Microtransit Feasibility and Fixed Route Transit Service Plan Design Assistance Study

December, 2022

SWRPC

Provided by

VIA

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The preparation of the Microtransit Feasibility and Fixed Route Transit Service Plan Design Assistance Study was financed in part through a grant from the Federal Highway Administration (FHWA), under the State Planning and Research Program of Title 23, U.S. Code as well as the Federal Transit Administration (FTA) through the 5305(e) transportation planning program. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

Executive summary.

Stone Arch Bridge Keene

Introduction

This Microtransit Feasibility and Fixed Route Transit Service Plan Design Assistance Study was conducted on behalf of the Southwest Region Planning Commission (SWRPC), in partnership with Home Healthcare, Hospice, and Community Services (HCS) and the Monadnock Region Coordinating Council (MRCC), and the City of Keene. This project was funded with Federal Transit Administration 5305(e) State Planning and Research funds and administered by the New Hampshire Department of Transportation.

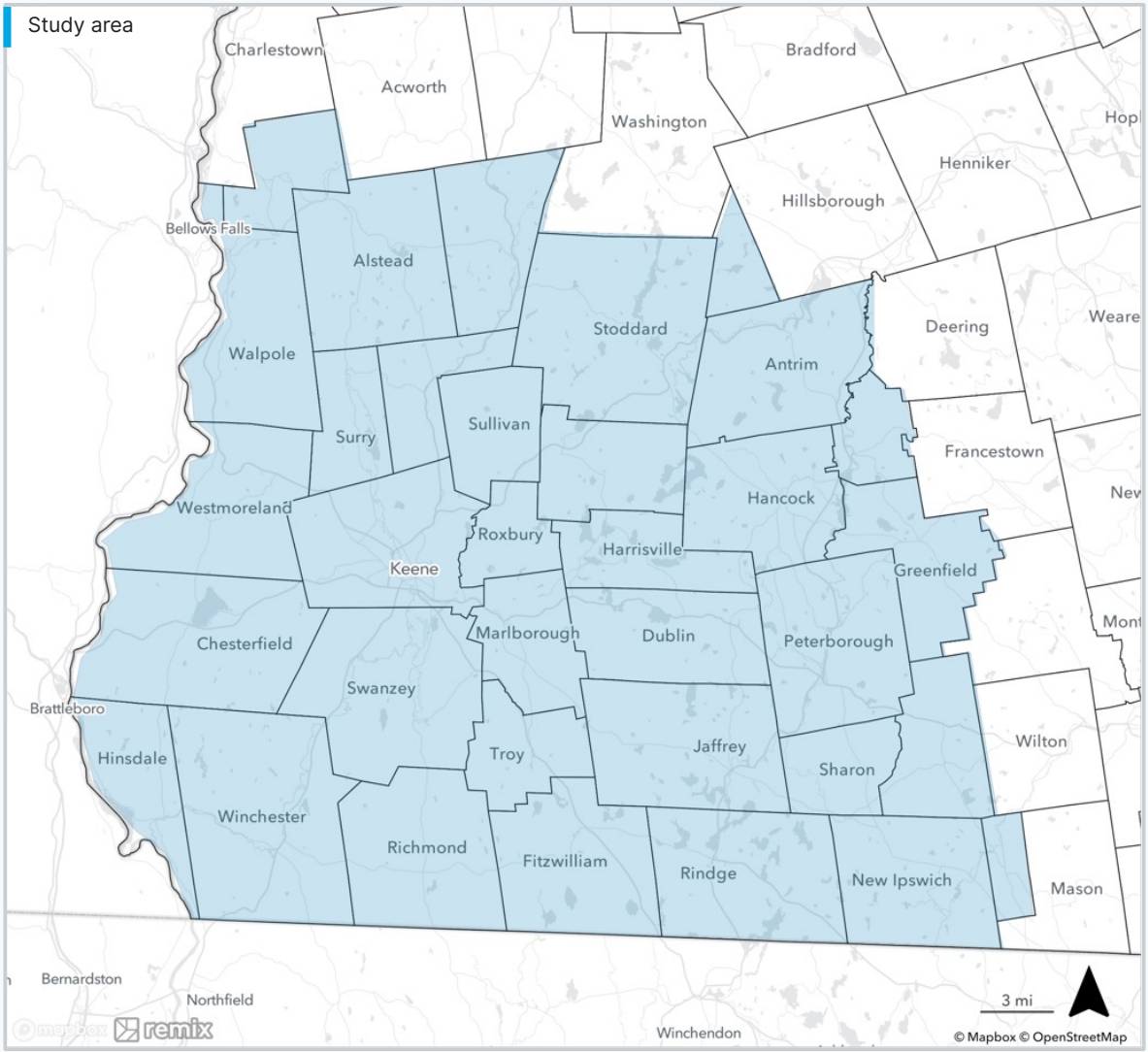
Goals

The purpose of this study is to examine opportunities to improve transit service in the City of Keene and surrounding communities. The Southwest Region Planning Commission serves the areas shown on the map below. Based on guidance from stakeholders and the public, the Study focuses on Keene and surrounding towns, the eastern Monadnock Region, and high-need areas such as the town of Winchester. The Study is not restricted to only these areas, nor is it intended to develop transit solutions for all of them.

Key Tasks and Study Area

1. An assessment of the existing fixed-route transit system in Keene, New Hampshire. This service is operated by HCS and is known as the City Express.
2. An assessment of the feasibility of operating microtransit as a replacement and/or complement for the City Express service.
3. An assessment of the feasibility of expanding transit services beyond the current City Express service area.

The Study identifies several transit service alternatives and develops cost estimates and ridership forecasts for each. The Study also includes recommendations to support the implementation of one or more of the alternatives in the future.



Transit Need in Southwest New Hampshire

The Study examines the existing conditions in the Monadnock Region of New Hampshire. In addition, the project team met with stakeholders several times throughout the Study, holding six public meetings. Through these conversations and a review of demographic and socioeconomic patterns, existing transit ridership patterns, and previous studies and plans, the following baseline findings have been identified:

