



Rhode Island Public Transit Authority  
**COMPREHENSIVE OPERATIONAL ANALYSIS**

# OVERVIEW OF POTENTIAL CHANGES

4/15/2013





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# OVERVIEW OF POTENTIAL CHANGES

## INTRODUCTION

Places are always changing, and this has especially been the case in Rhode Island, where Providence has undergone one of the most successful transformations of a small American City. As this transformation has occurred, in the Providence area and throughout the state, population and employment has grown, moved, and sometimes contracted. The places that residents, workers, and visitors travel to and from have changed, as well as the number of people who travel between these areas. The days and times that people travel have also changed.

RIPTA recognizes that transit services must periodically be reviewed to ensure they are effectively bringing people where they need to go. This detailed “Comprehensive Operational Analysis,” or “COA,” is being performed to evaluate how well RIPTA’s transit network is serving existing population, employment and activity centers around the state, as well as the overall productivity and effectiveness of individual bus routes.

RIPTA’s COA consisted of the following tasks:

- A **Market Review** that was used to identify concentrations of population and employment, as well as other activity centers that have the ability to effectively support transit services
- **Stakeholder Outreach** that consisted of interviews and meetings to discuss common objectives and perceived travel needs throughout the state
- **Customer and Non-Rider Surveys** that were conducted during the summer and fall of 2012 to identify the travel patterns and desires of more than 9,800 riders, as well as individuals who don’t currently ride RIPTA
- The development of new **Service Guidelines** that were used to determine where service should be provided, to design service, to determine appropriate service levels, and to ensure that service would meet minimum levels of productivity
- **Detailed Route Evaluations**, that consisted of in-depth analysis of the market each route is intended to serve, its ridership patterns, its strengths and opportunities for improvement that would serve more riders or improve route productivity
- **Customer and Stakeholder Input** on the route evaluations.

This information was used to develop the draft recommendation that are presented in this document. These recommendations incorporate a number of common service improvement themes that are described below, plus specific changes to each route, as described in subsequent sections. All of the changes are designed to make RIPTA services:

- Easier to use
- Easier to understand
- More convenient
- Faster and more direct



- Better aligned with customer demand

These recommendations are being presented to RIPTA riders and other stakeholders for comment. Once those comments have been received, project staff will develop final recommendations that will reflect the components of each scenario that were most favorably reviewed by stakeholders and that would provide the most effective service within RIPTA's financial abilities.

## RECOMMENDED CHANGES

Over the course of the COA, a number of common themes emerged on how to enhance service throughout the state. These themes fall into three categories:

### Service Design

- Orient the RIPTA system around a “family of services” better matched to specific needs
- Develop a Frequent Service Network
  - Rapid Bus (R-Line)
  - Key Corridor Routes
  - Transit Emphasis Corridors
- Simplify service
  - Make service faster and more direct
  - Operate service consistently/eliminate low ridership variants
- Improve hubs and develop Superstops
- Expand service to new areas
- Better integrate RIPTA and commuter rail service
- Improve express service
- Consolidate stops to speed service
- Consolidate duplicative services

### Schedule

- Operate service with regular/clockface headways
- Coordinate schedules
- Revise service frequencies and spans to better match demand
- Introduce all day scheduled Flex/fixed-route connections

### Branding & Public Information

- Renumber and rename some routes to improve legibility/avoid confusion
- Highlight Frequent Service Network
- Improve schedule brochures and maps

## SERVICE DESIGN

### Family of Services

At present, too many RIPTA routes try to do too many things, or “be all things to all people.” The most complicated routes provide a mix of local and express service, mainline arterial service and local circulator service, and part-time variants. The result is many overly complex routes with irregular schedules that are too difficult to use.

To address this, RIPTA will shift to a “family of services” approach in which different types of services will be tailored to specific markets (see Table 1). The family of services will include a variety of service types



that will be designed to better attract discretionary riders and maintain service for transit dependent riders.

**TABLE 1 | FAMILY OF BUS SERVICES**

<b>Service Type</b>	<b>Service Characteristics</b>
<b>Rapid Bus</b>	<i>Frequent, limited stop service using distinct vehicles and intelligent technology systems such as signal priority to reduce travel time.</i>
<b>Key Corridor</b>	<i>High ridership routes, that in combination with Rapid Bus routes, will form the “backbone” of the RIPTA system. These routes will operate along primary arterials and offer simple, straight, and direct service. Key corridors will also be targeted for passenger amenities, service enhancements, intersection improvements, and other enhancements</i>
<b>Urban Radial</b>	<i>Routes that operate either entirely or primarily in densely developed areas, which are where the demand for transit is the highest, and to and from either downtown Providence or downtown Pawtucket. (Most of RIPTA’s routes are urban radial routes.)</i>
<b>Non-Urban/Suburban/Crosstown</b>	<i>Routes that operate primarily outside of the Providence core and whose major function is to serve non-urban or crosstown trips. Some of these routes may be radial routes to and from Kennedy Plaza or other transit hubs, but primarily serve passengers from outside of the urban core.</i>
<b>Regional</b>	<i>Routes that provide service between Rhode Island’s major regional centers, such as Woonsocket – Providence, Newport – Providence, or URI – Providence. These routes are long routes that serve to tie much of the state together.</i>
<b>Express/Commuter</b>	<i>Routes that are designed primarily to provide commuter service to and from downtown Providence. Express routes typically make stops at designated areas such as park &amp; ride facilities and regional transit centers, then travel non-stop via highways or freeways. These routes generally operate on weekdays only, and often only during peak periods. However, depending upon demand, some express routes operate for longer hours. In addition, some local routes may also only provide commuter service.</i>
<b>Flex</b>	<i>Flexible service designed to serve lower density areas that operates within a geographically limited area (“a Flex zone”), and picks up and drops off passengers anywhere within the zone, including connecting points with fixed-route bus service for travel outside the zone.</i>

**Frequent Service Network**

Transit is most attractive when it is simple and frequent enough that people can easily learn what it does and use it without a schedule. RIPTA already has many very high ridership routes that provide frequent service, plus corridors where the total amount of service provided by multiple routes is high. RIPTA also has plans to implement streetcar service. Those existing services, new Rapid Bus (R-Line) service, plus future streetcar service, will be developed into a “Frequent Transit Network,” or FTN, that will offer frequent, reliable service in Rhode Island’s most important transit-oriented travel corridors throughout the day, every day. This network will consist of a combination of (see Table 2 and Figure 1):

- Streetcar service (future)
- Rapid Bus (currently being developed)
- Key Corridor routes that would provide frequent service seven days a week from early until late. Weekday peak period service would operate at least every 15 minutes.
- Transit Emphasis Corridors, in which the service provided by multiple routes will provide equivalent, or near-equivalent service, to that provided by Key Corridor routes (during peak periods, every 15 minutes or better).



TABLE 2 | FREQUENT TRANSIT NETWORK

Streetcar	Key Corridor Routes	Transit Emphasis Corridors
<ul style="list-style-type: none"> <li>College Hill – RI Hospital</li> </ul>	<ul style="list-style-type: none"> <li>R-Line (to replace Routes 11 Broad Street and 99 Pawtucket)</li> <li>1 Eddy Street</li> <li>20 Elmwood Avenue</li> <li>21 Reservoir Avenue</li> <li>31 Cranston Street</li> <li>42 Hope Street</li> <li>56 Chalkstone Boulevard</li> </ul>	<ul style="list-style-type: none"> <li>Dorrance Street/Eddy Street (downtown Providence)</li> <li>Washington Street (downtown Providence)</li> <li>Westminster Street</li> <li>Broadway</li> <li>Charles Street</li> <li>Elmwood Avenue</li> <li>East Side Tunnel</li> <li>Francis Street/Gaspee Street</li> </ul>

Key characteristics of the Frequent Transit Network services are that they will be:

- Fast: Service will operate on arterial streets and be as direct as possible to minimize travel times. Other actions that will be implemented to speed service will be to consolidate stops to better balance bus travel time with walk times and the implementation of transit priority measures (in the short-term for R-Line service, and over the mid-term for other routes).
- Frequent: Contingent upon RIPTA’s financial capabilities, it is intended that FTN services would operate at least every 10 to 15 minutes during weekday peak periods, and at least every 10 to 20 minutes during the midday.
- Operate from Early Morning until Late Night: FTN services would operate at least from 6:00 AM to midnight on weekdays, as well as long hours on weekends.
- Operate Every Day: FTN services would operate seven days a week.

