Town of Randolph

Transportation System Feasibility Study

June 2024

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Executive Summary

Project Overview

The Randolph Transportation System Feasibility Study was conducted for the Town of Randolph to evaluate existing transportation services, identify local mobility challenges, and develop potential service alternatives to improve local transportation. Significant portions of the Town do not have access to public transit, particularly southern and western areas of the town beyond walking distance from existing MBTA bus stops. Shorter, locally oriented trips to reach Randolph's shopping destinations, medical centers, multifamily housing communities, and employment centers are a particular challenge using the existing network. Six potential public transit alternatives were developed including two bus routes, two microtransit services, and two ride-hailing service options (combining Uber/Lyft and traditional taxi providers).

Existing Conditions Analysis

To develop these alternatives, the team evaluated the existing transportation options in Randolph based on attributes such as hours of operation, ridership, geographic coverage, service frequency, and eligibility restrictions (if present). Existing services include the MBTA Commuter Rail and bus

services, MBTA's The RIDE (ADA paratransit) service, and a pre-scheduled, demand-response shuttle operated by Randolph Intergenerational Community Center (RICC) for residents ages 60+ and people with disabilities. The study evaluated demographics of area residents related to transit ridership and distilled key findings from several previous plans and studies to ensure congruence with the Town's planning goals. To ensure the study considered the needs of residents most likely to use a potential new transit service, stakeholder interviews were conducted with community-based nonprofits, elected officials, and Town staff. Further interviews were held with two other municipalities that have recently launched transportation services of their own, independently from area transit agencies: Salem, Massachusetts, and Chandler, Arizona. A community meeting was held in April 2024 at Randolph Town Hall to gather resident feedback about local mobility needs and challenges as well as solicit comments on proposed service alternatives.

Key findings from these activities include:

- **Randolph's transit network consists of three fixed-route bus services and the Middleborough/Lakeville commuter rail line**, which operate seven days a week at frequencies ranging from 15-150 minutes. Train service and two of three bus routes are operated by the Massachusetts Bay Transit Authority (MBTA). An additional fixed-route service is operated by the Brockton Area Transit Authority (BAT), though this service does not serve Randolph north of Crawford Square. MBTA also provides complementary ADA paratransit service for qualified people with disabilities, with rides available on a pre-scheduled or on-demand basis throughout the region. In addition, the Town of Randolph's Elder Affairs division provides transportation for seniors and people with disabilities in Randolph and neighboring municipalities, a service operated by the Randolph Intergenerational Community Center (RICC).
- **There is limited bus service coverage beyond the North/Main Street corridors** (MBTA Routes 238 and 240), and more than half of Randolph residents (53%) and half of Randolph jobs (50%) are located beyond one-quarter mile of an MBTA bus stop. Previous studies and interviews with residents (through the community workshop), indicated the need for improved east-west mobility within Randolph (especially for areas beyond walking distance to Main/North Street corridors) as well as first- and last-mile connections to Holbrook/Randolph Station. Elected officials and residents highlighted several multifamily apartment communities affected by this challenger, such as Highland Glen and Rosemont Square.
- **Infrequent service at off-peak times on MBTA Routes 238 and 240 makes relying on transit challenging.** Moderately frequent peak period service, with buses every 15-30 minutes, but frequencies are worse (40-70 minutes) during midday, evening, and weekend hours. Stakeholders reported that the infrequency of service encourages many lower-income residents to own a vehicle, carpool with friends or family, or use rideshare services like Uber.
- **Service restrictions prevent most Randolph residents from using the Brockton Area Transit (BAT) Route 12** service that parallels MBTA Route 240; due to transit agency rules against competition between BAT and MBTA services, northbound riders headed to Boston cannot board or get off north of Crawford Square, and southbound riders from Ashmont cannot get off north of Crawford Square..

- **Programs such as the RICC shuttle or MBTA's The RIDE provide both pre-scheduled and on-demand service within Randolph, but only for qualifying seniors and people with disabilities.** Most Randolph residents (77%) are ineligible for both of these programs.
- **Private ride-hailing services such as Uber/Lyft are widely used by lower-income residents, but they represent a high cost burden** as they are too expensive for lower-income residents to rely upon for everyday transportation.
- **Residents in the community meeting stressed that several key destinations they need to travel to are located just outside of Randolph's boundaries**, such as the shopping centers in Stoughton (e.g. Target, Kohl's, Costco).

Service Alternative Development

Based on these findings, the six transportation alternatives that were developed for further evaluation include:

Fixed-Route Service Alternatives

1. **Route 1** is a fixed-route bus alternative that connects Holbrook/Randolph commuter rail station and southern Randolph along Mazzeo Drive to a shopping center (Target) just outside the Town limits in Stoughton, at Turnpike Street & Hawes Way. This proposed route has a run-time of about 25 minutes, enabling it to be operated with 30-minute frequency using a single vehicle. This route would facilitate east-west trips by Randolph residents in the southern half of the Town.
2. **Route 2** is a fixed-route bus alternative that would operate north-south within Randolph, primarily along High Street, from Holbrook/Randolph commuter rail station to Pacella Park via Rosemont Square. This proposed route would have a roundtrip cycle time of about 44 minutes, requiring two vehicles to operate at 30-minute frequency. This route prioritizes providing broad coverage for northern and western Randolph, particularly to multifamily apartment communities and industrial parks not served by MBTA Route 240.

Microtransit Service Alternatives

1. **Zone 1** is 8 square miles in area and aligns with the Randolph town limits.
2. **Zone 2** is 9.3 square miles in area and includes both the Randolph town limits as well as additional shopping destinations identified through the Existing Conditions Analysis. These destinations are within ¾ mile of Randolph's borders and include Kohl's, Target, Costco, and Ikea, among others.

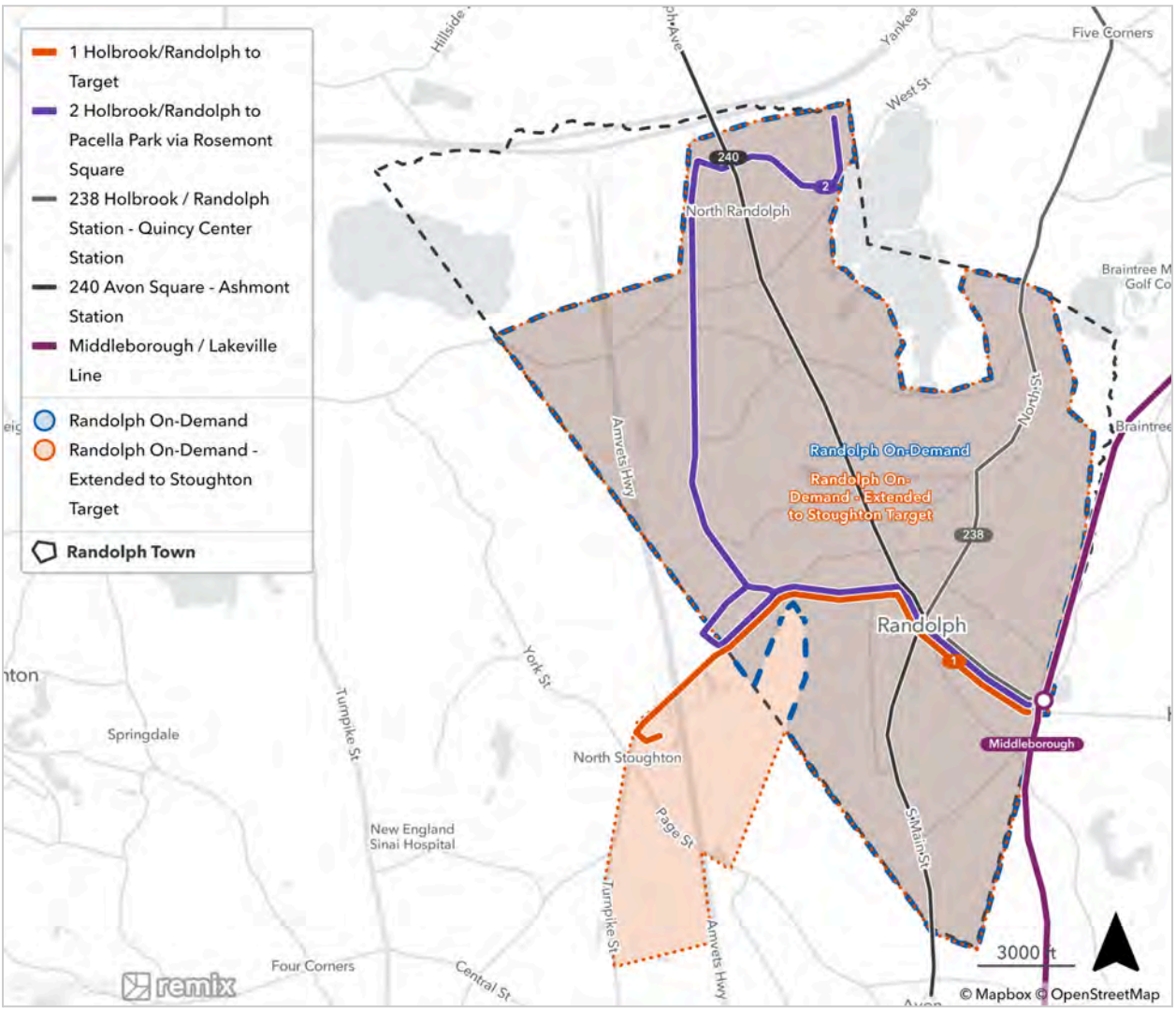
Ride-Hailing Service Alternatives

Ride-hailing service zones could be provided using either Zone 1 or Zone 2 boundaries as indicated for the microtransit service alternatives above.

1. **Option 1:** Eligibility is limited to seniors (60+), disabled, and low-income Randolph residents; about one-third (34%) of Randolph population would qualify for this type of service.
2. **Option 2:** Service is available to the general public, as with the microtransit service alternatives.

The six alternatives are shown on the map below, **Figure 1**.

Figure 1. *Map of Proposed Service Alternatives in Randolph*



The blue polygon in the map above represents microtransit/ride-hailing service alternatives limited to the Town of Randolph, while the orange polygon represents service alternatives that extend service to shopping centers in neighboring Stought. The fixed-route options are represented with purple and orange lines. Modeling was conducted to determine the estimated ridership of each service, the number of vehicles required to operate the service, the average productivity of the service (based on passenger boardings per vehicle hour), and the estimated annual operating costs and cost per passenger. The service alternatives were modeled under several key assumptions:

- Ridership was estimated using low, medium, and high-demand scenarios to represent the potential variability in ridership outcomes.
- Each service alternative was also modeled with both 14-hour and 16-hour service spans on weekdays.
- Ride-hailing service alternatives were modeled using two scenarios of rider eligibility: in Option 1, service is limited to Randolph residents who are seniors (60+), low-income, or disabled. In Option 2, service is open to all Randolph residents.

The results of this analysis are shown in Table 1. The table shows a range of outcomes for a medium-demand scenario, operating with 14 hours of service on weekdays, and the limited-eligibility Option 1 for ride-hailing service alternatives.

Table 1. *Summary of Cost-Benefit Analysis of Proposed Service Alternatives*

	Fixed-Route Bus[1]		Microtransit		Ride-hailing (Uber/Lyft/taxi)[2]	
	1	2	3	4	5	6
	Holbrook/ Randolph to Stoughton Shopping Centers	Holbrook/ Randolph to Pacella Park	Randolph Town Limits	Randolph Town Limits + Stoughton Shopping Centers	Randolph Town Limits	Randolph Town Limits + Stoughton Shopping Centers
Key Statistics						
Percent Coverage of Randolph Employment	36%	56%	100%	100%	100%	100%
Percent Coverage of Randolph Population	17%	39%	100%	100%	100%	100%
Investment						
Annual Ridership	10,400	35,200	41,000	53,000	14,000	18,000
Vehicles Required	1	2	3	3	N/A	N/A
Annual Operating Cost[3]	$515,000	$853,000	$930,000	$930,000	$174,000	$221,000
Efficiency						
Avg. Productivity *Passengers per revenue-hour*	1.9	4.0	3.1 - 3.7	4.1 - 4.7	N/A	N/A
Avg. Operating Cost per Trip	$50	$24	$23	$18	$12	$12

[1] Assumes medium-demand scenario within 6-12 months of service launch.
[2] Ride-hail service limited to seniors (60+), low-income, and disabled residents.
[3] Fixed-route and microtransit service priced by number of vehicle-hours; ride-hail service priced per ride (by distance and duration).

Cost-Benefit Analysis

Key conclusions from the cost-benefit analysis of the service alternatives explored in this study is provided below:

- **Microtransit or ride-hail alternatives would offer ubiquitous service coverage** to all Randolph residents and jobs, whereas fixed-route options would serve 39% of Randolph residents and 59% of Randolph jobs (within ¼ mile walking distance to bus stops).
- The **microtransit service alternative Zone 2, Scenario 1** — which includes Stoughton Target and operates 14 hours per weekday — is the **more cost-effective and productive** service of the four alternatives.
- The **cost of ride-hail service alternatives increases in direct proportion to ridership**, as there is no shared-ride aggregation in this service model. As a result, limiting subsidized ride-hail service to specialized populations (seniors, people with disabilities, and low-income residents) is recommended as an important guard against the potential for escalating costs, should actual ridership exceed the forecasts included in this study.
- **Ride-hail service alternatives would require additional, conventional taxi vendors** to participate for its service to comply with FTA regulations required for most federal and state funding programs (e.g., ADA, Title VI, drug/alcohol testing).
- If ride-hail service is limited to seniors, people with disabilities, and low-income residents, as recommended above, it is likely that **significant shares of these populations will require cash payment, phone-in booking, and/or wheelchair-accessible vehicles**, driving up costs from traditional taxi vendor(s) to which these ride requests would be referred.

This study concludes with an Implementation Guide, which discusses key actions the Town of Randolph should take if it decides to proceed with implementation of any of the proposed service alternatives.

Acknowledgements

The project team wishes to thank the following individuals for their support and contributions to this study.

Town of Randolph Staff

Christine Griffin, Town Attorney
Brian Howard, Town Manager
Liz Larossee, Director of Community Programs
Keri Sullivan, Director of Elder Affairs
Michelle Tyler, Director of Planning

Other Project Stakeholders

Philip Chong | Executive Director, Quincy Asian Resources
Susan Hearn | Executive Director, Randolph Community Partnership
Councilor Jesse Gordon | Randolph Town Council

Peer Municipality Advisors

Nancy Jackson | Transportation Program Coordination, City of Chandler (AZ)
David Kucharsky | Director of Traffic and Parking, City of Salem (MA)

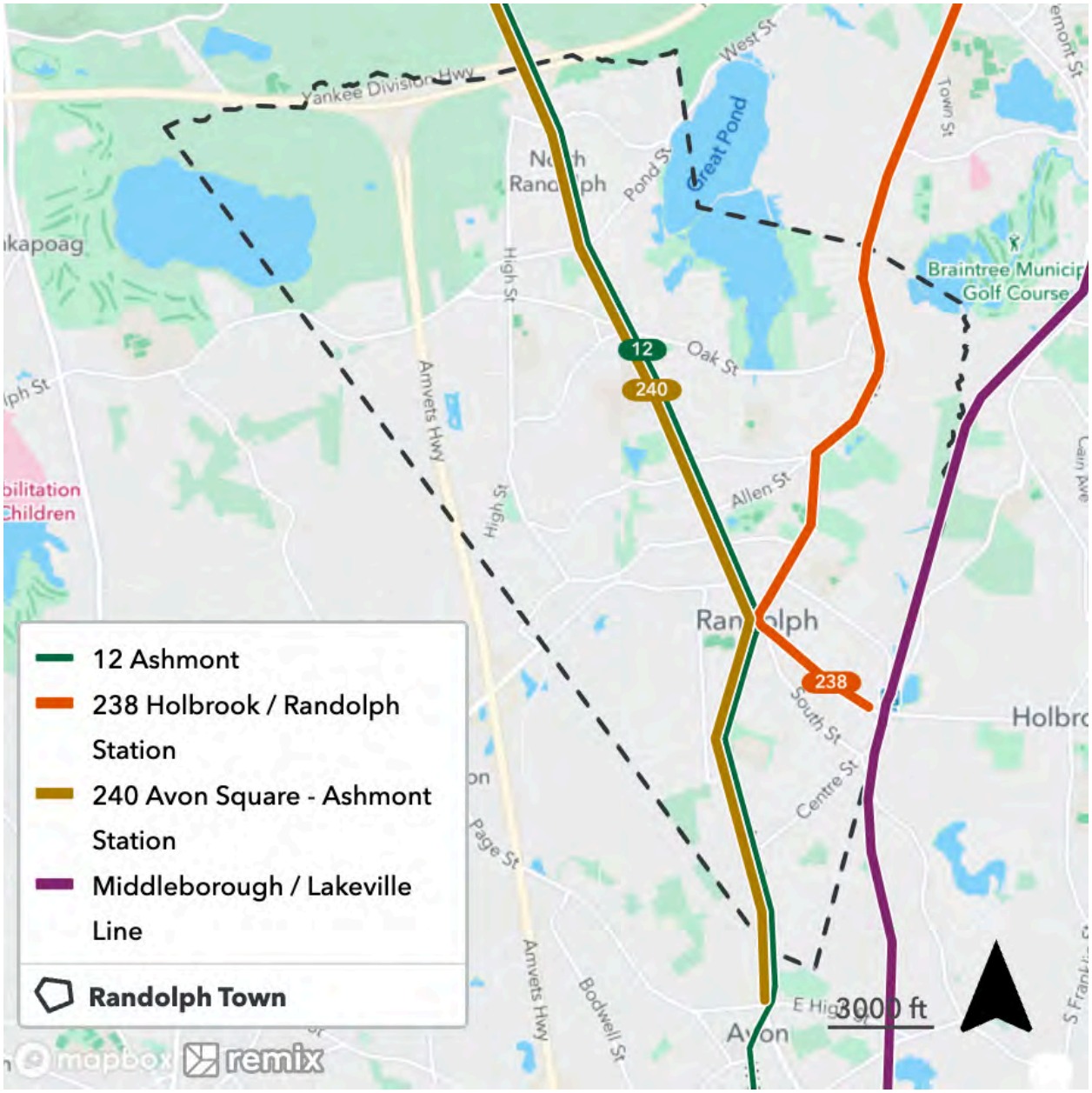
1. Project Goals and Study Area

The Randolph Transportation System Feasibility Study was conducted on behalf of the Town of Randolph to evaluate existing transportation services within the Town and assess the feasibility of implementing a range of potential service alternatives to improve local mobility. The Town's goals and objectives for the study include:

- Extend transportation options for Randolph residents living or working beyond existing transit corridors on Main and North Streets (MBTA Routes 240 and 238, respectively).
- Identify the feasibility of a same-day, on-demand transportation service for residents who do not qualify for other paratransit services, such as MBTA's The RIDE (ADA paratransit) or the senior shuttle operated by Randolph Intergenerational Community Center (RICC).
- Improve first/last-mile connections to Holbrook/Randolph Commuter Rail station to support residents who are making regional transit trips.
- Evaluate the cost-effectiveness of various service alternatives to enable the Town of Randolph to make informed decisions about which programs, if any, should be advanced to implementation.

The focus area for this study is the Town of Randolph, Massachusetts. While all public transit services were examined, the main focus was local trips within Randolph. In addition, the project considered regional transit connections between Randolph and the broader Boston region via the MBTA's Routes 238 and 240 as well as the Middleborough/Lakeville Commuter Rail line. The existing public transportation options are shown in **Figure 2**.

Figure 2. *Map of Randolph and existing transportation options*



2. Existing Conditions Analysis

The consulting project team undertook an Existing Conditions Analysis as part of its study to evaluate the existing transportation options in Randolph and document unmet transportation needs. Key findings of this analysis are summarized below:

1. In 2.1. Current Public Transit Network Offerings, a summary of fixed-route and demand-response service available within Randolph is provided, followed by an analysis of their ridership and service performance patterns. The existing public transportation options in Randolph are shown in **Figure 2**. Fixed-route services operated by MBTA, Routes 238 and 240, are highly utilized within Randolph and provide moderately frequent service during peak times (20-30 minute frequencies), but service becomes significantly less frequent during off-peak times and on weekends (40-70 minute frequencies are more typical). This reduced level of frequency makes it more difficult to rely on transit for many Randolph residents traveling at off-peak times or on weekends. Fixed-route service operates via two Randolph thoroughfares, Main and North Streets. However, a majority (53%) of Randolph residents and half (50%) of Randolph jobs are located beyond one quarter-mile of existing bus stops. Demand-response service is available for qualified Randolph residents who are either seniors (60+), as with the Randolph Intergenerational Community Center's senior shuttle, or disabled (MBTA's The RIDE paratransit service). A large majority (77%) of Randolph residents do not qualify for either service.
2. In 2.2. Key Findings from Previous Studies, we detail how Randolph residents and stakeholders have long advocated for improved local mobility options to particularly address challenges in completing east-west trips within Randolph. Additionally, several Complete Streets infrastructure projects are underway to improve pedestrian safety near bus stops along Main and North Streets.

3. In 2.3. Demographic Assessment, the study evaluates Census socioeconomic and demographic factors that indicate relative distributions of transit needs within Randolph, including zero-vehicle households, seniors, and people with disabilities. These data indicate that Randolph has significant shares of zero-vehicle households as well as individuals living in poverty who are more likely to rely upon transit than the general population. Additionally, this section includes a description and map of key destinations in and near Randolph that may generate demand for local public transportation trips (see **Figure 11**). In particular, several multifamily apartment communities and industrial job centers are located beyond walking distance from the Main/North Street transit corridors, and these locations are high priorities for the proposed service alternatives developed in this study.

2.1. Current Public Transit Network Offerings

Randolph's transit network consists of four fixed-route services (three bus routes and one train service), which operate seven days a week at frequencies ranging from 15-150 minutes. Train service and two of three bus routes are operated by the Massachusetts Bay Transit Authority (MBTA). An additional fixed-route service is operated by the Brockton Area Transit Authority (BAT). MBTA also provides complementary ADA paratransit service for qualified people with disabilities, The RIDE, which is operated by the MBTA seven days a week, 5am - 1am, and offers curb-to-curb rides by reservation throughout the region. In addition, the Town of Randolph's Elder Affairs division provides transportation for seniors and people with disabilities in Randolph and neighboring municipalities. The service is operated by the Randolph Intergenerational Community Center (RICC), with service available on weekdays from 8:30am to 3:00 pm for general transportation and 8:30am - 2:00pm for non-emergency medical transportation. More detailed information on each mode is below.

MBTA Commuter Rail

Randolph is served by MBTA's Middleborough / Lakeville Line which stops at Holbrook / Randolph. This service connects Randolph to Quincy and Boston's South Station to the north, as well as Brockton to the south. This service operates hourly on weekdays inbound from Randolph to Boston from 4:50 am - 10:00 pm. It also operates hourly outbound from Boston to Randolph from 8:35 am - 1:00 am. On weekends, inbound service operates every 90-150 minutes from 5:15 am - 10:00 pm, and outbound service operates every 90-150 minutes from 6:35 am - 11:30 pm. A one-way trip costs between $2.40 to $13.25 depending on the zone the trip starts and ends in.

