to unique destinations.*

SERVICES SHOULD BE WELL COORDINATED

When multiple routes operate through the same corridor but to different destinations (for example, along Lamar Avenue or Watkins Street) service should be coordinated to maximize its utility and minimize redundancy. *To avoid bunching of buses and to balance loads, major routes of the same route type that serve the same corridor should be scheduled to operate at the same service frequencies and should alternate trips at even intervals.*

SERVICE SHOULD BE CONSISTENT

People can easily remember repeating patterns but have difficulty remembering irregular sequences. For this reason, *routes should operate along consistent alignments and at regular intervals (headways).*

For example, routes that provide four trips an hour should depart from their terminals every 15 minutes. *However, limited exceptions can be made in cases where demand spikes during a short period in order to eliminate or reduce crowding on individual trips.*

Also, most routes intersect with other routes at transit centers, stations, and street intersections. *At major transfer locations, schedules should be coordinated to the greatest extent possible to minimize connection times for the predominant transfer flows.*

SERVICE LEVELS SHOULD BE SET BASED ON SERVICE GUIDELINES.

Service guidelines help ensure that the appropriate amount of service is provided on each route. For example, service guidelines should establish minimum levels of service in terms of the number of trips, span, service frequencies, and/or passenger loadings. Service level guidelines are presented in the next chapter.

4. SERVICE LEVEL GUIDELINES

Service level guidelines define when service should be provided and how often it should be provided. The Three guidelines are used:

- Minimum Span of Service
- Minimum Service Frequencies
- Maximum Passenger Loadings

These guidelines are intended to be used in combination with the productivity guideline (presented in Chapter 5) to identify the most appropriate and effective service levels for each route. They also offer a structure for routes to change classifications as demand requires and resources permit.

Services are currently classified (based on the SRTP) so that MATA will meet the minimum guidelines. On an ongoing basis, however, service should be added when ridership increases to levels that exceed maximum loading guidelines. Conversely, service should also be reduced when ridership falls significantly below the passenger loading guidelines.

MINIMUM SPAN OF SERVICE

The span of service guidelines define the minimum period of time that different types of service should operate, in terms of the latest hour that service should begin and the earliest hour that it should end. Higher ridership services will have long spans of service, while lower ridership services will have shorter spans of service. *Minimum span of service guidelines are presented in Figure 4-1.*

Based on demand, service can go beyond these guidelines to start earlier and end later, but remain subject to the minimum performance guidelines presented in Chapter 5. For some services and/or days, the span of service guidelines may not apply; this may include Mainline routes designed to serve a high need neighborhood, or other specific need identified by the MATA Board or staff.

Figure 4-1 Minimum Span of Service

	Key Corridor Routes	Emerging Key Corridor Routes	Mainline Routes	Express		Feeder Routes	Flex Routes	Shuttle Services
				AM Peak	PM Peak			
Weekdays								
Begin	5:00 am	6:00 am	6:00 am	6:00 am	3:30 pm	6:00 am	8:00 am	5:00 am
End	11:00 am	10:00 pm	7:00 pm	8:30 am	5:30 pm	6:00 pm	4:00 pm	11:00 pm
Saturdays								
Begin	5:00 am	6:00 am	--	--	--	--	8:00 am	5:00 am
End	10:00 pm	8:00 pm	--	--	--	--	4:00 pm	10:00 pm
Sundays								
Begin	6:00 am	7:00 am	--	--		--	8:00 am	6:00 am
End	6:00 pm	6:00 pm	--	--		--	4:00 pm	6:00 pm

Notes: The beginning span of service refers to the departure of the first inbound trip, and the ending span of service refers to the departure time of the last peak direction trip. "—"indicates that the guideline does not apply.

MINIMUM SERVICE FREQUENCIES

The minimum service frequency guidelines define the minimum service frequencies at which each type of service should operate. Based on demand, many services could operate more frequently, and in these cases, the service frequencies would be based on ridership and loading levels (as described in the next section). *Minimum service frequency guidelines are shown in Figure 4-2.*

Figure 4-2 Minimum Service Frequency (Minutes)

	Key Corridor	Emerging Key Corridor	Mainline Routes	Express	Feeder	Shuttle
Weekdays						
Early Morning	30	60	60	--	--	30
AM Peak**	20	30	60	3 Trips	60	30
Midday (Base)	45	60	60	--	60	30
PM Peak**	20	30	60	3 Trips	60	30
Evening/Night	60	60	--	--		30
Saturdays						
All Day	30	60	60	--	--	30
Sundays						
All Day	45	60	60	--	--	30

Note: "—"indicates that the guideline does not apply. Also, the guidelines apply to services that are provided, and do not imply that all services will be provided at all times.
** AM Peak is defined as 6:30 AM to 8:30 AM and PM peak period is defined as 3:00 pm to 5:30 pm. Evening is defined as 7:00 pm to service ends. Time period between 5:30 pm and 7:00 pm is considered same as Midday/Base service. Early Morning is prior to 6:30 AM.

VEHICLE LOADING

MATA strives to provide a seat to most passengers. During peak periods, it is expected that some passengers may have to stand, but the number of standing passengers will be kept to reasonable levels. Also, services will be designed so that when passengers do have to stand, they will not have to stand for long periods of time. On routes that operate for long distances on highways, and on all off-peak services, service will be scheduled to provide nearly all passengers with a seat.

Two different techniques are used to keep passenger loads within acceptable levels. The first is to match vehicle types with ridership levels, and to use larger vehicles on higher ridership routes. The second method is to provide more frequent service, with service frequencies set to keep passenger loads within the limits presented in Figure 4-4.

These guidelines are presented in terms of maximum passenger loads as a percentage of seated capacity of the vehicle used to provide service (see Figure 4-3), and average loads over any one hour period should be less than these levels. Where passenger loads exceed these levels, MATA will deploy larger vehicles and/or increase service frequencies.

Figure 4-3 Maximum Passenger Loading (as a Percentage of Seating Capacity)

	Key Corridor	Emerging Key Corridor	Mainline	Express	Feeder	Flex	Shuttle
Weekdays							
Peak Periods	120%	120%	120%	100%	100%	100%	100%
Off-Peak Periods	100%	100%	100%	100%	100%	100%	100%
Saturdays							
All Day	100%	100%	100%	100%	100%	100%	100%
Sundays							
All Day	100%	100%	100%	100%	100%	100%	100%

Note: Maximums are averages over one-hour periods; individual trips may exceed averages.

As discussed, in addition to setting guidelines for passenger loads as a percentage capacity, guidelines on maximum loads are also set by vehicle type (see Figure 4-4). Note that in the case of smaller transit vehicles standing loads are not tolerated.

Figure 4-4 Maximum Passenger Loads by Vehicle Type

	Seats (Typical)	Maximum Load
Articulated Bus	60	72
40' Transit Bus ("Large Bus")	40	48
35' Transit Bus ("Large Bus")	35	42
30' Transit Bus ("Small Bus")	23	28
Flex Service Vehicles	12	12

Note: MATA currently only operates large buses plus a handful of articulated buses in its fixed-route fleet. Guidelines are in anticipation of potential fleet and service changes.

5. PRODUCTIVITY

MATA needs to use its resources effectively and all routes should achieve a minimum level of productivity. These guidelines use "Passengers per Revenue Vehicle Hour" which is a measure of the average number of passengers on each bus deployed on a given route for each hour that it is in service.

PRODUCTIVITY

With limited exceptions, all routes should attract a minimum number of passengers for each hour that buses are in service (revenue vehicle hours). *These minimum productivity levels are presented in Figure 5-1.*

In cases where routes do not meet minimum productivity guidelines, changes should be made to improve route productivity. These changes can include a variety of measures, including improving/adding marketing efforts, reconfiguring the route alignment to attract more passengers, eliminating particularly unproductive segments, and reducing service levels (for example). If no changes can be identified that improve productivity, then the route could be downgraded, especially if the route serves a demonstrable critical need or service (i.e. paratransit). Other strategies include taking steps would to discontinue the route.

In cases where service expansion is considered (either to a new area or to extend the span of service), ridership and productivity estimates should be developed that indicate that there is a reasonable certainty that the new service will meet the productivity guideline within 12 months of implementation.

Figure 5-1 Minimum Productivity Levels (Passengers per Revenue Vehicle Hour)

	Key Corridor	Emerging Key Corridor	Mainline	Express	Feeder	Flex	Shuttle
Weekdays							
Early Morning	10	10	8	--	-	-	6
Late Night	10	10	8	--	-	-	6
All Day	30	20	15	10	6	5	15
Saturdays							
Early Morning	6	6	--	--	-	-	6
Late Night	6	6	--	--	-	-	6
All Day	20	15	--	--	-	5	10
Sundays							
Early Morning	6	6	--	--	-	-	6
Late Night	6	6	--	--	-	-	6
All Day	20	15	--	--	-	5	8

Note: “Early morning” and “Late Night” refers to service before and after the minimum span of service. All day refers to the complete span of service, including early morning and late night service. “—“indicates that the standard does not apply. Most existing MATA routes currently meet the all day standard.

6. BUS STOP SPACING AND AMENITIES

Being able to get to a bus stop easily and, once there, wait for the bus in a comfortable environment is a significant part of nearly every transit customer's experience. At the same time, having too many transit stops is one of the major reasons why transit service is slower than automobile trips. Since most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance.

In addition to spacing stops appropriately, providing safe and comfortable waiting areas is also essential to attracting and retaining customers. This assumption is supported by transportation research, which shows that, "the quality of the customer experience while waiting for transit vehicles is a crucial determinant of both overall satisfaction and general community attitudes towards transit," and that "the cost of better amenities is often more than offset by increased ridership."[1] In this next section, we present bus stop spacing guidelines as well as guidelines for providing bus stop amenities.

BUS STOP SPACING

Stops Should be Spaced Appropriately: MATA operates different types of transit services that are tailored toward serving different types of trips and needs. Bus stop spacing should reflect these service differentials. Services that emphasize speed and direct service (i.e. key corridor routes) should have fewer stops, while service that emphasizes accessibility (i.e., feeder routes) should have more frequent stops. Stop spacing guidelines, in terms of minimum stop spacing and the maximum number of stops per mile are shown in Figure 6-1. Exceptions to these guidelines should only be made in cases where walking conditions are particularly problematic or

[1] "The Role of Transit Amenities and Vehicle Characteristics in Building Transit Ridership: Amenities for Transit Handbook," Transportation Research Board, 1999.

dangerous, or where there are significant topographical challenges or concentrations of origins and destinations.

Figure 6-1 Stop Spacing

	Key Corridor	Emerging Key Corridor	Mainline	Express	Feeder	Flex / Shuttle
Minimum Stop Spacing (feet)						
Moderate to High Density Areas	1,100	900	900	1,100	900	n/a
Low Density Areas	1,300	1,300	900	1,300	1,100	n/a
Maximum Stop Spacing (per Mile)						
Moderate to High Density Areas	6	6	7	5	7	n/a
Low Density Areas	5	5	6	4	6	n/a

Note: Currently, about six MATA routes fall within these guidelines

BUS STOP AMENITIES

As discussed, transit stops serve different purposes and volumes of passengers. In general, we accept that the most important stops need to be well designed, attractive, comfortable, and convenient. However, much less planning and fewer resources are directed to the design of other stops, with the result that they are often located in inconvenient locations and/or provide fewer amenities than may be warranted. A study conducted for the Greater Cleveland Regional Transit Authority[2] presented a number of guiding principles for bus stop design that provide a starting point for improvements in Memphis:

- Waiting for the bus should be a comfortable, safe experience.
- Bus stops must be easily identified.
- Waiting for the bus should be a predictable experience.
- Waiting for the bus should be a convenient part of everyday life.
- Amenities should be provided at stops serving the greatest number of potential riders.