### Simplify Service

As described above, existing RIPTA service is complex, with too many routes trying to do too many things, and too many routes operating in similar corridors in an uncoordinated manner. A major focal point of the systemwide and route-by-route recommendations are to make service simpler.

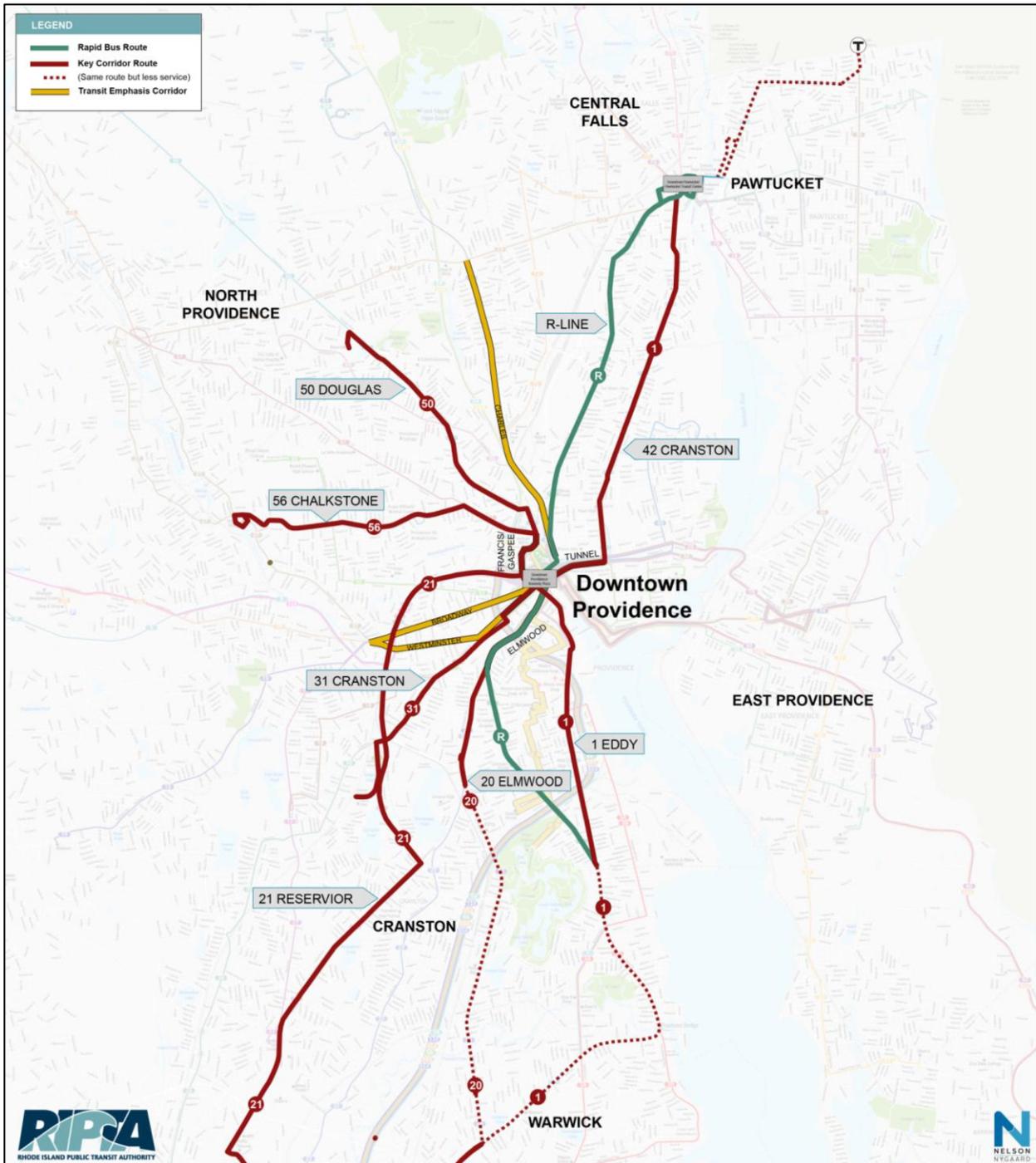
This is important because for people to use transit, they must be able to understand it, and simple route structures are easier to understand than complex route structures. As stated in TCRP’s “Traveler Response to Transportation System Changes” report,<sup>1</sup> “a readily transparent service design 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 to try the system, and once they do, the simpler route structure will help ensure that they get to where they want to 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.

<sup>1</sup> Transit Cooperative Research Program, Transportation Research Board, Chapter 11, 2003.



FIGURE 1 | FREQUENT TRANSIT NETWORK



The recommendations employ a number of strategies, and these include the following design principles:

- **Routes Should Operate Along a Direct Path:** Transit riders prefer faster, more direct transit services. In all cases, routes will be designed to operate as directly as possible unless there is a compelling reason.
- **Route Deviations/Variants Should be Minimized:** One of the biggest reasons that existing RIPTA service is sometimes complicated is that selected trips on many routes detour to off-route

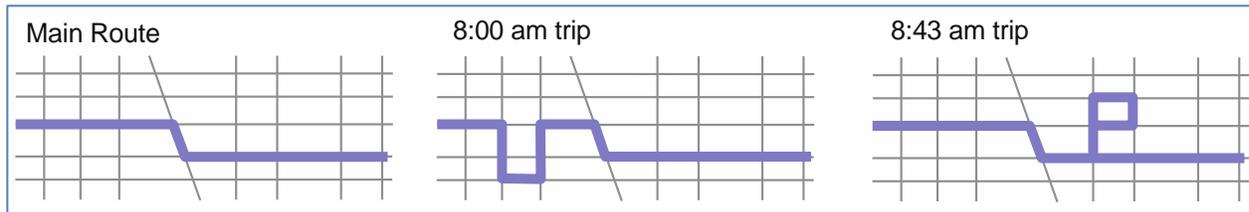


locations. These “variant” services have been added over the years largely to respond to request from users and their advocates, and have generally made service worse rather than better. Most serve very few riders (some none), and make service slower for most riders, make service complex, and create inconvenient gaps in schedules.

- **Major Transit Routes Should Operate Along Arterials:** Riders and potential transit users typically have a general knowledge of an area’s arterial road system and use that knowledge for geographic points of reference. The operation of bus service along arterials makes transit service faster and easier for riders to understand and use.
- **Routes Should be Symmetrical:** Routes should operate along the same alignment in both directions to make it easy for riders to know how to return to their trip origin location. For example, if a route follows Elmwood Avenue into downtown, it should use Elmwood Avenue on its outbound trip. Exceptions can be made in cases where such operation is not possible due to one-way streets or turn restrictions. In those cases, routes should be designed so that the opposite directions parallel each other as closely as possible.
- **Routes Should Serve Well-Defined Markets:** To make service easy to understand and to eliminate service duplication, service should be developed to serve well-defined markets. Ideally, major corridors should be served by only one route of each route type—for example, one key corridor route and one regional route, and not by multiple key corridor routes and multiple regional routes.