- **Population patterns:** About 100,000 people live in the 34 municipalities included in the SWRPC Region. Keene is the most densely populated and largest with 23,000 residents. The region is relatively rural, with small pockets of higher-density populations in most towns. The overall density of the 1,000 square mile region is about 100 people per square mile. While most of the existing public transportation options in the Region are in the City of Keene, there are also apparent transit needs throughout the Region.
- **Employment patterns:** Keene is a major employment hub in the Region and the City has about 14,000 jobs (about 40% of the Region's jobs). Of these jobs, about 30% are held by Keene residents, the remaining ~9,500 jobs are held by those living outside of the City and travel to Keene for work. Most of the commuters to Keene drive personal vehicles, as there are few other transportation options connecting Keene to other areas.
- **High transit-need areas:** In addition to Greater Keene, parts of Winchester stands out as having higher poverty rates and people living with disabilities. The Eastern Monadnock Region stands out as having higher rates of car-free households and seniors. People with disabilities, low-incomes, and car-free households all tend to rely more heavily on public transit.
- **Existing bus network:** Home Healthcare Hospice & Community Services (HCS) of Keene operates the two fixed-route buses in Keene on weekdays. Together, the routes serve approximately 1,500 passenger trips per month. There are no bus routes that connect Keene to other municipalities available every weekday.
- **Additional public transit services:** HCS also operates demand-response transportation services within Keene, including the Friendly Bus and Para Express. Across both programs, HCS serves about 28 passenger trips per day. HCS also operates limited shopping shuttle and medical transportation services to the public. Community Volunteer Transportation Company (CVTC), the other major New Hampshire based transportation operator serving the region, coordinates a volunteer driver program across the entire Monadnock Region. The volunteer driver program averages about 17 passenger trips per day. Southeastern Vermont's MOOver! provides limited fixed route public transit service to Hinsdale and Walpole, NH. Beyond these services, there are few other public transit or public shared ride transportation options outside of Keene for those without access to a private vehicle.

Modes of Transit

A key focus of this Study is to evaluate both fixed-route bus and microtransit services.

Fixed-route buses are vehicles that follow a fixed route and timetable. Many fixed-route buses have pre-determined stops, but some also allow passengers to flag the vehicle down between stops.

Microtransit, also known as "on-demand transit", or "demand-responsive transit", is a form of public transit that features flexible routing and flexible scheduling of vehicles. Passengers must request a trip and this is most commonly done using a smartphone application or by calling a dispatcher. For a detailed description of microtransit, please refer to 3. Microtransit Overview.