There is no post-COVID ridership data available at this time. However, the MBTA reported 473 average weekday boardings at the Holbrook / Randolph station in 2018, ranking sixth in terms of ridership out of the Middleborough / Lakeville Line's 10 stations.[4]

MBTA Route 238

Route 238 connects Holbrook / Randolph Station to South Shore Mall and Quincy Center Station, making several stops in Randolph via North Street and Union Street. Hours of operation and frequencies are detailed in **Table 2**. A one-way trip costs $1.70.

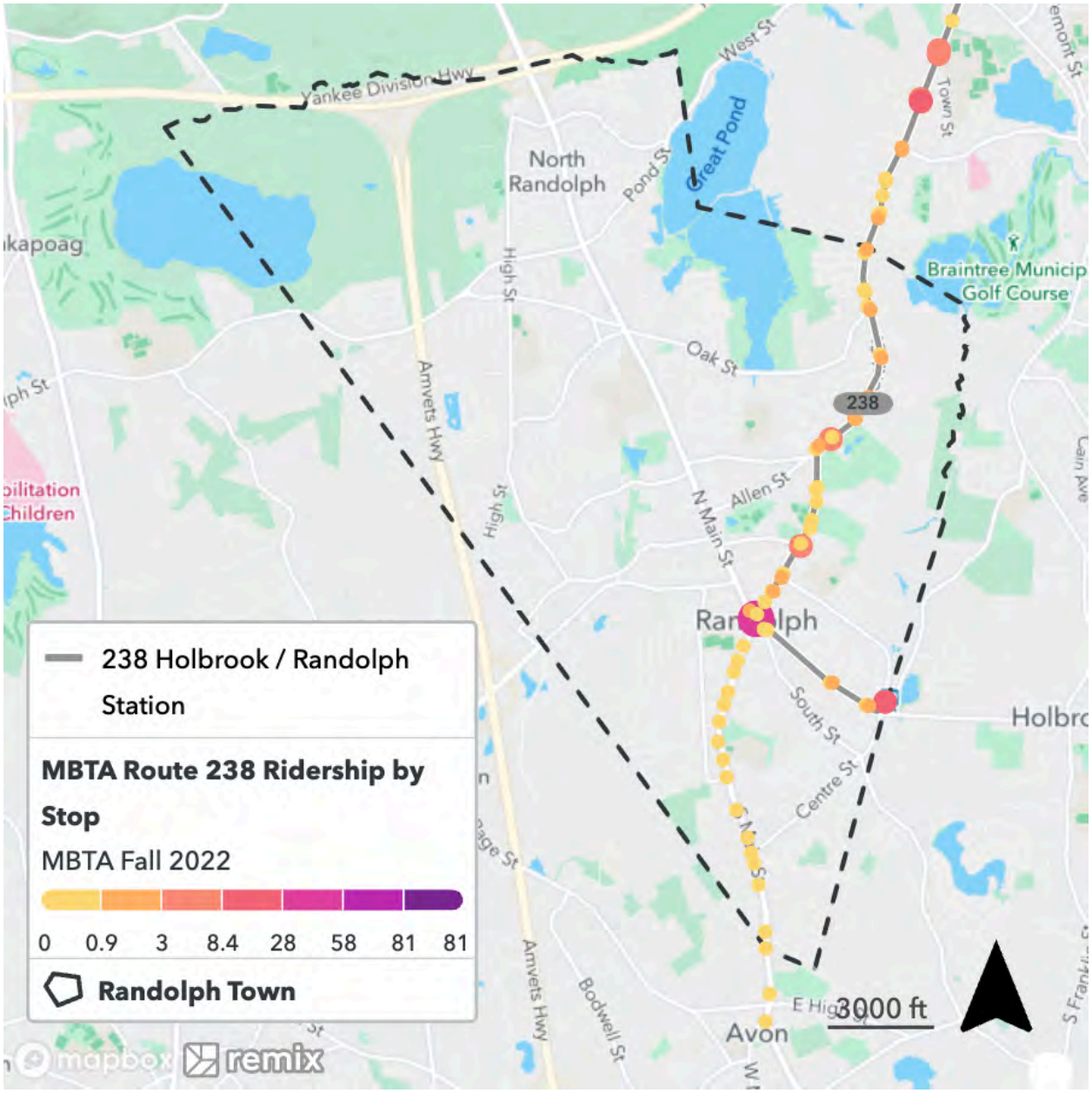
[4] MBTA. 2020. Office of Performance Management & Innovation: MBTA Open Data Portal. https://mbta-massdot.opendata.arcgis.com/datasets/3b93de20570f462ea27219dfb7e75347_0/explore

Fall 2022 ridership-by-stop data show the highest-ridership locations for stops in the Town of Randolph include North St & Union St (Crawford Square) and Holbrook-Randolph Station.

Table 2. *MBTA Route 238 Frequency*

Direction & Day	Hours of Operation	Frequency
Inbound: Weekday	6:00 am - 9:30 am	25-30 minutes
	9:30 am - 5:30 pm	55-65 minutes
	5:30 pm - 8:00 pm	25-40 minutes
	8:00 pm - 11:30 pm	60 minutes
Outbound: Weekday	6:00 am - 9:30 am	25-30 minutes
	9:30 am - 3:15 pm	55-65 minutes
	3:15 pm - 7:15 pm	25-40 minutes
	8:00 pm - 11:30 pm	60 minutes
Inbound: Saturday	7:30 am - 11:30 pm	60 minutes
Outbound: Saturday	5:15 am - 11:30 pm	60 minutes
Inbound: Sunday	8:00 am - 11:30 pm	75 minutes
Outbound: Sunday	6:30 am - 11:30 pm	60-80 minutes

Figure 3. *Average Weekday Boardings of MBTA Route 238 by Stop (Fall 2022)*



MBTA Route 240

MBTA's Route 240 connects Avon Square to Ashmont Station, making several stops in Randolph along Main Street and sharing the corridor with Brockton Area Transit Authority (BAT) Route 12. Hours of operation and frequencies are detailed in **Table 3**. A one-way trip costs $1.70.

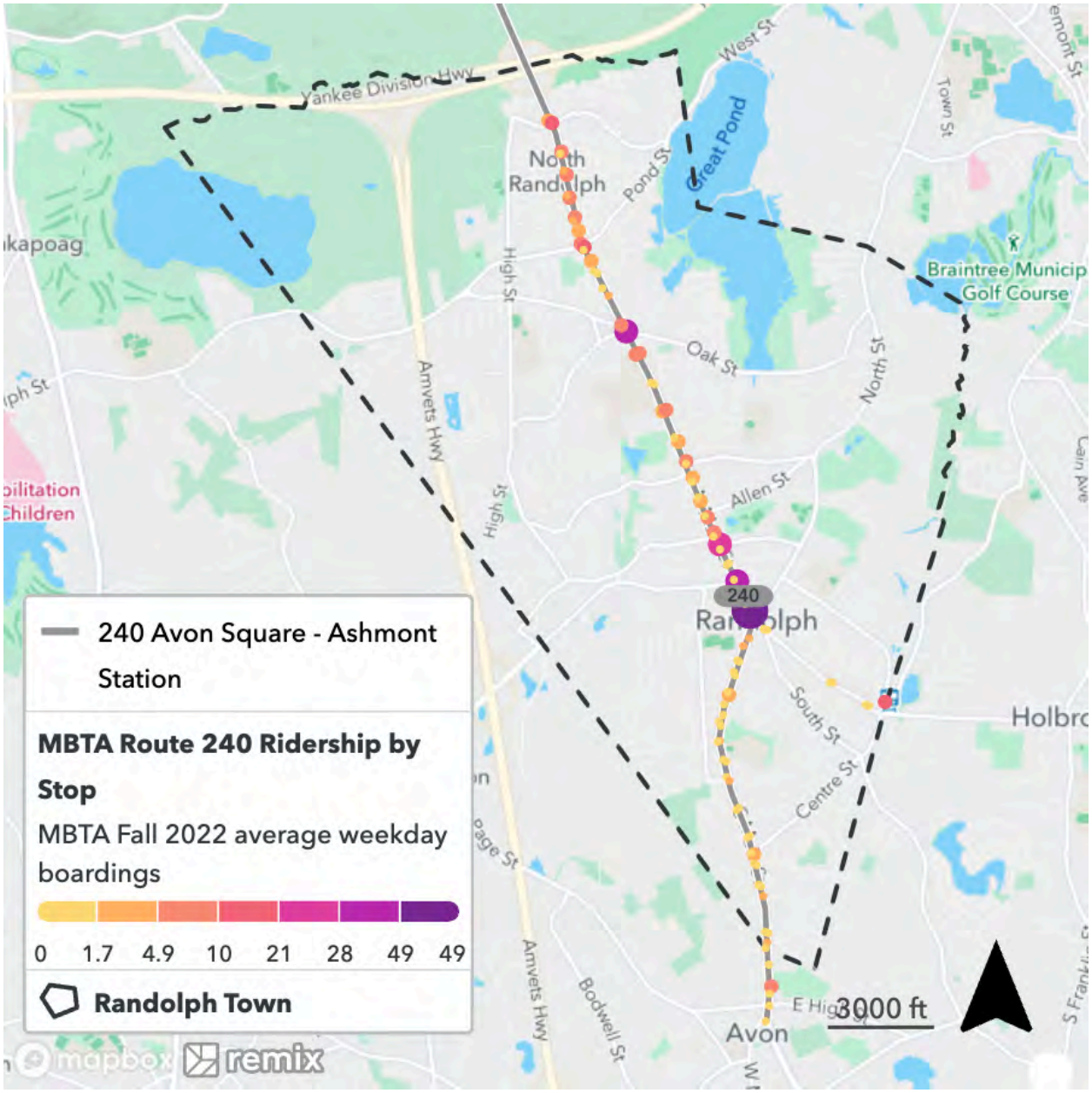
Table 3. *MBTA Route 240 Frequency*

Day	Hours of Operation	Frequency
Weekday	5:00 am - 9:00 am	13-17 minutes
	9:00 am - 1:30 pm	38 minutes
	1:30 pm - 4:00 pm	26 minutes
	4:00 pm - 6:30 pm	15 minutes
	6:30 pm - 10:00 pm	33 minutes
	10:00 pm - 1:10 am	70 minutes
Saturday	5:50 am - 1:10 am	34 minutes
Sunday	7:00 am - 1:10 am	68 minutes

Fall 2022 ridership-by-stop data show the highest-ridership locations for stops in the Town of Randolph include:

- N Main Street & Warren Street (Walgreens)
- N Main Street & Memorial Parkway (Crawford Square/Shaw's)
- N Main Street & Oak Street

Figure 4. *Average Weekday Boardings of MBTA Route 240 by Stop (Fall 2022)*



Brockton Area Transit Authority (BAT) Route 12

Route 12, operated by the Brockton Area Transit Authority (BAT), makes several stops in Randolph along Main Street starting on S Main Street. BAT Route 12 operates along N Main Street and then onto S Main Street, but it does not make stops north of Crawford Square (N Main Street) because MBTA Route 240 serves that area exclusively, due to MBTA regulations against competing public transit operations in its service area. As a result of this rule, riders who board Route 12 going northbound in Randolph, south of Crawford Square, are prohibited from alighting before Ashmont Station, and likewise southbound riders who board at Ashmont may not alight north of Crawford Square. Hours of operation and frequencies are detailed in **Table 4**. A standard one-way trip

between Brockton and Ashmont costs $2.25, between Brockton and Milton costs $1.75, and between Brockton and Avon costs $1.50.

Table 4. *BAT Route 12 Frequency*

Direction & Day	Hours of Operation	Frequency
Inbound (to Brockton): Weekday	5:40 am - 9:00 pm	15-30 minutes
	9:00 pm - 12:20 am	45-60 minutes
Outbound (to Ashmont): Weekday	5:00 am - 8:00 pm	15-30 minutes
	8:00 pm - 12:00 am	60 minutes
Inbound: Saturday	6:20 am - 12:00 am	30-60 minutes
Outbound: Saturday	5:20 am - 11:00 pm	30-60 minutes
Inbound: Sunday	8:00 am - 7:40 pm	60 minutes
Outbound: Sunday	7:20 am - 6:50 pm	60 minutes

MBTA's The RIDE Paratransit

MBTA's The RIDE paratransit operates seven days a week generally from 5:00 AM to 1:00 AM. This service is for passengers unable to use the subway, bus, or trolley due to a disability. Service is door-to-door and rides are shared between multiple passengers. A one-way ADA trip costs $3.35 and a one-way premium non-ADA trip costs $5.60; premium non-ADA trips are those for which the trip origin and/or destination is greater than ¾ miles from MBTA bus or subway service or for same-day changes, except for trip time negotiation. MBTA also offers The RIDE Flex, which offers on-demand trips for ADA paratransit customers. These rides are provided by Uber and Lyft, and the cost structure requires riders to pay the first $3 of the fare and any amount over $43 for each trip, with MBTA subsidizing up to $40 per trip.

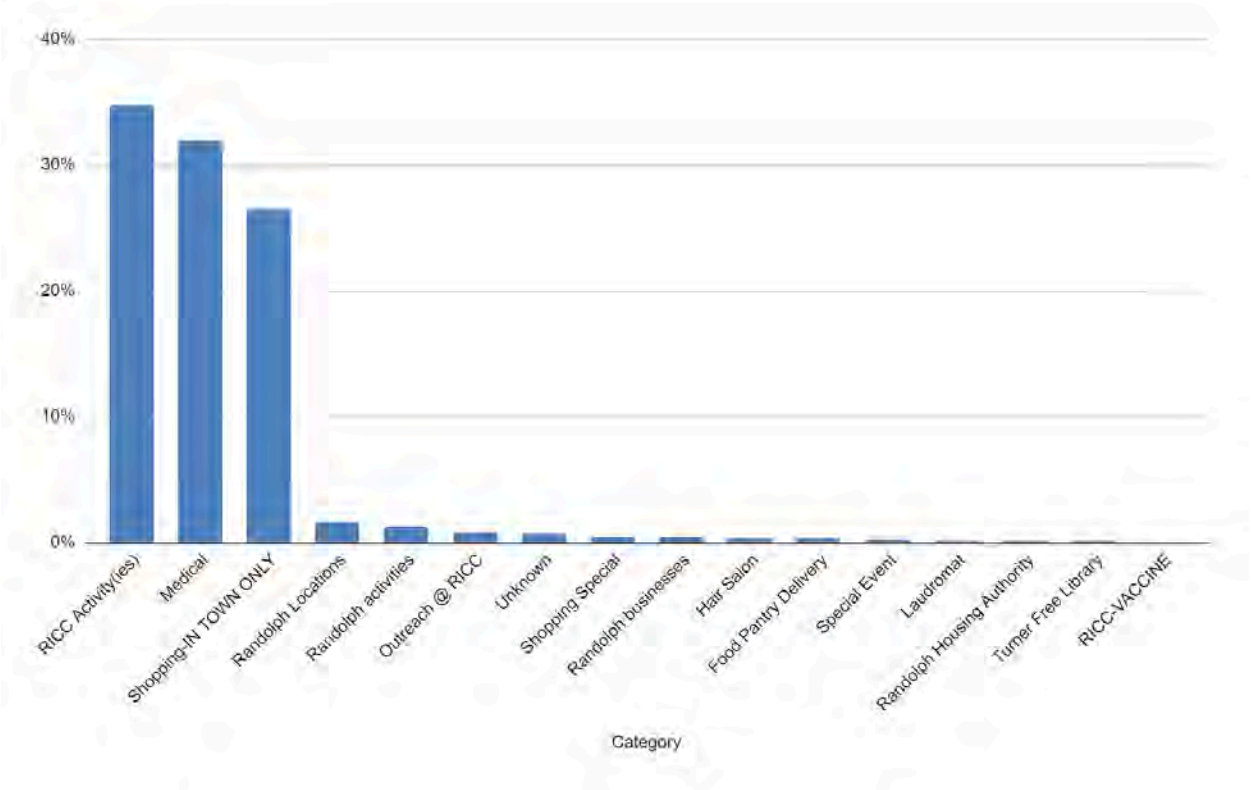
RICC Transportation

Through the Randolph Intergenerational Community Center (RICC), Randolph provides transportation for residents who are seniors (age 60+) or people with disabilities. This service is funded by the Massachusetts Executive Office of Elder Affairs, and it operates on Tuesdays, Wednesdays, and Thursdays from 8:30 AM to 3:00 PM for general-purpose transportation within Randolph. On weekdays, 8:30am to 2pm, RICC also provides non-emergency medical transportation within Randolph and any of its adjacent municipalities, including Milton, Quincy, Braintree, Holbrook, Avon, and Canton.[5] Due to the significantly greater travel distances and the cost of serving these trip requests, non-emergency medical rides within town are $3 and out of town are $9. Other ride types within Randolph on Tuesdays through Thursdays are fare-free.

[5] Additionally, about $4,000 in annual funding provided by MAPC to the Central Community Action Council for a limited number of non-emergency medical trips (about 50/year). This funding provides non-emergency medical transportation to select Boston hospitals, with rides available on a first-come, first-served basis, and may be scheduled by Medicaid-eligible riders or directly by the hospitals.

Trips provided by this service are concentrated at key shopping, medical, and community centers with the top trips for 2023 being: RICC Activities, Medical, and Shopping (in town) as shown in **Figure 5**.

Figure 5. *Top Trip Purposes of RICC Senior Transportation, 2023*



2.2. Key Findings from Previous Studies

This section summarizes key findings of three studies previously conducted in Randolph. It notes any key findings or considerations that are relevant with respect to existing transportation options and unmet transit needs of concern to this study.

Randolph Community Wellness Plan (January 2020)

The *Randolph Community Wellness Plan* provides a health profile of Randolph residents by assessing social determinants of health, including transportation infrastructure and services. The Town of Randolph's goal for its transportation system is to provide residents with safe, multimodal, and regionally coordinated mobility options that promote health, particularly for those with mobility and income constraints, youth, and seniors. This study's findings highlight the following:

- The Plan surveyed residents and found they desired safer streets and improved transit service to Boston.
- Residents expressed challenges traveling between east and west portions of Randolph, especially to Stoughton.
- Seniors, youth, and low-income families are most affected by these challenges.

One of the study's primary recommendations includes conducting a local mobility study to determine better east-west and first- and last-mile connections particularly to employment, community and medical resources, and looking into piloting local shuttles that could be funded by sources such as the Boston MPO Community Connections Program, MassDOT Community Transit Grant Program, and MassDOT Workforce Transportation Program.

Complete Streets Program Prioritization Review (March 2023)

Randolph's Complete Streets program is focused on improving pedestrian infrastructure at multiple intersections, in addition to other multimodal transportation improvements to improve traffic circulation and the safety of all road users. The following Complete Streets projects are prioritized for implementation and may impact areas where existing fixed-route services operate:

- **Union Street and Center Street:** improve accessibility and pedestrian mobility of intersections where existing crosswalk infrastructure exists with the addition of pedestrian countdown, accessible pedestrian signals, detectable warning panels, and reconstructed ramps.
- **Oak Street Sidewalk and Intersection:** (re)construct sidewalk on Oak Street on the north side before it intersects with North Street and repaint the crosswalk at North Street.
- **North Street Sidewalk:** improve pedestrian mobility and connectivity with the addition of a sidewalk between 368 North Street and Ice Arena on the west side and two speed feedback radar signs.
- **North Street and Colonial Liquors Intersection:** improve pedestrian mobility and accessibility with realignment of the crosswalk, addition of rectangular rapid flashing beacons, ramps, and detectable warning panels.
- **North Street and Pleasant Street Intersection:** improve pedestrian mobility and accessibility where existing crosswalk infrastructure exists with the addition of pedestrian

countdown, accessible pedestrian signals, reconstructed ramps, and detectable warning panels.

- **North Street Bike Lanes:** improve bicycle connectivity for 2.2 miles, add two speed feedback signs, add buffers at wide roadways.

MBTA Better Bus Project (2020)

As part of its bus network redesign, the MBTA's Better Bus Project profiled Route 238, finding that this route is moderately important to the overall network and that it has relatively strong ridership despite its low frequency. The study also suggested that the route has unreliable service which results in crowding for some trips, in addition to having complex service patterns on Sunday. The study includes the following ridership data:

- 1,750 average boardings on weekdays
- 1,000 average boardings on Saturdays
- 600 average boardings on Sundays
- Strong weekday ridership from start to middle PM peak for inbound service
- Similar weekday outbound ridership with notable stronger ridership during PM peak compared to AM peak
- Generally 20-30 passengers throughout service for Saturday inbound service
- Generally 40-60 passengers midday for Saturday outbound service
- Generally 20-30 passengers throughout service for Sunday inbound and outbound service, with weaker ridership at the beginning and end of service

The Better Bus Project also profiled Route 240, finding that this route is an affordable but slower option between the rapid transit network and residential areas that are in municipalities south of the urban core. The study notes that Randolph is an area of growing ridership demand, and the route's long distance results in poor reliability and on-time performance. The study includes the following ridership data:

- 2,500 average boardings on weekdays
- 1,250 average boardings on Saturdays
- 725 average boardings on Sundays
- Outbound and inbound ridership are generally inverses on weekdays
- Weekend service ridership patterns are similar to weekday but at lower volumes[6]

[6] MBTA. 2018. Better Bus Project. https://www.mbta.com/projects/better-bus-project/update/bus-route-profiles-now-available

2.3. Demographic Assessment

The project team mapped information on the demographic and socioeconomic patterns of the Town of Randolph that influence demand for public transportation. This analysis can help provide an understanding of the market for new and existing transit service in the area. In particular, high-need populations such as seniors, zero-vehicle households, low-income households, and more.