For RIPTA, the elimination of variants is particularly important. These have been added to the system one-by-one over many years. Most carry very few riders, and oftentimes no riders, and are the primary cause of RIPTA’s sometimes irregular schedules. As shown in the example in Figure 2, variant services, in effect, are detours off of the main route to provide front door service to locations that have requested the special service. All require additional time, and this results in gaps in service on the rest of the route after the detour. It also means that the next trip departs later, which creates a break in the regular schedule.

FIGURE 2 | VARIANT EXAMPLE



In most cases, RIPTA has provided the variant services to be responsive to community desires, and not based on actual demand. They also make service difficult to understand, and the “specialized” services drive away more potential riders than they serve.

The general approach taken in the two service scenarios is that if there is significant demand at variant locations, then all service should operate there; otherwise service should operate along the main route. The specific variants that would be discontinued are described in the individual route sheets, and in all cases, the discontinuation of the variant services will provide better service to nearly all riders on the affected routes and trips, and attract new riders.



### Improve Hubs and Superstops

Much of RIPTA’s service is already focused around transit hubs, the most notable of which are Kennedy Plaza, which is the focal point for most routes, plus the Pawtucket Transit Center and the Gateway Center in Newport. As transit needs grow outward and to new locations, transit hubs can facilitate transfers between routes and expand travel opportunities in the same manner as airline hub and spoke systems provide service to more locations.

As described below, both scenarios incorporate enhancements to existing transit hubs, plus the development of a new hub at the Warwick Mall and “superstops” at key transfer locations.

#### Kennedy Plaza

RIPTA continues to work with the City of Providence and the Greater Kennedy Plaza Working Group to improve the transit experience at Kennedy Plaza and the vitality of the Burnside Park/Kennedy Plaza area. Physical improvements will include new and improved bus berths, more space for waiting passengers, improvements to the transit building, and better public information. Service improvements will include the grouping of routes that travel in the same corridors or to the same destinations at the same or adjacent berths to make it easier for passengers to find and catch the first bus.

One of the most recent concepts for the redesign of Kennedy Plaza is illustrated in Figure 3. However, it should be noted that additional work needs to be conducted to determine whether the transit aspects would work effectively, and it is likely that changes will be made to this concept.

FIGURE 3 | KENNEDY PLAZA CONCEPTUAL PLAN (EARLY 2013)

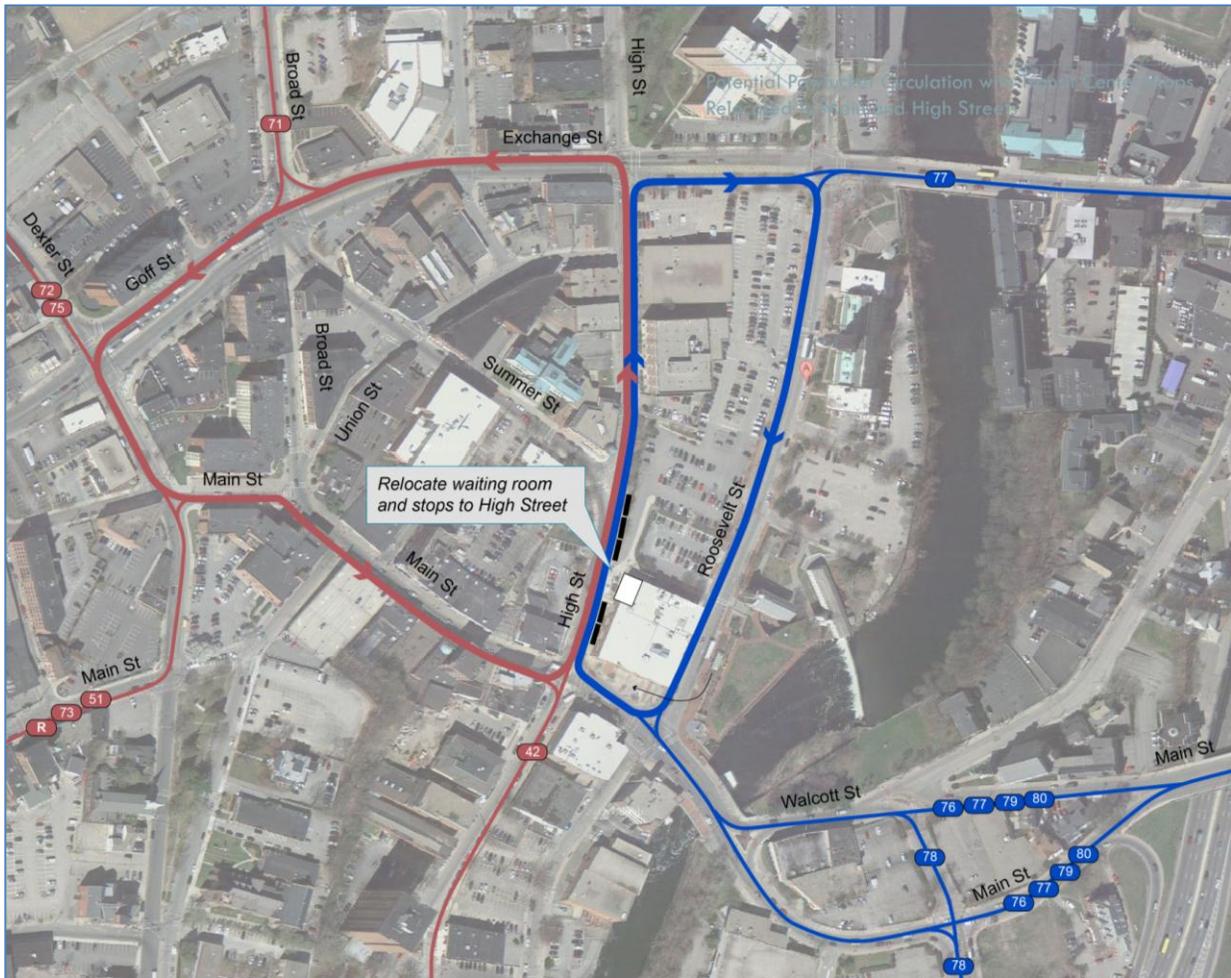


#### Pawtucket Transit Center

RIPTA is also working with the City of Pawtucket to revitalize the Pawtucket Transit Center. This will consist of relocating the waiting room, bus berths, and other facilities from Roosevelt Avenue to High Street, and reconfiguring bus circulation through downtown Pawtucket to make it more efficient (see Figure 4).



**FIGURE 4 | PROPOSED DOWNTOWN PAWTUCKET CHANGES**



**Warwick Transit Center**

In a similar manner as the transit center in the Pawtucket area is focused around the Pawtucket Transit Center, much service south of Providence would be focused around a new transit hub at the Warwick Mall (see Figure 5). This hub would be connected to downtown Providence with frequent Key Corridor service (Route 21 Reservoir) and would provide connections to other area locations.