Based on these guiding principles, a set of more specific design principles could be as follows:

- Stops should be located in convenient, comfortable and safe locations.
- Bus stops should be visible and easily identifiable.

[2] "Transit Waiting Environment, An Ideabook for Making Better Bus Stops," prepared for the Greater Cleveland Regional Transit Authority by The Urban Design Center of Northeast Ohio, June 2004.

- Bus stops should provide information – or an ability access information - that informs riders where buses serving the stop go and at what times. This information may be provided through posted schedules and/or a telephone number that gives passengers access to real-time information.
- Bus stops should have good pedestrian and bicycle links to the area that it serves.
- Bus stops should be well integrated with their surroundings.
- Stops should provide basic amenities to make the wait comfortable.

Bus Stops Should be Located in Convenient, Comfortable, and Safe Locations: First and foremost, bus stops should be located in places that are convenient to where people are traveling to and from. They should also be located where passengers feel comfortable, which is usually a location close to shops, schools, places of work, and other activity centers. In addition, the location of the stop itself should be well lit, and the stop should provide adequate space for waiting riders to sit or stand, away from other pedestrian flow and street traffic. Ideally, stops should also provide shelter—either through the installation of a bus shelter or through the use of existing buildings or awnings.

Bus Stops Should be Visible and Easily Identifiable: Bus stops should be located in easily identifiable places, so they can be easily found by bus passengers, and where bus drivers can easily see whether waiting passengers. Stops should be identified by the MATA brand so they are clearly recognizable as a part of transit infrastructure. Riders should feel familiar with the elements present at each transit stop, even if the exact amenities differ somewhat from stop to stop.

Bus Stops Should Provide Information on Available Services: All transit customers need basic information about the service, such as: can I get to where I want to go from this stop, is the route running at this time of day, and when will it arrive? This type of information is available to passengers using a cell phone (real time) or by contacting MATA's Call Center. Higher volume stops should have schedule and route information at the stop.

Bus Stops Should Have Good Pedestrian and Bicycle Access: Bus stops should be located at sites that provide safe, accessible pedestrian access to the area that it serves, and to the other side of the street. This should include well-defined and contiguous pathways to and from the stop, and crosswalks. This is currently a major challenge in parts of Memphis and Shelby County. As pedestrian and bicycle infrastructure develops in Memphis and Shelby County, MATA and the city will need to encourage pedestrian pathways, especially pathways to/from develop high volume bus stops.

Bus Stops Should be Well Integrated with their Surroundings: To the extent possible, bus stops should be integrated within their surroundings. When new developments are

constructed, the stops should be designed as part of the overall project, rather than placed afterward. Similarly, when roads and/or sidewalks are reconstructed, bus stops should be developed as part of the overall design.

Bus Stops Should Provide Amenities to Make the Wait Comfortable: Providing amenities, such as benches, lighting, bike facilities, trash cans, etc., at stops make waiting for the bus more comfortable. For a number of reasons, particularly cost, it is not practical to provide all amenities at all stops. Typically, more extensive amenities are provided at the busiest locations (for example, transit centers), and only basic amenities (such as bus stop signs) are provided at very low volume stops. In Memphis, most bus stops can currently be characterized as one of three types:

- **Trolley Stops:** MATA trolley stops are more substantial than bus stops, are less constrained by the available street space, and are designed to support the surrounding environment. As a result, MATA trolley stops are easily recognizable as part of the transit system infrastructure. All 37 trolley stops have a covered waiting area, lighting, benches, system information and trash cans (see Figure 6-2).

Figure 6-2 MATA Trolley Stop

Source: Nelson\Nygaard

- **With Shelter**: MATA currently has about 326 shelters in its system. The shelters consist of two types: about 100 shelters that are sited and owned by MATA; and 226 shelters sited and owned by a private contractor (see Figure 6-3). Most shelters, in both programs, contain seating within the shelter and are mounted on a paved waiting area. Most also have a bus stop sign identifying the routes and a trash can. All shelters are maintained by the private contractor. All contractor-owned shelters have advertising on one or more walls of the

Figure 6-3 MATA Private Contractor Shelters

Source: Nelson\Nygaard

shelter, and some MATA-owned shelters also have advertising, placed by the private contractor.

- **Without Shelter**: Stops without shelters often consist simply of a bus stop sign and bus stop number. A few of these stops also provide a bench provided by another entity not affiliated with MATA.

BUS STOP AMENITIES AND HIERARCHY

At the time the service standards were prepared MATA was in the process of undertaking a bus stop inventory. The results of the inventory, however, were not available for this analysis. Instead the proposed hierarchy included here was prepared using average daily bus boarding data from MATA passenger counts (April 2011). This data suggests there are approximately 4,500 bus stops in the MATA network. These stops are broadly categorized based on passenger boarding volume, as follows:

1. **Low Volume Stops (Less Than 50 Avg. Daily Boardings):** The majority of MATA bus stops have fewer than 50 passengers boarding each day. These stops generally serve only one route and are identified by a MATA bus stop sign. MATA bus stop signs will not only identify the stop but also provide a bus stop number and call-in telephone number so passengers can access real-time information on bus arrival times. Ideally, a safe, off-street waiting area and overhead illumination is available. Due to limited resources and the large number of stops in this category, no further amenities or improvements are recommended at this time.
2. **Medium Volume Stops (50 – 100 Avg. Daily Boardings):** An estimated 55 MATA bus stops have daily boardings in the range of 50 – 100 passengers. It is recommended that these locations be sited in locations that provide overhead lighting (i.e. streetlight or store lighting), a shelter with seating, current schedule information and a trash can – and many stops in this category already include these amenities. Furthermore, as part of any future bus stop sign replacement program, MATA should consider replacing or supplementing these signs with ones identifying/mapping the specific MATA route(s) serving the stop.
3. **High Volume Stops (101 – 350 Avg. Daily Boardings):** An estimated 15 MATA area bus stops have daily boardings in the range of 100-350 passengers. Most of these bus stops will be served by two or more MATA bus routes. Other important information for high volume stops includes a current systemwide transit map and current schedule information. In some cases, MATA may want to consider working with the City of Memphis to improve pedestrian crossings (see Figure 6-5).

4. **Super Stops (200 – 500 Avg. Daily Boardings):** Six locations have been identified as 'Super Stops'', most of which are currently high volume stops. Super Stops have a high volume of daily passengers using them and are served by two or more MATA routes, one of which is a key corridor route. These locations include the intersections of Frayser and Watkins; Hollywood and Chelsea; Bellevue and Union; the University of Memphis; Lamar and Airways; and Third and Mitchell. Amenities at Super Stops should include a relatively high level of passenger amenities, such as larger, more comfortable shelters, real time bus schedule information signage, improved and signalized pedestrian crossings and, ideally, unique design elements, such as landscaping and/or public art.

5. **Regional Transit Centers (500+ Average Daily Boardings):** This category consists of the three transit centers in the MATA network: the North End Terminal, American Way Transit Center and Airways Transit Center. These stops provide the highest level of passenger amenities and may also serve as a focal point for other local area information and connections to inter-city bus services.

Figure 6-4 Stop Classifications and Associated Amenities

	Low Volume Stops	Medium Volume Stops	High Volume Stops	Super Stops	Transit Centers
Avg. Weekday Boardings	<50	50-100	101-350	200-500	Varies
# Locations in Metro Area	~4,400	55	15	6	3
MATA Bus Stop Sign	√	√	√	√	√
Real-time schedule call-in instructions	√	√	√	√	√
Sign with Route ID/ Map	√	√	√	√	√
Lighting[3]		√	√	√	√
Paved/Accessible Standing Area[4]		√	√	√	√
Seating/Seating		√	√	√	√
Trash Can		√	√	√	√
Current transit system map			√	√	√
Current schedule information			√	√	√
Bike rack				√	√
Real-time schedule signage				√	√
Unique design elements, landscaping and/or public art				√	√
Enclosed waiting area					√
Restrooms					√
Passenger drop-off area					√

LOCATION OF BUS STOPS/PEDESTRIAN CROSSINGS

A major challenge for many transit routes in Memphis is the location of bus stops and providing well marked, safe pedestrian crossing. On major arterials, where key corridor routes operate, bus stops should be located at signalized intersection (preferably the far side) to make it easy for transit passengers to cross the street. At locations where there are no nearby signalized intersections (for example, at some half-mile collectors) and the arterial does not have a median strip, pedestrian activated crosswalks (i.e. hawks) and/or refuge islands should be provided (see Figure 6-5). These types of improvements would need to be approved and implemented by local government engineering and/or public works departments.

[3] MATA would not provide lighting but would locate stops where other sources of lighting are available wherever possible.

[4] MATA is not responsible for sidewalk or providing accessible path to stops.

Figure 6-5 Pedestrian Refuges

Source: left photo: www.walkinginfo.org; right photo: City of Peoria

Appendix A:
Route by Service Category

MATA Number	Route Name
Key Corridor Routes (8)	
08	Chelsea
10	Watkins
32	Hollywood/E Parkway/Airways
39	South 3rd
43	Elvis Presley
50	Poplar
52	Jackson
56	Lamar
Emerging Key Corridor Routes (5)	
11	Thomas/Frayser
20	Winchester
21	Mitchell
53	Summer/N Parkway
57	McLemore/Park
Mainline Routes (13)	
4	Person
7	Shelby
9	New Allen
12	Florida
13	Lauderdale
14	Ball
16	Madison/Central
19	Vollintine/Macon
30	Perkins
34	Union/Walnut Grove
35	Vance/Southern
38	Hickory Hill
40	Stage

MATA Number	Route Name
Feeders (8)	
5	Millbranch
6	Northaven
18	Hawkins Mill
25	Rains
26	Getwell
29	Mt. Moriah
37	Johnson
82	Germantown
Express/Commuter (4)	
61	Wolfchase
62	Getwell
63	Walnut Grove
500	Poplar
Shuttles and Flex Routes	
64	Airport Shuttle
F1	Whitehaven Flex

