2015 motion

MTA/RTA STRATEGIC PLAN

SERVICE IMPROVEMENT STRATEGIES

7/31/2015

Nashville MTA

RTA

NELSON NYGAARD

GRESHAM SMITH AND PARTNERS

CAMBRIDGE SYSTEMATICS

TABLE OF CONTENTS

INTRODUCTION

Transit service in Nashville is provided by the Nashville Metropolitan Transit Authority (Nashville MTA), and transit service in the 10-county Middle Tennessee region is provided by the Regional Transportation Authority of Middle Tennessee (RTA). As described in the recently published *State of the MTA System Report* and the forthcoming State *of the RTA System Report,* there are a number of issues with existing transit service in Middle Tennessee:

- **The expansion of transit services has not kept pace with growth.** Nashville has grown from a small city to a medium-sized city. The area's population and employment, and the demand for transit, have grown much faster than transit services.
- **Projected growth will continue to outstrip Nashville MTA's and RTA's ability to expand.** Nashville and the region will continue to grow rapidly—much more rapidly than Nashville MTA and RTA will be able to expand service based on current funding streams.
- **Combined, Nashville MTA and RTA provide small city service for an area that is no longer small.** In many respects, Nashville MTA provides small city services for a city that has grown much larger. This can be seen in the number of routes and particularly in terms of services that operate infrequently, with evening service that ends early, and limited weekend service.
- **Transit demand will grow faster than population growth.** Projected demographic changes will mean that transit demand will increase faster than population growth. Demand for transit is growing rapidly among many groups—both among people who already live in Middle Tennessee as well as among those who are moving here. Key groups who desire better transit options include Baby Boomers, Millennials, and minorities.
- **Service is not attractive to most residents.** Because service coverage, service frequencies, and the hours and days of service are limited, it is not convenient for residents and employees who have other options—in other words, service is inconvenient for the broad cross-section of the region's population.

These issues mean that Nashville MTA and RTA of Middle Tennessee both need to catch up with the growth that has already occurred and grow much faster in the future to keep pace with projected growth. This document describes potential strategies for addressing these needs; additional strategies may be added based on stakeholder input and additional technical analysis.

SERVICE IMPROVEMENT STRATEGIES

Transit service can be provided in many ways, and the most effective approaches match different services with the demands of individual markets. Potential strategies to significantly improve transit in Middle Tennessee include:

IMPROVE EXISTING SERVICES

- Provide more frequent service for longer hours
- Improve non-downtown Nashville-oriented services
- Streamline downtown circulation
- Develop Transit Emphasis Corridors
- Implement transit priority
- Develop outlying transit centers to provide focal points for outer area services
- Make service easier to use and understand
- Make service faster

EXPAND SERVICE TO NEW AREAS

- Expand service within Davidson County
- Expand service between surrounding counties and Nashville
- Develop outlying transit centers as focal points for outer area services and connections between local and regional services

DEVELOP A FREQUENT TRANSIT NETWORK

- Develop a network of routes that provide frequent service from early morning to late night in major corridors

DEVELOP HIGH CAPACITY TRANSIT SERVICES AND PREMIUM SERVICES

- Commuter rail
- Light rail
- Bus Rapid Transit (BRT)
- Rapid Bus (BRT without exclusive bus lanes)
- Streetcar
- Freeway BRT
- Express bus
- Airport service

IMPROVE ACCESS TO TRANSIT

- Develop first mile/last mile connections between fixed-route services and nearby destinations
- Improve pedestrian access and conditions along transit routes and around stations
- Improve park-and-ride opportunities

PROVIDE BETTER FACILITIES AND AMENITIES

- Improve passenger amenities at stations and stops

MAKE TRANSIT EASIER TO UNDERSTAND AND USE

- Present Nashville MTA and RTA services as part of a unified system
- Rebrand specific services to increase awareness
- Provide information on available services that is attractive, easy to obtain, and easy to understand
- Adopt new technologies such as mobile ticketing, electronic fare payment, and real-time information that makes transit easier to use

IMPROVE EXISTING SERVICES

Since 1965, the Nashville region has grown from approximately 750,000 residents to over 1.7 million. Today, the Nashville area is approximately the same size as the Austin and Charlotte areas. However, Nashville MTA provides only 34% to 46% of the service that its counterparts in those two cities provide.

PROVIDE MORE FREQUENT SERVICE FOR LONGER HOURS

Perhaps the easiest way to make transit convenient is to make it frequent and to provide service over long hours. To make service more convenient and thus more attractive, Nashville MTA and RTA will need to significantly increase the amount of service provided.

Provide More Frequent Service

Most riders consider service that operates every 10 minutes or more frequently as very convenient and service that operates every 15 minutes or less as relatively convenient. Conversely, service that operates every 30 minutes or more becomes too infrequent for most travelers who have other opportunities to travel, such as driving.

In terms of these definitions of frequency, on weekdays during the day (through the end of the PM peak):

MTA

- Only three routes provide service every 15 minutes or better throughout the day on weekdays
- Three Music City Circuit routes provide service every 15 to 20 minutes
- 15 routes provide service every 16 to 30 minutes
- 13 routes provide service every 31 to 90 minutes
- 12 routes provide peak period-only service

On weekday evenings and on weekends, service is much less frequent. Only two Music City Circuit routes operate every 15 minutes, and only three routes operate every 30 minutes. All other routes operate less frequently, with most operating every 60 minutes or less.

RTA

- Music City Star provides three round trips in the AM and PM peaks, plus one additional round trip on Friday nights
- Two routes provide two AM inbound and two PM outbound trips
- Two routes provide two AM inbound and three PM outbound trips
- Five routes provide three AM inbound and three PM outbound trips
- One route (Murfreesboro Relax and Ride) provides all day service

The lack of frequent service is one of the major issues facing Nashville MTA and RTA, as relatively little service operates frequently enough for most potential riders to consider it convenient. To address this situation, more service will need to be provided on existing routes; new routes will also need to provide sufficiently frequent service.

Operate Service for Longer Hours

The span of service—meaning the hours that service operates—is another factor that strongly influences the convenience of the transit system. Nashville MTA's services operate for more limited hours than in most major metropolitan areas.

- On weekdays, all service ends at 11:15 PM. Of the 35 non-express/limited routes, 15 end service before 10:00 PM. These include the BRT lite routes, which are Nashville MTA's highest ridership routes and end service by 9:15 PM.
- On Saturdays, most service ends by 10:15 PM, and only two routes (the Blue and Green Music City Circuit routes) operate as late as 11:00 PM.
- On Sundays, Route 18 Airport/Downtown Hotels operates until 10:40 PM, but all other service ends before 10:00 PM.

Viewed together with the service frequencies described above, Nashville MTA's service operates neither frequently enough nor late enough to provide the flexibility that most riders with other options require. This limited service makes it difficult for riders or potential riders with alternative schedules or second- and third-shift employment. It also poses a challenge to those who would like to use transit to reach social or entertainment activities in the evening. In addition to providing more frequent service, Nashville MTA will also need to provide later service.

As described above, most RTA services operate only during peak periods, and one characteristic of many is that their schedules are designed to serve very early work schedules. For example, Route 87X Gallatin Express' last AM inbound trip arrives at Music City Central at 7:15 AM, and the last PM peak outbound bus departs from the West End at 4:37 PM. To make regional services more convenient, RTA will need to serve a wider range of work schedules.

STREAMLINE DOWNTOWN CIRCULATION

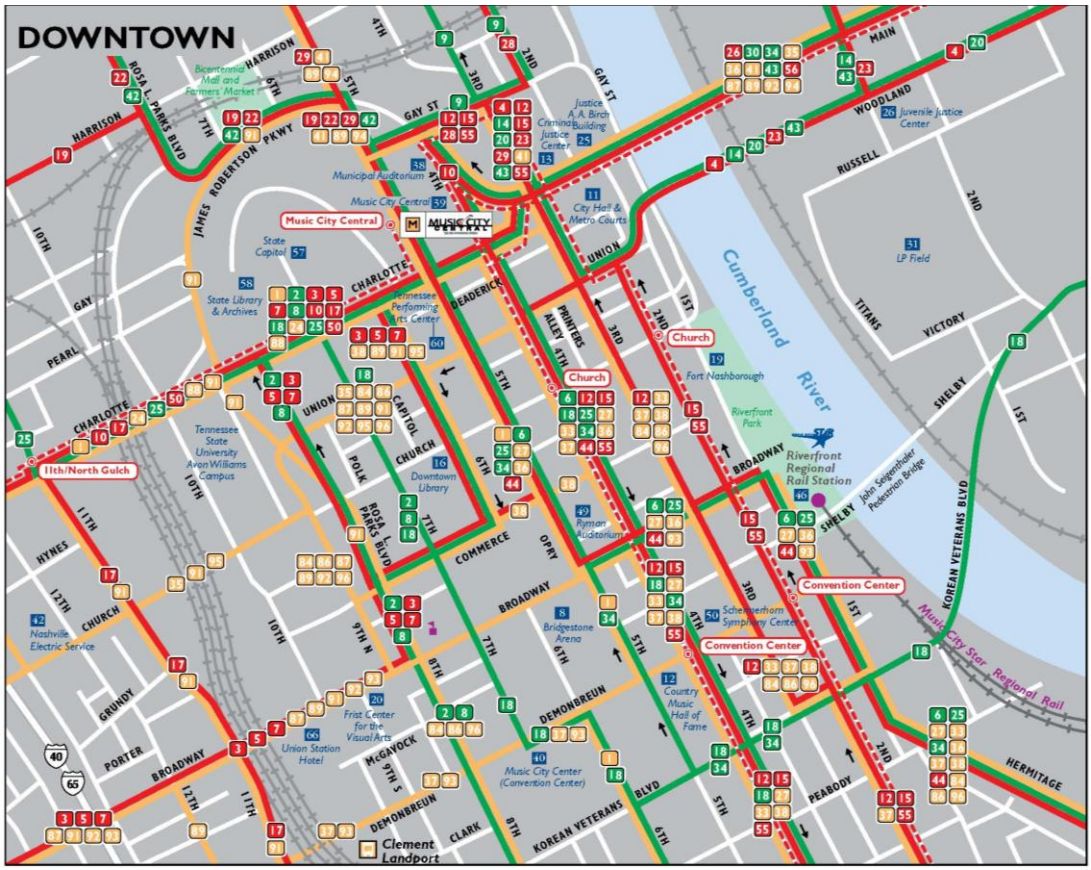
In Nashville, as in many cities, downtown services have evolved over time, with individual routes added, eliminated, and revised, often with too little consideration of how individual changes fit within the overall system. The result is often complex service that is difficult for passengers to understand and use (see Figure 1). Furthermore, with the continuing growth of downtown and immediately adjoining areas such as the Gulch, transit service will become slower without improvements, and more and more destinations will be beyond walking distance of Music City Central.