**Superstops**

In addition to formal transit centers, there are also a number important transfer points throughout the RIPTA system. These stops will be developed as “Superstops” that will provide a much higher level of passenger amenities than regular stops (see Figure 6). Superstop locations include:

- Olneyville Square
- Garden City Center in Cranston
- Top of the Transit Tunnel on College Hill
- Six Corners in East Providence
- Additional locations to be determined as part of subsequent work



FIGURE 5 | WARWICK MALL HUB



FIGURE 6 | SUPERSTOP EXAMPLE (PORTLAND OR)





## Expand Service

Overall, the Market Review that was conducted at the beginning of this study concluded that RIPTA generally provides service to areas that can support productive transit, but that there were some opportunities to expand service. Major findings included:

- Warwick is an important work trip location from surrounding communities including Cranston and West Warwick, plus other nearby communities. The development of a Warwick transit hub (similar to Pawtucket) could provide strong ties between Warwick and Providence as well as facilitate local travel. The recommendations include:
  - The development of a new transit hub at the Warwick Mall.
  - New Key Corridor bus service between the Warwick Mall hub and downtown Providence.
- Transit demand is high throughout most of North Providence, and there are opportunities to improve service coverage. The recommendations propose changes to North Providence service, including:
  - Increased service frequencies on Route 50 Douglas.
  - Better connections to Smithfield Crossing.
- Transit demand is high in much of Cranston, and there are opportunities to improve service coverage. The recommended changes would expand and improve service in Cranston, including:
  - New Route 20 Reservoir Key Corridor bus service along Reservoir Avenue and the Route 1 corridor.
  - New connections to Garden City Center.
- Demand is high throughout most of Woonsocket, and there are opportunities to improve fixed-route service coverage. The recommendations include:
  - Both scenarios include more frequent Route 54 Woonsocket service to downtown Providence.
  - New Route 54X Woonsocket Express service.
  - A new Route 88 Highland Corporate route that would operate between Woonsocket Depot and businesses along Cumberland Hill Road.
- There is emerging demand for service in the southern half of the I-295 corridor, particularly the south half in Smithfield, Johnston, Cranston, and West Warwick. The recommendations include limited improvements in these areas. From north to south, these include:
  - Better service to and from Lincoln Mall, including faster, more frequent express service to Providence.
  - Expanded service to Smithfield Crossing.
  - More frequent service to Bryant University.

A summary of the improvements to expand service is provided in Table 3.

Finally, it should be noted that there have also been requests for the expansion of service to locations that are not included in the service scenarios. In all cases, these areas are not included because the areas that would be served cannot support effective transit service. In most cases, this is because the areas do not have sufficient numbers and densities of population and employment to support transit. This includes areas such as Quonset Point, Tiverton, Wickford Junction Station, and South County. In the case of Tiverton, a second issue is that most travel is to and from Massachusetts, whereas RIPTA provides transit only within Rhode Island.

**TABLE 3 | SERVICE TO NEW AREAS**

Route	New Service
1 Hope/Eddy	Extend to T.F. Green Airport
6 Prairie/Zoo	Extend to Providence Station
13 Arctic	Extend all trips to Woodland Apartments in Coventry
17 Dyer/Pocasset	Extend to Garden City Center in Cranston
21 Reservoir:	Extend to new Warwick Mall hub, Rhode Island Mall, and CCRI
29 Kent County	Reroute through new retail areas in West Warwick
35 Rumford	Reroute northern end to South Attleboro Station
58 Mineral Spring	Realign to connect Smithfield and Pawtucket
71 Broad Street/Pawtucket	Extended south along Pawtucket Avenue
75 Central Avenue	Extend to Bryant University
77 Benefit/Broadway	Reroute to South Attleboro MBTA Station
88 Woonsocket	New route between downtown Woonsocket with Highland Corporate Drive.

### Better Integrate RIPTA and Commuter Rail Service

Both scenarios improve the integration of RIPTA service with MBTA commuter rail service (see Table 4). This would occur at four locations: (1) Providence; (2) South Attleboro; (3) the InterLink Station at T.F. Green Airport; and (4) Wickford Junction.

**Providence Station:** The Francis and Gaspee Street corridors would be designated as Transit Emphasis Corridors, providing frequent, regular headways between Kennedy Plaza and the Station. RIPTA is also working with RIDOT on physical improvements to the Station area and with the City of Providence and other stakeholders to improve connections between Kennedy Plaza and the Station. In addition, Route 6 Prairie/Zoo would be rerouted and extended to connect Upper South Providence, the Jewelry District and the train station.

**South Attleboro Station:** RIPTA is working to determine how to best address insurance requirements that would allow it to extend service to South Attleboro Station in Massachusetts. Once this has been accomplished, Routes 1 Hope/Eddy and 35 Rumford would operate to and from South Attleboro Station.

**InterLink Station/T.F. Green Airport:** At the InterLink Station, improved integration would provide connections with commuter rail, as well as Airport/InterLink - Providence services. This would allow passengers to use commuter rail in one direction and RIPTA bus service in the other direction. In other words, RIPTA bus service would fill gaps in commuter rail service between the InterLink Station and downtown Providence.

**Wickford Junction:** In Wickford, express bus service would be relocated from the Route 2/102 park and ride lot to Wickford Junction Station. This shift would be to facilitate the use of commuter rail in one direction and RIPTA express bus service in the other.

However, note that the recommendations to not include new feeder service to Wickford Junction Station, as the demand for such services is too low to meet minimally acceptable productivity and cost-effectiveness levels. In addition, neither scenario would provide coordinated transfers with all or most train trips. This is because commuter rail trains do not arrive at regular frequency, and it is more important to design service for the large majority of bus passengers who would not transfer to commuter rather than the much smaller minority who would.

**TABLE 4 | BETTER INTEGRATION WITH COMMUTER RAIL**

Route	Connection
1 Hope/Eddy	Shift northern end to South Attleboro Station
6 Prairie/Zoo	Extend to serve Providence Amtrak Station
35 Rumford	Shift northern end to South Attleboro Station
65X Narragansett Express	Operate via Wickford Junction Station
68X Newport/West Bay Express	Operate via Wickford Junction Station

### Improve Express Service

RIPTA currently provides a significant amount of express service. However, much of it is provided as selected trips on local routes or as “Route 90,” which is actually four different routes. The result is that express service is difficult to understand, and it often creates gaps in local service. The recommendations include significant improvements to express service (see Table 5 and Figure 7):

- The branding of all express routes with a unique number and name that clearly identifies it as an express route.
- The operation of express service as unique routes that do not reduce the amount of local service provided.
- A minimum of three AM inbound and three PM outbound trips on most routes.

**TABLE 5 | EXPRESS SERVICE IMPROVEMENTS**

Route	Service
10X Scituate Express	Rebranded Route 90 Scituate route
12X: West Warwick Express	Rebranded Route 90 Arctic/West Warwick route with more service
54X: Woonsocket Express	Rebranded and more direct Route 54 “Direct” trips
65X: Narragansett Express	Rebranded Route 66 express trips
60X Newport/East Bay Express	New express service between Newport and Providence via East Bay
68X: Newport/West Bay Express	Rebranded Route 14 express service with additional service
95X: Westerly Express	Rebranded Route 90 Westerly route with more service