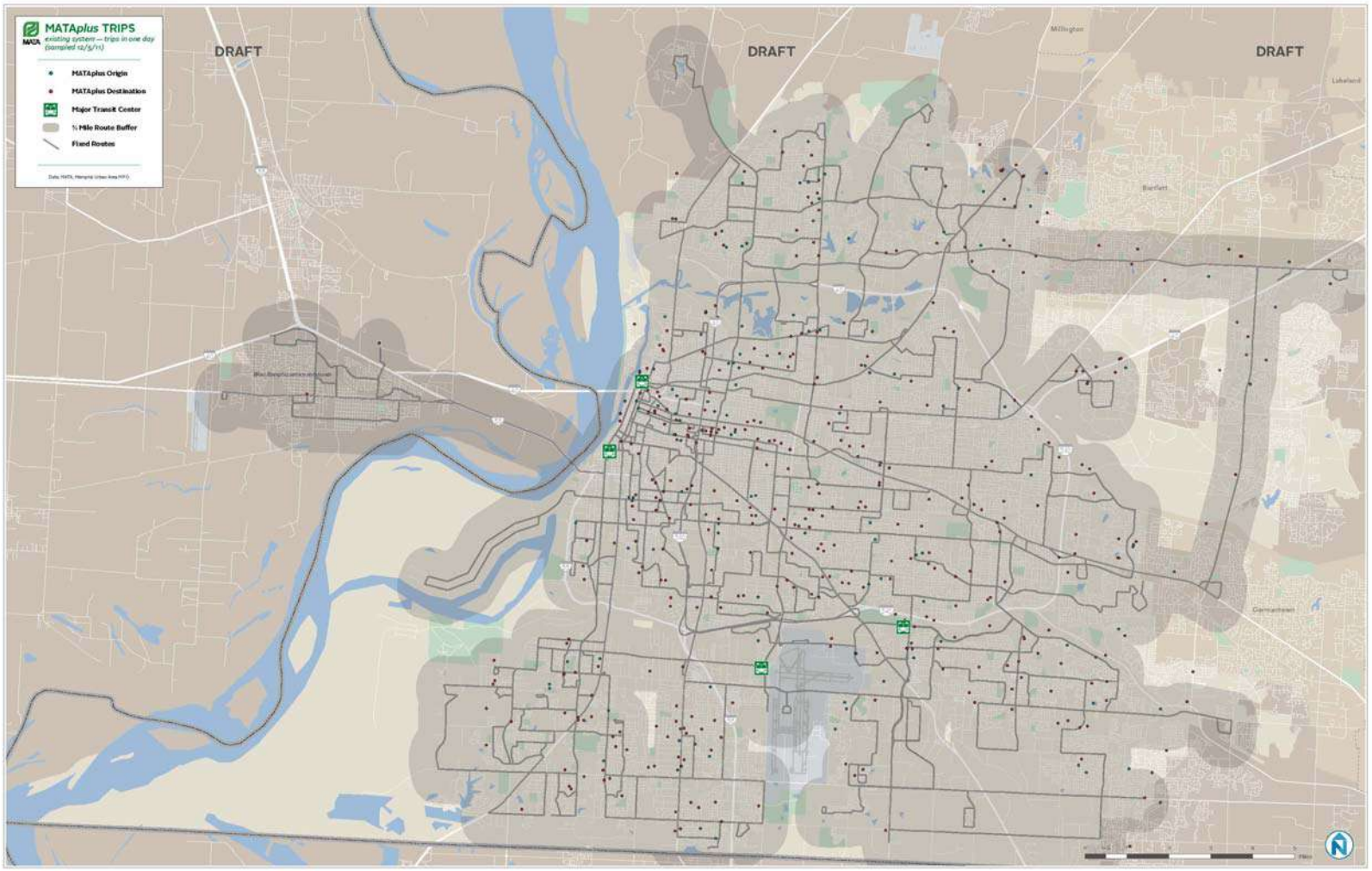
APPENDIX C

ADA and Trolley Service Analysis

MATA*plus*

MATA's complementary paratransit service, MATA*plus,* provides curb-to-curb transportation service to individuals who have a disability that prevents them from using the fixed-route service. This service is provided in accordance with the Americans with Disabilities Act of 1990 (ADA) that clearly defined a disabled person's right to equal participation in transit programs. MATA*plus* is designed to complement the fixed-route service and passengers unable to use regular fixed-route service, can use MATA*plus* to travel within ¾ mile of the existing fixed-route system. MATA*plus* is available during the same hours and days of the week as the fixed-route service. In 2010, 235,966 individuals took trips using MATA*plus*. The origin and destination of trips taken on MATA*plus* on a typical weekday is shown in Figure 1.

Figure 1 – MATA*plus* Trip Origins and Destinations and MATA Fixed-Route Service (Typical Weekday)



Operations and Eligibility

The ADA law and the accompanying regulations set specific standards and requirements for how complementary paratransit must be provided. These standards are set as minimums; transit agencies are permitted to go beyond the federal standards, but are not required to do so. MATA*plus* complies with all federal standards. Some of the commonly cited federal standards for ADA complementary paratransit service are listed in Figure 2.

Figure 2 – Sample of Federal Standards for ADA Complementary Paratransit

Federal ADA Requirement
Service available during the same days and hours as the fixed-route bus system.
Service area extends ¾ of a mile on each side of a fixed-route.
Trips must be scheduled at least 24-hours in advance and up to 14 days in advance.
Transit agencies must have staff available to take reservations during regular business hours.
Paratransit rides must be provided no more than an hour before or after a requested departure time.
Service may be suspended for riders who establish a pattern or practice of missing scheduled rides.
Personal care attendants (PCAs) cannot be charged a fare, when traveling with an ADA-eligible rider.
Additional individuals may accompany the customer if space is available and the inclusion of these individuals will not result in denial of service to another ADA-eligible rider.
Fares may be not more than twice the fixed-route fare.

Source: ADA Essentials for Transit Board Members: Fundamentals of the Americans with Disabilities Act and Transit Public Policy

The federal government also sets standards for determining eligibility regarding qualifying for ADA service. Individuals must have a disability that prevents them from using regular fixed-route service and they must apply to use the service. Applications may be accepted by mail or transit agencies may require in-person interviews and/or functional assessments or some sort of medical or professional verification, provided these are not overly burdensome to the applicant. Agencies may also require individuals to be periodically recertified for ADA paratransit eligibility.

MATA currently allows individuals to mail in their applications for ADA eligibility, but a portion of the application must be completed by a qualified physician, health care professional, rehabilitation professional or social worker. MATA*plus* users also must be recertified every five years. MATA categorizes eligible users into one of three groups:

- ***Unconditional Eligibility*** – individuals who are unable to use fully accessible fixed-route service for any purpose and are unconditionally certified for any and all trips.
- ***Conditional Eligibility*** – individuals who are able to use accessible fixed-route service for some but not all trips. These individual are certified for paratransit service for some, but not all trips.

- ***Temporary/Transitional/Recurring Conditions*** – individuals who have a temporary or recurring condition that limits their ability to use fixed-route service. Individuals in this category have unconditional or conditional eligibility; the difference is that eligibility is defined according to a length or period of time.

MATA*plus* Fleet

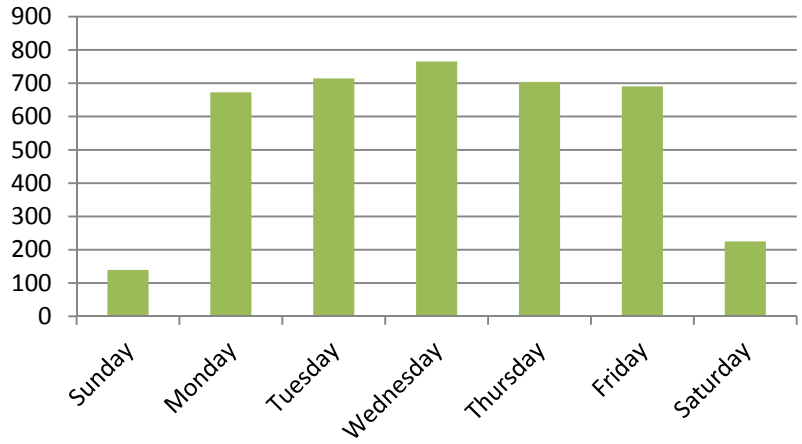
MATA*plus* is operated with a fleet of about 67 active vehicles, of which 57 are 29-foot heavy duty transit vehicles and 10 are medium duty 22-foot vans. The heavy duty vehicles have seating for between 22 and 29 individuals and space for between two and three wheelchair users. The medium duty vehicles have seating for between two and 10 individuals and space for between one and three wheelchair users. Several of the vehicles in the MATA*plus* fleet are at or nearing the end of their useful life. As part of its vehicle replacement program, MATA is continuing to integrate vans into its MATA*plus* fleet.

Ridership

MATA*plus* serves approximately 756 riders on an average day and an average of 22,800 passengers per month (2011). Daily ridership is heavily oriented towards the weekdays; a direct reflection of MATA's fixed-route service, which is also heavily oriented towards weekdays (see Figure 3). In 2011, average MATA*plus* weekday ridership was more than twice as high as an average Saturday and more than three times as high as compared with an average Sunday.

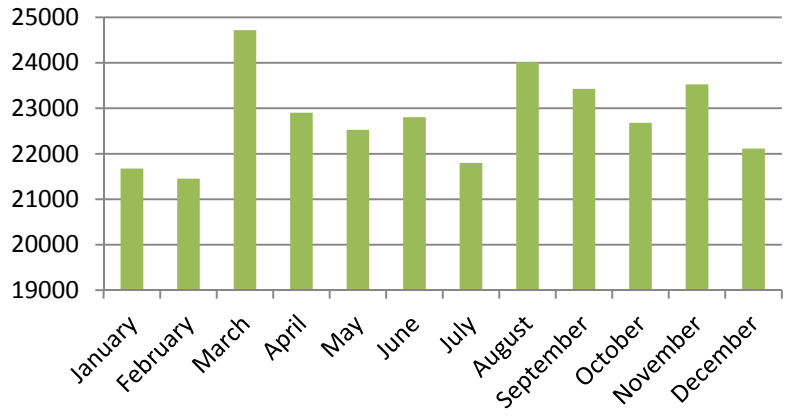
The annual distribution of the MATA*plus* ridership, however, is spread out fairly evenly, with most months having between 21,000 and 25,ooo riders (see Figure 4). January and February had the fewest riders, while March and August had the most riders.

Figure 3 – MATA*plus* Ridership by Day of the Week (2011)



Source: Nelson\Nygaard adapted from MATA data.

Figure 4 – MATA*plus* Ridership by Month (2011)



Source: Nelson\Nygaard adapted from MATA data.

Consistent with complementary paratransit services around the country, there is a discrepancy between the number of trips scheduled and the number of trips taken. This discrepancy reflects the need to schedule service in advance and normal variations in individual travel plans. On MATA*plus*, there are approximately 756 trips scheduled on an average day; about 41% of these trips are recurring (subscription trips), 58% are scheduled at least 24 hours in advance and less than 1% are scheduled the same day the trip is taken. Same day service trips are typically trips that have been rescheduled because the rider was not ready to be picked-up at the scheduled time. Of the 756 scheduled trips, MATA*plus* provides about 584 trips per day, or roughly 77% of the scheduled trips. The majority (22%) of the trips not taken was cancelled and the remainder (2%) was "no-shows" where the rider did not show up for his or her trip (see Figure 5). A no-show rate of 5% or less is considered within expectation, especially for a system as large as MATA*plus*.

Figure 5 – Annual MATA*plus* Trips Scheduled, Cancelled and Taken (2011*)

Category	Number	Percentage of trips scheduled
Subscription Trips	111,626	41%
Scheduled Trips	162,010	58%
Same day Requests	1,846	1%
Total Scheduled	275,482	-
Cancelled	57205	21%
No Show	5730	2%
Trips Taken	213,594*	77%

Source: Nelson\Nygaard adapted from MATA data.

**Number is based on partial year data. Will not match with other annual totals.*

Service Productivity and Trends

Demand for MATA*plus* has been fairly steady over the past five years, ranging from a low of 235,966 trips (2010) to a high of 258,000 (2007) (see Figure 6). The hours and miles of service provided have likewise held fairly steady. The cost of the service increased by 23% in terms of total operating costs and by 32% in terms of operating cost per hour of service provided. Farebox revenue, by contrast, increased by only 14%. The only fare increase that occurred during this five year period went into effect on July 1, 2007, establishing a base fare of $3.00. The cost increases, especially in terms of hourly costs, have generally outpaced general cost of doing business increases that typically range between 3% - 5% per year. Fuel costs have been a large part of the cost increases. Consequently, the cost per passenger has risen over time as the farebox recovery rate has declined. In terms of service efficiency, however, MATA*plus* has increased the number of passengers carried per hour. In 2010, MATA*plus* carried 2.2 passengers per hour, which is above the industry standard of carrying 2.0 passengers per hour.