A systematic reconfiguration of downtown transit is one important way to improve transit service—to increase individual transit options, to improve connections, and to focus service in ways that can make service faster and enable the provision of better passenger facilities. Principles for the design of effective and attractive downtown services are:

- Services that operate from the same origin areas (for example, north, south, east, west) should come from the same locations and use the same alignment downtown so that passengers can easily use all routes that serve their destination.
- Circulation patterns should be simple so that passengers can easily learn and remember where to catch the bus. To accomplish this, routes that operate from the same origin areas should operate to the same downtown terminal and use the same alignment within downtown.
- Transfers should be possible between any two downtown routes without walking farther than across the street or one block in cases where bus service operates on one-way pairs. To accomplish this, all circulation patterns within downtown should connect at a minimum of one point.
- Transit should operate on streets that are compatible with high levels of bus service.

In terms of implementation, providing effective downtown transit service typically consists of a combination of elements, which can include service design, Transit Emphasis Corridors, new transit centers, and transit priority.

FIGURE 1 | CURRENT DOWNTOWN NASHVILLE SERVICE



Service Design

A number of different service design approaches can be used for downtown transit, and common approaches include:

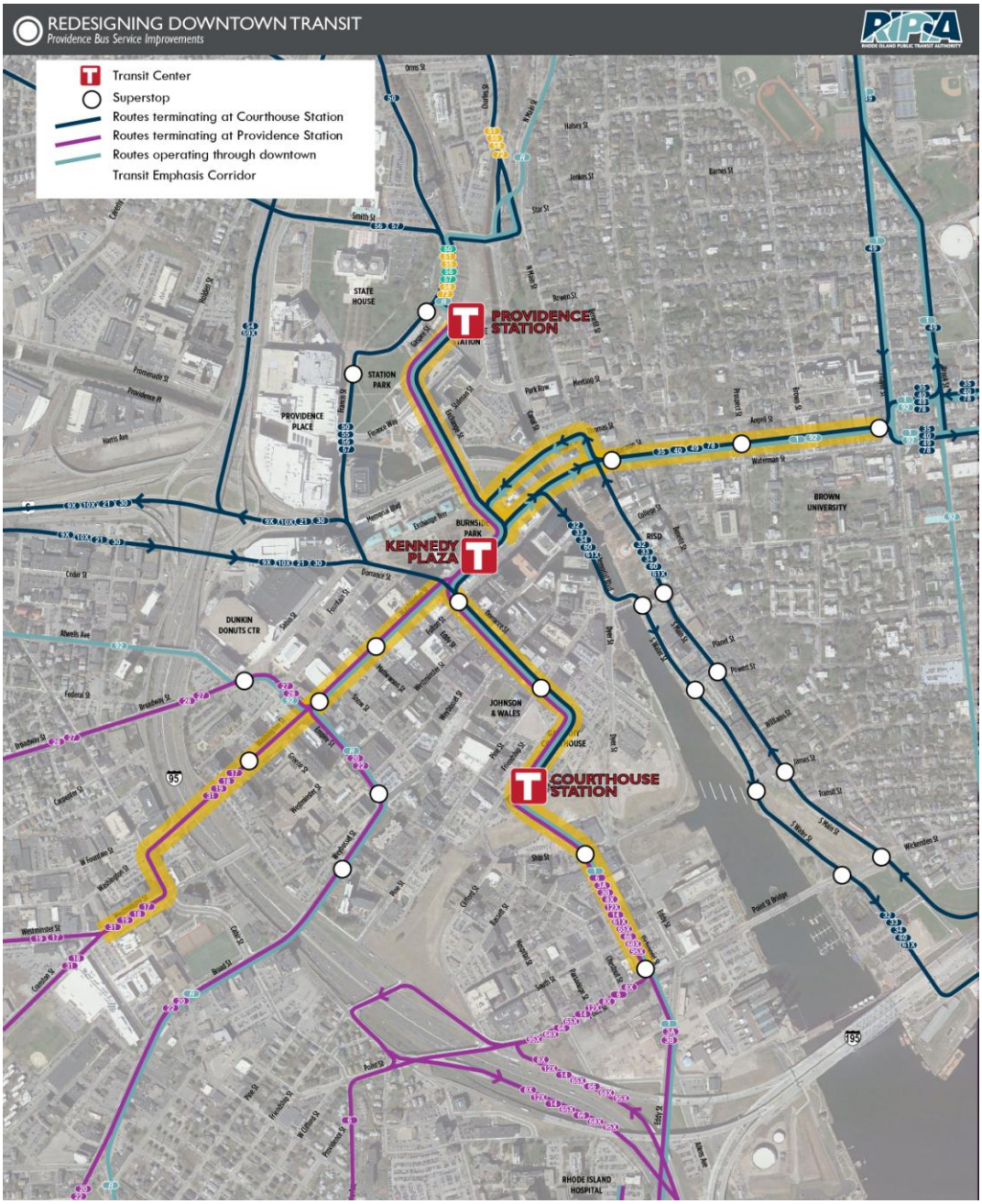
- Intersecting trunk routes where routes are organized into intersecting patterns (see Figure 2).
- Transit Emphasis Corridors, with transit service concentrated on a limited number of corridors, sometimes within a transit mall.
- Perimeter service, in which service is limited to the periphery of downtown, with circulator service within downtown.

Very few cities, if any, use a "pure" approach. Instead, most emphasize one approach and supplement that with others to address special circumstances. Given the physical constraints and traffic congestion in downtown Nashville, this would also likely be the case for Nashville MTA and RTA services.

Transit Emphasis Corridors

Transit Emphasis Corridors are corridors that are served by high volumes of transit service where priority is given to transit and a high level of transit amenities are provided. Additional information is provided below.

FIGURE 2 | PROVIDENCE, RI DOWNTOWN SERVICE REDESIGN



Transit Centers

Transit centers provide both a focal point for transit and comfortable passenger facilities. Many small- to medium-size transit systems focus service around a single downtown transit center as is currently the case with Music City Central in downtown Nashville (see Figure 3). However, as cities and their transit systems grow, increasing volumes of service and passengers can begin to overwhelm the surrounding area, meaning that additional capacity is needed. To avoid this, a more distributed approach using multiple transit centers can be pursued. (Kansas City and Providence are two examples of growing systems that are now taking this approach.) Nearly all large transit systems have multiple downtown transit centers.

FIGURE 3 | MUSIC CITY CENTRAL

TRANSIT PRIORITY

Traffic in downtowns is usually congested, and consequently, downtown transit service is typically slow. Transit can be made more attractive through the use of transit priority measures to make it faster. These measures can include:

- Exclusive bus lanes
- Queue jump lanes
- Signal priority

Additional information on transit priority is provided below.

TRANSIT EMPHASIS CORRIDORS

Transit Emphasis Corridors are corridors that are served by high volumes of transit service where priority is given to transit and a high level of transit amenities are provided. In some cases, Transit Emphasis Corridors are transit "malls" where vehicular traffic is limited entirely or, with only limited exceptions, to transit. The best examples of transit malls in the United States are Minneapolis's Nicollet Mall and Denver's 16th Street Mall (see Figure 4).

Much more common, however, are Transit Emphasis Corridors that emphasize transit service but do not exclude other traffic. Examples of these types of transit emphasis corridors are Portland's Transit Mall, which is a one-way pair that dedicates two lanes to transit and one lane to other traffic, and San Francisco's Market Street, which is open to all traffic but heavily emphasizes transit (see Figure 5). A third example is Minneapolis' Marq2 corridor, where bus lanes operate as contraflow lanes on two parallel streets.

FIGURE 4 | TRANSIT-ONLY MALLS

MINNEAPOLIS NICOLLET MALL

DENVER 16TH STREET MALL

FIGURE 5 | TRANSIT EMPHASIS CORRIODORS

PORTLAND, OR TRANSIT MALL

SAN FRANCISCO MARKET STREET

Major benefits of Transit Emphasis Corridors are that they make transit service faster, which makes it more attractive. Transit Emphasis Corridors also typically include more significant and higher quality stop facilities, which helps to make transit service more comfortable. In Nashville, potential locations for Transit Emphasis Corridors are within downtown and along major corridors in and out of downtown.

PROVIDE PRIORITY TO TRANSIT

Transit service is most attractive when it is faster than driving, or when the time differences are reasonable. To make transit faster, it can be given priority over regular traffic. This can be done through the use of:

- **Exclusive bus lanes,** which can be developed in a number ways, including in medians and in curb lanes.
- **Peak period-only bus lanes,** which are usually in lieu of parking, but sometimes implemented through the use of a regular traffic lane.
- **Queue jump lanes,** which typically substitute a short stretch of parking for a curbside bus lane that allows buses to jump to the front of the queue at bus stops or traffic signals (see Figure 6).

- **Transit signal priority** that extends green signals for approaching buses, which allows them pass through the intersection before the light turns red and provides them with an early green signal (see Figure 7).
- The use of **freeway shoulders** by express buses to bypass congestion.

FIGURE 6 | QUEUE JUMP LANE

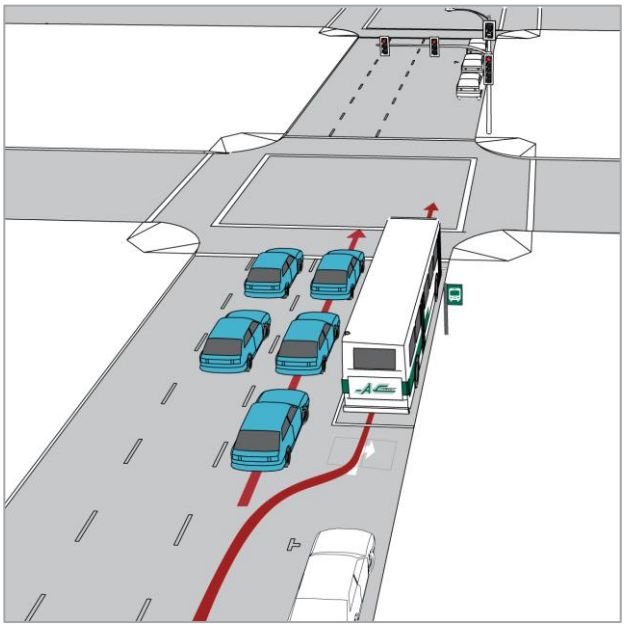
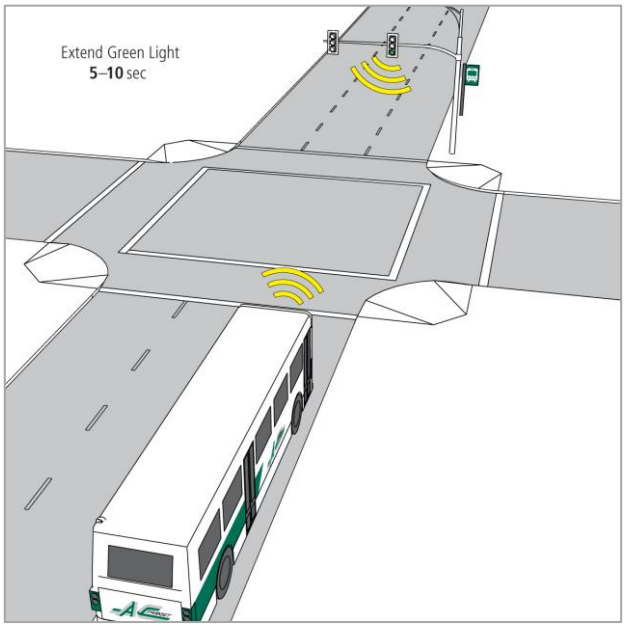