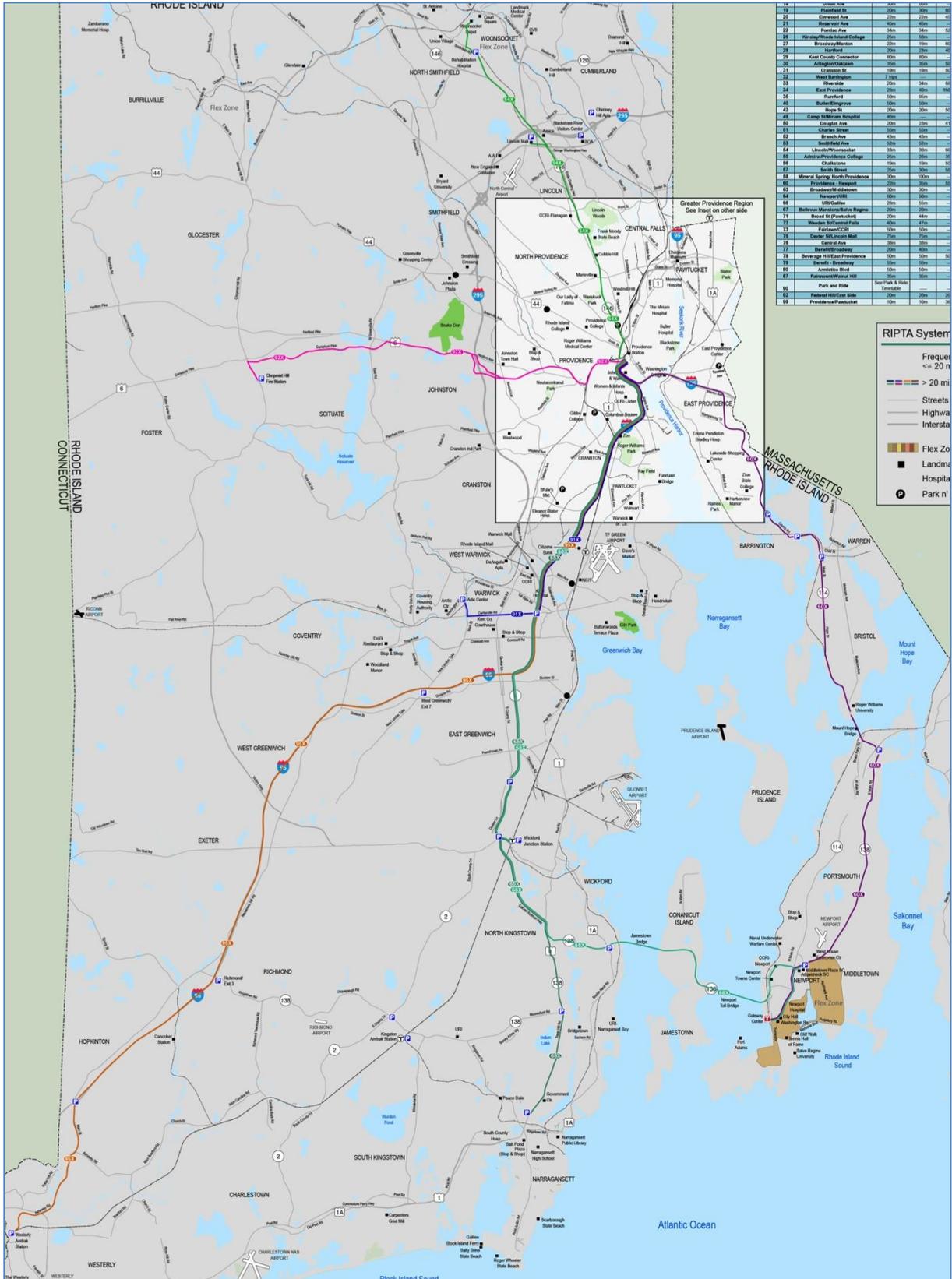
### Consolidate Stops to Speed Service

Transit stops are customers’ access and egress points for transit services and, as such, should be conveniently located. However, transit stops are also the major reason that transit service is slower than automobile trips. Most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance. At the present time, RIPTA’s stops are spaced very closely together (see Figure 8), and there is a much greater emphasis on reducing walk distances than providing faster service.

However, as the success with BRT has shown, most passengers prefer a greater emphasis on faster service than on shorter walks, and to achieve a better balance, both scenarios include the consolidation of stops. The consolidation of stops can also provide for 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. It also provides for a more comfortable ride, as the trip involves less stop-and-go operation.

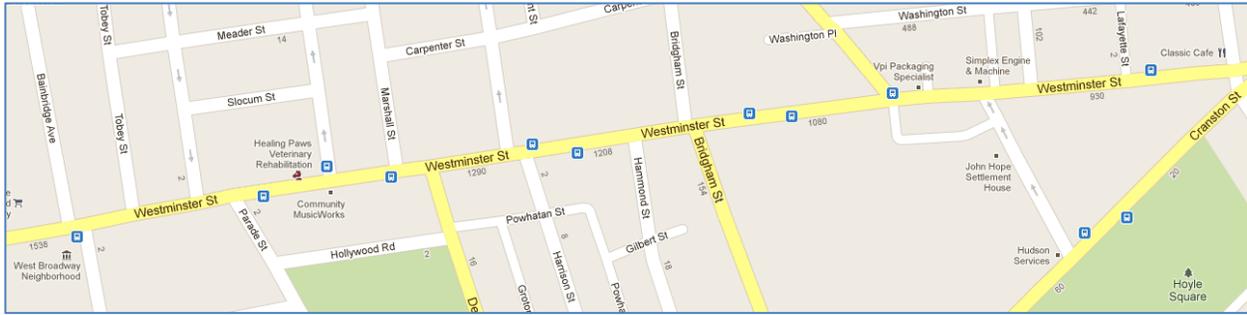


**FIGURE 7 | EXPRESS ROUTES INCLUDED IN SCENARIOS 1 AND 2**





**FIGURE 8 CLOSE STOP SPACING ON WESTMINSTER STREET IN PROVIDENCE**



RIPTA provides different types of transit services that are tailored toward serving different types of trips and needs. Services that emphasize speed should have fewer stops, while service that emphasizes accessibility should have more frequent stops. As part of the COA, RIPTA developed and adopted new stop spacing guidelines, which are shown in Table 6 and, stops would be consolidated using these guidelines. Exceptions to these guidelines should only be made in locations where walking conditions are particularly dangerous, significant topographical challenges impede pedestrian access, and factors compromise safe bus operations and dwelling. Finally, in most cases, passengers should not have to walk more than one or two blocks farther to access service.

**TABLE 6 | BUS STOP SPACING GUIDELINES**

	RAPID BUS	KEY CORRIDOR	URBAN RADIAL	NON-URBAN/ SUBURBAN/ CROSSTOWN	REGIONAL	EXPRESS/ COMMUTER	FLEX
<b>Minimum Stop Spacing (feet)</b>							
Moderate to High Density Areas	1,100	900	900	660	900	900	n/a
Low Density Areas	1,300	1,300	1,300	1,100	1,100	1,100	n/a
<b>Maximum Stops per Mile</b>							
Moderate to High Density Areas	5	6	6	8	6	6	n/a
Low Density Areas	4	4	4	5	5	5	n/a

*Notes: Moderate to high density = greater than or equal to 4,000 persons per square mile; low density = less than 4,000 persons per square mile*

**Consolidate Duplicative Services**

Many existing RIPTA routes serve similar areas, and compete with each other more than they complement each other. These corridors and areas include:

- The Route 146 corridor between Woonsocket and Providence (Routes 54 Woonsocket, 75 Dexter Street/Lincoln Mall and 90 Cumberland Express).
- Between downtown Pawtucket and downtown Providence (Routes 42 Hope, 49 Camp Street and 99 Pawtucket).
- Eastern Pawtucket (Routes 35 Rumford, 76 Central Avenue, 78 Beverage Hill, 79 Columbus Avenue, and 80 Armistice Boulevard).
- Douglas Avenue between Bryant University and downtown Providence (Routes 50 Douglas and 52 Branch Avenue/Bryant University).
- Charles Street between Mineral Spring Avenue and downtown Providence (Routes 51 Charles Street, 52 Branch Avenue/Bryant University, 53 Smithfield Avenue, 54 Lincoln/Woonsocket, 55 Admiral Street/Providence College, 58 Mineral Spring Avenue/North Providence, and 72 Weeden Street/Central Falls).



- Smithfield Avenue between Mineral Spring Avenue and downtown Providence (Routes 53 Smithfield Avenue and 72 Weeden Street/Central Falls).
- The Atwells Avenue corridor between downtown and Rhode Island (Routes 26 Atwells Avenue/Academy/Mount Pleasant/RI College, 55 Admiral Street/Providence College, and 92 Federal Hill – East Side).

In each of these corridors, and as summarized in Table 7, changes would be made to consolidate service to provide more compelling service with fewer routes.