Figure 6 – MATA*plus* Trends (2006 - 2010)

Operating Data	2006	2007	2008	2009	2010
Unlinked Trips (Riders)	245,712	257,717	254,032	244,766	235,966
Revenue Hours	116,347	129,610	129,093	121,841	108,693
Revenue Miles	1,851,188	2,084,359	2,036,628	1,943,410	1,704,340
Operating Costs	$4,620,628	$5,309,225	$5,893,802	$6,602,770	$5,694,519
Farebox Revenue	$422,095	$463,261	$548,372	$496,379	$480,965
Cost Efficiency					
Operating Cost per Hour	$39.71	$40.96	$45.24	$54.19	$52.39
Cost Effectiveness					
Operating Cost per Passenger	$18.81	$20.60	$22.99	$26.98	$24.23
Farebox Recovery	9%	9%	9%	8%	8%
Service Efficiency					
Passengers/Hour	2.1	2.0	2.0	2.0	2.2
Passengers/Mile	0.1	0.1	0.1	0.1	0.1

Source: National Transit Database

SERVICE IMPROVEMENT OPTIONS

MATA*plus* is a federally mandated service designed to provide equal access to public transportation. Because MATA*plus* is a demand response service that transports the highest need clients in the system, operating costs and operating costs per passenger are expected to be significantly higher as compared with fixed-route. Opportunities to improve the MATA*plus* service include:

- **Diversify ADA Paratransit Fleet.** MATA*plus* is currently operated with mostly 29' buses. These vehicles have seating for between 22 and 29 passengers; however, the service currently carried just over 2 passengers per hour (on average) meaning the vehicles are underutilized. Most transit operators around the country operate their ADA service using small transit vehicles, often referred to as "cutaways". The vehicles are usually less than 30' long and have capacity for 18 individuals, including ADA mandated

wheelchair positions. The vehicles have a significantly shorter useful life as compared with full-sized transit vehicles, but they are less expensive to operate and more easily maneuvered in small streets. Many transit agencies also use sedans to transport ambulatory passengers; these vehicles are even less expensive than vans to operate.

- **Incorporate taxi cabs into ADA service.** MATA may consider contracting with local taxi operators as a technique to reduce overall costs, especially during periods of very high and very low demand. This strategy is not universally adopted nationally due to mixed success contracting with taxi operators. Challenges include ensuring consistent service quality and the fact that taxi operators are often reluctant to meet federal standards for insurance and driver requirements (training, drug and alcohol testing). Transit operators who have successfully worked with taxi operators often assist the operators in meeting the ADA requirements and motivate them to provide a higher level of service by guaranteeing operators a certain number of ADA trips.
- **Require in-person eligibility application.** Currently, MATA accepts mail-in applications for ADA certification. The federal law does allow transit agencies to require in-person interviews and functional assessments by the agency. Requiring in-person applications will increase agency overhead/administrative costs and may be met with resistance by the applicants. On the other hand, it has been shown to reduce fraud, the overall number of eligible applicants as well as overall costs.
- **Offer weekday ADA service city-wide**. On weekdays, MATA*plus* currently provides ADA service to most but not all neighborhoods in the City of Memphis. MATA could expand the ADA service area to include the entire city during the weekdays. This would greatly increase customer satisfaction, reduce confusion over trip eligibility, simplify trip scheduling without significantly increasing service costs.
- **Offer ADA-type subscription trips to members of the public at premium fare.** Other transit agencies have reduced ADA costs by allowing members of the general public to schedule subscription trips for a premium fare. Because most ADA trips have capacity in the vehicles, agencies are able to schedule non-ADA passengers together with the ADA riders, so cost increases are minimal and the higher fares reduce service costs overall.
- **Update MATA*plus* Rider's Guide**. The current rider guide (December 2009) is out of date and could be simplified.

IMPLICATIONS OF THE PROPOSED SERVICE NETWORK ON ADA SERVICE

The SRTP developed a preferred network for the organization and development of future MATA fixed-route service. A critical part of the SRTP is to broadly gauge the impact of the proposed network on ADA service demand and costs. From an operations and service design perspective,

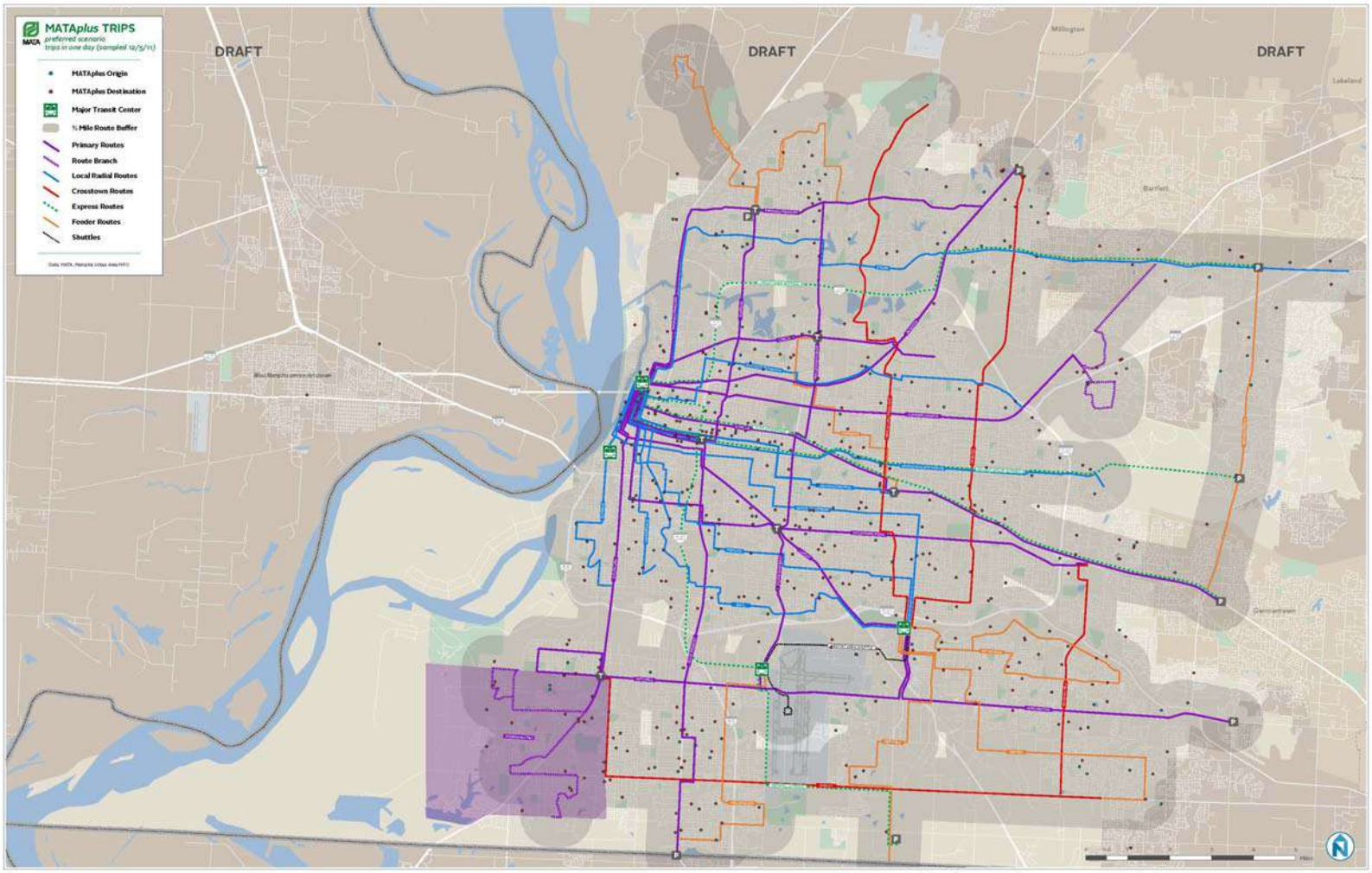
there are two primary factors that determine the demand and cost of ADA paratransit service: span of service and geographic coverage. In terms of the span of service, the preferred scenario proposed to operate a slightly shorter schedule with fewer routes starting before 6 am and ending after 11 pm (see Figure 7). The number of routes operating on Saturday and Sunday, however, is fairly consistent. In terms of geographic coverage, the preferred scenario is very similar to the existing network (Figure 8). Without any additional steps (such as agreeing to include areas currently served or instituting citywide weekday coverage), the MATA*plus* service area will be slightly reduced. Overall, however, the preferred network is not expected to have a significant impact on the demand for MATA*plus* services or the costs associated with providing those services.

Figure 7 – Comparison of Existing MATA Network with Preferred Scenario

	Existing Network	Preferred Scenario
Routes starting before 6 am	24	14
Routes operating after 7 pm	18	17
Routes operating after 11 pm	15	0
Saturday Routes	24	22
Sunday Routes	15	15

Source: Nelson\Nygaard

Figure 8 – MATA*plus* Trip Origins and Destinations and Proposed Fixed-Route Service Scenario (Typical Weekday)



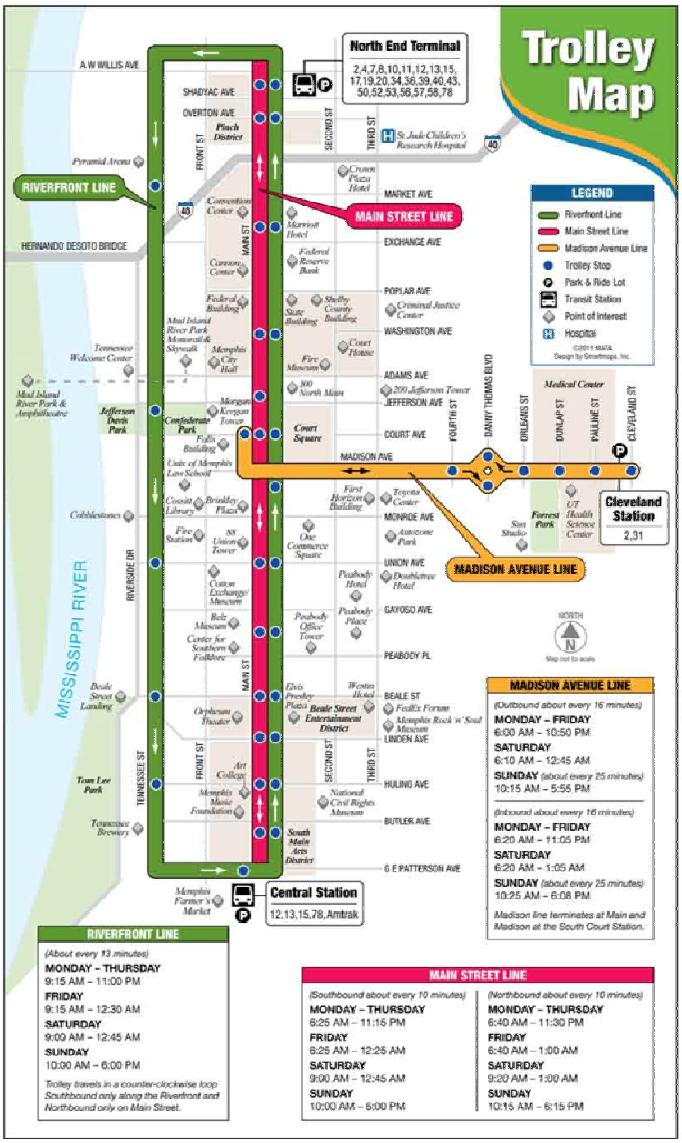
RAIL TROLLEY SERVICE

MATA operates three rail trolley lines in the downtown area using vintage trolley vehicles:

- The **Main Street** line, which provides bi-directional service along Main Street between the North End Terminal and Central Station.
- The **Riverfront** line that travels along a one-way counterclockwise loop on Main Street and along the riverfront. The Riverfront line also serves the North End Terminal and Central Station.
- The **Madison Avenue** line, operates a bidirectional service along Madison Avenue between Main Street and Cleveland Street.