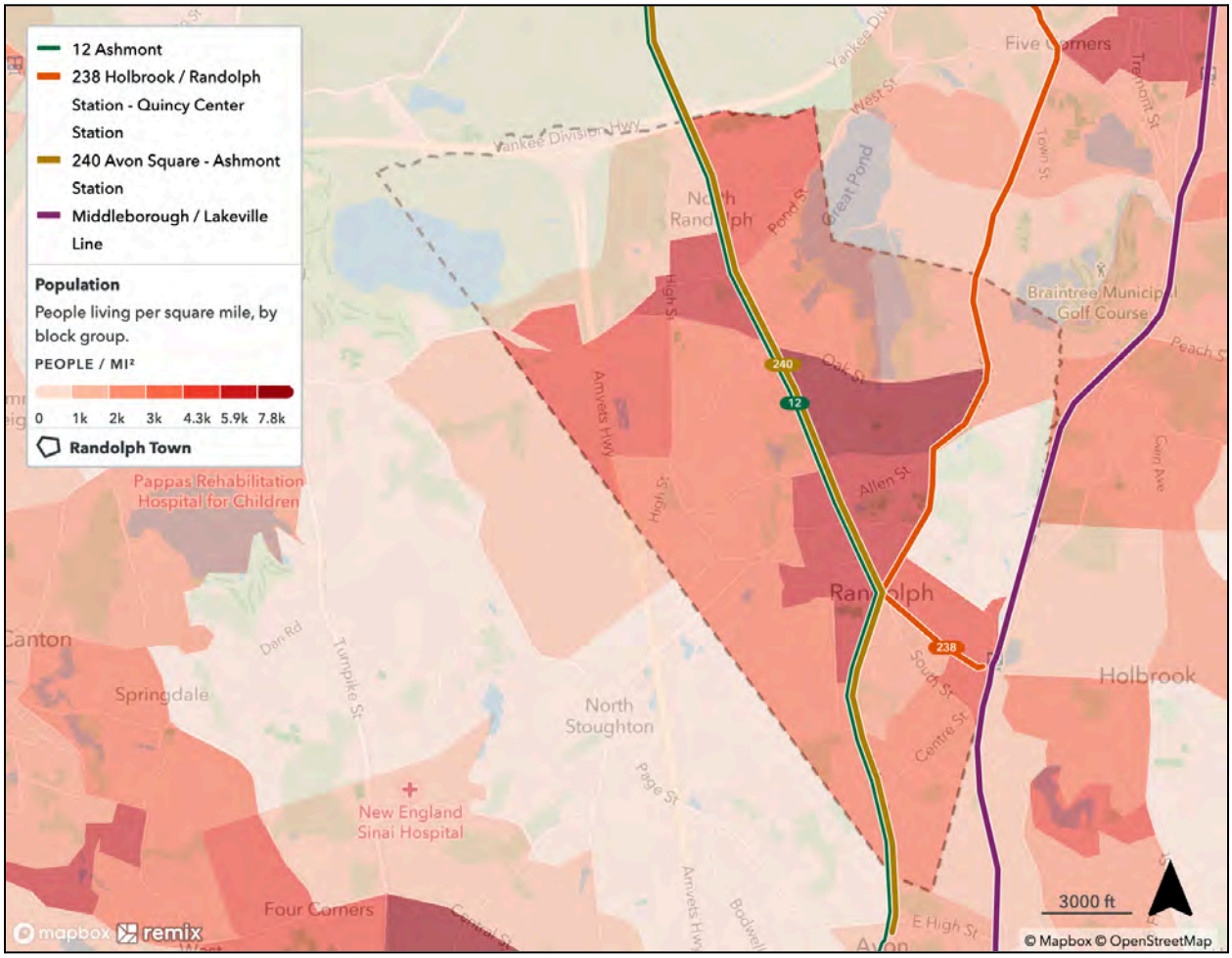
Table 5. *Randolph Demographic Summary*

Metric	Total	Percent of Population	Density per Square Mile
Population	35,000	N/A	3,400
Employment	8,400	N/A	810
Seniors (age 65+)	5,800	17%	560
Individuals living in poverty	3,200	9%	300
Zero-vehicle households	1,100	9% (of households)	110

Population Density

The Town of Randolph has a population of about 35,000 people. The average population density is about 3,400 people per square mile. This level of density is just above the threshold (3,000 residents per square mile) that has been found by industry research to justify either local fixed-route bus service operating with hourly frequency or general-public, demand-response service (e.g. microtransit), or both.[7] This benchmark of density in relation to transit service levels is based upon typical bus operating costs and funding levels in the United States. The most densely populated neighborhoods are located in residential areas from Crawford Square to Oak Street, between Main and North Streets. North Randolph also has some concentration of population in the residential areas west of Main Street.

Figure 6. *Population Density Map*

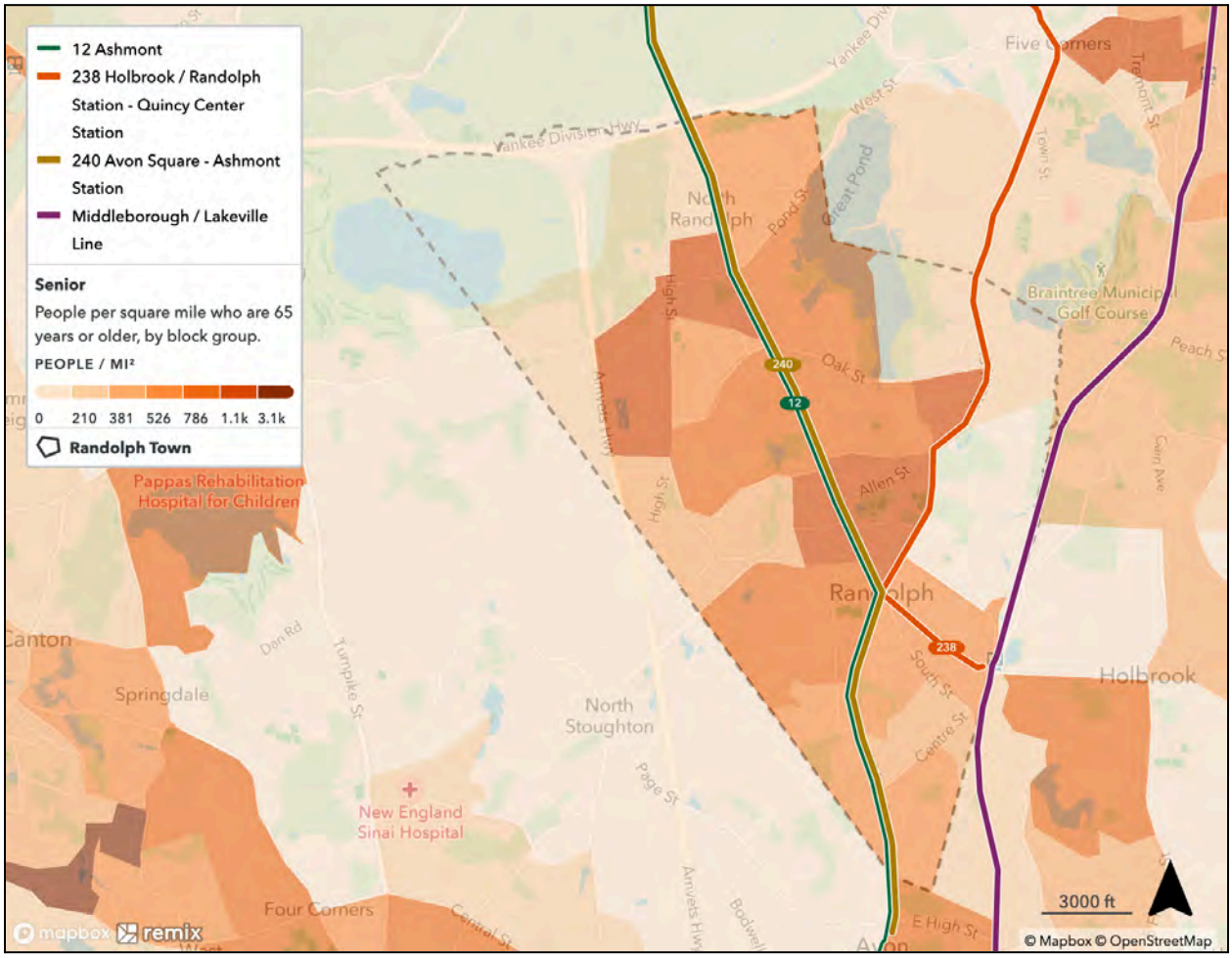


[7] Transportation Research Board. *Transit Capacity and Quality of Service Manual.* Part 5: Quality of Service. P. 5-23. https://www.trb.org/publications/tcrp/tcrp_webdoc_6-e.pdf

Seniors

Older adults are more likely to rely on public transit due to lower incomes and lower vehicle ownership rates. For these reasons, seniors are sometimes referred to as “transit-dependent” riders. Nearly one-fifth (17%) of Randolph’s population is over the age of 65. The senior population distribution does not significantly vary from overall population, suggesting an “aging in place” pattern.

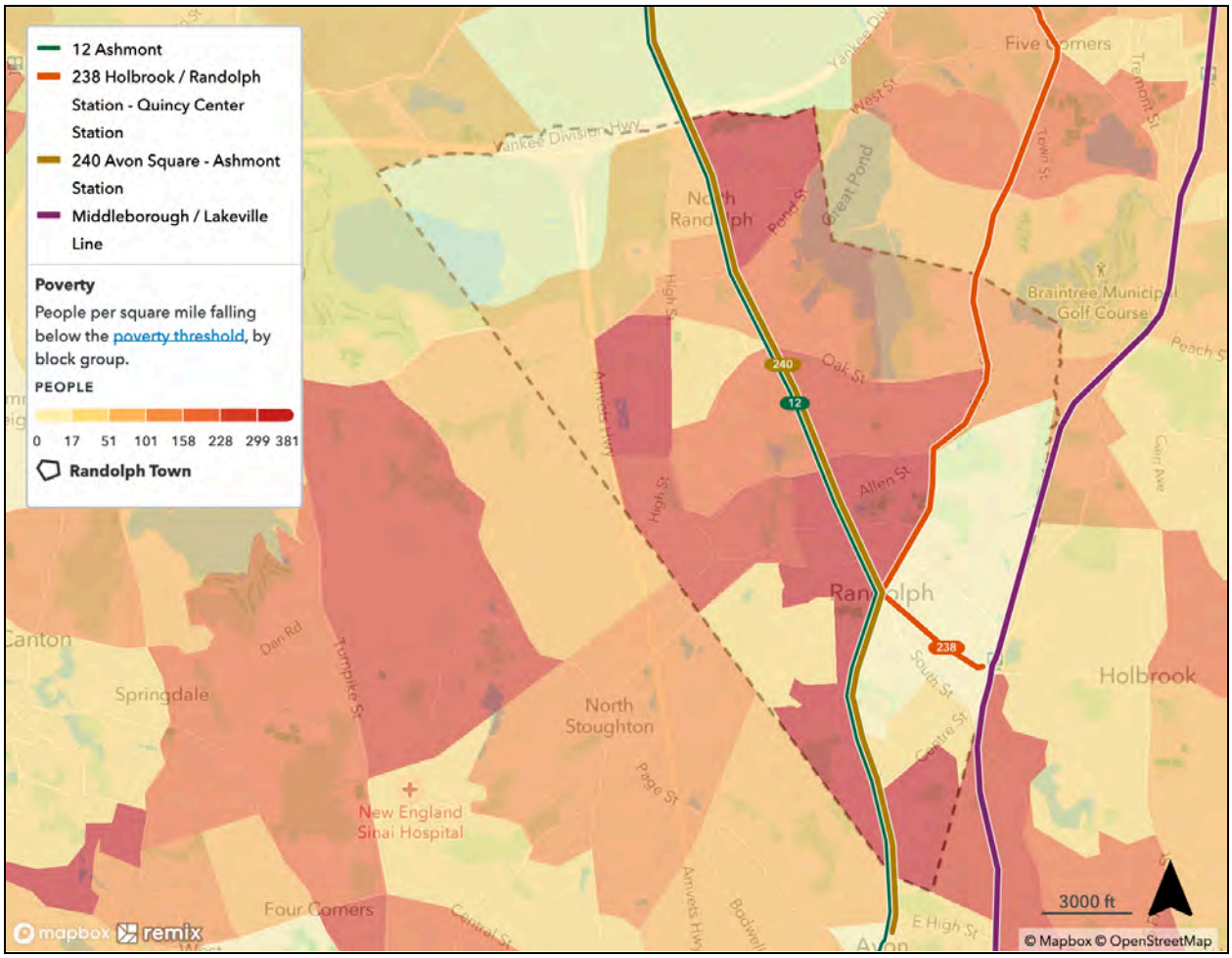
Figure 7. Density of Seniors (65+)



Poverty Status

Low-income households are less likely to be able to afford a private vehicle and are more likely to rely on public transportation. About 4% of the population is living in poverty. Highest density of individuals living in poverty is found along the Main Street corridor and in isolated apartment communities in the northwest section of the Town such as Rosemont and Irving Road. The most affluent neighborhoods are located outside the Town's center, with notable concentration in the area near Randolph Community Middle School and along the southwest of the Town.

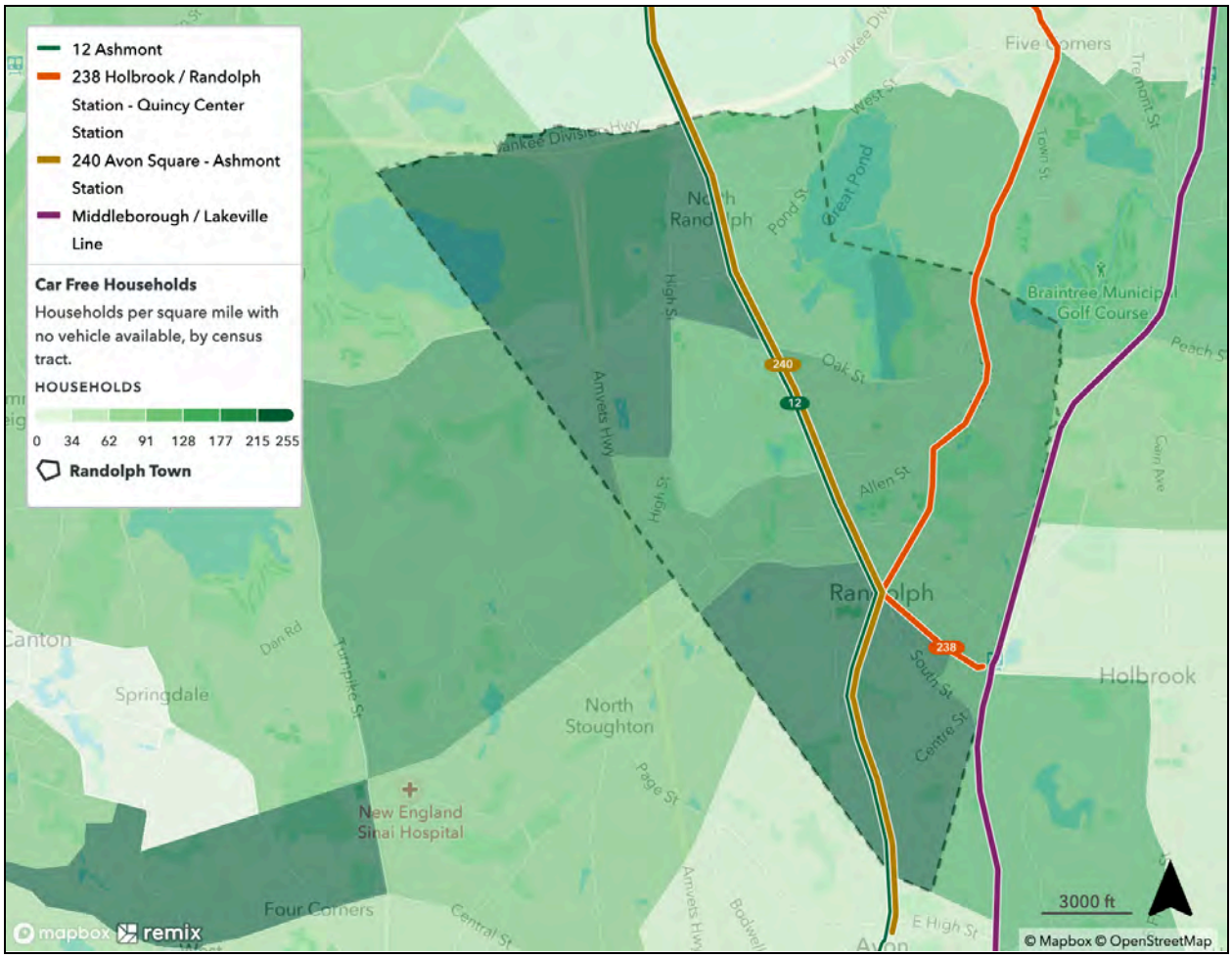
Figure 8. *Density of Individuals Living Below the Poverty Line*



Zero-vehicle Households

Zero-vehicle households are more likely to rely on public transportation to access employment and other services. If public transportation is unavailable, these households may have to rely on friends/family to drive them, walk long distances, or pay for costly ride-hailing services. About one in ten (9%) of Randolph's households is car free, a higher rate than neighboring communities of Holbrook or Stoughton. Northwest and southwest quadrants of Randolph have higher shares of car-free households.

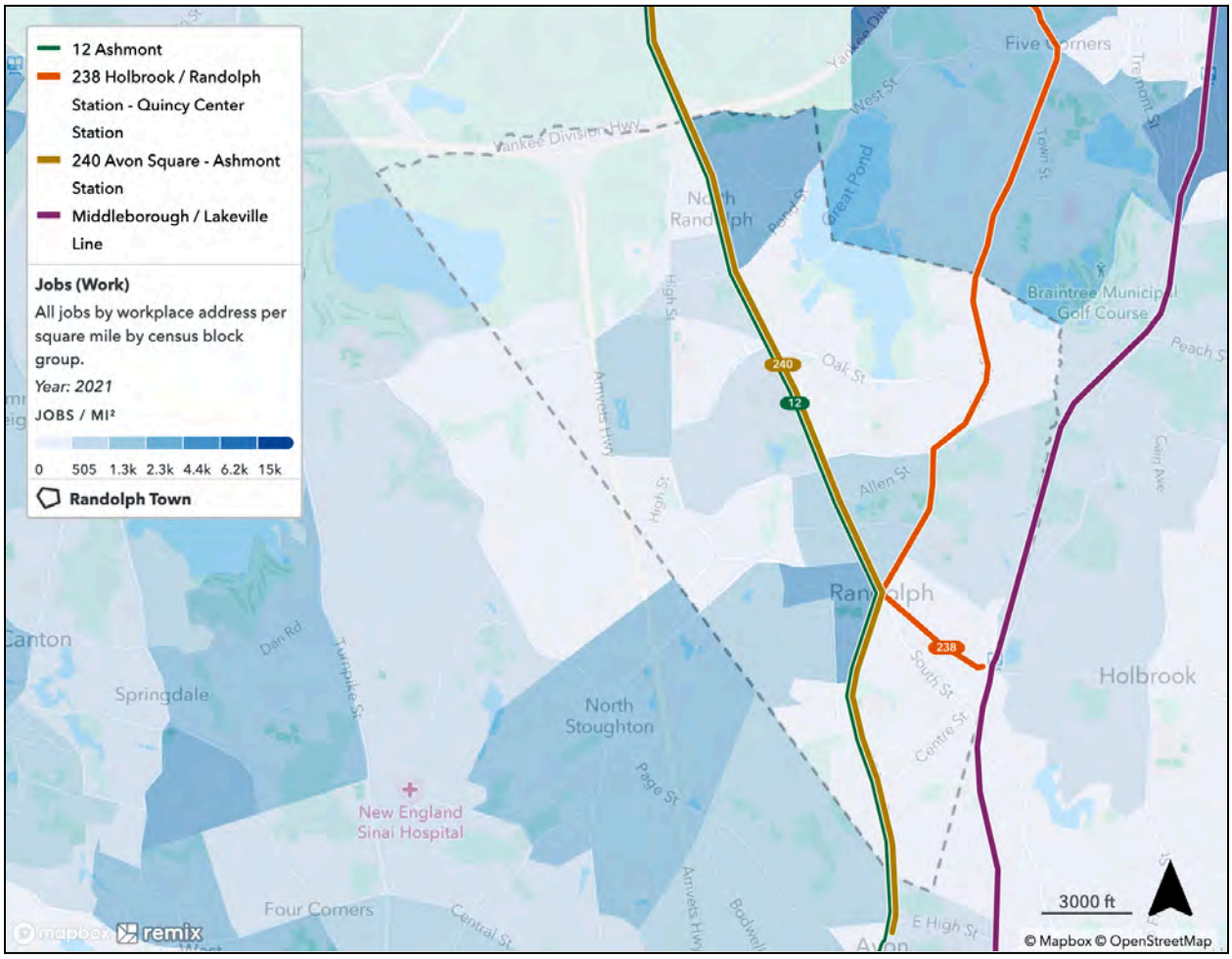
Figure 9. *Density of Zero-Vehicle Households*



Employment Density

The location and density of employment opportunities is one of the most significant predictors of transit usage for an area as many people use public transportation as a means of commuting. As of 2021, there are about 8,400 jobs within Randolph, or about one job for every four residents. There are notable areas of employment in industrial parks such as York Avenue and Pacella Park Drive, in addition to retail centers west of Crawford Square.

***Figure 10**. Employment Density*



Key Destinations

The map below identifies some common destinations many people may want to visit with public transit in Randolph and nearby communities. The map includes destinations such as major employers, shopping centers, grocery stores, medical centers, schools, libraries, and parks.

Figure 11. *Map of Key Destinations in and near Randolph.*

3. Public and Stakeholder Engagement

3.1. Community Meeting

A 90-minute community meeting was held on April 24, 2024, at Randolph Town Hall, from 6pm to 7:30pm. Held in a focus-group format, the meeting was limited to Randolph residents who had engaged with Town staff previously on local transportation issues. Of the 10 residents invited, there were six attendees, in addition to two Via representatives and the Town of Randolph's Director of Planning.

Figure 12. *Community Meeting Venue, Randolph Town Hall*

The meeting began with an overview of the study, in which the project team introduced the study goals and objectives:

- Improve first/last-mile connections to the MBTA commuter rail station;
- Expand transit coverage in areas of Randolph with poor bus stop access;
- Explore opportunities to leverage existing transportation services; and
- Evaluate the feasibility of potential service alternatives.

The project team reviewed existing challenges of public transportation options within Randolph, including infrequent MBTA bus service at off-peak times; service restrictions that prevent most Randolph residents from using the Brockton Area Transit (BAT) network; limited bus coverage beyond the North/Main Street corridors (MBTA Routes 238 and 240); specialized transportation

that is limited to qualified individuals only (e.g., MBTA The Ride, RICC); and private ride-hailing alternatives that are too expensive for daily transport.

Project staff then reviewed a range of potential service alternatives to address these challenges, including traditional (fixed-route) circulators, microtransit, and subsidized Uber/Lyft service for general-public or certain groups. Subsidized ride-hailing service was framed as an option that could either be open to the general public or limited to certain groups of Randolph residents (e.g. low-income residents, seniors, and people with disabilities).

Figure 13. *Community Meeting with Randolph Residents*

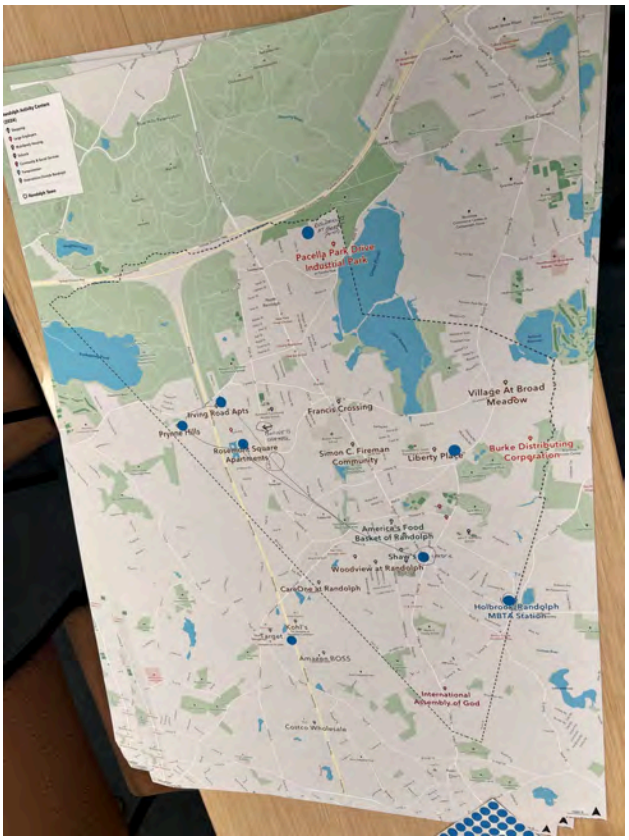
Above: Project staff meet with Randolph residents at a community meeting in April 2024

Randolph residents raised a range of questions and requests for further clarification. Some of the more commonly raised questions and points of clarification included:

- How were different areas within Randolph identified as having unmet transportation needs, referencing the study's Existing Conditions Analysis?
- How did the study determine which community stakeholders and organizations to interview during the stakeholder interview process (see 3.2. Stakeholder Interviews)?
- How would potential transportation service alternatives interact with existing transit services like the MBTA?
- How is the Town of Randolph evaluating the extent to which it could (or could not) financially sustain potential new transportation services?