TABLE 7 | CONSOLIDATED SERVICES

Existing	Proposed
<ul style="list-style-type: none"> <li>▪ 26 Atwells/Academy/Mount Pleasant</li> <li>▪ 92 Federal Hill – East Side</li> </ul>	<ul style="list-style-type: none"> <li>▪ 92 RI College – East Side</li> </ul>
<ul style="list-style-type: none"> <li>▪ 49 Camp Street</li> <li>▪ 99 Providence/Pawtucket</li> </ul>	<ul style="list-style-type: none"> <li>▪ R-Line service between Pawtucket and Providence/Cranston Line</li> </ul>
<ul style="list-style-type: none"> <li>▪ 50 Douglas</li> <li>▪ 52 Charles</li> </ul>	<ul style="list-style-type: none"> <li>▪ 50 Douglas, with service extended to Bryant University</li> </ul>
<ul style="list-style-type: none"> <li>▪ 51 Charles Street</li> <li>▪ 54 Lincoln/Woonsocket</li> <li>▪ 58 Mineral Spring Avenue/North Providence</li> </ul>	<ul style="list-style-type: none"> <li>▪ 51 Charles Street with Route 54 Woonsocket/Lincoln relocated to Route 146 and 58 Mineral Springs inner terminal shifted to the Pawtucket Transit Center</li> </ul>
<ul style="list-style-type: none"> <li>▪ 53 Smithfield Avenue</li> <li>▪ 72 Weeden Street/Central Falls</li> </ul>	<ul style="list-style-type: none"> <li>▪ 72 Weeden Street/Central Falls, without service to Saylesville Industrial Park but more service to Central Falls</li> </ul>
<ul style="list-style-type: none"> <li>▪ 54 “Direct” trips</li> <li>▪ Route 90 Cumberland Express</li> </ul>	<ul style="list-style-type: none"> <li>▪ 54X Woonsocket/Lincoln Express</li> </ul>
<ul style="list-style-type: none"> <li>▪ 76 Central Ave</li> <li>▪ 78 Beverage Hill/East Providence</li> <li>▪ 79 Benefit-Broadway</li> <li>▪ 80 Armistice Blvd in eastern Pawtucket</li> </ul>	<ul style="list-style-type: none"> <li>▪ 76 Central Ave</li> <li>▪ 78 Beverage Hill/East Providence</li> <li>▪ 79 Benefit-Broadway</li> </ul>

Through the consolidation of routes described above, and a reconfiguration of service in other areas, most riders would be served by equal or better service. However, in some areas, some riders would need to walk farther to stops and/or make transfers or in one case (Route 90C Cumberland express) drive to a park and ride lot:

- 8 Jefferson, which would be replaced by Routes 14 West Bay (along Jefferson Avenue) and 29 Kent County Connector (through Buttonwoods). Current Route 8 riders who travel between Buttonwoods and downtown Providence would need to transfer with Route 14.
- 49 Camp Street, where all riders will be within a short walk of new R-Line service or improved Route 42 Hope/Eddy service.
- 79 Columbus Avenue, which largely duplicates Route 35 Rumford/Newport Avenue and 76 Central Avenue service.
- 90C Cumberland Express, which will largely be replaced by Route 54X, which would provide more service.

### SCHEDULE IMPROVEMENTS

All routes would be rescheduled to operate much more consistently and improve coordination between routes and in corridors where multiple routes operate, with all changes based on the following principles:



- **Service Levels Should be Set based on Service Guidelines:** RIPTA's new Service Guidelines have been designed to ensure that the appropriate amount of service is provided on each route, and to the extent possible within RIPTA's current budget, service frequencies and spans of service would be set based on those guidelines.
- **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. To achieve this, most routes would be rescheduled to operate every 10, 15, 20, 30 or 60 minutes.
- **Services Should be Well Coordinated:** To make service more convenient and reduce overcrowding in high ridership corridors, schedules should be coordinated to provide short connection times and to operate service at even intervals. The rescheduling of service based on 10, 20, 15, 30, and 60 minute headways will allow connections to be much better coordinated. In addition, in corridors that are served by multiple routes, many schedules would be revised so that individual routes operate with the same service frequencies and alternate trips at even intervals.

### Operate Service with Regular/Clockface Headways

As stated above, people can remember repeating patterns much better than irregular patterns. For example, they can remember that service operates every 15 minutes better than they can remember that service operates four times an hour with trips spaced 15, 8, 22, and 35 apart one hour and something different the next hour (see Table 8). In addition, with bus schedules, people can also remember schedules that repeat at the same time every hour (clockface headways) rather than those that fall at different times every hour. For example, they can remember that service operates at 7, 22, 37, and 42 minutes past the hour every hour better than a schedule that operates four times an hour but at different times every hour.

At present, most RIPTA routes operate with schedules that are very irregular. This is primarily due to two factors:

1. The large number of variants that are provided on many routes. As described above, the operation of each variant takes more or less time than regular service, and thus most variant trips create a gap in the schedule.
2. Historically, RIPTA has scheduled service as efficiently as possible in order to provide as much service as possible. This meant that if it were possible to schedule service every 14 minutes rather than every 15 minutes, it was done. As a result, RIPTA's schedules are very efficient but sometimes difficult to understand. Efficient schedules should be balanced with ease of use to provide better service for most riders.



TABLE 8: SCHEDULE EXAMPLES (BASED ON FOUR TRIPS PER HOUR)

	DEPARTURE TIME		
	BAD (NON-REPEATING PATTERN)	BETTER (REPEATING PATTERN)	BEST (REPEATING PATTERN + CLOCKFACE TIMES)
	7:00	7:00	7:00
	7:12	7:14	7:15
	7:35	7:28	7:30
	7:50	7:42	7:45
	8:05	7:56	8:00
	8:15	8:10	8:15
	8:30	8:24	8:30
	8:40	8:38	8:45

Most routes would be rescheduled to operate with regular clockface headways, with the specific headways based on the proposed route changes in each scenario.

**Coordinate Services**

The operation of service with irregular headways also means that timed connections cannot be provided, and that where multiple routes operate in the same corridor, some buses will operate back-to-back and that there will also be gaps in service. This scheduling is inconvenient for passengers, as they do not realize the benefit of the total amount of service that is provided. It also means that buses that run closely behind another run nearly empty, while the first bus after a gap can be overcrowded.

The operation of service at clockface headways as described above will allow timed-transfers to be provided at many locations where service operates infrequently—for example, twice an hour on routes that operate every 30 minutes and once an hour on routes that operate every 60 minutes. In both scenarios, this would be done wherever possible. The best example of the benefits of this approach would be in Newport at Gateway Center, where buses on all routes would “pulse” once an hour to provide timed transfers between all Newport routes.

In addition, in most cases where two or more routes operate in the same corridor, and especially in Transit Emphasis corridors, each route would be rescheduled to operate at the same service frequencies and for the trips on each route to alternate trips at even intervals. This will eliminate bunching and gaps, and increase the effective amount of service provided to passengers (since two buses arriving at the same time have the equivalent utility of a single bus).

For example, Routes 27 Broadway/Manton and 28 Hartford both operate along Broadway between Kennedy Plaza and Olneyville Square. At the present time, from Kennedy Plaza, Route 28 buses often follow closely behind Route 27 buses, and there are also gaps in Route 28 service (see Figure 9). With both routes proposed to operate every 20 minutes during peak periods, schedule coordination would mean that buses would arrive every 10 minutes along the high ridership Broadway corridor.