The seven-mile system operates along a combination of in-street, pedestrian mall, and dedicated right of way, with35 stations, each ADA accessible, plus the North End Terminal and Central Station.

Figure 6 - Trolley System Map



SYSTEMWIDE — RIDERSHIP AND PRODUCTIVITY

The system serves over a million passengers annually, carrying approximately 71% of the riders on weekdays, 21% on Saturdays, and 7% on Sundays (see Figure 2). Daily ridership is about 3,100 on weekdays, 4,600 on Saturdays, and 1,600 on Sundays, making it one of the most effective services in the MATA network.

The service, especially the Main Street and Riverfront lines, serves a range of downtown activities, not just work-oriented trips. This design is reflected in the ridership by time of day. The Main Street and Riverfront services are most productive on Saturdays, weekday afternoons and Sundays (see Figure 2).Overall, the system is productive and carries over 60 passengers per service hour. The early morning, morning peak and evening services are relatively less productive.

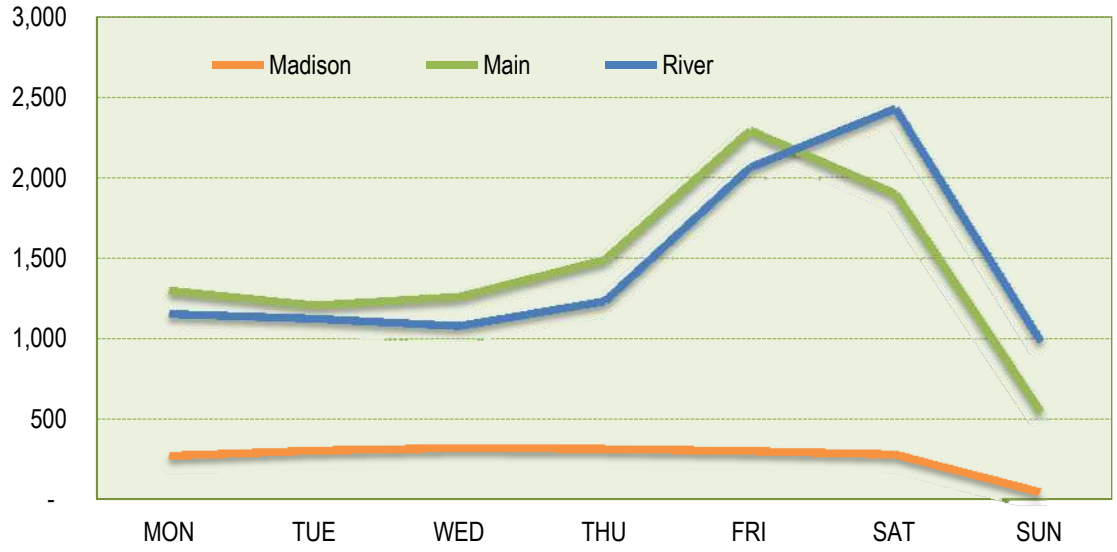
Figure 7 - Ridership by Service Period

Time Period	Annual Ridership	Daily Ridership	Ridership by Service Hour*
Weekday			
Before 6:30 AM	2,066	8	14.4
6:30 AM – 8:30 AM	32,621	125	31.2
8:31 AM – 2:59 PM	355,072	1,360	72.9
3:00 PM – 5:30 PM	165,280	633	84.4
After 5:30 PM	256,884	984	55.9
All Day	811,923	3,131	64.4
Saturday	239,663	4,609	90.9
Sunday	81,566	1,569	65.0

** Ridership by Time Period Hour is the total ridership in a time period divided by the hours in that time period (not the number of revenue hours of actual service).*

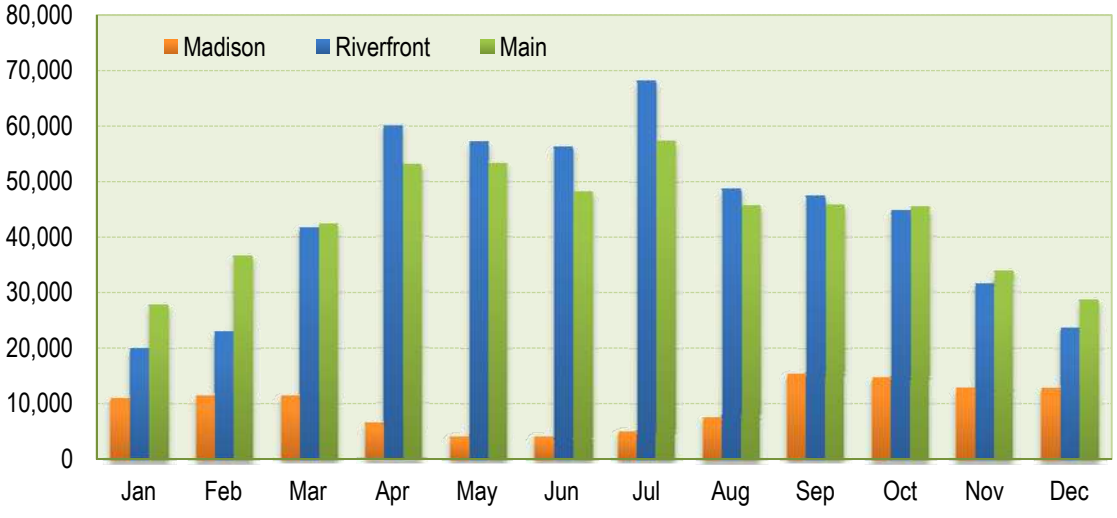
Ridership by line (see Figure 3) shows the Main Street and Riverfront trolleys have considerably higher daily ridership than the Madison Avenue trolleys. The Main Street and Riverfront trolleys also follow a similar pattern throughout the week — ridership is low Monday through Wednesday; increases slightly on Thursday; nearly doubles for Friday and Saturday, and then falls to the week's lowest level on Sunday. The Main Street line peaks on Friday (suggesting high Friday demand for travel along Main Street — lunchtime eating establishments, evening entertainment, etc.), while the Riverfront line peaks on Saturday (suggesting high Saturday demand for Riverfront visitor destinations). The Madison Avenue line has significantly lower, but relatively steady ridership throughout the week and on Saturday and falls off significantly on Sunday.

Figure 8 - Average Daily Ridership by Line



Ridership by month (see Figure 9) exhibits varying ridership for each line throughout the year. The Riverfront and Main Street lines have higher ridership in the summer and peak April through July. Ridership on these lines falls during the winter by roughly half of their summertime peak. The Madison Avenue line exhibits the opposite pattern — ridership is lowest in the summer (again about half the wintertime peak activity). The higher winter ridership on the Madison Avenue line is likely due to the large numbers of school students served during the wintertime when school is in session.

Figure 9 - 2011 Monthly Ridership



Source: MATA (ridership for 2011, except January and February, which are from 2010)

The system is effective at carrying a significant number of riders; therefore, despite high operating costs overall, the trolley is cost effective in terms of operating cost per passenger (see Figure 10). This is consistent with rail services generally, which usually are able to attract a sufficiently high volume of riders, leading to a low cost per passenger. MATA service is compact and limited to dense downtown Memphis, which means the service doesn't travel very far and thus has a very good number of passengers per revenue vehicle mile. Conversely, because service doesn't travel very far and operating speeds are slow, the trolley does not carry passengers very far — which leads to a very high operating expense per passenger mile.

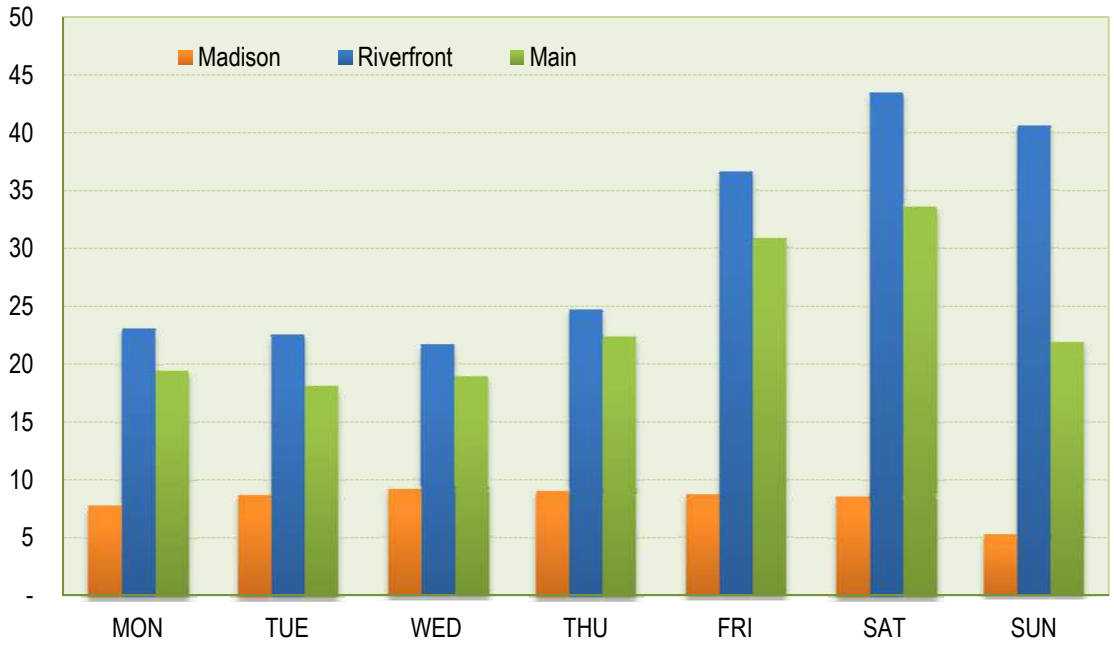
Figure 10– Productivity (Annual)

	Main	Madison	Riverfront	MATA Trolley	MATA Bus
Operating Cost/Passenger	$3.22	$8.85	$2.54	$3.59	$4.23
Passengers/Revenue Vehicle Hour	23.6	8.6	29.9	21.17	24.66
Passengers/Revenue Vehicle Mile	-	-	-	3.34	1.69
Operating Expense/Passenger Mile	-	-	-	$4.51	$0.78

Source:MATA (first three columns); National Transit Database RY 2010 (last two columns)

Transit productivity is often measured in passengers per revenue vehicle hour of service, which illustrates the service's effectiveness at carrying passengers compared to the prime cost driver of service. The three lines carry differing numbers of passengers per revenue vehicle hour of service (see Figure 11). The Riverfront and Main Street lines carry at least twice the number of passengers per revenue hour than the Madison Avenue line during the week, and over four times as many on weekends. Productivity for the Riverfront line peaks for Friday, Saturday, and Sunday service; productivity for the Main Street line peaks for Friday and Saturday service only; productivity for the Madison Avenue line is relatively constant throughout the week except for Sunday, which is lower.