FIGURE 7 | TRANSIT SIGNAL PRIORITY



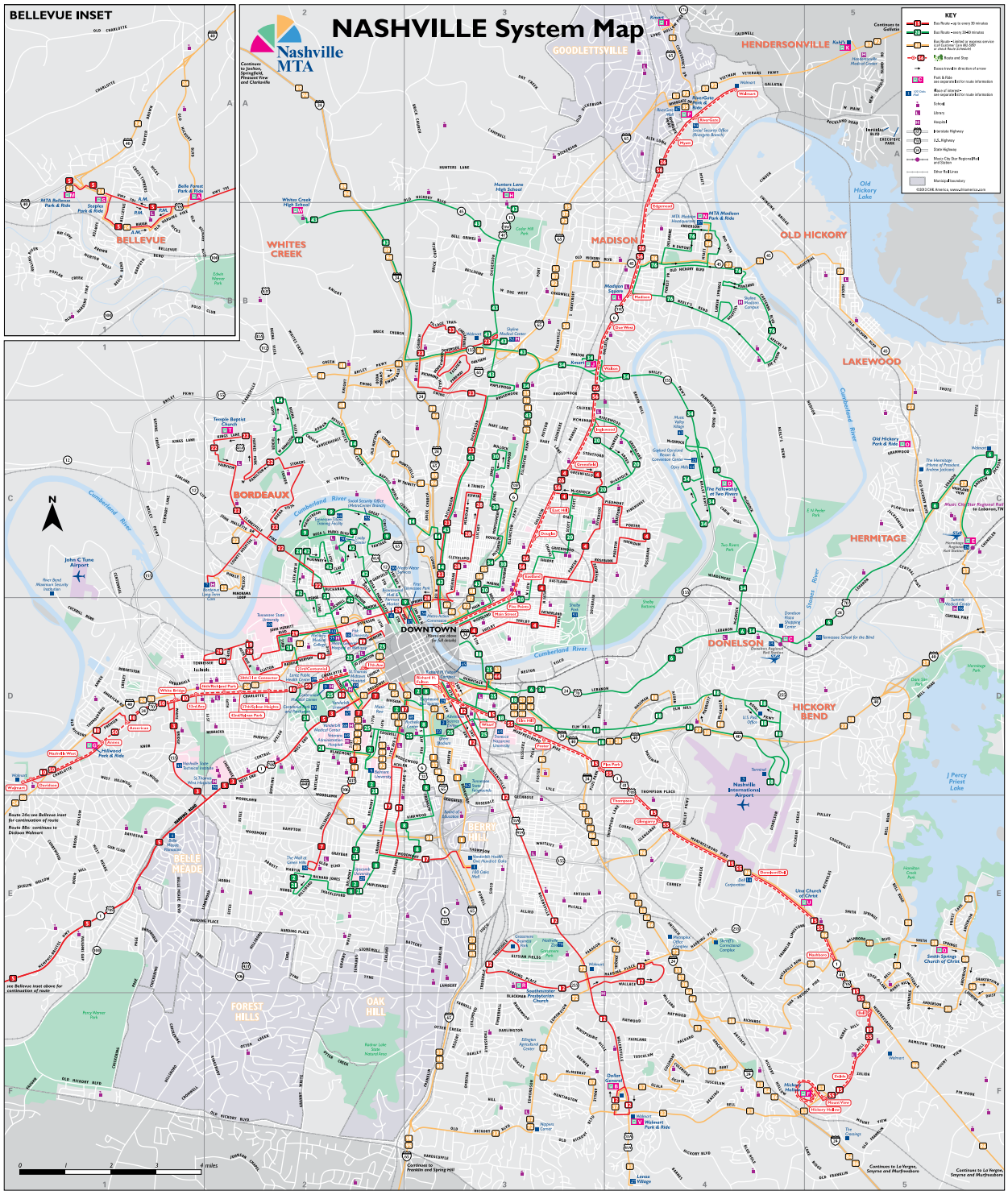
Source: AC Transit

Nashville MTA is implementing transit signal priority along Murfreesboro Pike, which will improve travel times on Routes 15 Murfreesboro Pike and 55 Murfreesboro BRT lite. The implementation of transit priority measures on new Bus Rapid Transit (BRT) and Rapid Bus lines, along Transit Emphasis Corridors, and in areas served by a Frequent Transit Network (described below), would make transit faster and more attractive.

IMPROVE NON-DOWNTOWN NASHVILLE-ORIENTED SERVICES

Middle Tennessee's transit services are heavily focused on transporting people to and from downtown Nashville (see Figure 8). As the region has grown, travel to locations outside of downtown has increased significantly, but transit trips to non-downtown locations require out-of-direction travel via downtown. Not surprisingly, the stakeholder outreach conducted to date for nMotion has indicated a large demand for new services that connect outer areas more directly. New services will be needed to develop a more robust transit system that better serves these types of trips, especially in Nashville's urban core.

FIGURE 8 | NASHVILLE MTA SYSTEM MAP



There are two primary ways in which this can be accomplished. The first would be to develop new "cross-town" routes that directly connect outer areas. The second would be to develop outlying transit centers that can act as focal points for outer area transit, and that can provide connections between cross-town

routes and between radial and cross-town routes. As transit needs grow outward and to new locations, transit hubs can facilitate transfers. This approach can also expand travel opportunities to and from lower volume outer areas in a similar manner as airline hub and spoke systems increase the amount of service that can be provided to smaller cities. Additional detail on new transit centers in outlying areas is presented below in the Outlying Transit Hubs sections.

MAKE SERVICE SIMPLER AND EASIER TO UNDERSTAND

For people to use transit, they must be able to understand it, and simpler services are easier to understand than complex services. As stated in the Transit Cooperative Research Program (TCRP) "Traveler Response to Transportation System Changes" report: "A readily transparent service design can to some extent market itself insofar as user information needs are concerned," while "a highly complex operation places heavy demand on the provision of information and the rider's ability to interpret and absorb it."

The end result is that a simple route structure will attract more riders than a complex system. Potential new riders will be more willing try the system, and once they do, the simpler route structure will help ensure that they reach their destination when they want to without experiencing problems. A simple service structure will also attract more occasional riders who otherwise would not take the time to figure out a complicated system.

Updating service based on service design principles that emphasize simplicity and clarity would attract more riders, especially occasional riders who have other travel options:

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, with more service provided by increasing frequency rather than adding routes.

Transit Routes Should Operate Along Arterials or Collector Streets: Potential transit users generally have at least a basic knowledge of an area's arterial road system and use that knowledge as a point of reference. The operation of bus service along arterials or neighborhood collector streets, whenever possible, makes transit service easier to figure out and to use.

Transit Service Should be Focused Around Landmarks: Most potential transit users have a basic knowledge of major landmarks (and are often traveling to them). When transit service is focused around landmarks, these locations can also become transit hubs. People traveling in unfamiliar area can more easily find their way to a landmark to make a transfer than to a lesser-known area.

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.

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 unless there is a compelling reason.

Route Deviations Should be Minimized: As described above, service should be relatively direct, and to make service direct, the use of route deviations—the deviation of service off the most direct route—should be minimized. There are instances when the deviation of service is appropriate, for example to provide service to major shopping centers, employment sites, schools, etc.

Route Variants Should be Minimized: Transit systems frequently receive requests for individual trips to serve off-route locations (schools are a common example), but having different trips on the same route

operate differently at different times makes service confusing, especially for occasional riders. As with route deviations, individual trips should not vary from the regular pattern unless there is a very compelling reason.

Service and Schedules Should be based on Repeating Patterns: People can easily remember repeating patterns but have difficulty remembering irregular sequences. For this reason, routes that operate along consistent alignments and at regular headways are more attractive than those that don't.

Services Should be Well Coordinated: Where different routes connect or operate along the same alignment, schedules should be coordinated to the greatest extent possible to provide short connection times and to operate service at even intervals. This will make service more convenient, and reduce overcrowding in high ridership corridors.

MAKE SERVICE FASTER

Virtually all travelers want to reach their destination as quickly as possible, and the ability to get most places much faster by car than by transit discourages many people from using transit. A common theme heard through the values exercise conducted at the beginning of this project has been that "transit should be as fast as driving." In most cases, this is not possible. However, it is possible to make transit faster than it is today, and if transit travel times can be reduced, more people will use transit for more trips.

There are a number of ways to reduce transit travel times, and these include:

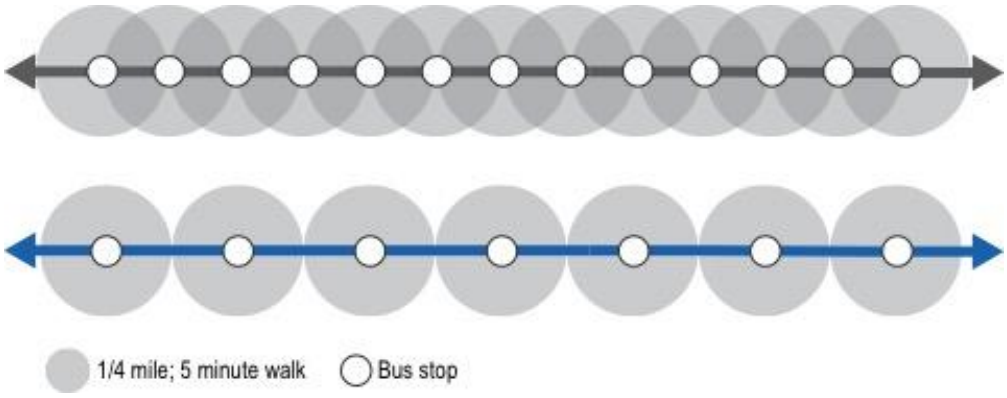
- **Implement transit priority measures,** as described above in the Implement Transit Priority section, to make metro area transit services faster.
- **Provide more cross-town services,** as described above in the Improve Non-Downtown Nashville-Oriented Services section, to serve more trips more directly.
- **Develop a Frequent Transit Network** to reduce transfer times (as described further in the Develop a Frequent Transit Network section, below).
- **Develop High Capacity Transit** services, such as commuter rail, light rail, Bus Rapid Transit (BRT), Rapid Bus, streetcar, Freeway BRT, and express bus (as described further in the Develop High Capacity Transit Options section, below). For service between outlying counties and downtown Nashville, both commuter rail and Freeway BRT could potentially provide faster service than driving.
- **Consolidate stops** to better balance the need to provide both faster service and convenient walk distances and times.

Consolidate Stops

Transit stops are customers' access points for transit services and, as such, should be conveniently located. However, they are also one of the biggest reasons that transit service is slower than automobile trips. Most riders want service that balances convenience and speed, and the number and location of stops are key components in determining that balance. At the present time, many of Nashville MTA's stops are spaced very close together, with a greater emphasis placed on reducing walk distances than providing faster service.

However, as success with BRT projects around the country has shown, most passengers prefer a greater emphasis on faster service than on shorter walks. To achieve a better balance, stops can be consolidated (see Figure 9). This can also provide significant travel time savings—on average, it takes a bus about 20 seconds to slow down, stop and pick up a passenger, and accelerate back up to speed. Thus, a consolidation from nine stops per mile to six can save one minute per mile, or five minutes on a five-mile trip. Fewer stops also means a more comfortable ride, as consolidation reduces stop-and-go operation.