- What creative, nontraditional funding options exist to support new transportation services?
- Could potential new transportation services offer extended service coverage to other, neighboring communities beyond the boundaries of Randolph?

After a brief presentation, the community meeting included an interactive mapping exercise in which residents were invited to use large-format, printed maps to illustrate their transportation needs, challenges, or opportunities for service improvement. Together, project staff and residents discussed the following topics in relation to the initial questions and requests for clarification indicated above:



- Project staff confirmed that employment centers, apartment and residential complexes (particularly beyond walking distance from existing bus stops), and key bus/train transfer points were considered important destinations that should be served by potential new transportation services.
- Residents emphasized that new transportation services must consider the potential safety issues of a diverse range of potential riders. For example, the transit industry typically considers areas within ¼ mile of a fixed-route bus stop to be within walking distance and therefore served by its bus route. However, even a relatively short, 5-minute or quarter-mile walk may not be suitable for rider groups such as families with younger children or older adults. Sidewalk coverage in Randolph is not present on all streets, and there are numerous areas with poor visibility or limited safe crossing locations.
- Residents stressed that several key destinations they need to travel to are located outside of Randolph's boundaries, such as the shopping centers in Stoughton (e.g. Target, Kohl's, Costco).
- Residents noted the importance of connecting riders to their workplaces, whether they are located in Randolph or in other communities.
- Existing school transportation for Randolph students does not provide universal coverage to all families; those families within two miles of a school location are ineligible for bus service.[8] However, some residents noted that while they live within the two-mile radius, they do not have a safe walking route to their child's school. Providing an alternative transportation option to those families who are not served by school buses may be essential to keeping these students enrolled in Randolph public schools.

[8] Randolph Public School District. 2024. School Bus Rules and Regulations. https://www.randolph.k12.ma.us/Page/2190

- It is essential to consider the service hours that will be offered in alternatives, particularly for use cases of employees working non-traditional work hours and residents traveling to/from the hospital for emergency or other medical appointments.
- Project staff noted other, comparable microtransit services in operation in Massachusetts, such as in the cities of Newton and Salem. However, residents noted that Randolph is much less affluent than these cities, which may affect the service design of potential microtransit alternatives. For example, riders will be less likely to have personal vehicles available, so the service should prioritize meeting all ride requests (even if it results in longer pickup wait times) as opposed to providing shorter average wait times while potentially denying some ride requests at peak times.

3.2. Stakeholder Interviews

The project team interviewed four community stakeholder organizations with significant interest in improving local transportation options in Randolph. These interviews focused on the typical clientele served and their specific transit needs and to understand whether existing Randolph transit and paratransit services are meeting the community's mobility needs. These discussions are intended to refine our understanding of unmet transit needs within Randolph and influence recommendations for service alternatives.

Methodology and Organizations Represented

In collaboration with Randolph's Planning Director, the project team finalized a list of four local organizations and the respective stakeholders representing them:

- Randolph Community Partnership, *Executive Director* - Susan Hearn
- Quincy Asian Resources Inc., *President* - Philip Chong
- Town of Randolph, *Director of Elder Affairs & Director of Library, Recreation, and Community Programs* - Keri Sullivan & Liz Larosee
- Randolph Town Council, *Town Councilor* - Jesse Gordon

The summaries below capture the key findings from the stakeholder interviews.

Challenges with Existing Public Transportation

Overall, the stakeholders appreciated the existence of multiple public transportation options in the Town of Randolph, but voiced that they do not sufficiently serve all residents. The infrequency of service is a main challenge for multiple groups, which in turn requires residents to own a vehicle, carpool with friends or family, or use rideshare services like Uber. Several stakeholders noted that recent immigrants and residents with limited English proficiency have particular challenges with transportation. For instance, both stakeholders representing Randolph Community Partnership and Quincy Asian Resources indicated that these populations often work in suburban job centers far from Randolph that are poorly served by existing transit options. These groups often use Uber/Lyft for their primary mode of transportation, and are motivated to do so despite the significant expense for several reasons including:

- There is not enough time to take public transportation, or it takes too long to reach their destinations relative to private car travel

- They work multiple jobs and need to commute as quickly as possible in order to reach their second (or third) jobs, rest, or spend time with their families
- They are commuting longer distances, beyond the Town of Randolph and beyond the reach of local bus or train services.

For many residents, limited frequency on MBTA bus routes during evenings and on weekends makes completing certain trips challenging by public transit. For example, stakeholders at Randolph Community Partnership noted that students attending free English or high-school equivalency classes end their last class at 9:30 pm on weekdays and must either endure long waits for bus service or make alternative travel plans (e.g. Uber) to get home. MBTA Routes 238 and 240 each operate with hourly service at this time during weekday evenings. Additionally, multiple stakeholders noted that residents with limited English proficiency are often unaware of the full range of transportation services available to them. These residents may not know about RICC's shuttle service, how to apply for MBTA's TheRide paratransit, or how to qualify for reduced-fare Charlie Card program.[9]

Other Randolph residents, even those who speak English well and are aware of the available transportation services, still often struggle to get around. A Town Councilor noted that residents of multifamily apartment communities located beyond walking distance from the two MBTA bus corridors (Main and North Streets), such as Highland Glen and Rosemont Square, have difficulty using local bus service because stop locations are too far to reach on foot. Stakeholders indicated that the RICC shuttle is an essential transportation service, and that most eligible seniors, people with disabilities, and veterans were aware of how to request a ride. However, even this mode of transportation is limited due to its relatively narrow hours of operation and limited funding available for rides beyond Randolph's town limits.

Opportunities for Improvement in Randolph Services

Stakeholders suggested a range of areas where local public transportation needs improvement. More frequent service on Routes 238 and 240, particularly during later evenings and weekends, would reduce wait times for riders and thereby make these routes more useful for locally oriented trips. Several stakeholders noted that additional service is needed to enable east/west-oriented trips that are currently not feasible on the transit network, as bus service is only available on two primary north/south corridors (Main and North Streets). Additional service on Pond/Reed/West Streets, Highland Avenue, Pacella Park Drive, and Warren Street could connect many of the employment centers and multi-family apartment communities that currently are beyond walking distance from the nearest bus stop. Other stakeholders voiced that additional community outreach, featuring culturally competent staff, is needed to increase awareness of transportation programs (e.g. MBTA's The RIDE and the RICC shuttle) among residents with limited English proficiency.

[9] https://www.mbta.com/fares/reduced

4. Service Alternative Development

The project team identified a range of local transportation service alternatives for further evaluation in the Town of Randolph, including fixed-route, microtransit, and ride-hailing options. These service alternatives were informed by findings from the Existing Conditions Analysis and Stakeholder Interviews, public comments received during the Community Meeting, and findings from Peer Municipality Interviews. The service alternatives were further evaluated using the following methodology:

1. **Transit need assessment within Randolph:** Service alternatives were designed to connect existing transit hubs (e.g., Crawford Square, Holbrook/Randolph MBTA rail station) with key activity centers not currently served by existing MBTA fixed-route buses. Shown in Figure 11, these destinations include shopping centers, medical centers, multifamily apartment communities (where more affordable housing in Randolph is typically found), schools, large employers, and community centers. Because this study is carried out on behalf of the Town of Randolph, additional destinations beyond Randolph's borders were not considered. The lone exception to this constraint is the Target at Turnpike Street & Hawes Way, about ¾ mile beyond the Town limits.

1. **Key service parameters:** Project staff determined key service parameters (e.g., hours of operation, service frequency/maximum pickup wait times, service eligibility restrictions, and geographic coverage) that best meet the Study's goals and objectives, in coordination with Town of Randolph staff. Distinct service parameters for each alternative are listed in the following sections.

2. **Demand estimation:** Estimates of demand (i.e., ridership) likely to be served by each alternative were developed based on transit-industry best practices. For fixed-route alternatives, the transit-industry benchmark of a quarter-mile radius surrounding each route's bus stops was selected as the route's "catchment area" that could feasibly access the service.[10] Ridership intensity within the catchment area is derived from that of existing service corridors along Main/North Streets of Routes 238 and 240, as described in 2.1. Current Public Transit Network Offerings. Microtransit and ride-hail alternatives' demand was estimated by applying a "capture rate" to the total population and employment within the service zone(s). This capture rate is a ratio of observed ridership to population/employment totals in active microtransit and ride-hail services in other communities in North America with similar characteristics to Randolph.

3. **Modeling and simulation:** Modeling of each alternative was performed to determine the number of necessary vehicles (for fixed-route and microtransit alternatives) and estimated operating costs required for implementation of each alternative. Additionally, the team used advanced simulation software to evaluate microtransit quality of service outcomes under various operating scenarios and confirm the estimated number of required vehicles could suitably meet the estimated demand for service.

[10] For example, this quarter-mile radius threshold, considered the maximum distance most riders will walk to access local bus service, is used by many transit agencies including the MBTA in service planning and FHWA guidelines for pedestrian planning.

Together, calculating the number of vehicles required for service as well as the number of rides likely to be served enable cost-benefit analysis of each service alternative, so that Town staff may select the most cost-effective and sustainable service option(s) for implementation.

4.1. Fixed-Route Service Alternatives

Fixed-Route Service Parameters and Approach

The proposed fixed-route alternatives use service parameters below that closely align with current existing fixed-route services operated by the MBTA in Randolph, and they include:

- **Service Frequency:** 30 minutes
- **Eligibility Restrictions:** service is open to general public (no restrictions)
- **Pickup Style:** stop-to-stop, with stops every ~1,000 feet
- **Vehicles:** CDL drivers and ADA-compliant cutaway vehicles that hold 12 to 24 passengers
- **Hours of Operation:** Monday to Friday from 7:00 AM to 9:00 PM, Saturday and Sunday from 9:00 AM to 5:00 PM
- **Average Hourly Operating Expense per Revenue Hour:** This analysis assumes an operating cost of $62/revenue-hour, which is derived from using an average of smaller, municipally-operated transit services Massachusetts (distinct from more common transit authorities).[11] Comparable services include the Towns of Lexington and Bedford and the City of Beverley, each of which operate fewer than 10 vehicles in maximum service.[12]

The project team developed two route alternatives focused on providing service to underserved destinations identified during the Existing Conditions Analysis. These routes prioritize connecting residents to regional transfer points where there is an existing MBTA service, such as the Holbrook/Randolph commuter rail station. Key points of interests also affirmed in the public engagement were included as much as possible as well, such as Pacella Park Drive, York Avenue, and Mazzeo Drive, each significant employment areas in Randolph. Routes are also designed to operate along primary or secondary roads (also known as “arterials” and “collectors,” respectively), which typically have better pedestrian facilities. In contrast, they avoid operating on local, residential streets that are often unable to accommodate larger cutaways or transit buses and may lack pedestrian facilities. Route alternatives are also designed to be as direct as possible, avoiding loops or deviations to reduce end-to-end travel times and maximize cost-effectiveness.

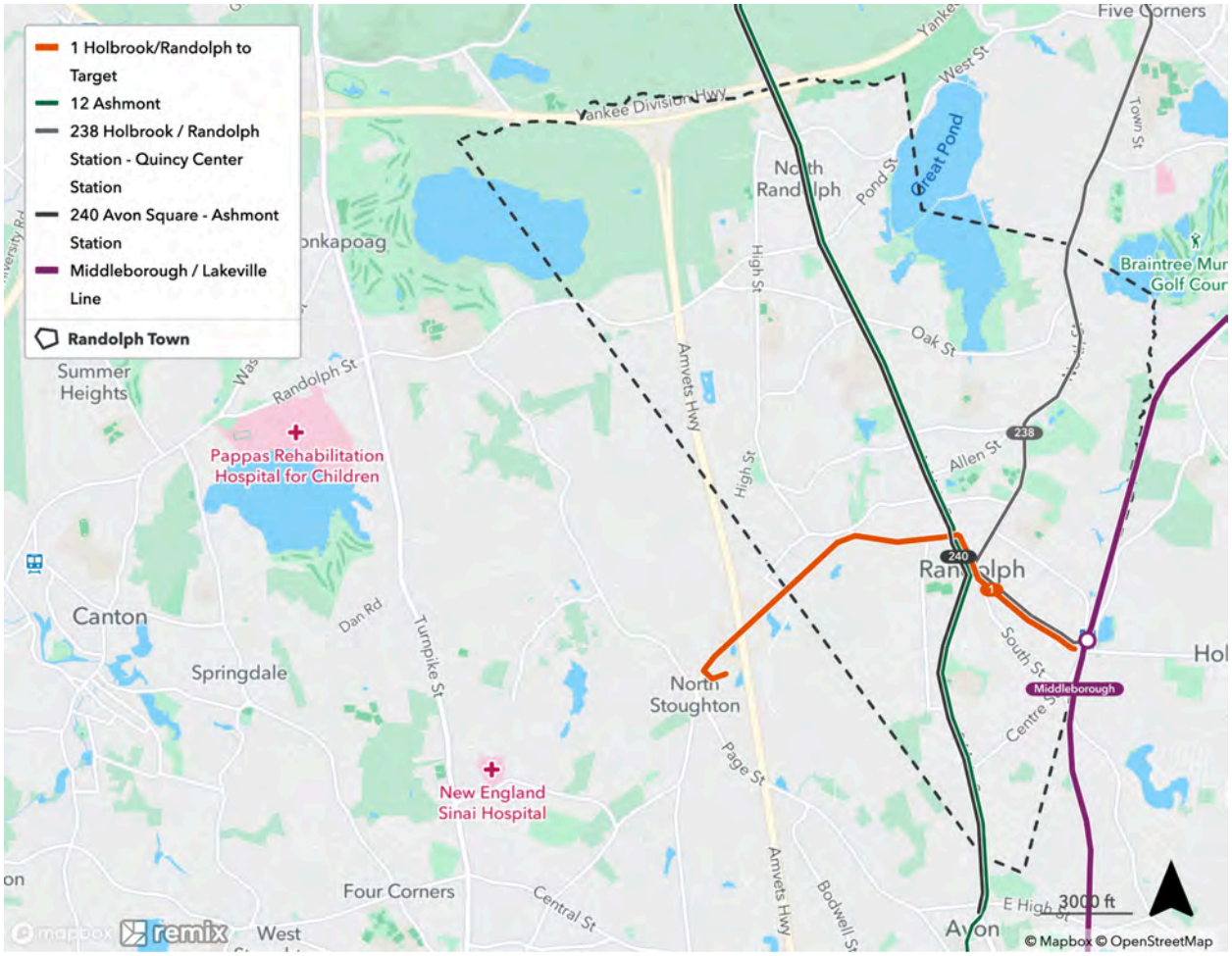
Route 1 - Holbrook / Randolph to Target

Route 1 is a fixed-route bus alternative that connects Holbrook/Randolph commuter rail station and southern Randolph along Mazzeo Drive to a shopping center (Target) just outside the Town limits in Stoughton, at Turnpike Street & Hawes Way. This proposed route has a run-time of about 25 minutes, enabling it to be operated with 30-minute frequency using a single vehicle. West of Crawford Square, there is no other fixed-route bus service in the area. This route would facilitate east-west trips by Randolph residents in the southern half of the Town.

[11] FTA National Transit Database. FY 22 Agency Profiles.

[12] Transit authorities with larger fleets and more complex operations and administrative needs, such as MBTA and BAT, typically have significantly greater hourly operating costs of $100-150 per revenue-hour.

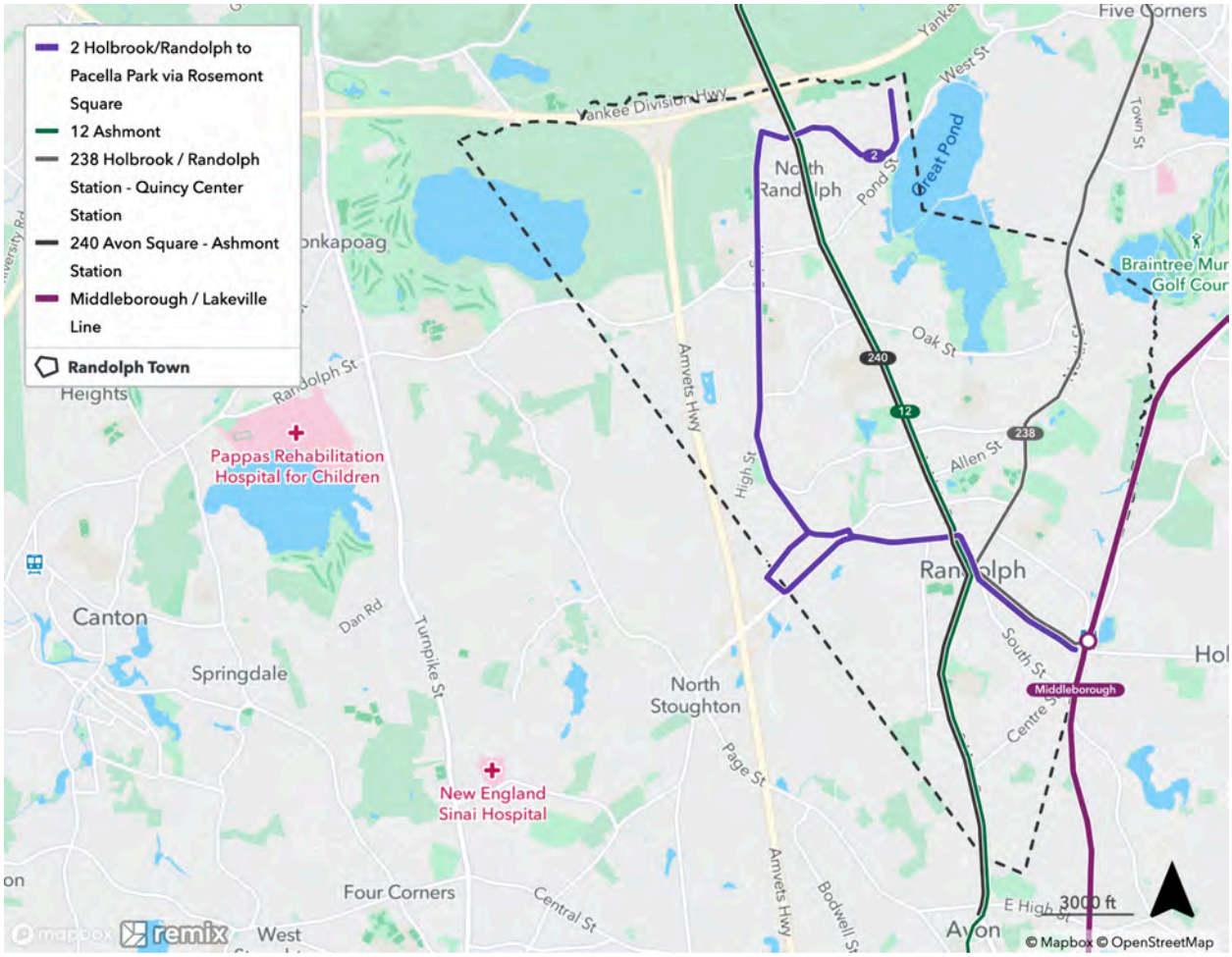
Figure 14. *Route 1 fixed-route alternative (shown in orange)*



Route 2 - Holbrook / Randolph to Pacella Park via Rosemont Square

Route 2 is a fixed-route bus alternative that would operate north-south within Randolph, primarily along High Street, from Holbrook/Randolph commuter rail station to Pacella Park via Rosemont Square. This proposed route would have a roundtrip cycle time of about 44 minutes, requiring two vehicles to operate at 30-minute frequency. This route prioritizes providing broad coverage for northern and western Randolph, particularly to multifamily apartment communities and industrial parks not served by MBTA Route 240.

Figure 15. *Route 2 fixed-route alternative (shown in purple)*



Modeling Analysis

Table 6 summarizes key characteristics of the proposed fixed-route service alternatives, including annual vehicles and revenue-hours required, estimated annual operating costs, population and employment served within ¼ mile of bus stops, and estimated annual ridership. The table also includes the estimated operating cost per passenger trip, a ratio of annual operating costs and annual ridership, as well as the percentage of Randolph population and employment located within ¼ mile of proposed bus stops.

Ridership estimates are derived from observed ridership patterns on MBTA Routes 238 and 240 reported in Fall 2022. First, we calculate the ratio of passenger boardings to the total population and employment within one quarter-mile of their bus stops, per revenue-hour of service on their routes. We then apply this ratio of ridership intensity to the service characteristics of each route alternative below, such as their proposed stop locations (assuming stop placement every ~1,000 feet along the route), service frequency, and hours of operation.

Both proposed route alternatives in Randolph would perform well below existing MBTA bus routes 238 and 240 in terms of ridership, and below transit-industry benchmarks in terms of cost-per-ride and productivity of service (boardings per revenue-hour). As described in 2.2. Key Findings from Previous Studies, Routes 238 and 240 serve 1,750 and 2,500 passengers per day, though it should be noted that each has a much longer service corridor than those explored here. Likewise, both proposed routes would serve fewer than five passengers per revenue-hour; this low level of productivity is almost universally understood by transit agencies as underperforming, according to a national survey of service evaluation standards by transit agencies conducted by the Transportation Research Board.[13]

[13] Benn, Howard P. 1995. "Bus Route Evaluation Standards." TCRP Synthesis of Transit Practice 10. Washington DC: *Transportation Research Board*. https://www.trb.org/publications/tcrp/tsyn10.pdf. Appendix C, p. 38.

Table 6. *Fixed-route modeling results*

Ridership	Route 1: Holbrook / Randolph to Target	Route 2: Holbrook / Randolph to Pacella Park via Rosemont Square	Total Fixed-Route Network (Routes 1 and 2)
Annual Revenue-Hours	5,100	8,500	13,700
Vehicles Required	1	2	3
Annual Operating Cost	$515,000	$853,000	$1,367,000
Population within 1/4 mile	5,900	13,500	13,700
Employment within 1/4 mile	3,000	4,700	5,700
Est. Avg. Weekday Ridership	33	113	146
Est. Avg. Saturday Ridership	22	73	95
Est. Avg. Sunday Ridership	15	51	66
Est. Annual Ridership	10,400	35,200	45,600
Est. Avg. Service Productivity on Weekdays	1.9	4.0	3.2
Est. Avg. Annual Cost per Passenger Trip	$50	$24	$30
Percent Coverage of Randolph Population	17%	39%	39%
Percent Coverage of Randolph Employment	36%	56%	56%

4.2. Microtransit Service Alternatives

Microtransit Overview

Microtransit is a shared, demand-responsive, technology-enabled form of public transportation. Unlike a traditional bus service, there are no fixed routes or schedules. Instead, vehicles are dynamically routed with onboard navigation software according to passenger demand, adjusting routes and stop locations based on where passengers need to travel in real time. The key difference between microtransit and other forms of demand-responsive transportation is that microtransit is technology-driven and encourages riders to book trips and track their vehicle in real-time through a mobile phone app. However, services also allow passengers who cannot or prefer not to use a smartphone application to book rides by calling a dispatcher.

Typically, microtransit operates within a predefined service zone, meaning passengers can only book trips where both their origin and destination are within the same zone, but can travel anywhere within the zone. For passengers who want to travel beyond the zone boundaries, microtransit can provide a first/last-mile connection to fixed-route buses that serve areas beyond the zone boundaries. In this case, passengers will only be able to complete part of their journey using microtransit and must transfer to complete their trip, typically at a major bus stop or train station within the service zone.