Figure 11 - Passengers per Revenue Vehicle Hour



MAIN STREET LINE

The Main Street line operates seven days a week (see Figure). Weekday service begins at 6:25 AM and ends at 11:30 PM Monday through Thursday and at 1:00 AM Friday. Saturday service begins at 9:00 AM and ends at 1:00 AM. Sunday service begins at 10:00 AM and ends at 6:15 PM. The Main Street line operates according to a headway-based schedule, meaning the trolleys serve each stop about every 10 minutes, rather than adhering to time points on the schedule.

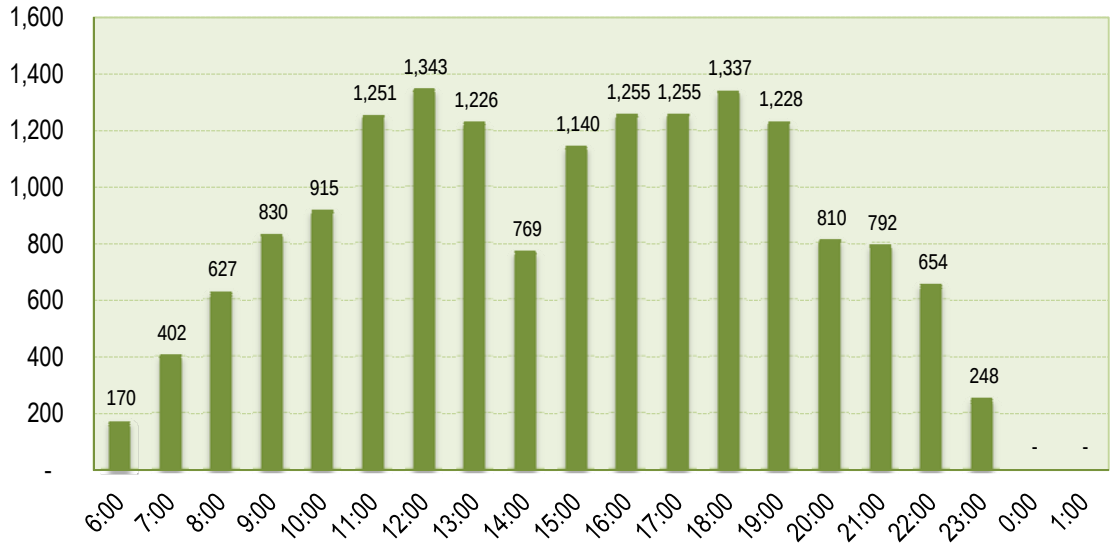
Figure 12 - Main Street Line Schedule Statistics

	Span of Service	Headways (minutes)
Monday – Thursday	6:25AM– 11:30PM	10
Friday	6:25AM– 1:00AM	10
Saturday	9:00AM– 1:00 AM	10
Sunday	10:00AM– 6:15PM	10

Ridership by Hour

The Main Street line exhibits two peaks of ridership activity during the weekday — one around noon and another more sustained peak from 4 to 7 PM (see Figure 13). The lunchtime peak is likely influenced by the lower lunchtime fare which, until recently, was offered Monday through Friday from 11:00 AM to 1:30 PM.

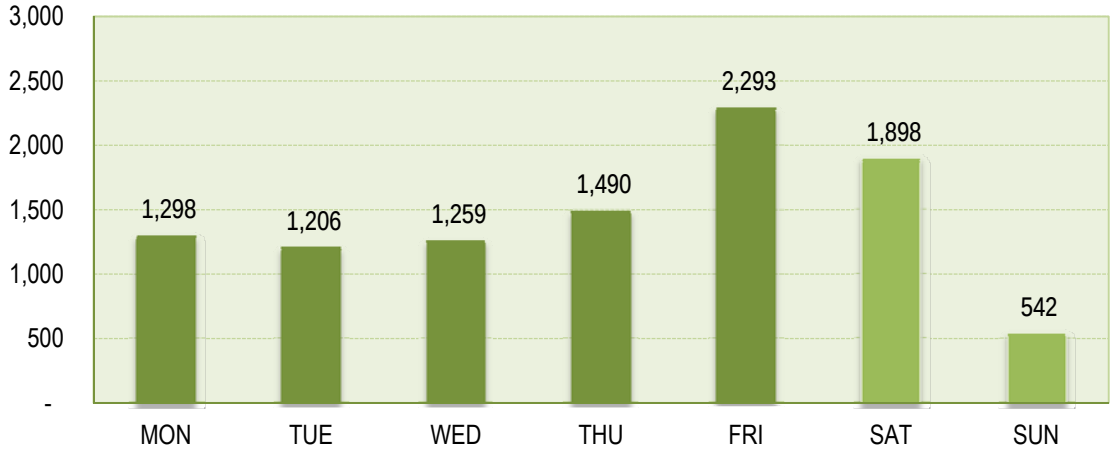
Figure 13 - Main Street Average Ridership by Hour (Monday – Thursday)



Ridership by Day

Ridership by day of the week (see Figure 14) demonstrates the pattern discussed earlier. Ridership is low Monday through Wednesday, peaks on Friday and Saturday, and then falls to its lowest point of the week on Sunday. The ridership trend throughout the week mimics the general activity level of the Main Street area in downtown, which is highly oriented to entertainment activities and daytime employment.

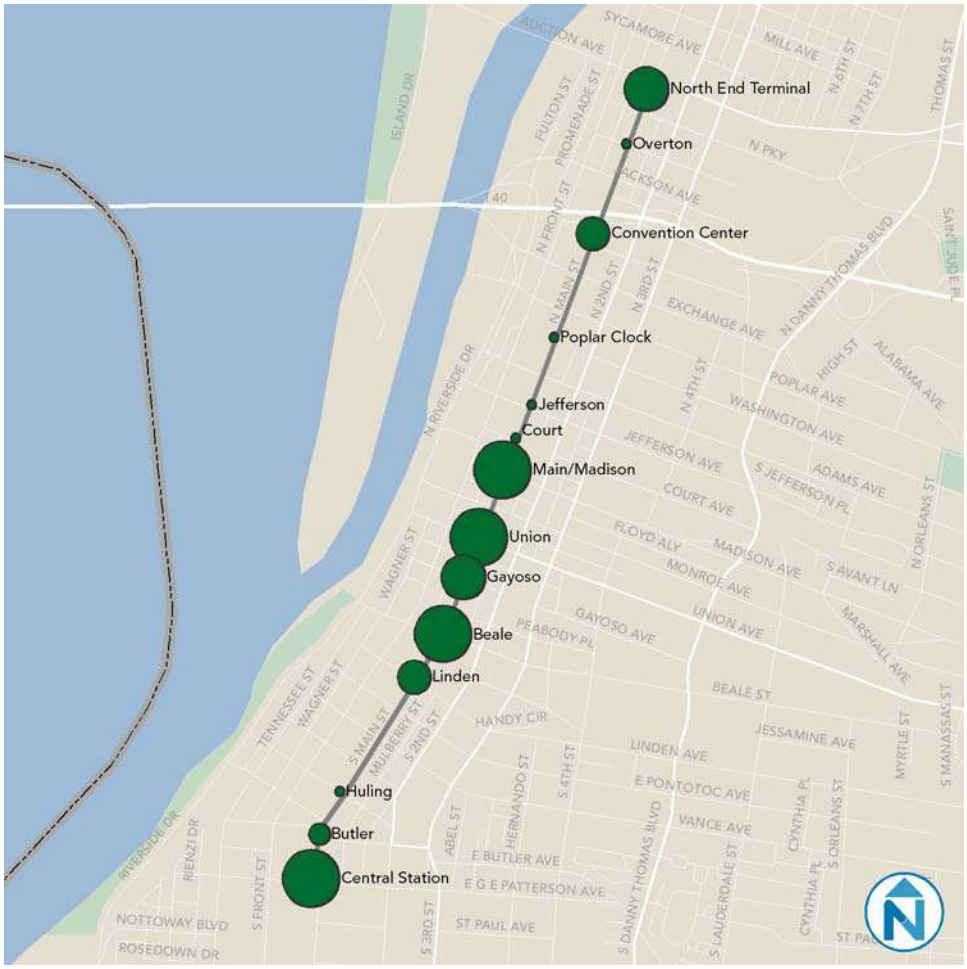
Figure 14–Main Street Average Ridership per Service Day



Ridership by Stop

The Main Street line has twelve stops. Ridership activity is clustered in the group of stops from Linden to Madison Avenues, plus the two end stops (see Figure 15). The central group of stops, not surprisingly coincides with the greatest downtown activity and pedestrian destinations.

Figure 15 – Main Street Relative Ridership Activity by Stop



Connections

The Main Street line is an important downtown service and is integrated with the rest of the system via a transit center connection. The line serves the NET, which provides a connection to nearly every other route in the system. The connection between bus and trolley at the NET is good — the station and the bus bays are on opposite sides of the terminal building, offering an easy connection. In addition, the high service frequency on the Main Street line supports transfers.

RIVERFRONT LINE

The Riverfront line operates seven days a week (see Figure). Weekday service begins at 9:15 AM and ends at 11:00 PM Monday through Thursday and at 12:30 AM Friday. Saturday service begins at 9:00 AM and ends at 12:45 AM. Sunday service begins at 10:00 AM and ends at 6:00 PM. Similar to the Main Street line, the Riverfront service is operated according to a headway based schedule, where the trolleys come approximately every 13 minutes (rather than adhering to time points on a schedule).Because both the Riverfront line and the Main Street line travel northbound on Main Street, the effective headway on this segment of the line is 5-6 minutes.

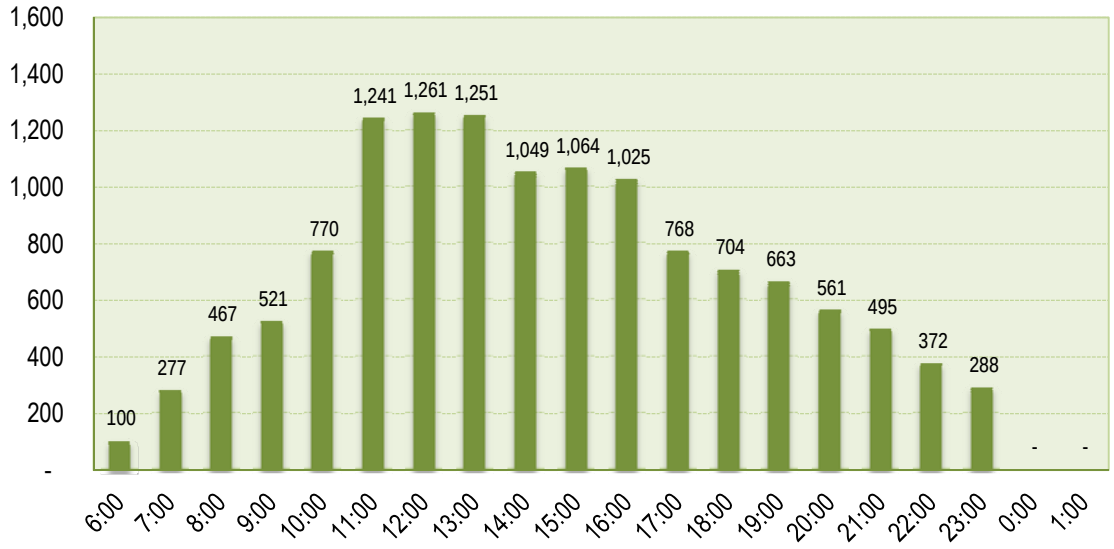
Figure 16 - Riverfront Line Schedule Statistics

	Span of Service	Headways (minutes)
Monday – Thursday	9:15AM– 11:00PM	13
Friday	9:15AM– 12:30AM	13
Saturday	9:00AM– 12:45 AM	13
Sunday	10:00AM– 6:00PM	13

Ridership by Time of Day

The Riverfront line exhibits a different ridership by hour trend throughout the weekday (see Figure 17). This line exhibits a singular peak pattern, with the highest activity from 11:00 AM to 1:00 PM. Ridership steadily falls after 1:00 PM.