FIGURE 9 | STOP CONSOLIDATION



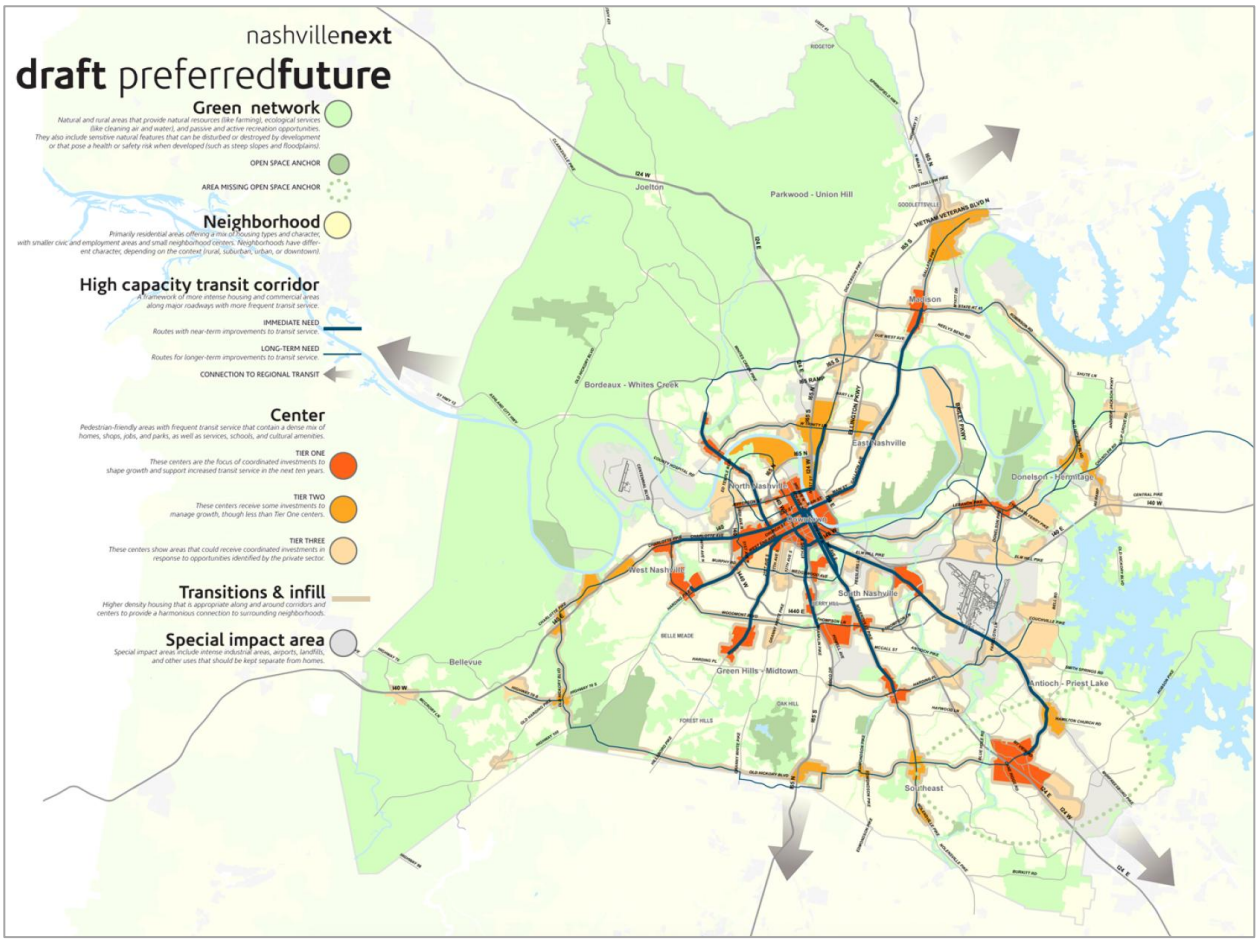
EXPAND SERVICE TO NEW AREAS

As described in *State of the System Reports,* Middle Tennessee is growing rapidly, which will require the expansion of both Nashville MTA and RTA services.

DAVIDSON COUNTY

Within Davidson County, NashvilleNext calls for growth more focused in centers and corridors (see Figure 10). Many of these areas are already served by transit, and in these areas, demand will grow. However, there are also places where new transit demand will emerge and grow, for example, north of Madison and in Nashville's southeast. Improvements to transit services will be needed, and in some cases, new transit services will be needed in concert with growth.

FIGURE 10 | NASHVILLENEXT PREFERRED FUTURE DEVELOPMENT PATTERNS

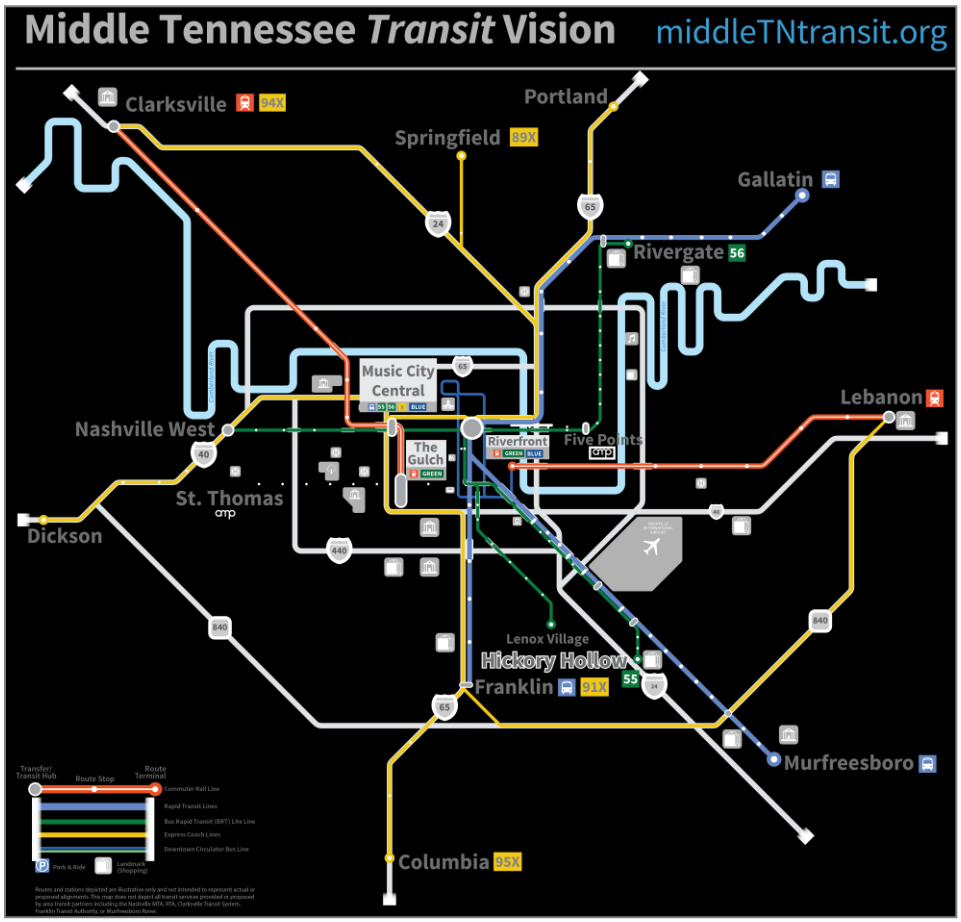


SURROUNDING COUNTIES

Outside of Davidson County, the Nashville Area MPO, in its 2035 Regional Transportation Plan (RTP), has articulated a "Bold New Vision for Mass Transit" that emphasizes expanding mass transit options, including BRT, light rail, and commuter rail. As stated in the RTP, the vision includes a variety of new and expanded services for regional corridors, urban centers, suburban communities, and even the rural countryside that consists of a strategic mix of transit options ranging from high-frequency rapid transit service to the continued provision of rural transit services for those who do not live near fixed-route options (see Figure 11):

- **Rapid Transit:** Three corridors are identified for future regional rapid transit service including the region's northeast, southeast, and south corridors. These areas are the most densely populated and fastest growing within the region and have well-established patterns of cross county travel. The long-range vision for rapid transit in these corridors includes the development of either light rail transit or dedicated-lane BRT that would operate at high levels of service throughout the day. The specific mode or technology used will be determined by future study and depend heavily on development patterns, anticipated ridership, cost of construction, and public support for funding.

FIGURE 11 | REGIONAL TRANSPORTATION PLAN TRANSIT VISION



- **Commuter Rail:** The long-range vision calls for continued support for the Music City Star's east corridor commuter rail service and the development of a new commuter rail line in the region's northwest corridor to connect Clarksville and Nashville, two of Tennessee's most populous cities.
- **Express Coach Service:** In corridors with strong commuting patterns but without the land development patterns or traffic congestion to warrant dedicated-lane transit service, the vision calls for the implementation of premium express coach service. Such service would offer a comfortable and stress-free ride for commuters, providing enhanced amenities along the way including high-back seats, wireless internet access, on-board televisions, and restrooms.
- **Urban Fixed-Route Service:** By far the most critical piece of the long-range vision, the region must continue to expand the existing urban fixed-route services in Nashville, Davidson County, Clarksville, Franklin, and Murfreesboro. Urban services are the backbone of any regional transit system and must be optimized to ensure the success of investments in regional rapid transit or commuter rail. The vision calls for continued investment in existing local bus systems, the eventual introduction of fixed-route service in Springfield, Gallatin, Lebanon, Columbia, and Dickson, and the return of the urban streetcar in downtown Nashville.
- **Suburban and Commuter Circulators:** As the region begins to implement rapid transit, commuter rail, or express coach services in each of the regional corridors, the vision calls for the development of local circulators in markets where a full-fledged urban fixed-route system would not make sense.

Such local circulation will be important for people to access regional services from primary destinations within their community. Suburban circulators, which would operate throughout the day, are envisioned for places like Goodlettsville, Hendersonville, Smyrna, La Vergne, and Brentwood, while commuter circulators, which would operate during peak commuting times, are envisioned for Portland, Spring Hill, Kingston Springs, and Ashland City.

- **Other Regional Services:** In addition to the geographically defined train, bus, and circulator services described above, the vision also calls for the expansion of the regional vanpool program and rural paratransit services. The regional vanpool program is a popular and cost-effective way to provide ride-sharing opportunities to commuters who live too far from fixed-route lines. As the region's population continues to grow older, rural paratransit services will be needed to ensure older Middle Tennesseans have transportation to and from life-sustaining services.

OUTLYING TRANSIT CENTERS

As Middle Tennessee's transit services expand, connections will become increasingly important. Outlying transit centers can provide a place to make those connections, as well as provide focal points for local transit. Additional transit centers would facilitate connections between regional and local routes in Davidson County, Clarksville, Franklin, Murfreesboro, and other locations as new local services are developed in Middle Tennessee, as well as between local routes at all locations.

They can also provide connections in a variety of ways:

- **Park-and-ride spaces** for express bus riders.
- **Secure bike parking** and **bike share** stations.
- Complementary services, such as **intercity bus service**, **taxis**, **university shuttles**, **corporate shuttles**, and new types of ridesharing services such as **Zipcar**, **Uber**, and **Lyft**.