Microtransit service is often operated using minivans or vans (6-12 passenger vehicles are most common), though smaller or larger vehicle classes may also be used. As with traditional bus service, passengers will share their ride with others traveling in the same direction at the same time, and the service's algorithm often adjusts routing to maximize rides shared between multiple passengers. Unlike ADA paratransit, microtransit is open to the public and anyone can use the service; wheelchair-accessible vehicles ensure the on-demand service is accessible to people with disabilities.

To book a ride, the passenger indicates the number of passengers in their party and their desired pickup and dropoff locations. When booking using the app, passengers will see a map of the service zone where they can book rides. The application often shows key destinations and transit hubs in the service area. Once the passenger submits a trip request, they are given a proposal that tells them when the vehicle will arrive and where to meet it. Riders are often asked to walk to a nearby pickup point to meet their vehicle, typically a 1-3 minute walk away to the nearest intersection. However, riders who indicate they have a disability — either in the mobile app or by notifying the dispatcher — will receive curb-to-curb service and are not asked to walk any distance.

Typically, passengers must wait between 10 and 20 minutes for a trip, although this may vary depending on the level of demand and the number of vehicles available. Passengers can track the vehicle in real-time using the smartphone app. The passenger is also provided with vehicle information—for example, license plate, driver name, driver photo, and vehicle ID number. For trip requests made through a call center, passengers can choose to receive text message updates for their trips.

Once the passenger(s) has boarded the vehicle, they are driven to their destination. Along the way, the vehicle will pick up and drop off other passengers heading in a similar direction, but services are configured to avoid lengthy detours for passengers already on board. The passenger can continue to track their trip's progress using the app. Passengers may also be asked to walk a few minutes from their dropoff point to their final destination. After each trip, riders who booked with the mobile app may be automatically emailed a receipt. They may also be able to provide real-time and post-trip feedback through the app.

Microtransit Service Areas

The project team developed two microtransit service alternatives to provide service within Randolph. The first microtransit alternative, **Zone 1**, is 8 square miles in area and aligns with the Randolph town limits. The second microtransit alternative, **Zone 2,** is 9.3 square miles in area and includes both the Randolph town limits as well as additional shopping destinations identified

through the Existing Conditions Analysis. These destinations are within ¾ mile of Randolph's borders and include Kohl's, Target, Costco, and Ikea, among others.

Figure 16. *Microtransit Zone 1 - Randolph*

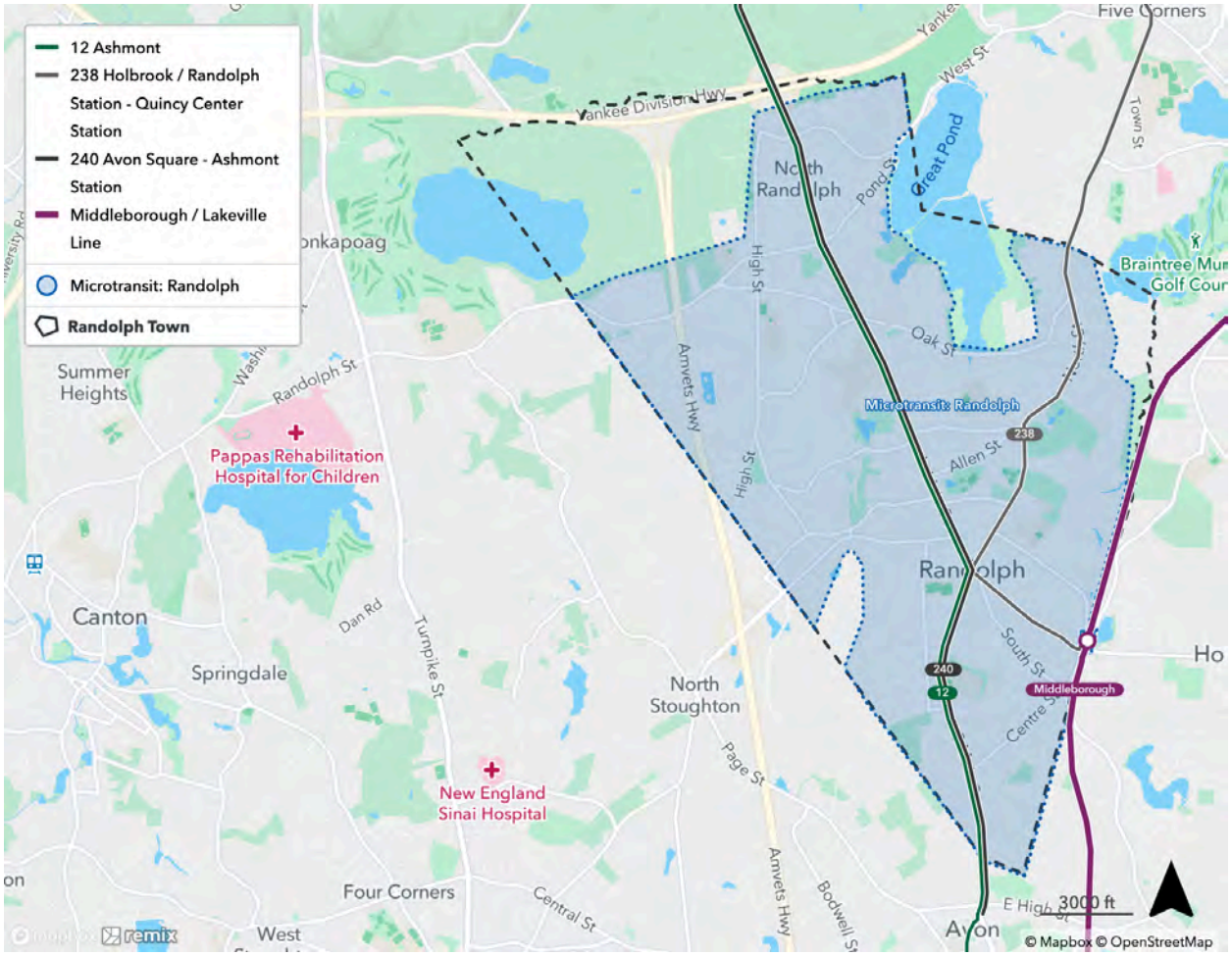
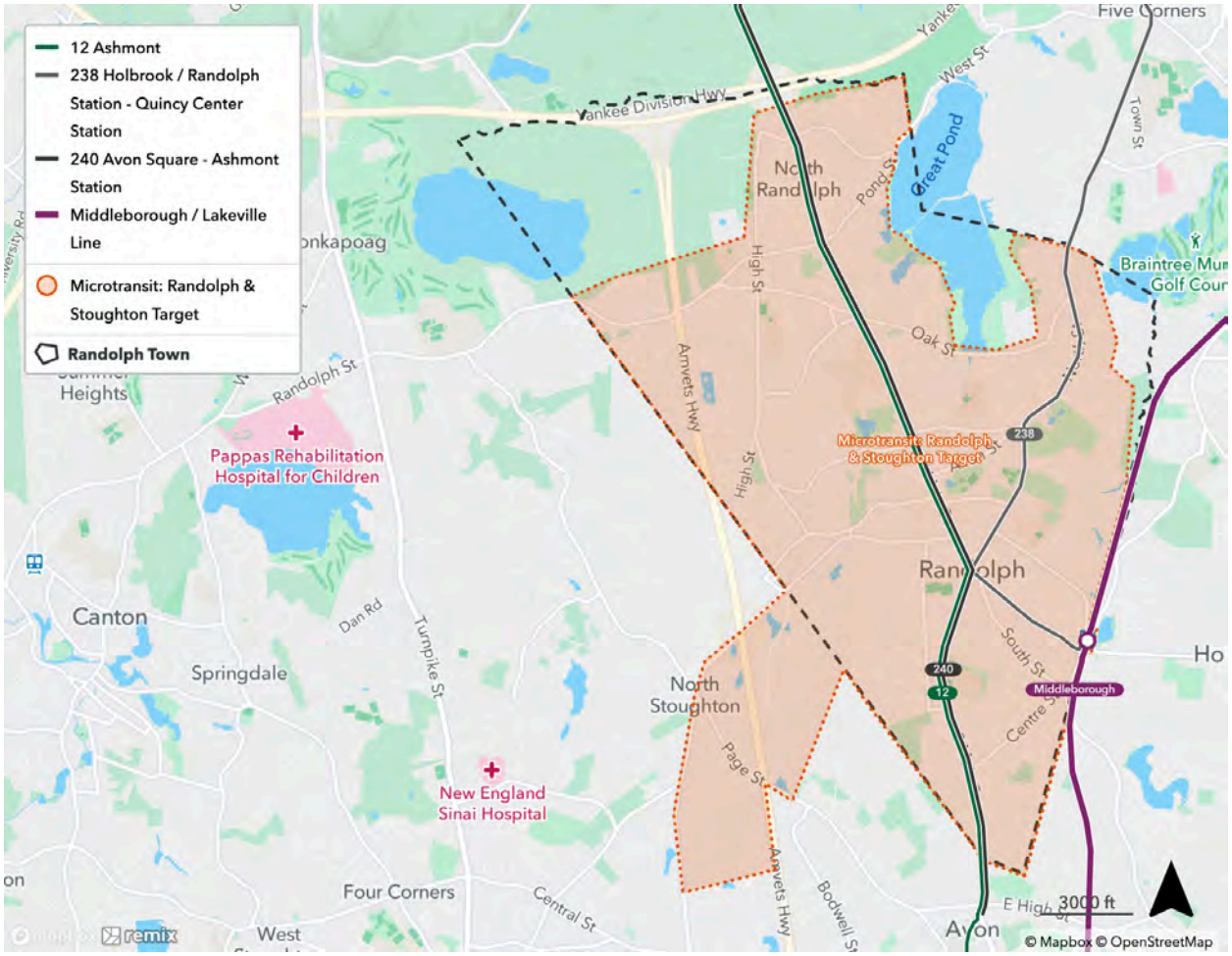


***Figure 17**. Microtransit Zone 2 - Randolph & Stoughton Target*



Ridership Estimates and Approach

Ridership estimates inform key service design decisions, such as the fleet size required to operate the service and thus, the level of funding required for each microtransit alternative. It can take six to twelve months, and sometimes even longer, for the ridership of a zone to mature and reach these estimates. The methodology for how the project team developed ridership estimates, followed by the ridership estimates themselves, are outlined below.

As travel demand is difficult to predict and is influenced by many factors, providing a range of demand estimates can be helpful for estimating the upper and lower bounds for the total cost to operate each opportunity area. Demand estimates for Randolph's opportunity areas accounted for the following:

1. The number of residents living in each opportunity area,
2. The number of jobs located in each opportunity area, and
3. The expected microtransit mode share (the percentage of individuals who live or work in the opportunity area that are likely to use the service).

Ridership estimates shared here are based on comparable communities. However, they carry some degree of uncertainty: **actual ridership levels may vary** based on a wide range of factors such as marketing efforts, community support, vehicle and driver quality, rider app functionality, booking requirements, and more. A low, medium, and high-ridership estimate was calculated for each zone. The three ridership scenarios are described below:

- **Low.** This scenario assumes the service does not perform as well as comparable peer microtransit services. Common reasons for lower ridership outcomes could include poor marketing, lack of community support, poor stakeholder relationships (e.g., with major employers), or unforeseen technological or operational challenges that affect the quality of service.

- **Medium.** The medium scenario represents the project team's best estimate of ridership within 6-12 months of launch based on the performance of similar services.

- **High.** This scenario assumes the service is more popular than most of its peers. Common reasons for an especially high-ridership microtransit service include strong community support, strong stakeholder and employer relationships (often employers are strong advocates of the service), fare-free service, or highly effective marketing campaigns.

A summary of the two zone options' operating hours and their ridership estimates are shown in the two following tables, Table 7 and Table 8. Estimates of ridership are shown below for three demand scenarios (low-demand, medium-demand, and high-demand as described above) and two scenarios of hours of operation (14-hours per weekday, 16 hours per weekday).

Table 7. *Microtransit Zone 1 - Randolph: ridership estimates*

Service Hours	Average Daily Boardings				
	Weekday: Low	Weekday: Medium	Weekday: High	Saturday	Sunday
Scenario 1: Mon-Fri: 7am-9pm, Sat-Sun: 9am-5pm	64	128	192	83	58
Scenario 2: Mon-Fri: 6am-10pm, Sat-Sun: 8am-6pm	69	138	207	90	62

Table 8. *Microtransit Zone 2 - Randolph & Stoughton Target: ridership estimates*

Service Hours	Average Daily Boardings				
	Weekday: Low	Weekday: Medium	Weekday: High	Saturday	Sunday
Scenario 1: Mon-Fri: 7am-9pm, Sat-Sun: 9am-5pm	83	167	250	109	75
Scenario 2: Mon-Fri: 6am-10pm, Sat-Sun: 8am-6pm	90	180	269	117	81

Microtransit Service Parameters

Designing a microtransit service entails making trade-offs between supply, demand, and service quality within a specific opportunity area. Simulations allowed the project team to evaluate these tradeoffs and make service design recommendations including passenger wait times, hours of operation, and vehicle fleet sizes. Supply, demand, and quality of service are generally measured as follows:

- **Supply:** Measured by vehicle hours, fleet size, or total budget for the service. An increase in supply can allow for more trips to be served but typically increases the overall cost of the service.
- **Demand:** Typically refers to the ridership of a service, and is a function of the opportunity area size, demographics, and key destinations.
- **Quality of Service:** Includes multiple metrics that impact rider experience, including average walking distance to pick up locations and from dropoff locations, wait times, and journey times. Increasing quality of service can increase demand, and therefore, supply. Conversely, reducing quality of service can make the service more efficient but may reduce demand and negatively impact riders' perception of the service.

Adjusting any of these three factors will require corresponding adjustments to the other two factors, reflecting a fundamental tradeoff. For example, if demand increases within an opportunity area, either the supply will need to increase to keep the quality of service constant, or the quality of service must degrade somewhat to avoid an increase in supply.

For each microtransit alternative, simulations were conducted to understand the average wait times, walking distances, service efficiency, vehicle and driver requirements, and estimated operating costs. Table 9 below indicates the recommended service parameters used to simulate the microtransit alternatives.

Table 9. *Microtransit service parameters*

Service Parameter	Description	Parameter Value for Randolph
Booking Model	Booking model refers to the different ways that riders can book microtransit trips and how far in advance they can book a ride: • **On-Demand Microtransit:** Passengers can request a journey in real-time. Passengers receive several proposals for a ride with a range of pickup times. • **Pre-Booked Microtransit:** Passengers can request a journey in advance. Ride requests must be scheduled from the day before (e.g., by 5pm on Monday for a ride booked on Tuesday morning) or up to several weeks ahead of time. The exact pickup time is confirmed before travel.	On-demand
Hours of Operation	Hours of operation are the times when a customer can request a ride and should, at a minimum, be set to match the	Option 1:

Service Parameter	Description	Parameter Value for Randolph
	existing fixed-route service hours. They may also be extended to provide service during times when there currently is no fixed-route service, such as later in the evenings or weekends. While longer service hours are useful for many people, they also make the service less cost-effective to operate, especially during low-ridership hours.	Mon-Fri: 7am - 9pm, Sat-Sun: 9am - 5pm Option 2: Mon-Fri: 6am - 10pm, Sat-Sun: 8am-6pm
Pickup / Dropoff Model	The most common microtransit pickup / dropoff models are curb-to-curb and corner-to-corner service. Curb-to-curb picks up and drops off passengers as close to their requested origins and destinations as possible, matching the standard of service used by ADA paratransit providers. Corner-to-corner services typically require a short walk to meet the vehicle, often at the nearest intersection. The corner-to-corner model offers many pickup and dropoff points throughout the opportunity area by allowing vehicles to stop near most intersections and major destinations. Pickup and dropoff locations in this model may be manually adjusted or removed to address potential pedestrian safety issues or avoid congested locations. Compared to a curb-to-curb model, corner-to-corner services typically have shorter wait times and higher rates of ride-sharing between multiple passengers. Corner-to-corner services are also useful in reducing the operator's vehicle miles traveled (VMT) by avoiding the detours required to provide curb-to-curb service. ***Note:*** *Under all models, riders with disabilities may request a curb-to-curb service either through the mobile app or by notifying the dispatcher at the time of booking.*	Corner-to -corner
Maximum Walking Distance	This parameter applies to corner-to-corner services. It controls the maximum distance a passenger must walk from their requested origin address to their vehicle and from their vehicle to their requested destination address. Allowing longer maximum walking distances means a passenger may be asked to walk further than their closest pickup location to minimize the distance a vehicle must detour to pick them up. Longer walking distances will increase the efficiency of the service and improve the rate of shared-ride occupancy by reducing vehicle detours on the way to pick up passengers, but they may also result in lower ridership as some passengers may choose another mode of travel (or not to travel) if they are asked to walk too far. Average walking distance will vary in each scenario depending on the street grid, distribution of trip requests, and level of demand.	Average: 400 - 600 ft Maximum: 1,320 ft (one quarter- mile) (total walking distance is ~twice the distance shown as passengers walk at both ends of the trip)

Service Parameter	Description	Parameter Value for Randolph
Maximum Wait Time	Maximum wait time is the maximum number of minutes between when a rider books an on-demand microtransit ride to the time that the vehicle arrives at the designated pickup location. If no vehicles can complete the requested pickup within the maximum wait time, the ride request is declined and service is considered "unavailable." On-demand microtransit service scenarios in this study are calibrated with sufficient vehicles to avoid this outcome.	Average: 15 minutes Maximum: 30 minutes
Detour Allowance	This parameter refers to the allowable detour a passenger can experience (measured in both time and distance) compared to the base route (quickest route) between a rider's pickup and dropoff. Microtransit does not have fixed-routes and the exact routing of a vehicle is based on the trip requests received in real-time. When the software is determining a vehicle's route, the detour threshold gives the vehicles the flexibility to aggregate rides. Large detour thresholds can lead to longer journey times for passengers, rendering the service less useful to some, especially those with access to a private vehicle.	10 minutes or 1.5x direct trip journey length/duration, whichever is shorter
Vehicle Capacity	This is the number of seats and wheelchair spaces per vehicle. A larger vehicle is often useful when a family or large group chooses to travel together. However, it is usually the number of vehicles, rather than the number of seats in the vehicles, that tends to limit the number of trips a microtransit service can complete in a given time period. Smaller vehicles, such as minivans or vans in the 6-12 seat range may also be less costly to operate, both in terms of vehicle purchasing/leasing and ongoing operating costs (a Commercial Driver's License is not required for these vehicle classes).	Minivans with two possible configurations: 2 regular seats + 1 wheelchair space 5 regular seats + 0 wheelchair space

Simulation Methodology

The project team used an agent-based, microsimulation software to run a series of iterative simulations to evaluate the trade-offs between supply, demand, and quality of service in each microtransit opportunity area under various operating conditions. Simulating each alternative allowed the project team to understand how different service parameters, route alignments, zone boundaries, and fleet configurations may impact important service performance indicators and quality of service metrics such as service utilization (passengers per vehicle-hour), average wait times for the service, and average trip duration. Specifically, the results below include the following for each zone and simulation:

- **Fleet size:** The number of vehicles required to meet the level of passenger demand at the set quality of service parameters during peak hours. The simulations may suggest fewer vehicles are needed during off-peak hours.

- **Weekday ridership:** The number of expected boardings per weekday and annually. The low, medium, and high demand estimates referenced in Ridership Estimates and Approach are provided for each zone.
- **Weekday average productivity:** Productivity is a measure of how efficient a service is and is measured by the number of passenger boardings per revenue-hour of service.
- **Average wait times (peak period):** The average time a passenger is asked to wait from when they request a ride and are assigned a trip to when they are asked to meet the vehicle during peak periods.
- **Annual ridership:** Annual ridership estimates are based on the demand estimates created using the Ridership Estimates and Approach outlined in the section above.
- **Annual revenue-hours:** The total hours a vehicle is scheduled to travel while in revenue service. Revenue hours are defined as the hours that a vehicle is in-service and available to complete trip requests or actively driving to pick up passengers and drop them off. It does not include deadhead time.
- **Total estimated annual operating cost:** Cost estimates were created based on operating an average contracted microtransit service ($65-80/vehicle-hour).
- **Average estimated operating cost per ride:** This figure is the ratio of annual operating cost to annual ridership, both indicated above.

Simulation results for each of the microtransit opportunity area alternatives are included in the tables below. Each alternative includes estimates for each of the low, medium, and high ridership scenarios outlined in the Ridership Estimates and Approach section above.

Simulation Results

The following section details the simulation findings for each zone and scenario.

Table 10. *Microtransit Zone 1 - Randolph: modeling results for 14 service hours per weekday*

	Low	Medium	High
Fleet Size *Vehicles required at peak (excl. spares)*	**2**	**3**	**3**
Weekday Ridership *Boardings*	64	128	192
Weekday Avg. Productivity *Boardings / Revenue-Hour*	**2.8 - 3.4**	**3.1 - 3.7**	**4.8 - 5.4**
Avg. Wait Time (mins.)	12	9	13
Avg. Ride Duration (mins.)	9	9	10
Annual Ridership *Passenger Boardings*	20,000	41,000	61,000
Annual Revenue-Hours	6,800	12,300	12,300
Annual Operating Cost ($) *Rounded to nearest $10,000*	$570,000 - $700,000	$840,000 - $1,030,000	$840,000 - $1,030,000
Avg. Cost per Ride *Rounded to nearest dollar*	$27 - $34	$21 - $25	$14 - $17

Table 11. *Microtransit Zone 1 - Randolph: modeling results for 16 service hours per weekday*

	Low	Medium	High
Fleet Size *Vehicles required at peak (excl. spares)*	**2**	**3**	**3**
Weekday Ridership *Boardings*	69	138	207
Weekday Avg. Productivity *Boardings / Revenue-Hour*	**2.1 - 2.7**	**2.7 - 3.3**	**4.3 - 4.9**
Avg. Wait Time (mins.)	9	9	14
Avg. Ride Duration (mins.)	9	9	10
Annual Ridership *Passenger Boardings*	22,000	44,000	66,000
Annual Revenue-Hours	9,500	14,600	14,600
Annual Operating Cost ($)* *Rounded to nearest $10,000*	$640,000 - $790,000	$930,000 - $1,140,000	$930,000 - $1,140,000
Avg. Cost per Ride *Rounded to nearest dollar*	$29 - $36	$21 - $26	$14 - $17

Table 12*. Microtransit Zone 2 - Randolph & Stoughton Target: modeling results for 14 service hours per weekday*

Ridership	Low	Medium	High
Fleet Size *Vehicles required at peak (excl. spares)*	**2**	**3**	**4**
Weekday Ridership *Boardings*	83	167	250
Weekday Avg. Productivity *Boardings / Revenue-Hour*	**3.1 - 3.7**	**4.1 - 4.7**	**4.6 - 5.2**
Avg. Wait Time (mins.)	10	11	14
Avg. Ride Duration (mins.)	9	10	11
Annual Ridership *Passenger Boardings*	27,000	53,000	80,000
Annual Revenue-Hours	8,000	12,100	16,100
Annual Operating Cost ($)* *Rounded to nearest $10,000*	$570,000 - $700,000	$840,000 - $1,030,000	$1,070,000 - $1,310,000
Avg. Cost per Ride *Rounded to nearest dollar*	$21 - $26	$16 - $19	$13 - $16

Table 13. *Microtransit Zone 2 - Randolph & Stoughton Target: modeling results for 16 service hours per weekday*

Ridership	Low	Medium	High
Fleet Size *Vehicles required at peak (excl. spares)*	**2**	**3**	**4**
Weekday Ridership *Boardings*	90	180	269
Weekday Avg. Productivity *Boardings / Revenue-Hour*	**3.0 - 3.6**	**4.2 - 4.8**	**4.7 - 5.3**
Typical Wait Time (mins.)	12	11	12
Typical Ride Duration (mins.)	10	10	11
Annual Ridership *Passenger Boardings*	29,000	57,000	85,000
Annual Revenue-Hours	8,800	12,700	17,500
Annual Operating Cost ($)* *Rounded to nearest $10,000*	$660,000 - $810,000	$930,000 - $1,140,000	$1,200,000 - $1,480,000
Avg. Cost per Ride *Rounded to nearest dollar*	$23 - $28	$16 - $20	$14 - $17

Results from the microtransit simulations suggest the following conclusions about the feasibility of the proposed microtransit service alternatives:

- Scenarios with 14-hour weekday service spans (Table 10 and Table 12) are more cost-effective and productive, in terms of boardings per revenue-hour, than scenarios with 16-hour weekday service spans (Table 11 and Table 13). While 16-hour scenarios result in modest ridership increases, these increases are not sufficient to offset the additional operating cost of provided extended service hours. As a result, **we recommend the 14-hour hours of operation during the first year of implementation.**
- The expanded service zone including Stoughton shopping centers, Zone 2, shown in Table 12 and Table 13, results in higher ridership as well as more cost-effective and productive operations, compared to the Zone 1 option shown in Table 10 and Table 11.
- The medium-demand scenario is the most likely ridership outcome to be achieved during the first 6-12 months of operation, and as a result **we recommend the microtransit service scenario of Zone 2 with a 14-hour service span, shown in Table 12, as the preferred microtransit service alternative.** This alternative offers the optimal anticipated outcomes, on balance, between vehicles required to operate the service (and therefore the annual operating cost), ridership, cost-effectiveness, and productivity of service.