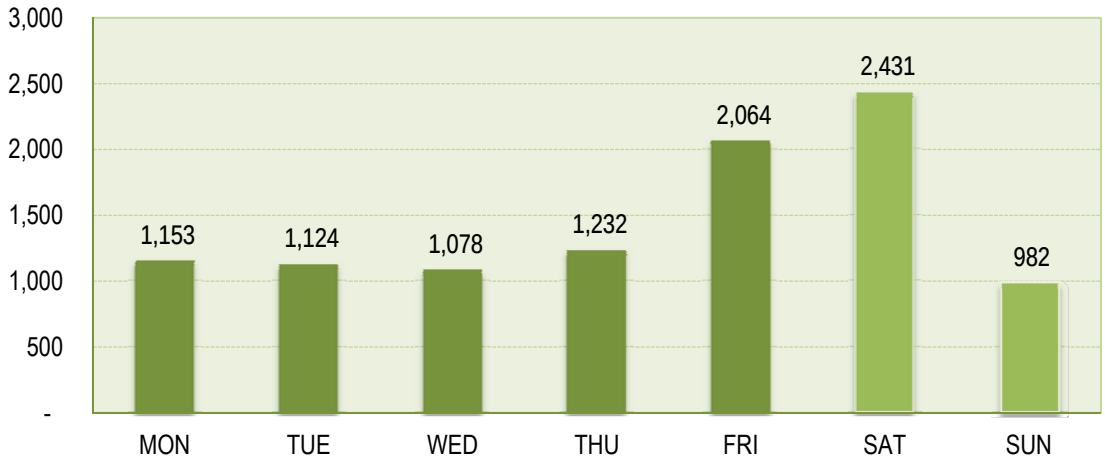
Figure 17 - Riverfront Average Ridership by Hour (Monday – Thursday)



Ridership by Day

Similar to the Main Street line, ridership is low Monday through Wednesday, peaks on Friday and Saturday, and then falls to its lowest point of the week on Sunday (see Figure 12). The high Saturday ridership attests to the tourist and visitor orientation of the line, which serves recreation facilities and tourist destinations along the riverfront.

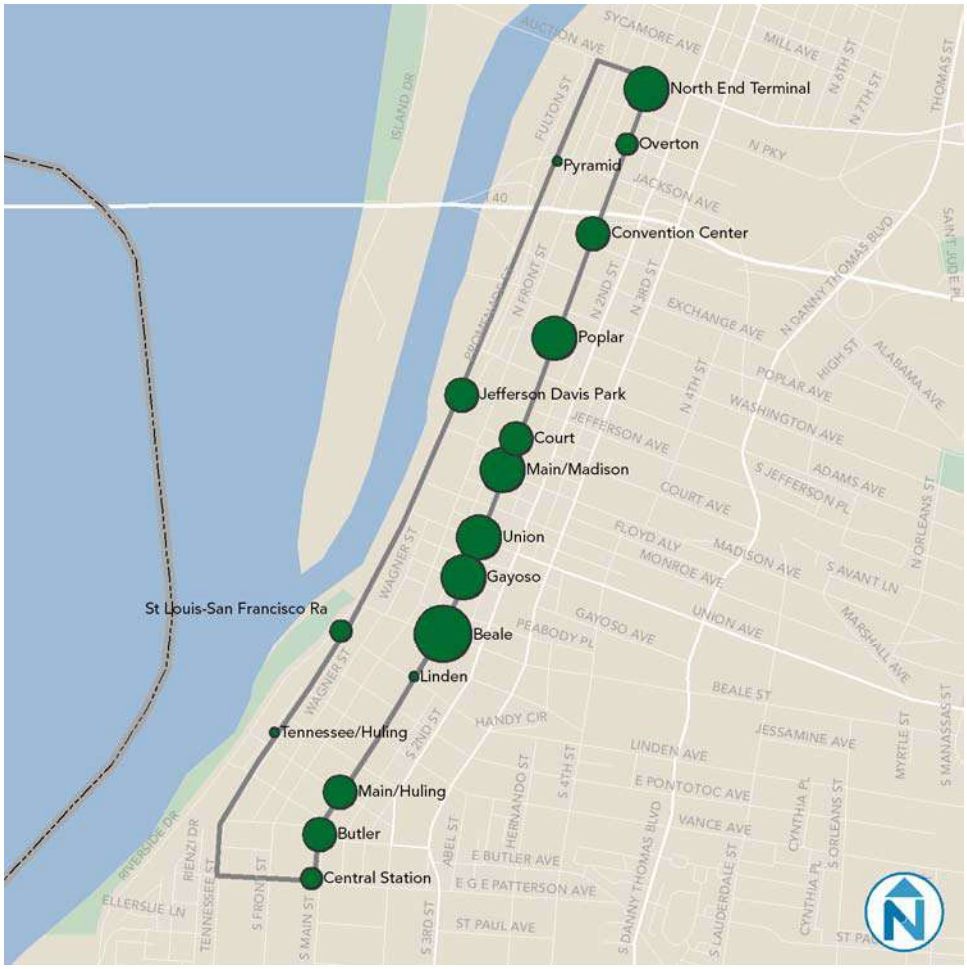
Figure 18 - Riverfront Average Ridership per Service Day



Weekday Ridership by Stop

The Riverfront line serves 18 stops along Main Street and the Riverfront: 12 of the stops are along Main Street; the remaining six stops, including a stop at Central Stationary along the riverfront and on G.E. Patterson Avenue (see Figure 13).Ridership activity is concentrated on the Main Street stops, with the largest stop at Beale Street. The riverfront stops are considerably less well used; only the Jefferson Davis Park stop near Mud Island River Park has significant ridership. This suggests that most riders are using the Riverfront line to travel along Main Street (likely in one direction only) and considerably fewer riders travel between the riverfront and downtown.

Figure 19 - Riverfront Relative Ridership Activity by Stop



Connections

The Riverfront line builds upon the Main Street line, supplementing service along Main Street and offering service west to the riverfront. Like the Main Street line, the Riverfront line also serves the North End Terminal, offering an easy connection to the rest of the bus system. The Riverfront line offers slightly less service than the Main Street line, but still supports transfers.

MADISON AVENUE LINE

The Madison Avenue line operates seven days a week (see Figure 14). Weekday service begins at 6:00 AM and ends at 11:05 PM Monday through Friday. Saturday service begins earlier than the other two lines, at 6:10 AM and ends at 1:05 AM. Sunday service begins at 10:15 AM and ends at 6:08 PM. The service operates according to a headway-based schedule, where the trolleys arrive approximately every 13 minutes instead of adhering to a timepoint-based schedule.

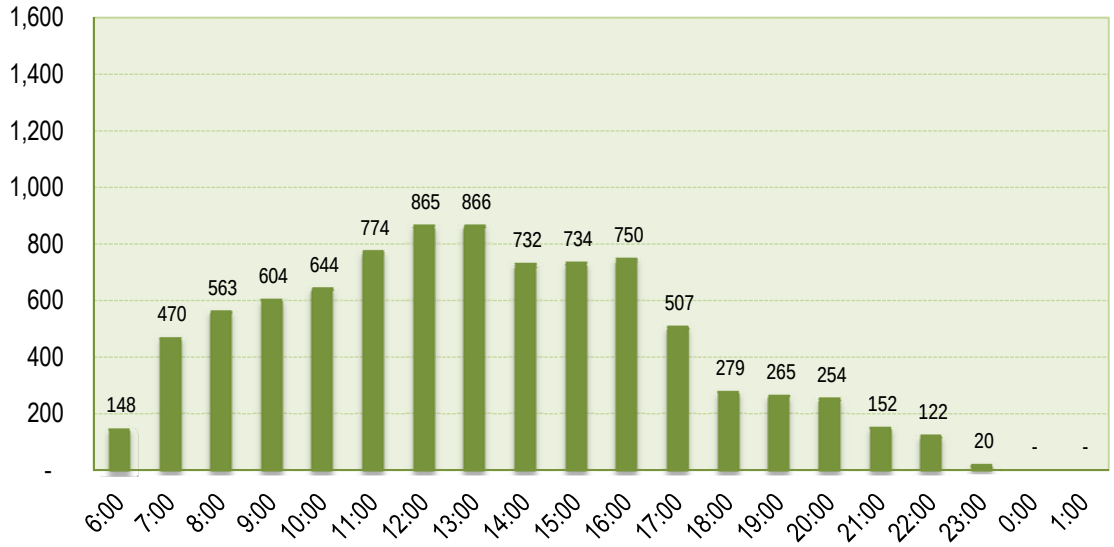
Figure 20 - Madison Avenue Line Schedule Statistics

	Span of Service	Headways (minutes)
Weekdays	6:00AM– 11:05PM	16
Saturday	6:10AM– 1:05 AM	16
Sunday	10:15AM– 6:08PM	25

Ridership by Time of Day

The Madison Avenue line's ridership trend throughout the weekday shows relatively consistent ridership from 7:00 AM through 4:00 PM (see Figure 15). The higher activity during this time coincides with typical office and school hours, which affirms that many of the Madison Avenue riders are using the service to travel to medical appointments, work, and classes at institutions of higher learning in the Medical Center. Ridership activity gradually builds up to a peak around noon, but the peak is less significant when compared to the other lines.

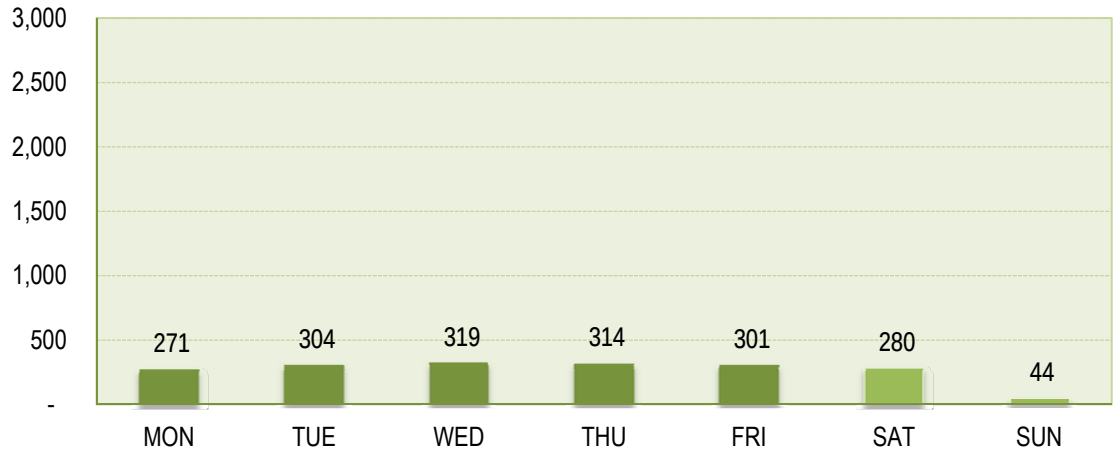
Figure 21 - Madison Avenue Average Ridership by Hour (Monday – Thursday)



Ridership by Day

The Madison Avenue line's ridership by service day is shown in Figure 16. The Madison Avenue line stands apart from the other lines because it has much lower ridership. Activity is fairly consistent throughout the week, drops off on Saturday, and falls significantly on Sunday. Unlike the Main Street and Riverfront lines, the Madison Avenue line is more oriented towards workers, students, and visitors to the medical facilities along Madison Avenue. As a result, weekday ridership is higher than the weekend service.