Transit centers can also provide other features such as indoor waiting facilities, Wi-Fi, concessions, and joint development (see Figure 12).

FIGURE 12 | FREDERICKSBURG, VA TRANSIT CENTER

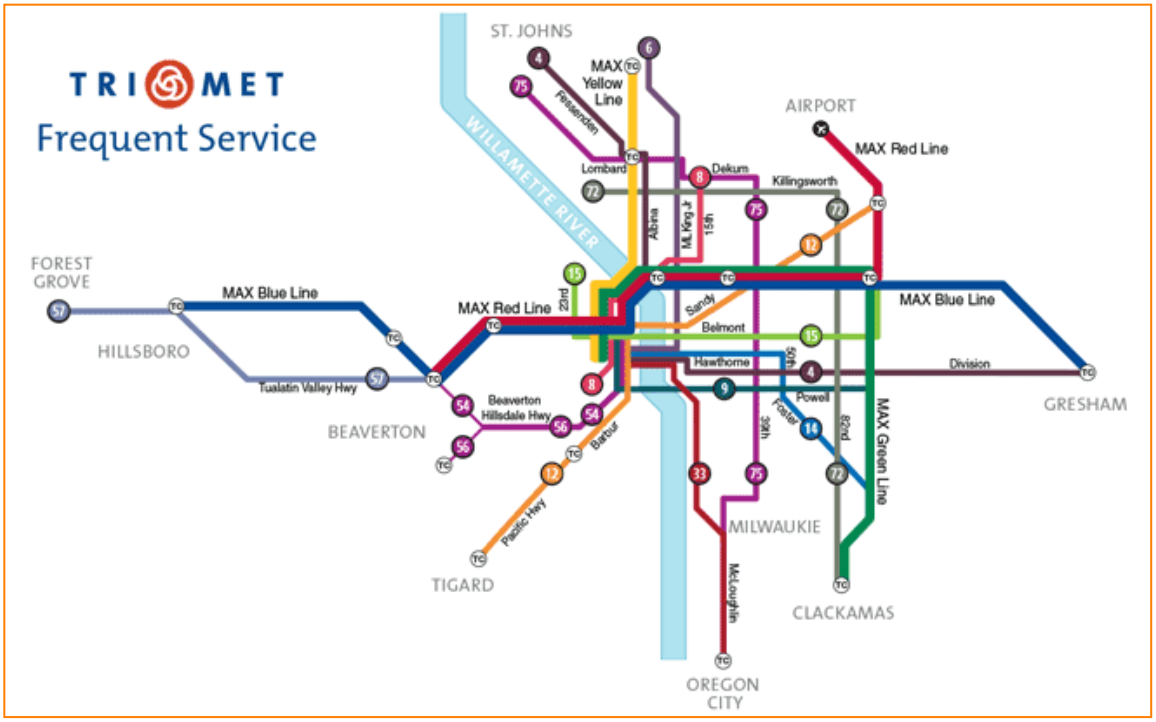
BOULDER, CO TRANSIT CENTER

DEVELOP A FREQUENT SERVICE NETWORK

Transit is most attractive when it is frequent enough that people don't need to consult a timetable and can instead just go to a stop and know that the train or bus will arrive shortly. Nearly all major transit systems operate networks of frequent services. At very large transit systems, these are often comprised of rapid

transit and light rail lines that are supplemented with frequent bus services. For transit systems that have either a limited number of rail lines or are bus-only, Frequent Service Networks are comprised either largely or exclusively of bus services (see Figure 13).

FIGURE 13 | PORTLAND, OR FREQUENT TRANSIT NETWORK

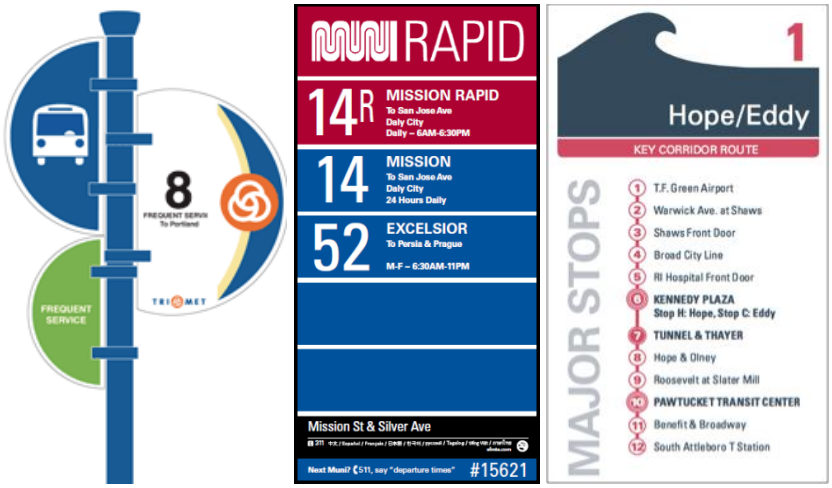


Frequent Service Networks are designed to provide convenient service between an area's most important destinations and consist of a number of inter-related elements that are designed to make service more convenient, connected, and memorable:

- Frequent service, typically every 10 or 15 minutes or less from the beginning of the AM peak to early evening or later
- A sufficient number of routes to create a network that serves all high-demand locations
- Direct routes that operate along major arterials, consisting of combination of rapid transit, light rail, BRT, Rapid Bus, and local bus routes, and sometimes consisting entirely of local bus routes

Frequent Transit Networks are also designed to be simple and memorable, typically through the use of special branding (see Figure 14), Frequent Transit Network maps, simple service structures, and simple schedules.

FIGURE 14 | USE OF BRANDING FOR FREQUENT SERVICES (PORTLAND, SAN FRANCISCO, AND PROVIDENCE)



The development of a Frequent Transit Network for the Nashville area will be one of the most important elements in the development of Middle Tennessee's transit future. NashvilleNext's preferred future envisions more focused development, especially along major corridors. These changes will enable transit to become more effective, increase the demand for transit, and provide a foundation for the development of a Frequent Service Network.

DEVELOP HIGH CAPACITY TRANSIT SERVICES AND PREMIUM SERVICES

Today, RTA operates Music City Star commuter rail services and Nashville MTA operates three "BRT lite" routes. Other services consist primarily of "regular" local bus service. To develop more compelling transit services, Nashville MTA and RTA will need to develop more High Capacity Transit and premium services that could consist of:

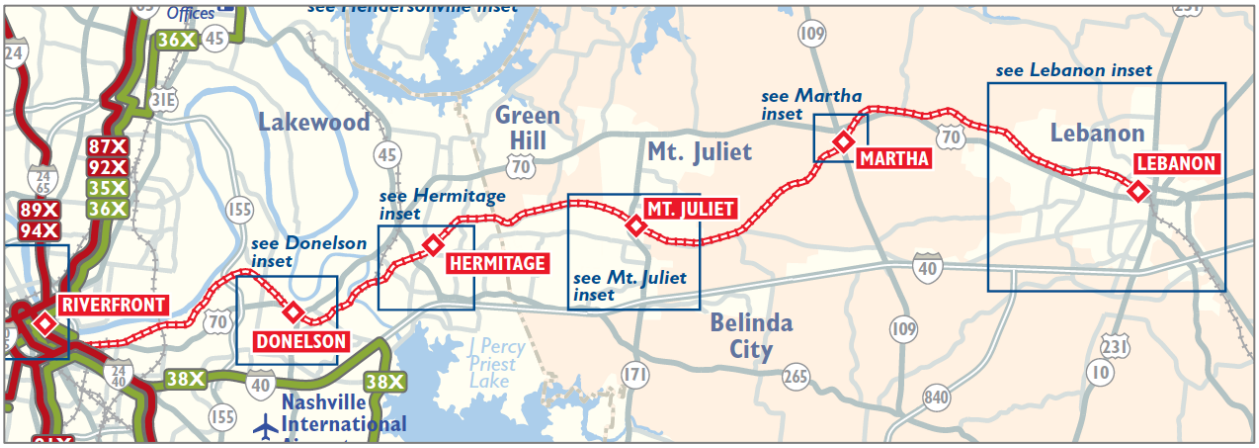
- Commuter rail
- Light rail
- Bus Rapid Transit (BRT)
- Rapid Bus (BRT without exclusive bus lanes)
- Streetcar
- Freeway BRT
- Express bus
- Airport service

COMMUTER RAIL

Commuter rail is intended to carry large volumes of passengers with stations typically spaced three to five miles apart. It is usually, although not always, oriented toward peak-period travel and typically serves suburban residents commuting to downtown employment centers.

RTA currently operates the Music City Star commuter rail, which provides service between Lebanon and downtown Nashville (see Figure 15). RTA is currently examining transit improvements for the northwest corridor between Clarksville and Nashville, with one alternative being commuter rail. There is also a significant amount of interest in developing commuter rail in additional corridors.

FIGURE 15 | MUSIC CITY STAR SERVICE



LIGHT RAIL

Light rail transit (LRT) provides urban rail service that operates in a combination of exclusive rights-of-ways and mixed traffic. It is typically operated with one to three car trains (with each car accommodating 150 to 220 riders) and is designed to serve high volume corridors at moderate speeds for shorter distances than commuter rail. Stations are usually spaced at half-mile intervals to allow the vehicles to reach higher speeds, but are often spaced more closely, particularly within downtown areas. LRT systems operate with overhead catenary wires and poles required for electrification.

FIGURE 16 | CHARLOTTE LYNX LIGHT RAIL

The Nashville Area MPO's 2035 Regional Transportation Plan (RTP) presents the northeast, southeast, and south corridors as rapid transit corridors that could be potential light rail corridors. Each of these would be long light rail lines that would serve RTA counties as well as trips within Davidson County. There would also be the potential for shorter lines within Davidson County, although possible alignments have not yet been identified.

BUS RAPID TRANSIT

Nearly 200 cities throughout the world have developed Bus Rapid Transit (BRT) services that have made bus service much more attractive and greatly increased ridership. BRT has become popular for a large number of reasons:

- **Service Quality:** BRT is faster, more convenient, more comfortable, and more attractive than regular bus service.
- **Higher Ridership:** Because it is more attractive than "regular" bus service, BRT can significantly increase ridership. The introduction of BRT lines, such as Boston's Washington Street Silver Line and Cleveland's Healthline, has produced very high ridership increases in many cities.
- **Affordability:** The cost to construct a full-featured BRT system is typically less than half the cost of light rail, and operating costs are not significantly higher than regular bus service.
- **Image:** Well-branded BRT services attract favorable attention for both the BRT service and also for other available transit services.

One major advantage that BRT has over light rail is that service can operate beyond the ends of the BRT facilities. For example, BRT can provide its own "feeder" service by operating locally from beyond the BRT line to the start of the BRT facilities.

Beyond the service that is provided, BRT also combines a number of physical elements that work together to produce attractive and compelling service (see Figure 17):

FIGURE 17 | CLEVELAND HEALTHLINE BRT

- **Unique Identity** to increase the service's visibility and differentiate it from "regular" bus service.
- **Special Vehicles** that provide greater comfort, reinforce the unique identify, and help differentiate the BRT service from regular bus service.
- **Exclusive Bus Running Ways**—dedicated rights-of-way and reserved lanes on existing roads—to allow buses to avoid the delays experienced in mixed-traffic operations.
- **Transit Signal Priority,** such as signal priority and queue jump lanes, to speed buses through intersections.