4.3. Ride-Hail Service Alternatives

Ride-hailing describes demand-responsive (typically on-demand rather than pre-booked), single-passenger (i.e. not shared rides), curb-to-curb services operated by taxi companies or transportation network companies (TNCs) such as Uber or Lyft. Unlike the microtransit service

alternatives which are assumed to be open to the general public, ride-hailing services could be offered in one of two configurations:

- **Option 1:** Eligibility is limited to seniors (60+), disabled, and low-income Randolph residents; about one-third (34%) of Randolph population would qualify for this type of service.[14]
- **Option 2:** Service is available to the general public, as with the microtransit service alternatives.

There are several other key differences between microtransit and ride-hailing service alternatives. Unlike microtransit services, TNCs such as Uber or Lyft are not reliably able to comply with FTA regulations such as ADA (wheelchair-accessible vehicles), Title VI (booking and fare payment options for cash-paying or non-smartphone-user customers), or the drug/alcohol testing and criminal background checks of drivers. To achieve compliance with these regulations, as is often required for services receiving state or federal funds, public agencies partnering with ride-hailing services typically contract with both Uber/Lyft *and* a traditional taxi company capable of providing wheelchair-accessible vehicles, cash fare payment and call-in booking options, and the drug/alcohol testing and criminal background checks of drivers. By offering customers the ability to select which contractor fulfills their ride request, the public agency ensures the service is compliant with these FTA regulations.[15]

Additionally, ride-hailing services operate with a non-dedicated service model priced on a per-ride basis (see 6.1. Operating Models), as opposed to a dedicated service model used in microtransit and fixed-route service alternatives, which are priced on a revenue-hour basis. As a result, the cost of ride-hailing service operations rises linearly and in direct proportion to ridership, due to the lack of aggregation of passengers into shared rides. This is in contrast to fixed-route and microtransit service alternatives, which see their costs-per-ride decline somewhat as ridership increases by aggregating passengers into shared rides. Uber/Lyft also feature dynamic pricing (a.k.a. “Surge pricing” during high-demand periods), leading to significant variation in total fares between low- and high-demand periods. Further service parameters are described below.

Ride-Hail Service Parameters

- **Booking Model:** on-demand
- **Service Hours:** Monday to Friday from 7:00 AM to 9:00 PM, Saturday and Sunday from 9:00 AM to 5:00 PM
- **Ridership:** average weekday ridership is assumed to be equivalent to microtransit service under low-, medium-, and high-demand scenarios.
- **Pickup / Dropoff Model:** curb-to-curb
- **Aggregation:** none - rides are not shared
- **Fare Policy:** passenger pays first $3 for each ride, the Town of Randolph pays the remaining amount subsidizing up to $20, and passengers pay any fare in excess of $20. This fare policy matches the MBTA’s The RIDE Flex, which uses ride-hailing services to provide on-demand rides for ADA paratransit customers.[16]

[14] American Community Survey 2018-2022 Five-Year Estimates, Tables B01001, B17024, and C18131.

[15] This approach is known as the “taxicab exemption.” More information available here: https://www.transit.dot.gov/regulations-and-programs/safety/shared-mobility-faqs-related-fta-drug-and-alcohol-program

[16] MBTA. 2024. “The RIDE Flex.” https://www.mbta.com/accessibility/the-ride/the-ride-flex

- **Vehicle Capacity:** Four-passenger sedans or SUVs. Unlike microtransit service alternatives, riders who require wheelchair-accessible vehicles, call-in ride booking, or cash fare payment will be referred to a local taxi operator in lieu of Uber or Lyft.
- **Average Ride Duration:** 9.5 minutes, based on average ride durations observed during microtransit simulations above.
- **Average Ride Distance:** 2.9 miles, based on average ride distances observed during microtransit simulations above.

Ride-hail service alternatives were developed using the same service zone boundaries as those described in Microtransit Service Areas:

- **Zone 1 - Randolph:** 8.0 square mile zone with service within Randolph Town limits.
- **Zone 2 - Randolph & Stoughton Target:** 9.3 square mile zone with service within Randolph Town limits, and additional service to shopping destinations in Stoughton such as Kohl's, Target, Costco, Ikea.

Modeling Analysis

The following section details the simulation findings for each zone and scenario for service hours per weekday. These results show that while costs per ride and net subsidies per ride stay constant ($11-13 and $8-10, respectively), annual operating costs escalate significantly in direct proportion with ridership growth. While a limited-eligibility ride-hailing program could be operated for between about $80,000 and $360,000 per year, depending on ridership volumes and zone boundaries, the cost of a general-public ride-hailing service is significantly greater: between $230,000and $1.1 million annually, given its much higher estimated ridership volumes.

Table 14. *Ride-Hail Zone 1 - Randolph: modeling results for option 1 (limited service eligibility)*

Ridership	Low	Medium	High
Weekday Ridership *Boardings*	22	44	66
Annual Ridership *Passenger Boardings, rounded to nearest thousand*	7,000	14,000	21,000
Annual Cost ($)* *Rounded to nearest thousand*	$77,000 - $92,000	$159,000 - $189,000	$236,000 - $280,000
Avg. Cost per Ride *Rounded to nearest dollar*	$11 - $13	$11 - $13	$11 - $13
Annual Net Subsidy ($)* *Annual opex less fare revenue, Rounded to nearest thousand*	$57,000 - $71,000	$117,000 - $146,000	$173,000 - $217,000
Avg. Net Subsidy per Ride *Avg. opex less fare revenue per ride, Rounded to nearest dollar*	$8 - 10	$8 - 10	$8 - 10

***Table 15**. Ride-Hail Zone 2 - Randolph & Stoughton Target: modeling results for option 1 (limited service eligibility)*

Ridership	Low	Medium	High
Weekday Ridership *Boardings*	28	57	85
Annual Ridership *Passenger Boardings, rounded to nearest thousand*	9,200	18,000	27,200
Annual Cost ($)* *Rounded to nearest thousand*	$103,000 - $122,000	$202,000 - $240,000	$306,000 - $363,000
Avg. Cost per Ride *Rounded to nearest dollar*	$11 - $13	$11 - $13	$11 - $13
Annual Net Subsidy ($)* *Annual opex less fare revenue, Rounded to nearest thousand*	$76,000 - $95,000	$149,000 - $186,000	$224,000 - $281,000
Avg. Net Subsidy per Ride *Avg. opex less fare revenue per ride, Rounded to nearest dollar*	$8 - 10	$8 - 10	$8 - 10

***Table 16.** Ride-Hail Zone 1 - Randolph: modeling results for option 2 (open to general public)*

Ridership	Low	Medium	High
Weekday Ridership *Boardings*	64	128	192
Annual Ridership *Passenger Boardings, rounded to nearest thousand*	20,000	41,000	61,000
Annual Cost ($)* *Rounded to nearest thousand*	$225,000 - $267,000	$461,000 - $548,000	$686,000 - $815,000
Avg. Cost per Ride *Rounded to nearest dollar*	$11 - $13	$11 - $13	$11 - $13
Annual Net Subsidy ($)* *Annual opex less fare revenue, Rounded to nearest thousand*	$165,000 - $207,000	$338,000 - $425,000	$503,000 - $632,000
Avg. Net Subsidy per Ride *Avg. opex less fare revenue per ride, Rounded to nearest dollar*	$8 - 10	$8 - 10	$8 - 10

Table 17. *Ride-Hail Zone 2 - Randolph & Stoughton Target: modeling results for option 2 (open to general public)*

Ridership	Low	Medium	High
Weekday Ridership *Boardings*	83	167	250
Annual Ridership *Passenger Boardings, rounded to nearest thousand*	27,000	53,000	80,000
Annual Cost ($)* *Rounded to nearest thousand*	$304,000 - $361,000	$596,000 - $708,000	$900,000 - $1,068,000
Avg. Cost per Ride *Rounded to nearest dollar*	$11 - $13	$11 - $13	$11 - $13
Annual Net Subsidy ($)* *Annual opex less fare revenue, Rounded to nearest thousand*	$223,000 - $280,000	$437,000 - $549,000	$660,000 - $828,000
Avg. Net Subsidy per Ride *Avg. opex less fare revenue per ride, Rounded to nearest dollar*	$8 - 10	$8 - 10	$8 - 10

5. Cost-Benefit Analysis

The project team conducted a cost-benefit analysis of the various service alternatives evaluated in the previous chapter, including fixed-route, microtransit, and ride-hailing options. The purpose of this cost-benefit analysis is to clarify the advantages and disadvantages of each of these service alternatives to support the Town of Randolph in making informed decisions with respect to which alternative(s) may or may not be suitable for implementation. This cost-benefit analysis encompasses four distinct categories of metrics for comparison: service performance (e.g., ridership, productivity of service), cost-effectiveness (e.g. annual operating costs, cost per ride, net subsidy per ride), service coverage of population and employment within Randolph (i.e., shares of each which could feasibly access each service alternative), and the changes in access to jobs from selected community activity centers identified in the Existing Conditions Analysis (a category limited to microtransit/ride-hail alternatives). In the following sections, scenarios within each modal category — fixed-route, microtransit, and ride-hailing — are evaluated followed by a comparison between modes.

5.1. Fixed-Route Bus

Fixed-route bus options are evaluated in Table 18. Route 1 (Holbrook/Randolph to Target) and Route 2 (Holbrook/Randolph to Pacella Park, via Rosemont Square) are evaluated in isolation, while the right-most column shows the average service performance and cost-effectiveness of a scenario in which both routes are implemented. If fixed-route service is implemented, we recommend introducing both routes in tandem to provide the most useful and comprehensive fixed-route network within Randolph. A network with both routes in operation is also more directly comparable to the microtransit and ride-hailing alternatives discussed above.

Due to its greater length, Route 2 serves both greater ridership and would require a second vehicle to operate at 30-minute frequency. In contrast, Route 1 could be operated with a single vehicle at this level of frequency. The relatively low ridership volumes of both routes (compared to existing MBTA Routes 238 and 240) result in productivities of service well below transit-industry guidelines, as discussed in 4.1. Fixed-Route Service Alternatives. Even with a relatively low assumed hourly operating cost of about $62/revenue-hour, costs-per-ride of each alternative are high compared to other fixed-route services in the region; however, Route 2 offers the more cost-effective of the route options with an average cost-per-ride of $24, less than half that of Route 1 ($49).

Table 18. *Service Performance and Cost-Effectiveness of Fixed-Route Alternatives*

	Route 1: Holbrook / Randolph to Target	Route 2: Holbrook / Randolph to Pacella Park	Total Fixed Route Network
Service Hours per Weekday	14	14	14
Fleet Size at Peak	1	2	3
Avg. Weekday Ridership	33	113	146
Avg. Weekday Productivity	1.9	4.0	3.2
Annual Ridership	10,400	35,200	45,600
Annual Revenue Hours	5,100	8,500	13,600
Total Estimated Annual Operating Cost	$515,000	$853,000	$1,368,000
Avg. Operating Cost per Ride	$49.52	$24.23	$30.00
Average Passenger Fare per Ride	$1	$1	$1
Estimated Fare Revenues Dollars	$10,400	$35,200	$45,600
Farebox Recovery Ratio	2.02%	4.13%	3.33%
Net Subsidy per Passenger Dollars	$48.52	$23.23	$29.00

5.2. Microtransit

Microtransit service alternatives are evaluated in Table 19. Zone 1 refers to a microtransit service zone that aligns with the Town of Randolph borders, while Zone 2 includes this area plus a small extension to shopping areas in neighboring Stoughton. Scenarios 1 and 2 refer to weekday service-spans of 14 and 16 hours, respectively. This evaluation assumes a medium-demand scenario, the most likely outcome to be realized within a year of a service's launch.

The microtransit simulations indicate that in the medium-demand scenario, the larger Zone 2 service area is preferable in that it would serve greater ridership yet does not require additional vehicles compared to Zone 1. As a result, the two Zone 2 options would yield higher service productivity (boardings per revenue-hour) than Zone 1 options. A shorter, 14-hour service span is recommended to reduce operating costs and reduce cost-per-ride. The cost-per-ride of each microtransit service alternative, it should be noted, is lower than each of the fixed-route service alternatives explored in this study. Likewise, the annual operating cost of microtransit service ($930,000 to $1.05 million) is somewhat lower than that of implementing both fixed-route options, Routes 1 and 2 ($1.37 million) indicated above.

Table 19. *Service Performance and Cost-Effectiveness of Microtransit Alternatives*

Service Performance (Medium-Demand Scenario)	Zone 1, Scenario 1	Zone 1, Scenario 2	Zone 2, Scenario 1	Zone 2, Scenario 2
Service Statistics				
Service Hours per Weekday	14	16	14	16
Fleet Size at Peak	3	3	3	3
Avg. Weekday Ridership	128	138	167	180
Avg. Weekday Productivity	3.4	3.0	4.4	4.5
Annual Ridership	41,000	44,000	53,000	57,000
Annual Revenue Hours	12,300	14,600	12,300	14,600
Service Investment				
Total Estimated Annual Operating Cost	$930,000	$1,050,000	$930,000	$1,050,000
Cost per Ride	$22.90	$24.07	$17.51	$18.38
Average Passenger Fare per Ride	$2	$2	$2	$2
Estimated Fare Revenues Dollars	$82,000	$88,000	$106,000	$114,000
Farebox Recovery Ratio	8.82%	8.38%	11.40%	10.86%
Net Subsidy per Passenger Dollars	$20.68	$21.86	$15.55	$16.42

5.3. Ride-Hail

Ride-hailing service alternatives are evaluated in Table 20. As with microtransit service alternatives described above, Zone 1 refers to a microtransit service zone that aligns with the Town of Randolph borders, while Zone 2 includes this area plus a small extension to shopping areas in neighboring Stoughton. A 14-hour span of service on weekdays is assumed for this cost-benefit analysis. This evaluation also assumes a medium-demand scenario, the most likely outcome to be realized within a year of a service's launch.

Unlike microtransit service alternatives, ride-hailing service alternatives do not feature any efficiencies of scale; costs would be billed to the Town on a per-ride basis rather than a per-revenue-hour basis, and due to the lack of passenger aggregation the costs of service would increase in direct proportion to ridership growth. As a result of these constraints, the cost-per-ride of each ride-hailing alternative remains constant across all alternatives and is a function of ride distance and duration, which are both derived from the outputs of microtransit simulations conducted in 4.2. Microtransit Service Alternatives. The alternative with the lowest annual operating costs is also the most limited in terms of zone geography (Zone 1, Town of Randolph limits) and eligibility restrictions (limited to residents who are low-income, 60+ years of age, or disabled).

Table 20. *Service Performance of Ride-Hailing Alternatives*

Service Performance (Medium-Demand Scenario)	**Zone 1 Ride-Hail:** specialized service for senior, disabled, and low-income residents	**Zone 2 Ride-Hail:** specialized service for senior, disabled, and low-income residents	**Zone 1 Ride-Hail:** general service for all Randolph residents	**Zone 2 Ride-Hail:** general service for all Randolph residents
Service Statistics				
Service Hours per Weekday	14	14	14	14
Avg. Weekday Ridership	44	57	128	167
Annual Ridership	14,000	18,000	41,000	53,000
Service Investment				
Total Estimated Annual Operating Cost	$174,000	$221,000	$505,000	$652,000
Cost per Ride	$12.30	$12.30	$12.30	$12.30
Average Passenger Fare per Ride	$3	$3	$3	$3
Estimated Fare Revenues Dollars	$42,000	$54,000	$123,000	$159,000
Farebox Recovery Ratio	24.14%	24.43%	24.36%	24.39%
Net Subsidy per Passenger Dollars	$9.43	$9.28	$9.32	$9.30

5.4. Multimodal comparisons

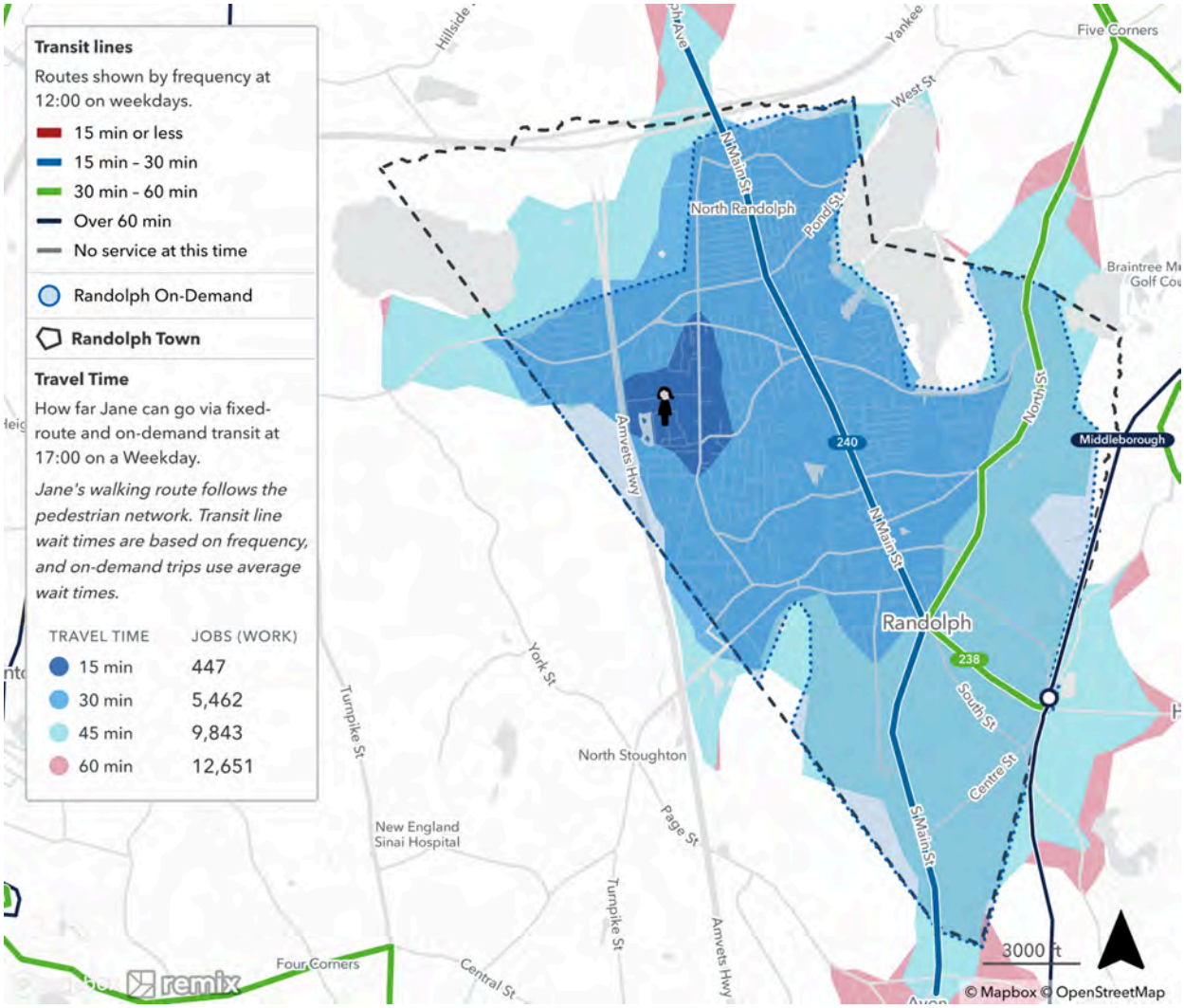
One of the potential benefits of both microtransit and ride-hailing service alternatives is that these modes can extend broader service coverage to lower-density areas that are difficult or not cost-effective to serve with traditional, fixed-route buses. However, broadening service coverage is only useful to public agencies to the extent that this additional access results in meaningful improvements in residents' access to community destinations. One way of quantifying these benefits is to measure the number of jobs that can be accessed via microtransit/ride-hailing, in combination with other existing transit services, within a specified travel-time threshold. In Table 21 below, we summarize the number of *additional* jobs that can be accessed via the proposed service alternatives (Zones 1 and 2 microtransit or ride-hailing) as compared to the existing number of jobs that can be reached on existing transit services. The largest gains in jobs access are found by adopting Zone 2, as this zone serves a significant number of additional jobs just beyond the Randolph town limits.

Table 21. *Increase in Access to Jobs (Total), within One Hour, from Selected Locations via Microtransit and Ride-Hailing*

Point of Origin	Zone 1 (Randolph)	Zone 2 (Randolph + Stoughton Target)
Rosemont Square Apartments	12,200	19,400
Liberty Place Apartments	15,800	21,900
Residences at Great Pond (Pacella Park Drive)	15,600	21,700
Bridle Path Circle Apartments	7,600	13,700

Transit network analysis software is used to calculate travel-time isochrones showing the areas reachable via the transit network, inclusive of microtransit/ride-hailing and other bus or train service. An illustration of the access-to-jobs analysis is shown in the map below, which shows the transit-accessible areas within one hour's travel time if one begins their trip at Rosemont Square apartments. As Rosemont Square and other locations in the table above are located beyond walking distance from existing MBTA bus stops, the improved access to jobs through a combination of microtransit/ride-hailing and fixed-route bus or train service is significant.