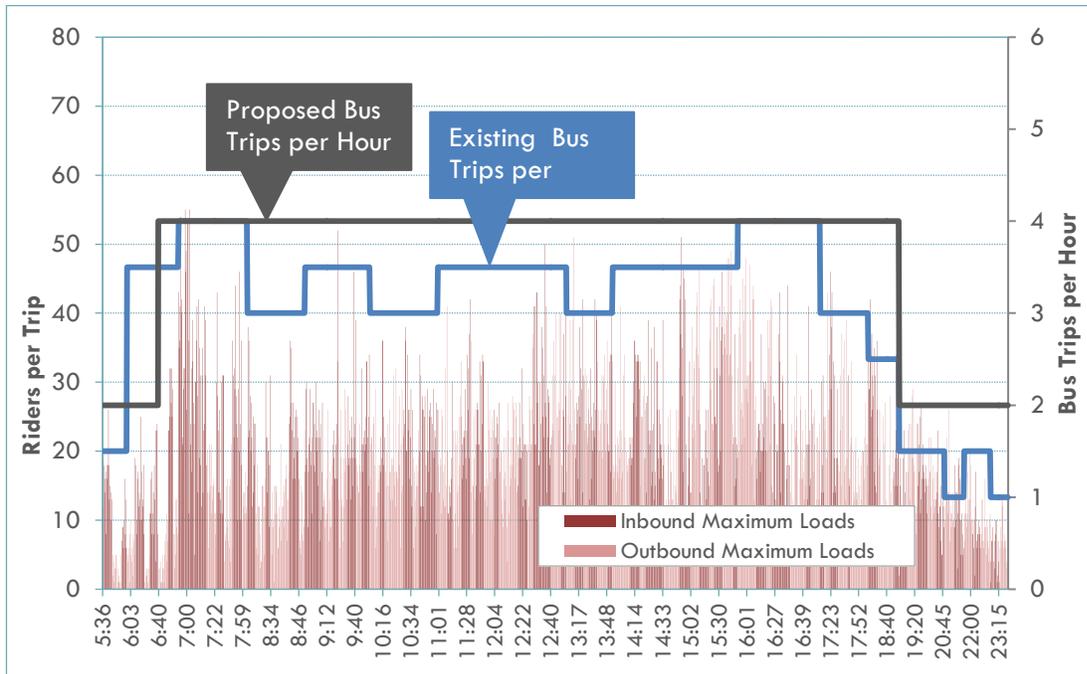
FIGURE 9: BROADWAY PM OUTBOUND DEPARTURES FROM KENNEDY PLAZA: CURRENT AND PROPOSED

EXISTING		PROPOSED	
ROUTE	DEPARTURE	ROUTE	DEPARTURE
27	4:06 PM	27	4:00 PM
28	4:10 PM	28	4:10 PM
27	4:25 PM	27	4:20 PM
28	4:30 PM	28	4:30 PM
27	4:44 PM	27	4:40 PM
28	4:50 PM	28	4:50 PM
28	5:10 PM	27	5:00 PM
28	5:30 PM	28	5:10 PM
27	5:34 PM	27	5:20 PM
28	5:55 PM	28	5:30 PM
		27	5:40 PM
		28	5:50 PM
		28	6:00 PM

### Adjust Service Frequencies

On some routes, based on current and projected ridership levels, too much service is provided, while on others, too little service is provided. Throughout the system, service frequencies would be adjusted to better match service levels with demand by time of day. Specific changes by route are listed in the route-by-route sections, while an example of how this would be done for Route 31 Cranston Street is illustrated in Figure 10. In this case, there is currently overcrowding on peak period and midday trips, while early morning trips run with very light passenger loads, and only one trip per hour is provided at night. To better balance service levels with demand and provide more convenient service, less service would be provided in the early morning, but more service during the rest of the day and at night.

FIGURE 10: ROUTE 31 CRANSTON STREET SERVICE FREQUENCY CHANGE

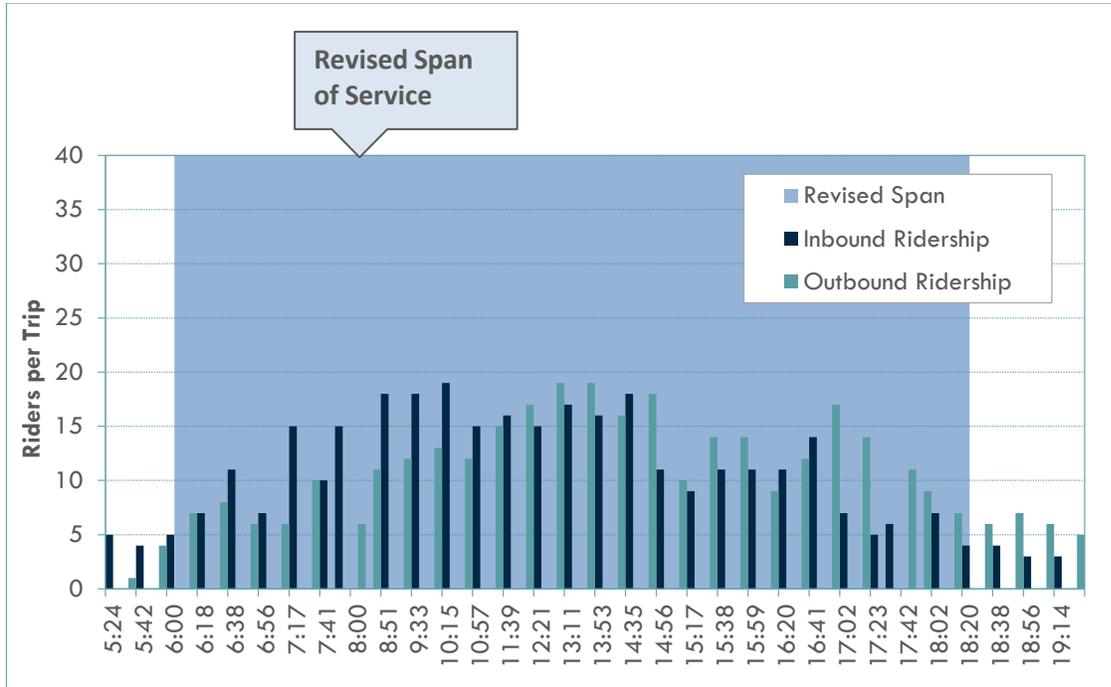




## ADJUST SERVICE SPANS

In a similar manner as with service frequencies, based on demand, some routes begin service too early or too late, and/or end service too early or too late. To better match service levels with demand, the start and end times of routes were adjusted based on RIPTA’s Service Guidelines. An example of how this would be done for Route 71 weekday service is shown in Figure 11. In this case, ridership before 6:00 AM and after 6:30 PM is very low. As a result, Route 71’s span of service would be reduced from 5:24 AM – 7:14 PM to 6:00 AM – 6:30 PM.

FIGURE 11: ROUTE 71 BROAD STREET/PAWTUCKET PROPOSED SPAN OF SERVICE CHANGE



In other cases, where there is demand for earlier or later service, spans of service would be increased. Specific changes are listed in the route-by-route sections and summarized below in Table 9.

TABLE 9 | SERVICE SPAN CHANGES

Route	Change
6 Prairie/Zoo	Start earlier
13 Arctic	End earlier
21 Reservoir	End later
22 Pontiac Ave	End earlier
28 Broadway/Hartford	Start later
32 West Barrington	Start later, end earlier
50 Douglas	Start earlier, end later
71 Broadway/Pawtucket	Start later, end earlier
77 Benefit/Broadway	Start earlier, end later
92 East Side Trolley	End later
64 Newport/URI	End later



### **Introduce All Day Scheduled Flex/Fixed-Route Connections**

At present, with only a few exceptions, Flex riders must make reservations 48 hours in advance for service. The exceptions are on some routes that make one or more scheduled stops a few times each day. However, the times and locations are limited.