- **BRT Stations** that provide similar features, amenities, and levels of passenger comfort as rail stations.
- **Level Boarding** via the use of either high-platform stations or low-floor buses to reduce dwell times and facilitate boardings and alightings by people with disabilities.
- **Pre-Paid Fare Collection** via either pre-paid passes or the sale of tickets from ticket vending machines at stations and stops to eliminate delays associated with on-board fare collection.
- **Real-Time Passenger Information** to inform passengers when buses will actually arrive at or depart from stations, which reduces much of the uncertainty that is associated with bus service.
- **Intelligent Transportation System Technologies** such as automatic vehicle location, which can be used to maintain consistent spacing between buses to keep them on schedule.
- **Effective Connections** with other transit and surrounding areas.

BRT can be developed in a wide variety of ways. Previous plans for the AMP are one example of full-featured BRT. Other approaches are to use outside lanes rather than median lanes to avoid the need to restrict left turns; hybrid solutions in which curb lanes are used for buses during peak periods and for parking at other times; and forgoing bus lanes in some areas. A particular focus of nMotion is to identify High Capacity Transit options for major corridors in Nashville that local communities will support.

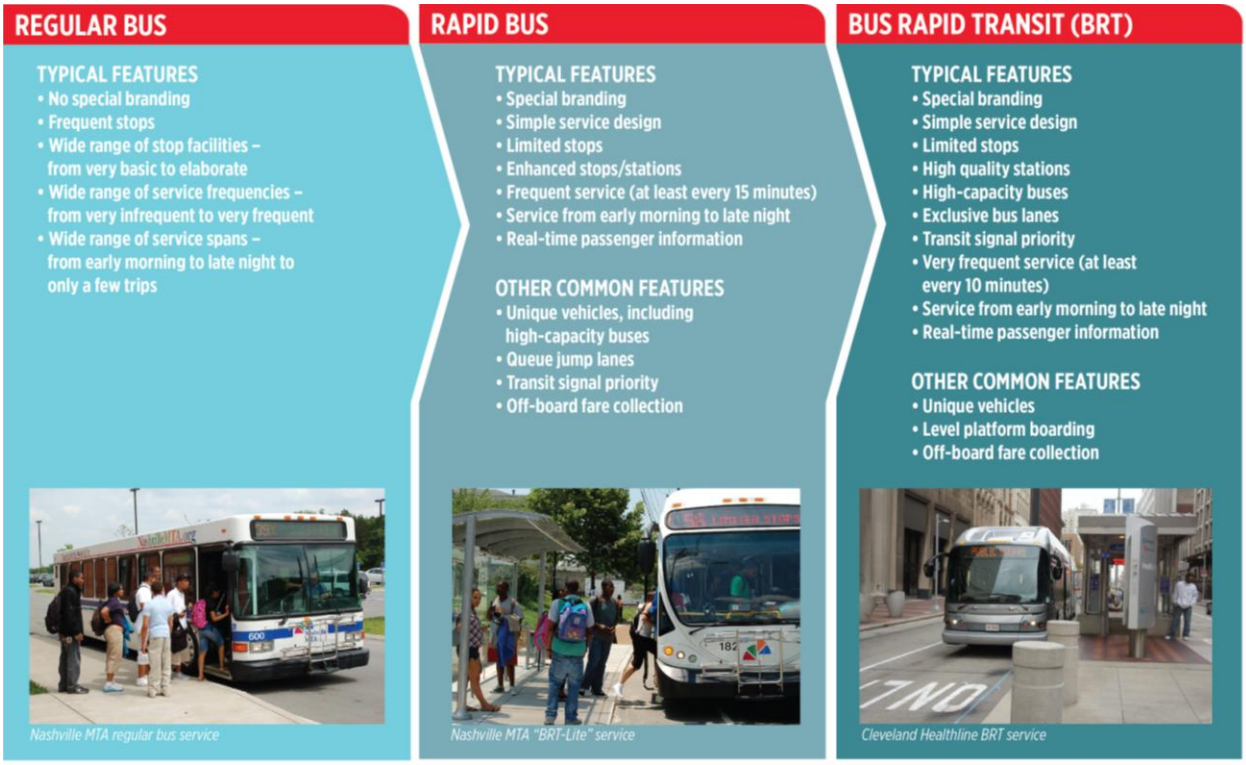
RAPID BUS

In order to provide many of the benefits of BRT service more quickly and affordably, many transit systems have begun providing "Rapid Bus" service. Examples include Nashville MTA'S "BRT lite" service. Rapid Bus service includes the elements of BRT that can be implemented without exclusive bus lanes and those that can be implemented at a lower coast and in a much shorter time frame. Rapid Bus can also be a first step toward full BRT.

Whereas BRT represents a middle ground between light rail service and regular bus service, Rapid Bus represents a middle ground between BRT and regular bus (see Figure 18). The travel time benefits of Rapid Bus are not as significant as with BRT but are still meaningful compared to regular bus service:

- **Service Quality:** Rapid Bus is faster, more convenient, more comfortable, and more attractive than regular bus service.
- **Higher Ridership:** Because it is more attractive, Rapid Bus can significantly increase ridership. LA Metro's first two Metro Rapid lines increased ridership by 49%, AC Transit's Rapid service on San Pablo Avenue increased ridership by 66%, and Kansas City's first MAX line increased ridership by over 50%.
- **Very Affordable:** The cost to implement Rapid Bus service is relatively low and consists of moderately higher costs for vehicles and premium stations/stops. Operating cost increases can be limited to the additional service required to serve new riders.
- **Image:** Well-branded Rapid Bus services, like BRT, attract favorable attention to themselves and also to other available transit services.

FIGURE 18 | REGULAR BUS VS. RAPID BUS VS. BUS RAPID TRANSIT



STREETCAR

Over the past decade, streetcar service has become increasingly popular. There are now over 45 different lines in various stages of development throughout the United States. The current desire to develop streetcar service is for two reasons. First, newer, shorter lines have proven to be very effective at serving shorter trips within neighborhoods and downtowns, adding a new type of transit service that can fill gaps in existing bus services. Second, streetcar has been very effective in stimulating development. Most new streetcar services are being developed to both stimulate development and improve transportation.

FIGURE 19 | SEATTLE SOUTH LAKE UNION STREETCAR

In most respects, streetcar service is scaled-down light rail service that typically operates in mixed traffic rather than in a dedicated right-of-way, for shorter distances, and with smaller stations that are spaced more closely together. An overview of common differences is shown in Table 1.

TABLE 1 | TYPICAL DIFFERENCES BETWEEN STREETCAR AND LIGHT RAIL

Service Element	Streetcar	Light Rail
Vehicles	Modern or historic streetcar	Modern light rail vehicle
Train Length	1 car	2 to 3 cars
Line Length	Shorter	Longer
Running Way	Mixed traffic	Dedicated right-of-way
Fare Collection	On station platform or on vehicle	On station platform
Stations	Short platforms; modest facilities	Long platforms; significant facilities
Station Spacing	2 to 3 blocks	½ to 1 mile
Speed	Slower	Faster
Development Benefits	Along line	Around stations
Construction Impacts	Minor to moderate	Major

Potential streetcar alignments have not yet been identified for Nashville, but based on how streetcar has been implemented in other cities, potential alignments could include East Nashville to downtown Nashville and between Vanderbilt and downtown.

FREEWAY BRT/BUS ON SHOULDER

As described above, travel times are important for most travelers, and a disadvantage of transit is that travel times are usually longer than travel by private vehicle. However, when transit is faster or nearly as fast (for example, many rail services), large numbers of travelers will choose to travel by transit instead of by car. Thus, one of the most effective ways to encourage transit use is to make transit as fast as possible. Freeway BRT services are designed to do this, and compared to other transit services, are unique in that they:

1. Operate along freeways, either in regular traffic lanes, in high-occupancy vehicle (HOV) lanes, or along the shoulders.
2. Can have stations within the freeway right-of-way that are designed to minimize travel times by eliminating all or most of the local circulation that is required to serve stops or stations located outside of the freeway rights-of-way.

Freeway Operations

As with urban BRT, Freeway BRT can be implemented in a number of ways, including a "mix-and-match" approach along an alignment:

Service in General Traffic: With service in general traffic, no special considerations are provided for bus service, and buses operate in the same manner and at the same speed as all other traffic. Most express bus services operate in general traffic.

Service in HOV Lanes: Throughout the United States, freeway bus services operate in HOV lanes. One challenge for these services is that most HOV lanes are the leftmost lanes, which requires buses to weave across all lanes of traffic to serve stops that are off the highway. To avoid this situation, transit stations are now being constructed in freeway medians where they can be easily accessed from HOV lanes.

Shoulder Running: Twelve states[1] have implemented policies that permit buses to operate on selected freeway shoulders in order to speed service, and more are now considering it. These policies permit buses to operate on selected freeway and arterial shoulders in order to bypass congestion and maintain transit schedules. Bus-on-shoulder operation is a low-cost way to make freeway transit service faster and more reliable.

Bus-on-shoulder operations were first implemented in Minnesota more than 20 years ago. Minnesota now uses 300 shoulder-miles and cites a number of benefits with bus-on-shoulder operation, including:

- Shorter and more predictable and reliable transit times
- Fewer missed transfer connections
- Increased transit ridership
- Reduced driver overtime
- Decreased operating costs

While there are often perceived safety issues with shoulder operations—particularly with respect to the potential for conflict with stalled vehicles or vehicles entering or exiting the highway in front of the path of a shoulder-running bus—there has been only one injury-crash attributed to shoulder-running buses in Minnesota since 1992. Furthermore, no state that has implemented shoulder-running policies has ever discontinued them.

Freeway Bus Stops and Stations

One of the most time-consuming aspects of freeway bus service can be the time it takes to get off and on the freeway in order to serve local stops. To reduce these delays, many areas have developed stops and stations that are located directly along freeways, and most have been "retrofitted" into existing freeways. In general, there are three types of freeway stops and stations:

1. Stops located along freeway shoulders
2. Stops located along freeway interchange ramps
3. Stops located in freeway medians (see Figure 20)

Both Nashville MTA and RTA currently operate express bus service in most of Middle Tennessee's radial interstate corridors, in particular on I-24 and I-65 from the south and I-24/I-65 from the north. The development of Freeway BRT and/or bus-on-shoulder operations could make these services faster, more reliable, and more competitive with automobile travel.

In addition, most of the express routes provide limited service to a limited number of places. The development of stations along freeways could provide the ability to serve more locations with fewer routes, which would mean more service to areas that now receive only very limited service. This approach could also provide the opportunity to consolidate some Nashville MTA and RTA express routes.

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[1] California, Delaware, Florida, Georgia, Illinois, Maryland, Minnesota, New Jersey, North Carolina, Ohio, Virginia, and Washington have shoulder-running policies.

FIGURE 20 | MINNEAPOLIS MEDIAN STATION ON I-35W

EXPRESS BUS

As described above, both Nashville MTA and RTA provide express bus service to and from downtown Nashville from many points in Middle Tennessee. There are a number of potential improvements that could be made to existing express services, and new services could be implemented.