***Figure 18**. Jobs Accessible within One Hour via Microtransit*



Another important point of comparison between fixed-route and microtransit/ride-hail service alternatives is the number and share of Randlph jobs and residents served by each alternative. While the population-based demographics of areas served by the microtransit/ride-hailing and fixed-route service alternatives are quite similar, the microtransit/ride-hailing options would serve significantly greater population and employment compared to the more limited areas served by fixed-route bus alternatives. This is because fixed-route bus service can only be reached at stop locations, and most riders will walk a maximum of one-quarter mile to access the service. In contrast, microtransit and ride-hailing services bring their respective vehicles to meet riders, requiring only short walks to the nearest intersection (typically no more than 1-2 minute walk) and curb-to-curb service, respectively. While microtransit/ride-hailing service alternatives would serve 100% of residents and jobs in Randolph, fixed-route alternatives explored in this study would serve just 39% and 56% of residents and jobs.

***Table 22**. Demographics and Jobs Served by Fixed-Route and Microtransit Service Alternatives*

Demographics and Employment Served	Fixed-Route Options 1 and 2	Randolph Microtransit / Ride-Hail	Randolph & Stoughton Target Microtransit / Ride-Hail
Population (Census 2020)	13,700	34,000	34,700
Jobs (work)	5,700	7,800	11,000
% of people in poverty	10.0%	9.5%	9.3%
% of people who are non-White or of Hispanic / Latino origin	73.0%	71.6%	71.0%
% of households that are car free	8.3%	8.8%	8.7%
% of people living with a disability	12.0%	12.3%	12.1%
% of workers who take public transit to work	8.6%	10.4%	10.2%
% of people who are 65+	16.8%	16.6%	16.6%
% of people who are 17-	17.7%	19.0%	19.0%
% of workers who bike to work	0.1%	0.2%	0.2%
% of people within 200% of the poverty threshold	20.3%	21.4%	21.0%
Percent coverage of Randolph population	39%	100%	100%
Percent coverage of Randolph employment	56%	100%	100%

A final area of comparison between modes is qualitative. Table 23 below categorizes each mode by its capacity to deliver a range of service types and compliance with FTA regulations, as well as other key service parameters. These evaluations are based upon typical performance of each mode in the Boston region; individual contractor capabilities may vary. These criteria are specified below:

- **ADA compliance:** does the service alternative reliably offer wheelchair-accessible vehicles and provide wheelchair customers with an equivalent quality of service (e.g., pickup wait times), per ADA requirements?
- **Title VI compliance:** does the service alternative offer options for ride booking and fare payment for customers who are unable or prefer not to use a credit/debit card linked to a smartphone app (the default approach for microtransit and ride-hailing services)?
- **Drug/alcohol testing and criminal background-checks:** Does the service conduct pre-employment drug/alcohol screening and criminal-background checks of its drivers to the standard of FTA regulations?
- **Does the service offer pre-booked as well as on-demand service?**
- **Driver employment stability:** does the service offer drivers stable, long-term employment with benefits, regular shifts, and opportunities for advancement?

- **Pricing risk:** does the service alternative charge riders a consistent fare for the same trip distance, or does the service alternative use dynamic pricing that varies depending on time-of-day and real-time demand?
- **Wait-time reliability:** Does the service offer consistent wait times at pickup (i.e., fixed timetables with arrival and departure times at key timepoints), or do wait times vary based on real-time demand and vehicle availability within the service zone?

Table 23. *Qualitative Comparison of Key Characteristics of Modal Alternatives*

Evaluation Category	Evaluation Type	Fixed-Route	Microtransit	Ride-Hail
ADA compliance (wheelchair-accessibility)	Boolean (yes/no)	Yes	Yes	No*
Title VI compliance (cash payment, call-in option available)	Boolean (yes/no)	Yes	Yes	No*
Drug/alcohol testing, criminal background checks of drivers	Boolean (yes/no)	Yes	Yes	No*
On-demand service available	Boolean (yes/no)	No	Yes	Yes
Pre-scheduled service available	Boolean (yes/no)	No	Yes	Yes
Driver employment stability	Ordinal (low/medium/high)	High	Medium**	Low
Pricing risk	Ordinal (low/medium/high)	Low	Low	High
Wait time reliability	Ordinal (low/medium/high)	High	Medium	Low
Typical pickup walk distance	Ordinal (low/medium/high)	High (bus stop-to-bus stop)	Medium (Corner-to-corner)**	Low (Curb-to-curb)
Vehicle capacity	Ordinal (low/medium/high)	High (12-24 pax. cutaway)	Medium (6-passenger minivan)**	Low (4-pax. sedan/SUV)

*Additional vendors (e.g. traditional taxi providers) required to achieve compliance

**Varies by microtransit vendor

5.5. Key takeaways

A set of key takeaways from the cost-benefit analysis of the service alternatives explored in this study is provided below:

- **Microtransit or ride-hail alternatives would offer ubiquitous service coverage** to all Randolph residents and jobs, whereas fixed-route options would serve 39% of Randolph residents and 59% of Randolph jobs (within ¼ mile walking distance to bus stops).
- The **microtransit service alternative Zone 2, Scenario 1** — which includes Stoughton Target and operates 14 hours per weekday — is the **more cost-effective and productive** service of the four alternatives.
- The **cost of ride-hail service alternatives increases in direct proportion to ridership**, as there is no shared-ride aggregation in this service model. As a result, limiting subsidized ride-hail service to specialized populations (seniors, people with disabilities, and low-income residents) an important guard against the potential for escalating costs, should actual ridership exceed the forecasts included in this study.
- **Ride-hail service alternatives would require additional, conventional taxi vendors** to participate for its service to comply with FTA regulations required for most federal and state funding programs (e.g., ADA, Title VI, drug/alcohol testing).
- If ride-hail service is limited to seniors, people with disabilities, and low-income residents, as recommended above, it is likely that **significant shares of these populations will require cash payment, phone-in booking, and/or wheelchair-accessible vehicles**, driving up costs from traditional taxi vendor(s) to which these ride requests would be referred.

6. Implementation Guide

This section provides an overview of key actions that the Town of Randolph can take to implement the fixed-route, microtransit, and ride-hailing service alternatives described above, should it elect to do so. Municipalities interested in implementing new public transit services must first select their preferred routes or service zones which are determined to be most suitable for its fiscal constraints, stakeholder and rider preferences, and the community's goals/objectives for the new service. To launch a successful service, the Town of Randolph must select an operating model, secure funding, procure software and operators, and market the new service to potential riders, among other key steps. This section includes recommendations on these topics as well as actions that Randolph can take prior to launching service to ensure ongoing success as the service is monitored and calibrated over the long-term.

6.1 Operating Models

Fixed-Route and Microtransit

Directly-operated service. In this model, the municipality would procure a software platform to support fixed-route or microtransit operations, while operating the service using its own drivers, vehicles, and operations team (e.g., administrators, dispatchers, customer support agents, and vehicle maintenance technicians). However, state law prohibits this model from being implemented in Randolph. As an MBTA-served community designated under Massachusetts Chapter 161A, Section 6,[17] **the Town of Randolph is not permitted to directly operate transit service** independently from the MBTA, as a municipality. This is because Chapter 161A, Section 3, grants the MBTA exclusive authority to operate transit service within its jurisdiction.[18] However, Section 47 of Chapter 161A permits municipalities to contract fixed-route service out to external vendors,[19] as in the operating model outlined below.

Turnkey purchased transportation (vendor-operated). In a turnkey purchased transportation model, a vendor provides the Town of Randolph a bundled solution which includes a fixed-route or microtransit operations management software platform, along with the vehicles, drivers, and operations management needed to operate service. Turnkey services sometimes have lower operating costs compared to the direct-operations approach above, particularly in high-cost states such as Massachusetts. In microtransit services, turnkey models are typically easier to scale quickly when compared to directly-operated alternatives, as third-party vendors can typically adjust vehicle supply or extend operating hours more flexibly than most public agencies. Turnkey models are often used in communities where a municipality or transit agency does not have sufficient vehicles or employees available to operate the service directly. Potential disadvantages of using a turnkey model include the reliance on an outsourced vendor for all aspects of service delivery as well as less direct agency control over operational decisions. In turnkey services, municipalities may have less influence over important service parameters such as vehicle make/model, driver recruitment strategies and pay/benefits, and maintenance processes. However, a well-designed contract can address many of these concerns.

[17] MA Gen L ch 161a § 6 (2023).
[18] MA Gen L ch 161a § 3 (2023).
[19] MA Gen L ch 161a § 47 (2023).

Ride-Hailing

Non-dedicated transportation providers. Microtransit requires dedicated vehicles and drivers to operate within specified hours within the service zone. As an alternative to microtransit, municipalities may consider contracting with one or more local taxi/Transportation Network Companies (TNCs) on a non-dedicated, or per-ride basis. Under this model, TNCs would deliver agency-subsidized trips within specified zones and hours of operation alongside unsubsidized trips for other customers. The MBTA's The RIDE Flex program is one example of a non-dedicated service model. The service provides on-demand rides to ADA-eligible customers via Uber or Lyft. Customers are responsible for the first $3 of the fare, and MBTA subsidizes the remainder up to $40, with any fare beyond $43 the customer's responsibility. A non-dedicated transportation provider model may be appropriate for similar services with a small, limited-eligibility rider cohort or notably low levels of forecast ridership.

However, there are significant potential disadvantages of the non-dedicated operating model. Its principal disadvantages include limited oversight of operations, limited vehicle availability (wheelchair-accessible vehicles are especially limited), high variability of wait times, and the inability of providers to group passengers into shared rides, making the services ineligible for FTA funding.[20] Because every ride serves only one passenger, costs increase linearly as demand grows (as compared to a fixed-route or microtransit service, where cost per trip decreases as more customers are aggregated into shared-rides). Finally, it is likely that multiple vendors would be required to participate in such a model in order to meet FTA's requirements for driver drug/alcohol screening and compliance with other regulations such as ADA and Title VI, contributing to a more administratively complex service.[21] This is because Uber/Lyft have shown limited capacity to comply with the regulations of FTA-funded service, while many taxi companies do not provide on-demand service. In practice, municipalities with non-dedicated service partnerships have often contracted with both Uber/Lyft and traditional taxi companies to ensure that customers can reliably request on-demand rides, book rides by calling a dispatcher, request wheelchair-accessible vehicles, and/or pay for rides in cash, depending on their needs.

6.2. Funding Options

Public transit services are typically funded by a combination of federal, state, and local dollars. Unlike the MBTA or other transit authorities in Massachusetts, the Town of Randolph is not a direct FTA recipient for FTA or state formula funding, nor is it an experienced operator of public transportation services. As a result, it is ineligible for federal formula programs such as FTA Section 5307 (Urbanized Area Grants), 5310 (Enhanced Mobility for Seniors and Individuals with Disabilities), 5339(b) (Bus/Bus Facilities Program), or the Massachusetts Regional Transit

[20] Shared-ride taxi services such as Uber X Share are not available in Randolph.

[21] In the past, Uber and Lyft have shown limited ability to comply with FTA drug/alcohol screening requirements outside of a few highly regulated markets (e.g. New York City). Likewise, they have limited ability to guarantee equivalent quality-of-service for passengers with disabilities, as the more expensive wheelchair-accessible vehicles are often unavailable. They also do not offer an alternative to credit/debit card payment, violating Title VI rules. To work around these constraints, transit agencies that have partnered with TNCs must offer riders the choice between Uber/Lyft and a traditional taxi company that does provide wheelchair-accessible vehicles and offers a cash payment option. This is known as the FTA's "taxicab exemption."
https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/134611/compliance-fta-requirements-transit-shared-mobility-partnerships-ppt.pdf

Authorities (RTA) formula funding. The following section provides an overview of funding sources that the Town of Randolph can use to fund the capital and operating costs of microtransit.

Federal Discretionary Funding Programs

Municipalities are eligible for a range of discretionary grant funding programs for local transit service; most are oriented towards on-demand microtransit or ride-hailing service, though some may also fund new fixed-route services. The primary challenge with each of these funding sources is that unlike formula funding, these grants are non-recurring and are typically only used to start up the service during the pilot period. A longer-term, more sustainable funding source must be secured by the time the grant funding ends.

Enhancing Mobility Innovation (EMI)

This program is funded by the Federal Transit Administration and formerly known as the Accelerating Innovative Mobility (AIM) Program. This competitive grant program funds forward-thinking approaches that improve transit financing, planning, system design and service. Eligible activities include all activities leading to the development and testing of innovative mobility, such as planning and developing business models, obtaining equipment and service, acquiring or developing software and hardware interfaces to implement the project, operating or implementing the new service model, and evaluating project results.

USDOT Congestion Relief Program

This new USDOT funding program is intended to spur investment in forward-thinking congestion management solutions, including mobility services such as commuter vans or on- demand microtransit. Funding is available for municipalities located in metropolitan areas whose populations exceed one million residents. There is an 80% federal and 20% local match required.

Congressional Earmarks

U.S. Senators and Members of Congress are increasingly using the recently revived congressional earmark process to advance promising transportation projects in their communities, including microtransit. A Community Project Funding Request (previously referred to as an earmark) is a funding provision that is inserted into an appropriations bill in Congress that directs funds to a designated recipient for a specific project. For example, during FY2023 37 Members of Congress and 38 Senators submitted earmark requests to the House/Senate Appropriations Committees. In both chambers, more than half of earmark requests ultimately received funding. The Salem Skipper service, detailed in 2.4. Peer Municipality Interviews, is one example of a municipally-managed microtransit service that has received congressional earmark funding.[22]

In addition to the FTA and broader USDOT, federal funding may also be available through the Department of Education, Department of Labor, Department of Veteran Affairs, Department of Housing and Urban Development (Office of Community Planning and Development and Federal Housing Administration), and the Department of Health and Human Services.

[22] Souza, Scott. 2022. "$2.3 Million North Shore Skipper Expansion In Federal Spending Package." Salem, MA Patch. December 27, 2022. https://patch.com/massachusetts/salem/2-3-million-salem-skipper-north-shore-expansion-federal-package.

State Grant Funding

Community Connections Funding Program

This program is issued by the Boston Region MPO to municipalities and regional transit authorities. The program allocates about $2 million in yearly funding for projects between $50,000 and $500,000. Both capital and operating costs for transportation programs are eligible, and a 20% local match is required. The MPO uses CMAQ funding to finance the Community Connections program, so projects related to improving air quality are specifically relevant, however, MPO has stated that the program is aimed at supporting local transportation and improving transit technology. The NewMo Microtransit service in Newton is partially funded through this program.[23] Watertown has recently been awarded over a million dollars in funds for a local shuttle service expansion.[24]

Community Transit Grant Program

Administered by MassDOT, this annual program provides funding to meet local or regional unmet transportation needs. Both microtransit and fixed-route buses would be eligible for funding. A 20% local match is required for capital expenses, and a 50% local match is required for operating expenses. Recently, the Town of Ware and the Quaboag Valley Community Development Corporation (QVCDC) were granted funding for a rural demand-response service, the Quaboag Connector.[25]

Taxi, Livery & Hackney Partnership Grant Program

The Taxi, Livery & Hackney Partnership Grant Program is an operational subsidy program that supports municipalities that contract with licensed taxi or livery businesses for transportation and delivery needs, as well as institutional programs and non-emergency medical transportation (NEMT). It is funded by the Commonwealth's Transportation Infrastructure Enhancement Trust Fund, a 2016 measure requiring a 20-cent assessment on every transportation network company ride in Massachusetts, of which 5 cents funds these grants. Both municipalities and nonprofit organizations are eligible for the program, with awards of up to $250,000 available.[26] This funding option could be suitable if the Town of Randolph adopts a ride-hailing service alternative, which will require coordination with at least one traditional taxi company in addition to Uber/Lyft.

Local Funding

Ballot measures

Transit ballot initiatives provide opportunities for local communities to raise dedicated funding for transportation through voter-approved property tax increases. In 2019, over $8B in new transit funding was approved in elections across 80 ballot measures, and in 2020 voters approved 13 out of 15 transit initiatives providing $38B in transit funding. Local funding in other parts of the United

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[23] "NewMo | City of Newton, MA." https://www.newtonma.gov/government/planning/transportation-planning/newmo.

[24] "Watertown Connector Shuttle In Service." 2021. March 3, 2021. https://www.watertowntma.org/watertown-connector-shuttle-in-service.

[25] MassDOT. 2024. "Community Transit Grant Program." 2024. https://www.mass.gov/community-transit-grant-program.

[26] Mogavero, Matthew. 2022. "$7M to Support Taxi & Livery Services." MassDevelopment. November 23, 2022. https://www.massdevelopment.com/news/7m-to-support-taxi-livery-services/.

States has also come from fees, such as for parking, vehicle registration (up to $5 per vehicle), vehicle leasing, rental, and mortgage recording fees.

Local Partnerships

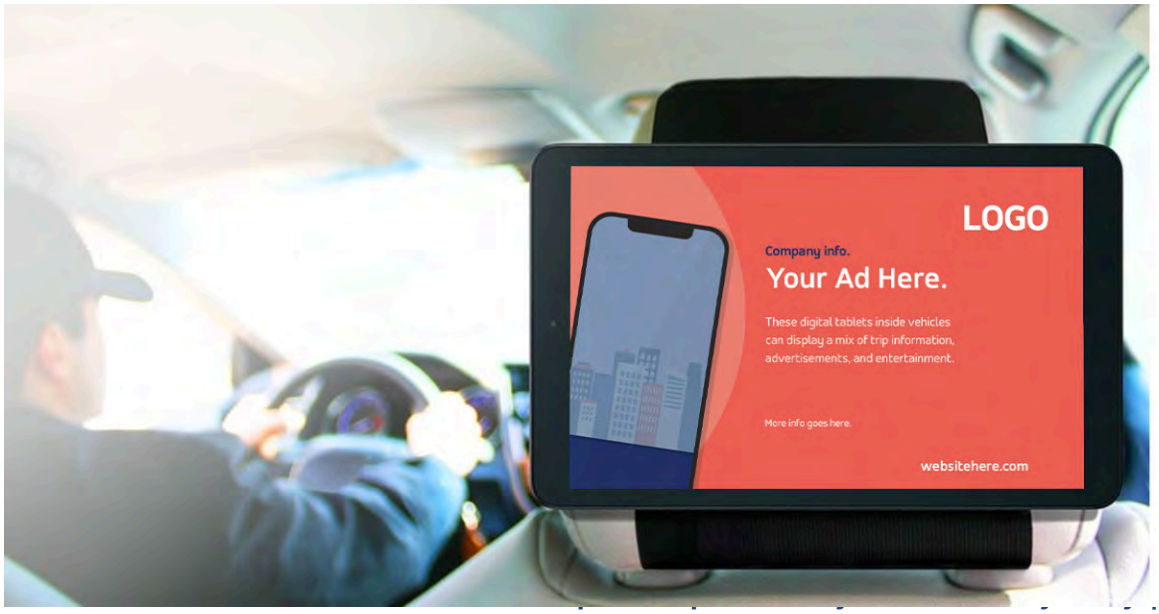
The Town of Randolph could also partner with key stakeholders in the community to fund or partially fund transportation services. For example, community organizations and nonprofits that believe funding transit services furthers their mission and help the communities they work in may choose to help fund services. Similarly, assisted-living facilities may choose to support local public transit initiatives in order to help get their residents to medical appointments or stores in a more cost-effective manner. Private employers may also be interested in supporting the services if it improves accessibility for their current employees or helps them attract new workers. These partners can contribute funding in various ways, including lump-sum annual contributions, direct reimbursements for specific trips, or by purchasing transportation passes for particular groups.

Philanthropic Foundations

Several nonprofit foundations in the Boston region have supported innovative transportation programs that benefit underserved communities. A list of these foundations is provided below:

- Barr Foundation supports transportation projects as part of its climate change focus area.
- Blue Cross Blue Shield of Massachusetts Foundation grants funding community organizations to expand healthcare access and affordability among low-income populations in Massachusetts.
- Fallon Health provides grants supporting senior health initiatives, including transportation to medical appointments
- Smith Family Foundation's small capital grants initiative funds one-time capital expenses for nonprofits, including purchase of vehicles.
- Tufts Health Plan Foundation supports healthy aging in Massachusetts, Connecticut, New Hampshire, and Rhode Island. Collaborative transportation projects are eligible.

Advertising: Additional revenue can be obtained by selling advertising space. These ads can be on the outside of vehicles, either as wraps or rooftop digital screens, on in-vehicle screens, or within a microtransit smartphone app. Other services have generated funding through naming rights and sponsorships. The contribution of advertising will depend on the type of branding and the number of interested companies.



6.3. Launch Planning

If the Town of Randolph proceeds to implement one or more of the service alternatives explored in this study, it should consider a three-phase approach, as shown in Table 24. This approach assumes that the Town must proceed with either a turnkey purchased transportation model or non-dedicated service model. If the former, aspects of the service launch such as vehicle acquisition, driver recruitment and training, and securing a maintenance facility would be the responsibility of the selected vendor.

Table 24. *Launch Planning Phases.*

	Procurement & Pre-Launch *(Months 1 - 3)*	**Launch Preparation** *(Months 4 - 6)*	**Post-Launch Evaluation & Marketing** *(Months 7 - 12)*
Goal	Finalize operating plan and routing/service design	Prepare to operate the service, promote service visibility, and attract first-time riders	Ensure continued success of the service
Activities	• Finalize preferred preliminary service design, including key parameters such as: hours of operation, fare policy, routing and stop locations (for fixed-route service options) vehicle and spare requirements, zone boundaries (for microtransit and ride-hail alternatives), and essential software requirements described in the following section • Procure a software provider and operator, for fixed-route or microtransit	• Create and finalize a marketing and rider education plan to promote the service; potentially with support from area stakeholders	• Continually evaluate the service against a set of recommended Key Performance Indicators (KPIs).

Procurement and pre-launch phase

The lead time to launch a new transit service will vary depending on the alternative selected. In general, budgeting between 6 and 12 months from issuing the procurement for any required service through to launch day is advised. Due to the MBTA's exclusive right to directly operate transit service in the Boston region, per Chapter 161A, the Town of Randolph will need to procure a turnkey, software-plus-operations package for fixed-route and microtransit service alternatives. The following minimum capabilities are recommended:

Operations requirements.

- Ability to lease vehicles, including wheelchair-accessible cutaway buses (for fixed-route alternatives) or minivans (microtransit).
- CDL-certified drivers (for fixed-route service alternatives).

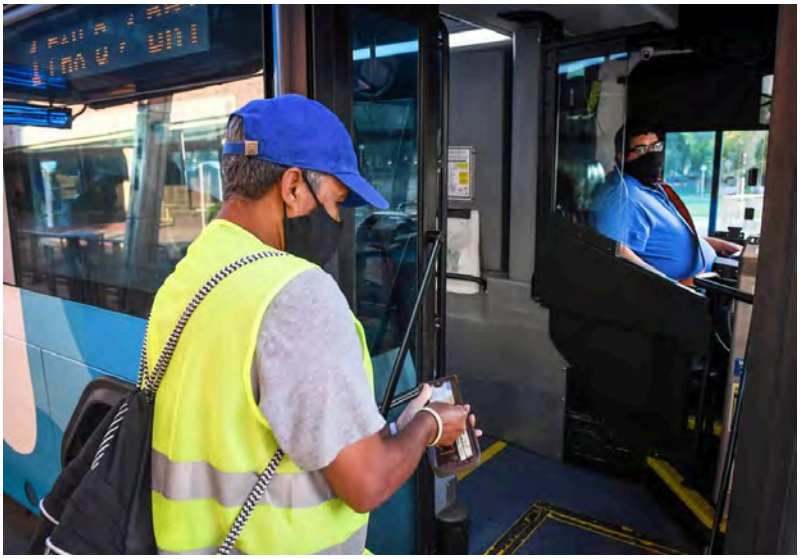
- Ability to lease a local maintenance facility.
- Experience operating comparable services in similar suburban settings to Randolph.
- Established driver training and safety programs.