To make service more convenient and improve connections with fixed-route service, Flex service would be reconfigured to include scheduled arrivals and departures at one major transfer point in each Flex area at times throughout the day that would facilitate connections with fixed-route services. For example, with a new transit hub at the Warwick Mall, West Warwick Flex service could be scheduled to arrive and depart there once an hour. This would facilitate transfers to fixed-route service and allow many riders to transfer to Flex service without a reservation. Scheduled arrivals and departures would be implemented for the following routes at the following locations:

- 203 Narragansett Flex at Salt Pond Plaza
- 210 Kingston Flex at URI
- 231 South Aquidneck Flex at Gateway Center
- 242 West Warwick Flex at the Warwick Mall
- 281 Woonsocket Flex at Woonsocket Depot

### **BRANDING & PUBLIC INFORMATION**

For people to be able to use transit, they must first know that it is there and be able to understand how to use it. This means that it is extremely important for transit systems to provide clear and concise information on their available 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 number of different ways. For example, many seniors are not web-literate, and thus the provision of information via the web will not reach many older residents. For this reason, telephone and printed information must be provided. However, telephone and printed information will not reach many younger riders, who rely primarily on the Internet. For transit systems to reach the people that they are there to serve, it is essential that they provide effective information in ways that will reach all potential riders.

Proposed improvements include renumbering and naming some routes to provide greater clarity on where they go, improving schedule brochures, and improving RIPTA's system map.

#### **Renumber/Name Some Routes to Improve Legibility**

Some routes use the same number for very different services. The two most confusing elements of RIPTA's existing branding include:

1. The use of a single route number of similar express and local routes. Examples include Routes 14 West Bay and 54 Woonsocket that label both local and express service with the same number, and Route 90 Park-n-Ride, which use the Route 90 label for four very different routes.
2. The use of legacy route numbers for routes that formerly operated independently but that have since been joined into single routes. For example, Route 1 Eddy/Gaspee and 42 Hope Street operate as a single route that operates between Warwick and Pawtucket but are presented to the public in most materials as separate routes that operate to and from Kennedy Plaza.

To make the service that routes actually provide clearer, express routes will be given unique numbers that clearly identify the nature of the service, and routes that have been combined will be re-designated with a single route number and name when it improves ease of use for customers (see Table 12).



TABLE 10 | ROUTE DESIGNATION CHANGES

Existing Number/Name	New Number/Name
<b>Express/Local</b>	
<ul style="list-style-type: none"> <li>14 West Bay</li> </ul>	<ul style="list-style-type: none"> <li>14 West Bay [local]</li> <li>68X Newport/West Bay Express [express]</li> </ul>
<ul style="list-style-type: none"> <li>54 Woonsocket</li> </ul>	<ul style="list-style-type: none"> <li>54 Woonsocket [local]</li> <li>54X Woonsocket Express [express]</li> </ul>
<ul style="list-style-type: none"> <li>60 Newport/Providence</li> </ul>	<ul style="list-style-type: none"> <li>60 Newport/Providence [local]</li> <li>60X Newport/East Bay Express [express]</li> </ul>
<ul style="list-style-type: none"> <li>90 Park-n-Ride</li> </ul>	<ul style="list-style-type: none"> <li>10X Scituate Express</li> <li>12X West Warwick Express</li> <li>54X Woonsocket Express</li> <li>95X Westerly Express</li> </ul>
<b>Route Combinations</b>	
1 Eddy & 42 Hope	<ul style="list-style-type: none"> <li>1 Hope/Eddy</li> </ul>
26 Atwells-RI College & 92 East Side Trolley	<ul style="list-style-type: none"> <li>92 RI College – College Hill</li> </ul>

### Improve Schedule Maps and Brochures

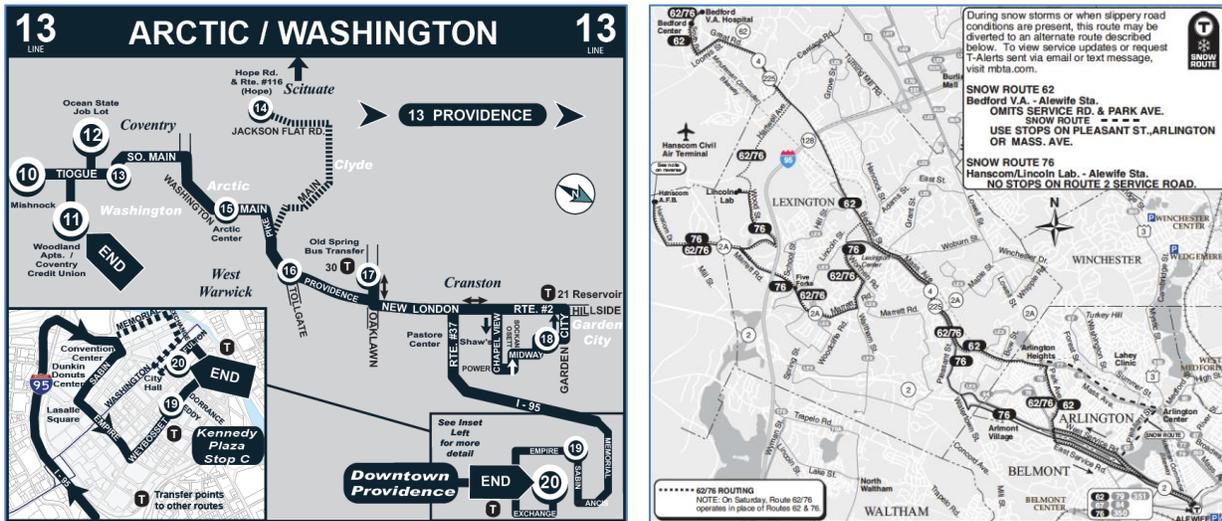
With only a few exceptions, RIPTA presents information on its existing services effectively, through a well designed web site, more recently via smartphone apps, and through other methods. The most significant exception is its schedule brochures, many of which include route maps that are neither geographically correct or to scale. The second exception is the Metro area system map excludes Warwick and Cranston, where there is a very high density of service. Those services instead are shown on the statewide maps, which provides only limited detail. In addition, it also illustrates frequent service routes in red, which implies that frequent service operates to the ends of each route even when it does not.

#### Schedule Brochures

RIPTA produces an individual schedule “card” for each route that presents the route’s schedule, a map, and other related information. Many riders carry the schedule cards for the routes that they regularly use, and infrequent riders pick-up the schedule cards to learn how routes operate. The following improvements would be made to these materials:

- Maps are being revised to be geographically correct and to provide additional information (see Figure 9). To date, about half have been completed, and in conjunction with the implementation of COA changes, the remaining maps will be updated.
- Schedule cards will be redesigned to use a standard fold size to improve convenience for riders who use and carry brochures for multiple routes.
- The same time point numbers will be used for inbound and outbound service to facilitate trip planning.

FIGURE 9: RIPTA SCHEDULE CARD MAP & MORE DETAILED MBTA MAP



**System Map**

For many riders, the starting point for determining whether service is available is a system map. Effective system maps display the services that are available with enough detail to allow the user to determine origins, destination, major attractions, and routes.

RIPTA’s current system map represents a great improvement over previous versions, and when revised to reflect COA changes, will include continuing improvements:

- The expansion of the Metro area map boundaries to include Warwick and Cranston and other areas where routes end just beyond the map boundaries.
- The inclusion of express routes.
- The inclusion of Flex route numbers.
- An improved representation of frequent service routes and corridors (similar to the yellow highlighting to designate Frequent Service Corridors shown in Figure 10 in the Twin Cities Metro Transit system map).

FIGURE 10: TWIN CITIES FREQUENT SERVICE CORRIDORS (IN YELLOW)