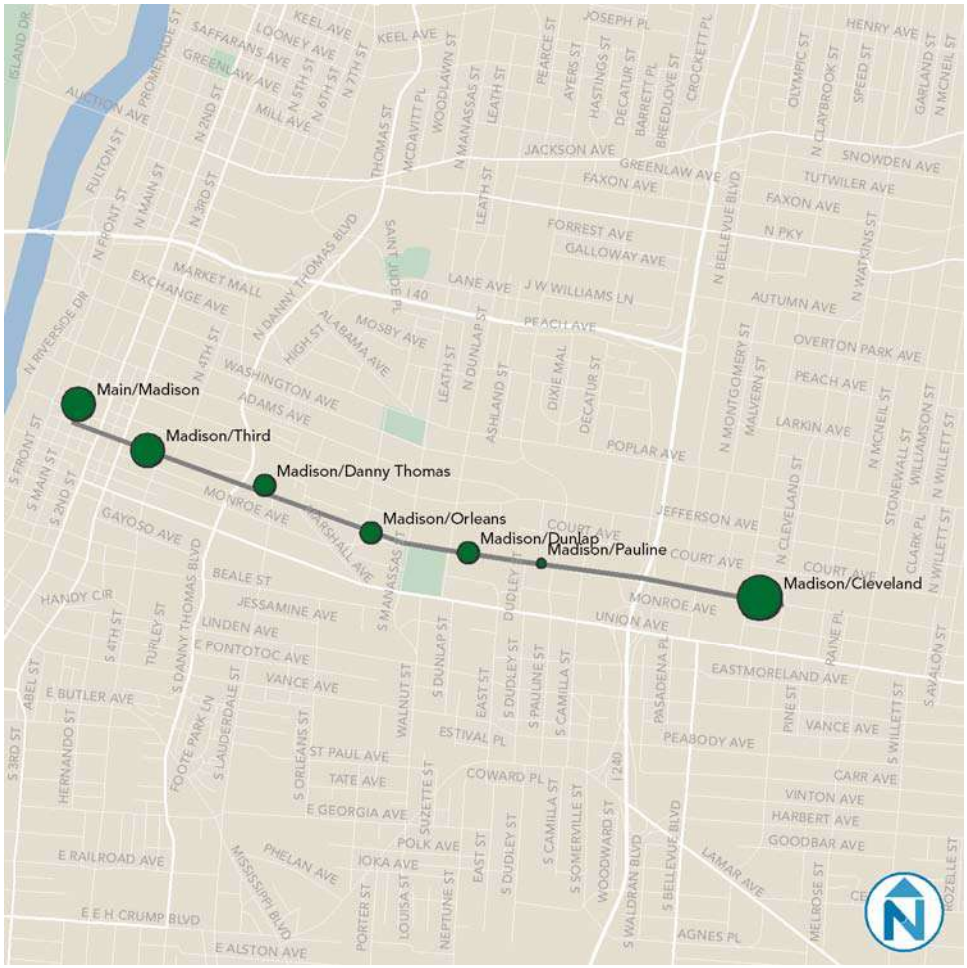
Figure 22 - Madison Avenue Average Ridership per Service Day



Weekday Ridership by Stop

The Madison Avenue line's ridership activity by stop is fairly consistent among the interim stops (see Figure 17). The end stops have higher ridership as is expected. The stop at Pauline Street has low ridership activity — likely because this stop is on the eastern end of a cluster of medical destinations, most of which are actually closer to the Dunlap Street stop to the west.

Figure 23 - Madison Avenue Relative Ridership Activity by Stop



Connections

The Madison Avenue line offers connections to the Main Street and Riverfront lines at the western end of the service and the Cleveland Street stop on the eastern end of the line (transfers to MATA bus Routes 2 and 31). Both of the end point stops have high ridership suggesting some people are using them for transfers.

SERVICE IMPROVEMENT OPTIONS

Opportunities to improve the MATA trolley service include:

- **Shift service span to begin and end an hour later**. The service is most productive in the afternoon, evening and late night, especially on Thursday and Friday. Ridership by time period data shows high demand for service during this time and less demand in the early AM period. All-day service may be more productive if the service span was shifted to begin and end an hour later. This is especially true on Friday, which has significant demand in the late night.
- **End service on the Madison line earlier.** Demand for the Madison line is considerably lower in the evenings and this service could be stopped earlier than the Main Street and Riverfront lines.
- **Discontinue Sunday service on the Madison line.** Demand for the Madison line is very low on Sundays, carrying only 44 passengers during eight hours of service (5.5 passengers per hour).This service may be discontinued to help improve the overall Madison line productivity.
- **Increase marketing and develop joint marketing initiatives along Madison line**. Instead of reducing service, MATA may become more aggressive about working with medical institutions and Madison Avenue businesses to develop partnerships and support the Madison line. MATA may, for example, negotiate a per-trip rate with the medical institutions for a universal access passes that allows medical institution employees to ride MATA services, including the trolley with their employee ID or special fare card. Likewise, MATA could work with the medical institutions near Cleveland Street to offer parking and trolley passes, such that people may park at the hospital garages and ride the Madison Avenue line into downtown for events at the FedEx Forum or on Beale Street. This shared agreement may help generate ridership for MATA and parking revenues for the hospitals.
- **Improve trolley-bus connections at Cleveland Street.** Cleveland Station along Madison Avenue is approximately 300 feet from Cleveland Street, a distance that is not too far to support transfers between the bus and trolley. There is currently no signage or clear guidance for passengers to get from Cleveland Station to Cleveland Street. While most passengers know how to make the connection, MATA may encourage riders to transfer with more signage, improved waiting facilities and information about MATA bus service at Cleveland Street.

- **Explore two-way service on the Riverfront line.** The one-way loop service on the Riverfront line makes transfers from the Madison Avenue line less attractive and ties the schedule to the Main Street line. If two-way service were offered on the Riverfront line, transfers from the Madison Avenue line to areas south of Madison would be much more attractive. This would also decouple the Riverfront line from the Main Street line, allowing each to operate and be adjusted independently.
- **Operate Riverfront according to a seasonal schedule.** Most riders seem to be using the Riverfront line to travel along Main Street rather than to travel along the riverfront, such that the trolley carries passengers between Central Station and the North End Terminal but is largely empty along the riverfront. This pattern is likely especially true in the winter months when there is less activity along the riverfront. One strategy to address this would be to operate according to a seasonal schedule where the Riverfront line operates according to a full seven-day per week service between April and October and a weekend (Thursday – Sunday) service during the off-peak season (November – March. This strategy may also address trolley congestion traveling northbound on Main Street.

APPENDIX D

Preferred Scenario Summary Document

SHORT RANGE TRANSIT PLAN

BACKGROUND OF THE STUDY

Purpose. The Short Range Transit Plan study evaluated the MATA system in order to suggest ways to improve the system. The goals of the study are to:

- Make sure MATA services meet and support community needs
- Make the bus an attractive option for more people in the community
- Ensure MATA services are efficient and cost-effective

Progress to Date. The study completed an evaluation of the existing system and travel market, a route-by-route analysis of the existing routes, and gathered comments and suggestions from riders and community members. These efforts helped us create three potential bus network scenarios. We showed these scenarios to riders and the public to gather their feedback and help us develop the final plan, called the Preferred Scenario. The study team is now looking to the community for final comments and suggestions on the Preferred Scenario.

ABOUT THE PREFERREDSCENARIO

- Simplifies the system by straightening routes, eliminating route branches and scheduling service to operate with consistent headways. This makes service easier to understand and use.
- Provides most riders with comparable or better service than they have today.
- Costs the same to operate as today's system and doesn't require any additional vehicles.
- Matches service levels to demand and categorizes routes accordingly:
  - 8 of the highest demand routes become **Key Corridor** routes that create MATA's service "core". These trunk line routes provide the highest level of service and carry the most passengers. One or more of these key corridor routes could become BRT service in the future.
  - 5 **Emerging Key Corridor** routes have slightly lower service levels as compared to the Key Corridor Routes; as new funding becomes available service levels may be upgraded.
  - 13 **Mainline** routes service neighborhoods and communities with low density development.
  - 8**Feeder** routes bring passengers to one of the transit centers or hubs.
  - 4**Express** routes connect downtown Memphis with large activity centers and outlying areas. Routes will start to build the 'choice rider' market.
  - **FlexService** serves low density neighborhoods that have a high need for service. This type of service may be implemented as a demonstration project. The plan recommends southwest Memphis as potential demonstration site.
  - An **Airport Shuttle** connects the Airways Transit Center, the airport, and the American Way Transit Center with frequent service.
- Most of the riders and neighborhoods currently within ¼-mile of a bus route will still be within ¼-mile of a bus route.
- Recommended service changes will start to open new travel markets and address gaps in the current system, especially along the Winchester Road corridor.

- Routes are organized around a **network of transit centers and hubs**. Riders can use these locations to transfer between routes and change direction of travel. The intent is to shorten travel time for riders. The network includes three transit centers which are already in place, six transit hubs or "super stops," and eight park and ride locations throughout the Memphis area.

UNFUNDED SERVICE PROJECTS

Preferred Scenario Expansion. The Short Range Transit Plan is based on available funding. However, the study identified a wish list of service improvements to support full implementation of the Preferred Scenario. The projects primarily involve increasing service hours or service frequency:

- Expand hours of service on Key Corridor routes to run until midnight
- Expand hours of service on Emerging Key Corridor routes to run until midnight
- Improve peak frequency on 13 Lauderdale to 30 minutes
- Improve peak frequency on 40 Wolfchase Berryhill to 30 minutes
- Improve peak frequency on 7 Air Park to 30 minutes (this route would provide service along Shelby Drive from Neely Road to Kirby Parkway)
- Improve peak frequency on 9 New Allen to 30 minutes (this new route would provide service along Highland Street and New Allen Road from the American Way Transit Center)
- Convert Poplar Express to BRT-Lite Service with 20 minute frequencies
- Add feeder route for area south of Mitchell between Neely and Elvis Presley
- Extend 11 Thomas/Frayser east to Germantown Road
- Add express service between NET and Airways Transit Center

Expansion Into New Markets. In addition to the need for improvements to the existing network of service, the plan also identified new and emerging markets for transit services, primarily around providing commuter service to eastern Shelby County and eastern Desoto County in northern Mississippi. These services may be explored as new funding partners are identified:

- Express service between Hickory Hill and Germantown
- Express service between Hickory Hill and Collierville
- Express service between Germantown and Bartlett
- Explore new service between Hickory Hill and Desoto County Mississippi
- Provide new service to areas north of Memphis toward Millington

WE WANT YOUR FEEDBACK

Additional Information. There are several documents for review on the project's website, below. You may also request a paper copy of any of the documents.

Provide Feedback. You can provide feedback by:

- Mailing your comments to:

TRUST Marketing, Inc.
44 N Second St, Ste 701
Memphis, TN 38103

- Calling or sending a text with your comments to: **901-300-MATA** (6282)
- Submitting a comment on the project website (click **Contact Us** at the top)

WWW.MATAPLAN.COM