Software requirements.

- Dynamic vehicle routing capability.
- Passenger aggregation into shared rides.
- Ability to book rides in advance as well as on-demand.
- Customer mobile application (available for iOS and Android) providing trip booking and providing real-time estimated time to arrivals (ETAs) and other trip updates.
- Driver mobile application for real-time transmission of routing, rider manifests, and trip information.
- Ability for administrators/dispatchers to book trips on behalf of customers (so riders who do not have or prefer not to use smartphones can book trips by calling the dispatcher).
- Ability for passengers to indicate their disability status, either directly through the app or through notifying the customer service agent at the time of booking.
- Ongoing technical, operational, and marketing support.
- Ability to offer multimodal trip planning, including fixed-route as well as microtransit services. Software should be able to refer ride requests to nearby fixed-route service, if available within a reasonable quality of service.

Fare Policy

Fare policy can provide the Town with additional revenue to partially support the service's operations, provided fares are not so high as to discourage ridership. In the Cost-Benefit Analysis chapter, it was assumed that fixed-route bus service would have a $1 fare per ride, microtransit would have a $2 fare, and ride-hailing would require passengers to pay the first $3 of the total fare. This Zero-fare transit services typically achieve higher ridership intensity (i.e., boardings per unit population/employment served) compared with services that charge a fare. However, this approach can complicate the operations of microtransit services, in particular, with increased rates of late cancellations and no-shows by riders. This behavior can worsen service reliability and efficiency. On the other hand, this drawback is not present with fixed-route alternatives, which do not require riders to make a reservation to board the vehicle.



6.4. Marketing and Rider Education

The ability to move conveniently and affordably around one's community is essential to residents' health and wellbeing. Any potential new transit service offered by the Town of Randolph would play a crucial role in enabling this movement in people's everyday lives. However, new services would represent change, which can naturally be a source of apprehension. A proactive approach to community engagement not only helps mitigate concerns, but can turn those in the community who could potentially be opponents of change into advocates. When launching a new transit service, support from the community is essential, both to ensure a smooth launch and to set the service up for continued success and growth.

Therefore, it is essential that the Town conducts community engagement and marketing activities in advance of launching new transit services. Particularly because microtransit and ride-hailing services lack the physical infrastructure of traditional fixed-route buses, building awareness through marketing and rider education efforts is needed to increase support for the incoming service.

Pre-Launch. Community engagement should begin several months before launch, giving Town staff adequate opportunity to incorporate feedback from stakeholders, and potentially to adjust service design. Starting community engagement early in the launch process also helps preempt passenger and stakeholder concerns through thorough education about service offerings. Engagement can build off the survey and stakeholder outreach that was conducted as part of this study. To continue this process:

1. Identify subcommunities that may be sensitive to service changes, or might require personalized outreach in order to adapt service. Examples of communities that should play a central role in community engagement efforts are included in Table 25.

Table 25. *Groups and stakeholders for targeted engagement.*

Customers with High Barriers to Entry	Stakeholder Groups Sensitive to New Services or Service Changes
Seniors	Rider advocacy groups
People with limited English proficiency	Elected officials
Residents who do not have, or prefer not to use smartphones	Civic and business leaders
Residents with disabilities	Major local employers

Once key stakeholders have been identified, steps can be taken to preemptively address their concerns. For example, if accessibility is an expected concern, riders can be advised that wheelchair-accessible vehicles will be made available to those who need them.

2. Develop materials that engage with likely responses to the new service to proactively answer questions. These materials can include pamphlets, mailers, videos, or physical or digital advertisements. The materials should explain the mechanics of the new service, service zone/routes, how to book a ride, and fares and payment options. Be sure to address how passengers in high-barrier groups will be able to access the service such as including information around phone booking, voucher payment, and accessibility features.

3. Speak with advocacy groups, elected officials, civic and business leaders, and major local employers as part of the broader community outreach.

Launch. Leading up to the launch of new transit service, the Town can continue its community engagement strategy through three channels:

- **Stakeholder Organizations.** The transit agency should re-engage with key stakeholder groups, such as those represented by this study's Stakeholder Committee, to enlist their help in publicizing key information about the service. Helpful organizations may include libraries, health or recreational centers, middle and high schools, assisted living facilities, civic groups, and social services organizations. These organizations can help create informational materials that are relevant to the audiences they serve and can help distribute these materials.

- **Customers with high barriers to entry.** The operator can build a list of users who are likely to have trouble accessing service and conduct phone calls to help them create accounts (if applicable), and alleviate any concerns they may have. This may be their first interaction with public transit and can impact how much they promote the service to their peers, so it's important to keep the communication open and keep a detailed record of their feedback, both positive and negative.

- **The public.** The Town should make information available to the public by posting information about service changes as early as possible and in as many places as possible. Posting physical signage (e.g., at local bus stops, small businesses, libraries, or parks/recreation facilities) is recommended to explain the new service, along with posting information digitally on local websites and transit agency social media accounts.

Post Launch. After the service has been launched, community engagement activities can inform continuing improvements to the system. The Town can then re-engage stakeholder communities to see how service is going, and identify opportunities for improvement. Stakeholder organizations can also play a central role in continuing to promote service to their constituent communities.

Marketing is an important step to ensure the public is aware of the new microtransit service, both to ensure existing riders are prepared for potential changes to service, and to attract new customers to the system. Creating sustained awareness of the new transit service prior to launch is essential, and some of the following strategies may be useful:

- **Webpage.** Create a dedicated website for the service with key service information.
- **Press release.** Develop a pre-launch press release for distribution in local media.
- **How-to video.** Create a short, informative video on how to use the service and share it on the service website and social media.
- **Targeted outreach.** Targeted emails or print and social media advertisements (see example at right). Targeted outreach, including "how-to" instructions, may be particularly useful for seniors and at assisted living communities.
- **Community announcements.** Announce the transit service in municipal communications, newsletters, school district, and community/recreation center communications
- **Street marketing.** Placing wrapped (branded) vehicles in high foot traffic areas throughout the county can increase awareness and encourage conversation about the service.

The transit agency can conduct marketing activities in phases to ensure success at each phase of the service's lifecycle, this is detailed in Table 26.

***Table 26**. Marketing activities timeline.*

	Pre-launch	Months 1-3	Months 4+
Focus	Establish marketing channels and develop materials	Promote service visibility and attract first-time riders	Continue attracting customers and retain customers with engagement promotions
Activities	• Design marketing materials • Begin pre-launch awareness: social media, local press, and local government outlets	• Digital (social media) and physical ads (flyers, direct mail, bus station signage). • Press releases • Events and direct public engagement	• Rider surveys and focus groups • Referral campaigns • Promotion of discounted tickets and referral campaigns • Outreach to specific communities

Table 27.

Above left to right, clockwise: 1) Direct mail flyers to area residents are a recommended strategy for improving awareness of microtransit in advance of a service's launch. These flyers can accompany municipal newsletters or even utility bills. 2) Mockup of a "how-to" brochure created to instruct riders how to create accounts in a microtransit smartphone app. These brochures are recommended for rider groups with a high barrier to entry, such as seniors. 3) and 4) Out-of-home (OOH) advertising such as billboards and signage at existing bus shelters can significantly drive awareness and adoption of microtransit.

Figure 19. *Promotional Event for New Transit Service*

Above: Hosting a press conference to celebrate the launch of a new transit service with local stakeholders is an excellent way to spread awareness in the community and increase local enrollment. Source: Via

6.5. Accessibility/Equity Policies

Randolph's new transit service should be accessible so that all potential riders have access to the service, including passengers with disabilities, and those without smartphones and credit cards. The following accessibility measures are recommended:

Riders with limited mobility. If a ride-hailing service is implemented, riders with limited mobility will be served with a traditional taxi or NEMT provider capable of providing wheelchair-accessible vehicles. For a microtransit service, the entire fleet does not necessarily need to be wheelchair-accessible. This is because wheelchair-accessible vehicles (WAVs) can be strategically deployed for passengers who require them. If a mixed accessibility fleet is acquired, the service should include at least 20% WAV, with minimum one WAV. About two to five percent of trips are expected to require an accessible vehicle.

To make the microtransit booking process accessible to passengers with disabilities, the software platform should remember a passenger's need for a WAV and ensure that a WAV request is the default for their future bookings. It should then automatically assign those passengers to vehicles with an available wheelchair position. Some passengers may be unable to walk to meet a vehicle but do not require a WAV. In those cases, riders can be offered a curb-to-curb trip in any vehicle. It is important to decide who is eligible for curb-to-curb service. Some agencies choose to have riders self-identify as having limited mobility when creating an account. Others limit these door-to-door requests to eligible riders who have formally enrolled as ADA paratransit customers.

Riders with hearing, vision, or cognitive impairments. Riders should be able to voluntarily indicate their disability status, either directly through a microtransit smartphone app or by notifying the customer support agent at the time of booking (for either the microtransit service or ride-hailing service). This information can be used to modify the service to better adapt to their needs, whether it's through enabling curb-to-curb pick-up and drop-offs or notification to the driver to provide additional assistance. Voiceover (reads the text on the screen aloud for those with visual impairments), adaptive font size, and Switch Control app capabilities can also make the request process easier for some riders. For a fixed-route bus, information can be provided in multiple formats, for example, with voice annunciators and on screens with large font text.

Ride Booking. For microtransit and ride-hailing service alternatives, the public should have multiple options to request rides. In addition to the smartphone app for booking trips, offering phone booking options can ensure passengers without smartphones (or those who prefer not to use an app) can access the service. Dispatchers should be able to easily book microtransit or taxi trips for riders calling in. Those who do not book with a smartphone but have SMS capabilities (i.e., texting) should have the option to receive text updates about their rides.

Payment. Passengers should be able to pay for services with several different options, which may include physical or digital vouchers (purchased in cash at community centers and other key locations), prepaid debit cards, or cash in fareboxes on board the vehicle. Some municipalities choose to operate cashless services, as cash payments can slow down the boarding process, while cash fareboxes may be costly to maintain.

Language. To ensure the service is accessible to non-English speakers, signs, public information, and transit information, including the microtransit smartphone app, can be made available in multiple languages. Using clear and universal symbols in the rider app and in official communications can also make it easier for non-native English speakers to use the system.

Appendix 1. Peer Municipality Interviews

Via Strategies interviewed two comparable municipalities that manage microtransit/demand-response services, with the intent to apply the key learnings in exploring viable options for Randolph. These interviews focused on motivations for pursuing microtransit service.

Chandler, Arizona: Chandler Flex

Chandler Flex is an on-demand service operated by Via and managed by the City of Chandler, Arizona. The City's 2019 update of its Transportation Master Plan helped lay the strategic framework for building towards a more multimodal system, with a particular focus on expanding residents' access to jobs within Chandler via public transportation. The Transportation Master Plan identified different opportunity zones that could be evaluated further for the feasibility of microtransit service. These zones were focused on areas that were main employment corridors or where there was limited or no fixed-route transit service. A subsequent study, the Price Road Flexible Transit Study, followed the Transportation Master Plan and focused on improving transportation options between local job centers and areas with limited or no fixed-route service. As the Price Road study was underway, an opportunity emerged for the City to apply for the "A for Arizona" grant program, a privately funded education grant also known as the Expansion & Innovation Fund. The City was ultimately awarded the A for Arizona funding, which supported startup costs for the microtransit service, branded as "Chandler Flex."

Chandler Flex launched in 2022 and serves southwest Chandler, with the 18 square mile service area noted in **Figure 20**. There are over 3,000 trips per month, at about $30 per ride, which is perceived as relatively costly compared to fixed-route service. About half of the ridership consists of students who are traveling to or from school. Other popular destinations include senior and recreational centers as well as major retail centers such as Walmart.

Lessons learned from the Chandler Flex service include:

- Microtransit may be a supplement for less productive fixed-route services; however, it may not be a cost-effective replacement in many cases due to the still-significant ridership these routes often serve and the significant number of revenue-hours required to operate microtransit in a larger zone, relative to an infrequent fixed-route bus operation. Microtransit is also not perceived as being as reliable as fixed-route service, which makes it more difficult to serve commuters if microtransit is the only service option available.
- Microtransit operations is a hands-on process regardless of whether the operating model is software-only or outsourced turnkey; it requires City staff resources and good communication with the vendor to monitor and sustain operations.
- It is important to sustain microtransit with multiple local funding sources, particularly from nontraditional sources (e.g., education, employer-led organizations) that derive a clear benefit from transit service outcomes. This is because microtransit does not have the same access to FTA and state formula funding sources that fixed-route service does.
- Municipalities considering microtransit should adopt a flexible approach because there is variability in a service, particularly when serving a primarily student-based ridership.

Adjusting vehicle supply (e.g. through shift planning by time of day) in response to ridership patterns is important to maintain productivity of the service.

- The City is adopting a flexible approach to funding microtransit as well; they are planning to shift to support microtransit using state lottery and "A for Arizona" funding, as City legislation restricts its local Public Transportation Fund (derived from sales taxes) to supporting only fixed-route service.
- The City's two most important evaluation metrics for microtransit are productivity (boardings/revenue-hour) and met demand (% valid ride requests met with a ride proposal). The former is an important metric for cost-effectiveness of the service relative to other demand-response programs (e.g. ADA paratransit). The latter is important in the perceived reliability of service. If a significant number of riders have their ride requests denied, this could impact community support for the service and ultimately depress ridership in the longer term as riders get discouraged.

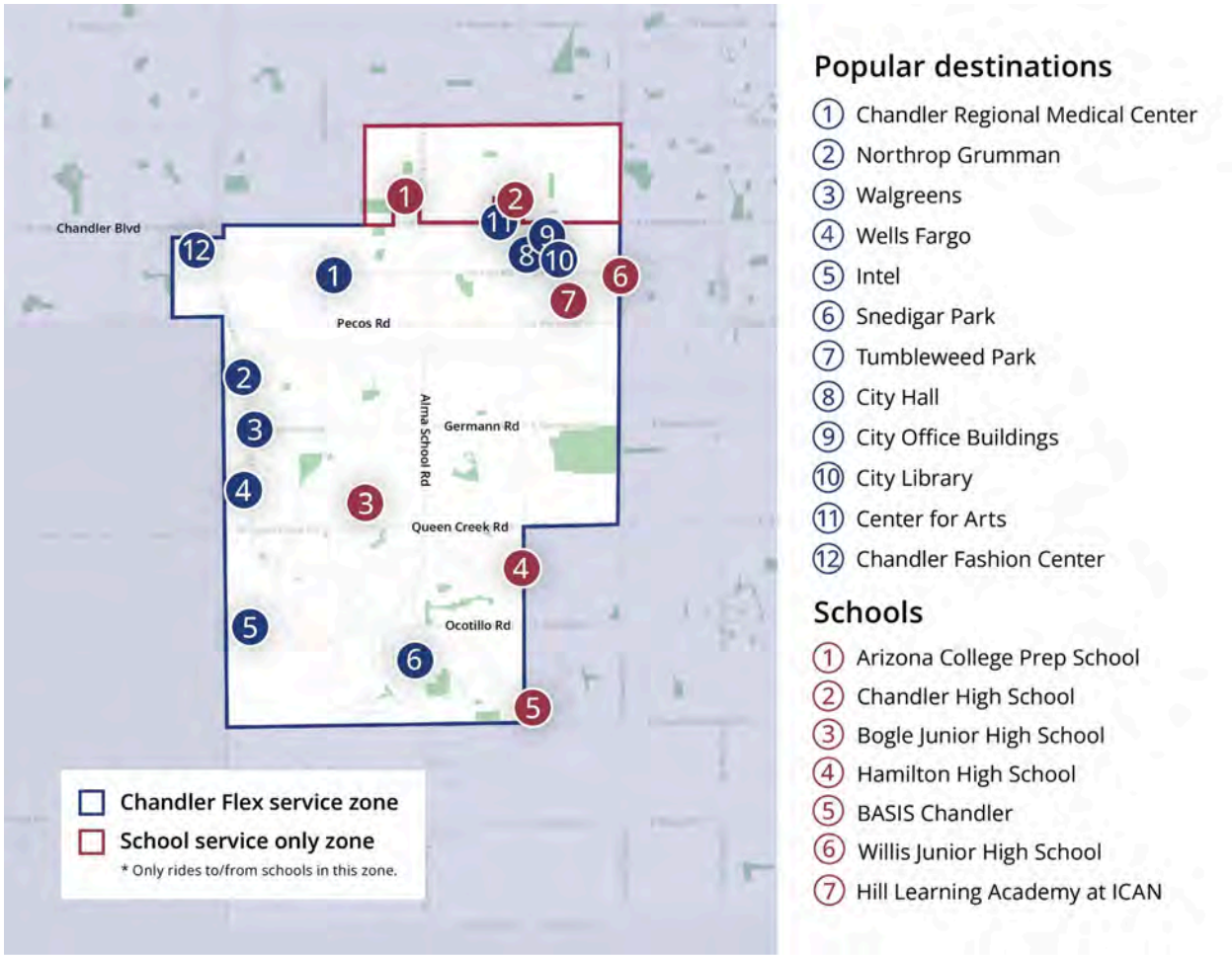
Table 28. *Service overview: Chandler Flex*

Start year	2022
Service area	Chandler, AZ
Use case	Point-to-point mobility in low-density areas and areas with low or no fixed-route, after-school transportation.
Pickup/dropoff type	Anywhere-to-anywhere within the service zone indicated in blue in Figure 20. A smaller zone shown in red in Figure 20 is also available for service, but origins/destinations in this area must be school locations.
Service hours	Monday - Friday: 5:30 am - 9:00 pm
Reservation type	Rides can be booked on-demand using a smartphone app or by calling a dispatcher.
Fare	$2 one-way, $1 for seniors (65+) and wheelchair-accessible riders. Service is free for middle and high school students traveling to and from school
Technology provider	Via
Operator	Via (same as technology provider)
Vehicle detail	3 minivans, which have two seating configurations: ● 5 ambulatory passengers, or ● 2 ambulatory passengers and 1 wheelchair passenger
Ridership and utilization	3,000+ completed monthly rides 3.0 passengers/revenue-hour
Funding sources	● A for Arizona Grant[27] (privately-funded K-12 education grants)

[27] https://aforarizona.org/expansion-innovation-fund

	• Arizona lottery fund • Local sales tax
Additional info	Links: • On-demand program information

Figure 20. *Chandler Flex service area*



Salem, Massachusetts: Salem Skipper

Salem Skipper is a microtransit service operated by Via and managed by the City of Salem, Massachusetts. The City was motivated to launch microtransit service in large part due to the efforts of Mayor Kim Driscoll (currently Massachusetts' Lieutenant Governor) and her 2016 *Salem for All Ages* age-friendly action plan. Her vision for Salem was to establish the city as a "car-free or car-light" place where car ownership was optional and daily necessities were available by public transit, walking, or biking. City staff had initially evaluated a fixed-route circulator option, similar to Lexington's Lexpress (where their transportation director used to work), to provide more comprehensive transit coverage in Salem; however, they found this option to be less user-friendly and not as effective in providing universal coverage throughout the city.

The City worked with a consulting firm, Nelson\Nygaard, to conduct a microtransit feasibility study. Following the study, the City issued an RFP in February 2020 for microtransit software and operations. As an MBTA-member city, Salem is subject to the same regulation against directly-operated transit services as is the Town of Randolph. The RFP was inspired by the City of Newton's NewMo microtransit service, which serves seniors (60+), people with disabilities, and low-income residents. There was internal debate among City staff whether to serve specified nodes within Salem or to provide more comprehensive service coverage, and likewise whether to serve a limited population of eligible riders (like Newton) versus all city residents.

Salem Skipper launched in December 2020 and serves the City limits, with a 8 square mile service area noted in **Figure 21**. There are over 7,000 trips per month, and about half of all rides are shared between multiple passengers. Service productivity averages 4.7 boardings per revenue-hour, and cost per ride averages $16-20. About 20% of the ridership is students from Salem State University and Salem High School. Other main rider groups include lower income families and zero-vehicle households. Popular destinations include the university and high school campuses, the MBTA commuter rail station, Salem Hospital, as well as shopping centers such as Walmart, Market Basket, and Target.

Lessons learned from the Salem Skipper service include:

- Securing sustainable funding sources for the service is its most significant challenge; regardless of how well the service performs, it will shutter without sufficient funds. The City's Transportation Director considers pursuing funding and grant applications to be "nearly a full-time job." The City cautions other municipalities considering a turnkey transportation service to ensure they have at least three years of funding (including capital plus operating costs) secured before entering into a vendor contract.
- The City has been opportunistic in seeking a variety of funding sources. These include congressional earmarks ($2.3 million), MassDOT's Workforce Transit grant ($75,000), City funding from its Transportation Enhancement Fund ($75,000), COVID relief funding from the American Rescue Plan ($400,000), and a community benefits fund from the local gas utility, Footprint Power ($150,000). Additional funding sources the City is exploring include developer impact fees, a state grant for non-emergency medical transportation (NEMT), and the MassDOT Regional Innovation Grant.[28] Apart from the City's Transportation Enhancement fund and the MassDOT Workforce Transit grant, these funding sources are non-recurring.

[28] https://www.mass.gov/how-to/regional-transit-innovation-grant

- Cities should establish cost-sharing partnerships with major institutions that benefit from the microtransit service. In previous years, the City has received funding from Salem State University, as many students depend on the Salem Skipper to get to class. However, this partnership has lapsed within the last year. The City is in discussions with Salem General Hospital to provide supporting funding, given that a significant number of employees use it to get to work.
- Demonstrating the success of microtransit can help prove it is a viable option for public transit. This is especially important in making the case for state-level or regional partnerships, as it may not be sustainable for municipalities to provide this service alone without additional support from higher levels of government.

Table 29. *Service overview: Salem Skipper*

Start year	2020
Service area	Salem, MA
Use case	Point-to-point mobility in low-density areas
Pickup/dropoff type	Anywhere-to-anywhere within the service zone, which coincides with City of Salem municipal limits
Service hours	Monday - Thursday: 7:00 am - 10:00 pm Friday: 7:00 am - 12:00 am Saturday: 10:00 am - 12:00 am Sunday: 10:00 am - 8:00 pm
Reservation type	Rides can be booked on-demand using a smartphone app or by calling a dispatcher.
Fare	$2 one-way until 7pm and $3 after 7pm, $1 for seniors (65+), $1 for middle school and high school students, $1 for people with disabilities
Technology provider	Via
Operator	Via (same as technology provider)
Vehicle detail	4 minivans, including: ● 2 Dodge Caravan (wheelchair-accessible) ● 2 Chrysler Pacifica (non-wheelchair-accessible)
Ridership and utilization	7,000+ completed monthly rides 4.7 passengers/revenue hour
Funding sources	● Congressional earmarks (FY 2023) ● MassDOT Workforce Transit grant ● Community Benefit Agreement with local utility provider ● City's Transportation Enhancement Fund ● COVID relief funding (ARPA)

Additional info	Links: • On-demand program information

Figure 21. *Salem Skipper service area*