Improvements to existing express routes could include:

Longer Service Spans: Most express routes provide only two or three trips during the AM and PM peak, and schedules are designed to accommodate early work schedules (with end times before 5:00 PM). Providing more trips and later service would give existing riders more flexibility and serve riders with a greater variety of work schedules.

Develop Park-and-Ride Lots at More Convenient Locations: At present, most park-and-ride lots have been located in places where local businesses, institutions, or organizations are amenable to sharing their parking with commuters rather than in locations that facilitate access. The development of dedicated transit facilities at more convenient locations would be an additional way to attract new riders and make express bus travel times more competitive with automobiles.

With respect to new services, the Nashville Area MPO's RTP envisions new express bus routes between Portland and Nashville, Columbia and Nashville, and Lebanon and Franklin.

AIRPORT SERVICE

Air travelers have unique transit demands in terms of when they travel, how they value time versus price, and their familiarity, or lack thereof, with local transit services. Air travelers are more time sensitive than price sensitive, and above all, they want reliable, predictable service to and from the airport. Air travelers also tend to travel to and from the airport outside of traditional peak service hours—based upon flight departure and arrival times—and need transit service during off-peak hours and on weekends. Finally, because time savings and predictability are both highly valued by air travelers, they prefer transit service that provides direct service between the airport and their origin or destination.

The most effective airport services provide fast and frequent service seven days a week from early until late. Many services focus on downtown, while others provide service to regional hubs and university

areas. In addition, vehicle designs should account for the fact that air travelers are likely to have luggage and other bulky items. Finally, special branding of airport services increases the visibility of service and makes it easier for first-time users to learn about it and find it (see Figure 21).

FIGURE 21 | AUSTIN AIRPORT TO DOWNTOWN BUS

Nashville MTA currently provides service between the airport and downtown, including to downtown hotels. However, it is a mix of express and local service that sometimes provides very fast and convenient service between the two locations and other times provides much slower and indirect service. The development of dedicated premium service could make the use of transit to and from the airport much more attractive for both employees and travelers.

IMPROVE ACCESS TO TRANSIT

PEDESTRIAN ACCESS

The pedestrian environment is the foundation for good access to public transit and is critical for attracting new riders, increasing ridership among existing passengers, and improving the overall travel experience. Since every rider begins and ends a transit trip as a pedestrian, the quality of the pedestrian environment is an important part of the trip and can be a deciding factor when choosing whether to take transit at all, especially for those with the option to drive.

Improving the pedestrian environment is conducive to transit ridership in general, but concentrating these improvements in the vicinity of transit facilities is especially important so that transit riders can get to and from stops. This issue is critical in Middle Tennessee, as many of the highest ridership routes—and potential High Capacity Transit services—operate along major arterials that have poor pedestrian environments and that are very difficult to cross (see Figure 22).

FIGURE 22 | NOLENSVILLE PIKE (POTENTIAL HIGH CAPACITY TRANSIT CORRIDOR)

FIRST MILE/LAST MILE CONNECTIONS

One of the greatest challenges faced by transit agencies and customers is making the connection between the starting point of the trip and the transit stop ("first mile"), or between the transit stop and the ending point of their trip ("last mile"). In some cases, passengers have a simple walk of just a few blocks, but in many other cases, fixed-route service may end too far from a destination to walk or at a point where a lack of pedestrian infrastructure makes it too difficult to walk. There are a variety of approaches available to address the "first mile/last mile" challenge, and the best approach for Middle Tennessee is likely to be a combination of public and private solutions.

In some jurisdictions, transit agencies play a significant role in ensuring the first mile/last mile connection is met, providing services specifically tailored to meet this need. The FlexBus in Orlando, operated by LYNX, is one example of a transit agency filling this role. Another important type of connection that is increasingly being provided by cities is bike share, which Nashville is already pursuing with the Nashville B-cycle system. The private sector offers additional strategies, including transportation network companies (such as Uber and Lyft) and car-sharing companies (such as Car2Go).

PARK-AND-RIDE ACCESS

As described above in the Outlying Transit Centers and Express Bus sections, there are opportunities to improve park-and-ride access by developing park-and-ride lots at more convenient locations and at new transit centers.

BETTER FACILITIES AND AMENITIES

Waiting for the bus is a significant part of nearly every bus rider's transit experience. If bus stops provide a comfortable waiting environment, people are more likely to use transit. Conversely, if bus stops do not provide a comfortable environment, people are less likely to use transit. Not surprisingly, research 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 “the cost of better amenities is often more than offset by increased ridership.”

In all transit systems, different stops serve different purposes and different volumes of passengers. It is accepted that the most important stops need to be well designed, attractive, comfortable, and convenient. However, other stops receive much less planning, fewer resources, and less attention to design, with the result that these stops are often located in inconvenient locations and/or provide fewer amenities than may be warranted.

Currently, Nashville MTA provides high-quality stop facilities on its BRT lite routes with shelters, real-time information, and other amenities (see Figure 23). There are many stops with shelters in and around downtown, but as the distance from downtown increases, the number of shelters generally decreases. The same is also true of benches. At this time, there is not a strong relationship between ridership levels and the stop facilities provided.

FIGURE 23 | NASHVILLE MTA BRT LITE STOP

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 major downtown stops (see Figure 24)—and only basic amenities (such as bus stop signs) are provided at very low-volume stops.

FIGURE 24 | PORTLAND, OR SUPERSTOP

Rather than determine which amenities should be provided at which stop on a stop-by-stop basis, Nashville MTA and RTA could adopt a more systematic approach that consists of a hierarchy of stops based on relative importance. The level of amenities that should be provided is then based upon that hierarchy (see Table 2). For example, basic stops that serve relatively few riders would consist simply of a bus stop sign with bus route information and, if possible, a paved waiting area, lighting, and a trash receptacle. At the other end of the spectrum, major regional portals would be uniquely designed and would include a full range of amenities, such as local area information and real-time passenger information.

TABLE 2 | EXAMPLE STOP HIERARCHY AND ASSOCIATED FACILITIES

	Transit Centers	HCT Stops	High Volume Stops	Medium Volume Stops	Low Volume Stops
Station/stop signage	√	√	√	√	√
Lighting	√	√	√	√	√
Seating	√	√	√	√	√
Paved, accessible area	√	√	√	√	√
Bus berths/pullout(s)	√	√	√	√	
Standard shelter without art				√	
Standard shelter with art			√	√	
Custom shelter with art	√	√	√		
Bike rack or enclosure	√	√	√	√	
Route maps	√	√	√	√	
Trash can	√	√	√	√	
Transit system map	√	√	√		
Schedule information	√	√	√		
Real-time information	√	√			
Ticket vending machines	√	√			
Unique design	√	√			
Landscaping	√	√			
Public art	√	√			
Passenger drop-off area	√	Possible			
Local area information/maps	√	Possible			
Enclosed waiting area	Possible				
Restrooms	Possible				

MAKE SERVICE EASIER TO UNDERSTAND AND USE

PRESENT NASVHILLE MTA AND RTA SERVICES AS PART OF A UNIFIED BRAND

Currently, Nashville MTA and RTA services are presented differently to the public because they are two different agencies. This means that riders need to go to different websites to find information and services are branded differently. However, some areas with multiple transit providers present all services as part

of a single, cohesive system. One of the best examples comes from the Phoenix area, where the services provided by four different agencies are all presented to the public as Valley Metro, and most passengers view the services as part of a single system. Presenting Nashville MTA and RTA services as part of a single system could help to communicate that the sum is greater than the individual parts.

Rebranding can also help increase awareness of service and improvements. In Oklahoma City, in conjunction with the introduction of streetcar service, the transit system was renamed EMBARK (from METRO), and the system brand was also updated (see Figure 25). The rebranding was undertaken as part of efforts to improve the system's image and attract more choice riders.

FIGURE 25 | OKLAHOMA CITY EMBARK REBRANDING

In Little Rock, the Central Arkansas Transit Authority (CATA) is in the process of rebranding as Rock Region Metro (see Figure 26). This is being done as part of a systemwide strategic plan and service redesign and is intended to help communicate the system improvements to the public and to address the perception that the agency only provides service for low-income residents or those who have no other transportation options. In tandem with a redesign of service and other improvements, the system's new branding is also geared toward making transit more attractive to choice riders.

FIGURE 26 | LITTLE ROCK REBRANDING

REBRAND INDIVIDUAL SERVICES

Many systems brand individual services, either for specific services or for entire "families of services." The most common reason to brand individual services is to draw attention to the services and differentiate

them from other services. Typically, the special branding is used widely, on informational materials, stops, and buses (see Figure 27).

FIGURE 27 | NEW JERSEY TRANSIT GO BUS BRANDING

Nashville MTA currently uses special branding for two of its services: "BRT lite" for Rapid Bus service that operates in the Charlotte, Gallatin, and Murfreesboro corridors, and "Music City Circuit" for three circulator routes that operate through downtown Nashville. Music City Circuit buses are also specially branded (see Figure 28), but BRT lite buses are not.

FIGURE 28 | MUSIC CITY CIRCUIT VEHICLE

Nashville MTA's "BRT lite" moniker undersells the service that is provided. Most transit systems use names that present the message that service is better than regular bus service. For example, Kansas City and Las Vegas use the name "MAX," Albany uses the name "Bus Plus", and San Antonio uses the name "Primo." Other systems incorporate speed into the name. In Oakland, AC Transit uses the name Rapid, and in Los Angeles, LA Metro uses the name "Metro Rapid."

Conversely, the BRT lite name is based on an industry term (BRT) that is unfamiliar to most people, and the term "lite" implies something less rather than something better. As Nashville MTA upgrades additional routes to "BRT lite," a comprehensive rebranding used on buses, at stations, and on other materials could heighten awareness of the service and its benefits.

PROVIDE EXCELLENT INFORMATION

For people to use transit, they must first know that it is available and understand how to use it. Therefore, it is extremely important for transit systems to provide clear and concise information about their services. Furthermore, transit typically serves a very broad cross-section of an area's residents, workers, and visitors. Because different people access, use, and process information in different ways, transit systems must deliver information in a variety of ways. For example, some older adults may not be comfortable accessing information online, so providing information on a website will help many older residents. For this reason, telephone and printed information must be provided as well. At the same time, telephone and printed information will not reach many younger riders, who rely primarily on the internet. Thus, web-based information must be provided as well. For transit systems to reach their customers, it is essential that they provide effective information in ways that will reach all potential riders.

Basic Types of Public Information and Delivery Methods

There are two types of basic service information that all transit systems provide:

1. Route and schedule information (maps, schedules, and information on connections)
2. Basic information on how to ride (fare policy, stop locations, accommodation for riders with disabilities, accommodation for bicycles)

These types of information are delivered in a variety of ways (see Figure 29):

- Traditional delivery methods include printed maps, schedule cards, and "rider guides." These are often distributed onboard buses and at key transit locations.
- As with most non-transit information, the majority of distribution has moved to the internet. Nearly all transit systems now provide service information on their websites where people can either view it electronically or print it.
- Third-party distribution systems have also become increasingly common. Most major transit systems now present route and schedule information through Google Transit, and smaller transit systems are also moving in this direction. Nashville MTA also provides schedule information in this way. It is now common for transit systems to make their Google Transit data publicly available for use in the development of third-party smart phone apps.
- In addition, transit systems are increasingly providing real-time service information, and people now expect it. This information can be provided via signage at stations and stops, via traditional websites, and via mobile websites and smart phone apps.

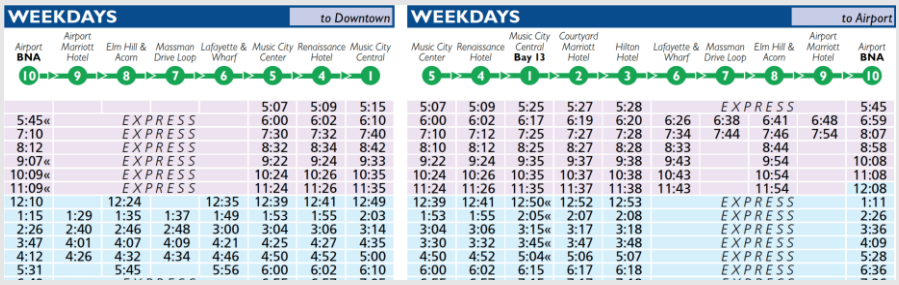
Both Nashville MTA and RTA provide information in a variety of ways. The most significant omission is the lack of real-time passenger information, which Nashville MTA and RTA will roll out in late 2015, with the exception of RTA buses operated by GrayLine. This information will be published on the agencies' websites and made available to third-party developers.

A second issue, as described above, is that information on Nashville MTA and RTA services is provided separately, which makes it more difficult than necessary to understand the overall system. Looking forward, the ways that transit information is provided will likely continue to evolve rapidly, and Nashville MTA and RTA will need to update the ways that information is provided on a regular basis.

FIGURE 29 | PUBLIC INFORMATION EXAMPLES

System Map
(RTA of Middle Tennessee)

Printed Schedules and Route Maps
(Nashville MTA)



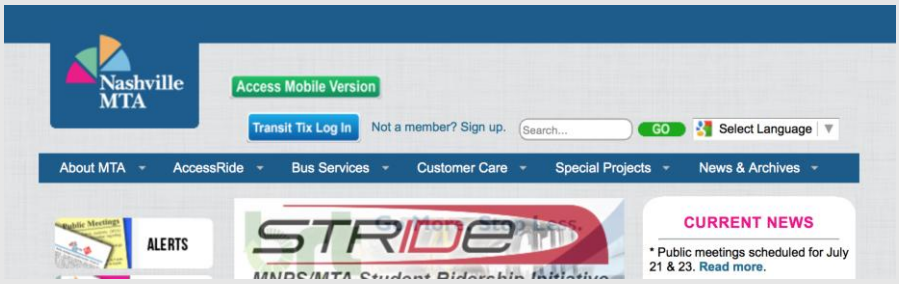
WEEKDAYS — to Downtown

Airport BNA (10)	Airport Marriott Hotel (9)	Elm Hill & Acorn (8)	Massman Drive Loop (7)	Lafayette & Wharf (6)	Music City Center (5)	Renaissance Hotel (4)	Music City Central (1)
					5:07	5:09	5:15
5:45«		EXPRESS			6:00	6:02	6:10
7:10		EXPRESS			7:30	7:32	7:40
8:12		EXPRESS			8:32	8:34	8:42
9:07«		EXPRESS			9:22	9:24	9:33
10:09«		EXPRESS			10:24	10:26	10:35
11:09«		EXPRESS			11:24	11:26	11:35
12:10		12:24		12:35	12:39	12:41	12:49
1:15	1:29	1:35	1:37	1:49	1:53	1:55	2:03
2:26	2:40	2:46	2:48	3:00	3:04	3:06	3:14
3:47	4:01	4:07	4:09	4:21	4:25	4:27	4:35
4:12	4:26	4:32	4:34	4:46	4:50	4:52	5:00
5:31		5:45		5:56	6:00	6:02	6:10

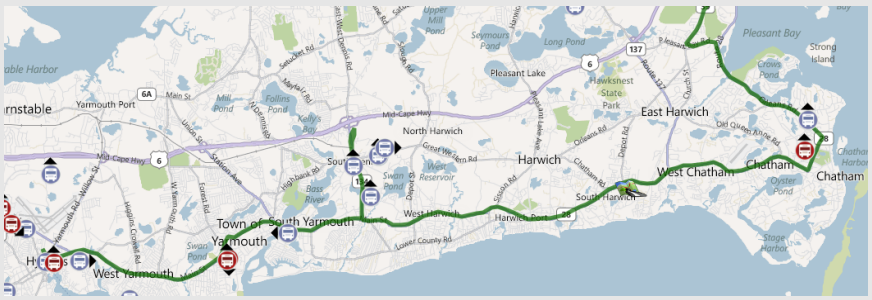
WEEKDAYS — to Airport

Music City Center (5)	Renaissance Hotel (4)	Music City Central Bay 13 (1)	Courtyard Marriott Hotel (2)	Hilton Hotel (3)	Lafayette & Wharf (6)	Massman Drive Loop (7)	Elm Hill & Acorn (8)	Airport Marriott Hotel (9)	Airport BNA (10)
5:07	5:09	5:25	5:27	5:28			EXPRESS		5:45
6:00	6:02	6:17	6:19	6:20	6:26	6:38	6:41	6:48	6:59
7:10	7:12	7:25	7:27	7:28	7:34	7:44	7:46	7:54	8:07
8:10	8:12	8:25	8:27	8:28	8:33		8:44		8:58
9:22	9:24	9:35	9:37	9:38	9:43		9:54		10:08
10:24	10:26	10:35	10:37	10:38	10:43		10:54		11:08
11:24	11:26	11:35	11:37	11:38	11:43		11:54		12:08
12:39	12:41	12:50«	12:52	12:53			EXPRESS		1:11
1:53	1:55	2:05«	2:07	2:08			EXPRESS		2:26
3:04	3:06	3:15«	3:17	3:18			EXPRESS		3:36
3:30	3:32	3:45«	3:47	3:48			EXPRESS		4:09
4:50	4:52	5:04«	5:06	5:07			EXPRESS		5:28
6:00	6:02	6:15	6:17	6:18			EXPRESS		6:36

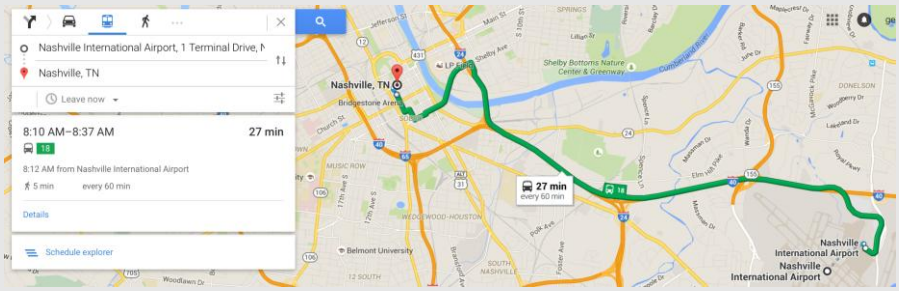
Website
(Nashville MTA)



Real-Time Information
(Cape Cod Regional Transit Authority)



Google Transit
(Nashville MTA)



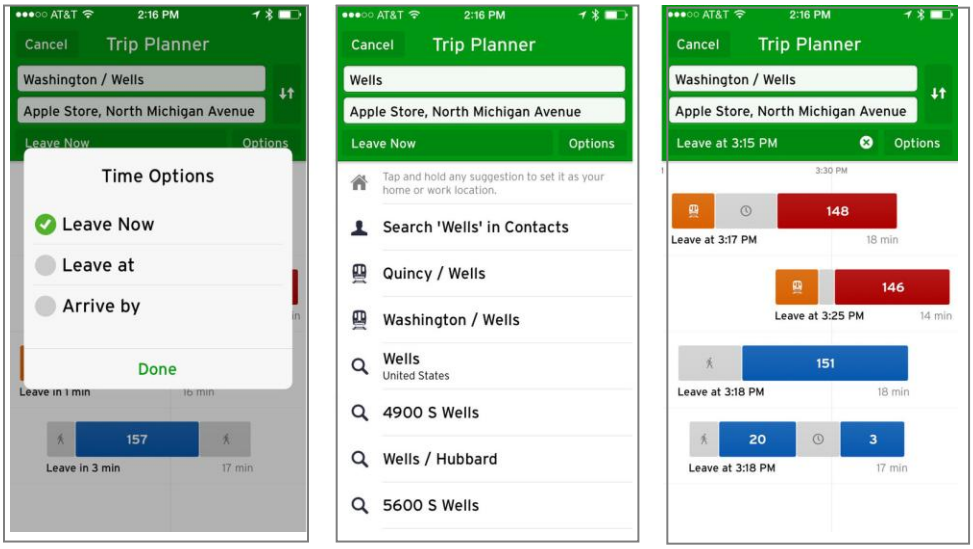
ADOPT NEW TECHNOLOGIES

Transit technologies are advancing rapidly, from the development of new types of vehicles, to widely available real-time passenger information, to fare payment. Transit systems have historically been slow to adapt to new technologies; for example, transit is one of the only remaining industries that requires payment with exact change. This has been the case for many reasons, including cost, limited resources and expertise, and, sometimes, resistance to change.

However, new technologies provide the opportunity to make service more convenient to use, reduce costs, and provide service in a more environmentally-friendly manner. In addition, there is increasing interest from the private sector in developing and providing services, such as mobile apps that provide transit information. There appears to be the greatest potential to adopt new technologies in the following areas:

- Schedule and real-time information via third party websites (for example, Google Maps) and mobile apps (for example, Google Maps, Transit App, Transit [see Figure 30], and Route Scout).

FIGURE 30 | TRANSIT IPHONE APP



- Schedule and real-time information via text messaging for those without smart phones.
- Real-time information at major stations and stops.
- On-demand scheduling of paratransit trips.
- New vehicle technologies, such as all-electric buses, which Nashville MTA will introduce on Music City Circuit routes.
- Partnerships with private companies to provide first mile/last mile connections.
- New fare payment options, including ticket vending machines and mobile fare payment (see
- Figure 31).

FIGURE 31 | GOPASS MOBILE TICKETING

SUMMARY

As described above, there are many ways to improve service:

- Improve existing services
- Expand service to new areas
- Develop a Frequent Transit Network
- Develop High Capacity Transit services and premium services
- Improve access to transit
- Provide better facilities and amenities
- Make transit easier to understand and use

The opportunities presented in this document are not intended to represent an all-inclusive list of possible improvements; instead, they are an initial look at those that could provide the highest value for Nashville MTA and RTA of Middle Tennessee. They are also opportunities that reflect the most important desires expressed by stakeholders—that service should be convenient, dependable, frequent, and safe.

The next steps in the development of potential strategies will be to:

- Present this overview to stakeholders for feedback and make revisions as appropriate—for example, add new strategies, expand on those presented in this document, and potentially eliminate some strategies.
- Produce a series of strategy documents that (1) describe each strategy in more detail, (2) describe how these approaches are used elsewhere, and (3) describe how they could potentially be implemented in Middle Tennessee.
- Conduct additional civic engagement on the individual strategy documents.

Following review of the strategies, the nMotion team will develop service scenarios based on these strategies, and those will also be presented to the public for review and comment.