Both microtransit and fixed-route have relative strengths and weaknesses, but microtransit could be a good fit in Southwest New Hampshire. While some prefer fixed-routes because they offer a pre-determined schedule, and consistency in service, microtransit provides several benefits. First, it can attract choice riders which are passengers who have access to a private vehicle but choose to use public transit because it is the best alternative for their trip. The existing HCS City Express fixed-route buses have relatively low ridership and microtransit services in similar communities have successfully attracted new public transit users, including those who have access to a private vehicle. This is due to shorter wait times, shorter walking distances, faster overall travel times, and a simplified technology-enabled booking process. A shift to microtransit could help to reduce congestion, parking demand, and improve air quality by reducing private vehicle trips in the service area.

Alternatives

A total of 12 transit service alternatives were evaluated during the Study.

Geographic Focus: The alternatives focus on improving public transit service within Greater Keene (which consists of the City of Keene and parts of Swanzey and Marlborough) as well as alternatives that focused on expanding public transportation to new areas, including the Eastern Monadnock Region and intercity connections between Keene, Peterborough, Winchester, and Brattleboro, VT.

Public Transit Modes: Three transit modes are explored as part of the study, fixed-route buses, on-demand microtransit, and pre-booked microtransit.

The table below shows the key results from modeling each of the alternatives: the estimated ridership per weekday and year, the number of vehicles required to operate the service, the annual cost to operate the service, and the estimated cost per trip. This Study has determined that expanding public transit to include weekends in Greater Keene would generate additional ridership and help to provide a real alternative to private vehicle ownership for residents. Weekend service has been included in cost estimates. However, if funds are limited and weekend service is not offered, costs would decrease by ~15-20%. For example, the Hybrid Microtransit and North-South Bus Route alternative would reduce from $2.1M per year to $1.7M per year.

Transit Alternatives Metrics

Alternative	Weekday Demand Estimates[1]	Annual Demand Estimates[2]	Peak Fleet Size[3]	Annual Operating Cost[4]	Estimated Cost per Trip[5]
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / Trip
Keene Circulator Bus Route + Friendly	200	53,000 - 86,000	5	$1.2M	$20
East-West/North-South Bus Routes + Friendly Bus	240	66,000 - 91,000	6	$1.6M	$21
Greater Keene On-demand Microtransit	280	79,000 - 99,000	5	$1.7M	$19
Keene Urban Area On-Demand Microtransit	210	54,000 - 79,000	4	$1.2M	$18
City of Keene On-Demand Microtransit	230	57,000 - 90,000	6	$1.9M	$25
Hybrid Microtransit and North-South Bus Route	315	90,000 - 110,000	6	$2.1M	$21
Winchester - Keene Pre-booked Microtransit	70	14,000 - 31,000	2	$0.5M	$24

[1]Assumes service between 7 AM and 6 PM; estimated ridership for microtransit alternatives represents the medium demand scenario.

[2]Assumes service on weekdays between 7:00 AM and 6:00 PM and weekends between 9:00 AM and 4:00 PM. Except for HCS current service which operates weekdays between 8:00 AM and 4:30 PM.

[3]For microtransit scenarios, assumes vehicles needed at peak for the medium demand scenario.

[4]Assumes operating costs of $95 per hour and the vehicle supply for the medium demand for the microtransit alternatives. Except for HCS service which shows actual 2019 costs.

[5]Assumes operating costs of $95 per hour and the vehicle supply for the medium demand for the microtransit alternatives. Except for HCS service which shows actual 2019 costs.

Transit Alternatives Metrics (continued)

Alternative	Weekday Demand Estimates[1]	Annual Demand Estimates[2]	Peak Fleet Size[3]	Annual Operating Cost[4]	Estimated Cost per Trip[5]
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / Trip
Winchester - Keene Bus Route	45	12,000 - 16,000	1	$0.3M	$21
Keene-Peterborough Bus Route	50	13,000 - 18,000	1	$0.3M	$20
Eastern Monadnock Pre-booked Microtransit	35	7,000 - 16,000	2	$0.5M	$47
Keene-Brattleboro Bus	50	13,000 - 18,000	1	$0.3M	$21
SWRPC Region Pre-booked Microtransit	170	33,000 - 77,000	7	$2.3M	$42
HCS Red and Black Routes + Friendly Bus (2019)	170	43,000	5	$0.7	$16

[1]Assumes service between 7 AM and 6 PM; estimated ridership for microtransit alternatives represents the medium demand scenario.

[2]Assumes service on weekdays between 7:00 AM and 6:00 PM and weekends between 9:00 AM and 4:00 PM. Except for HCS current service which operates weekdays between 8:00 AM and 4:30 PM.

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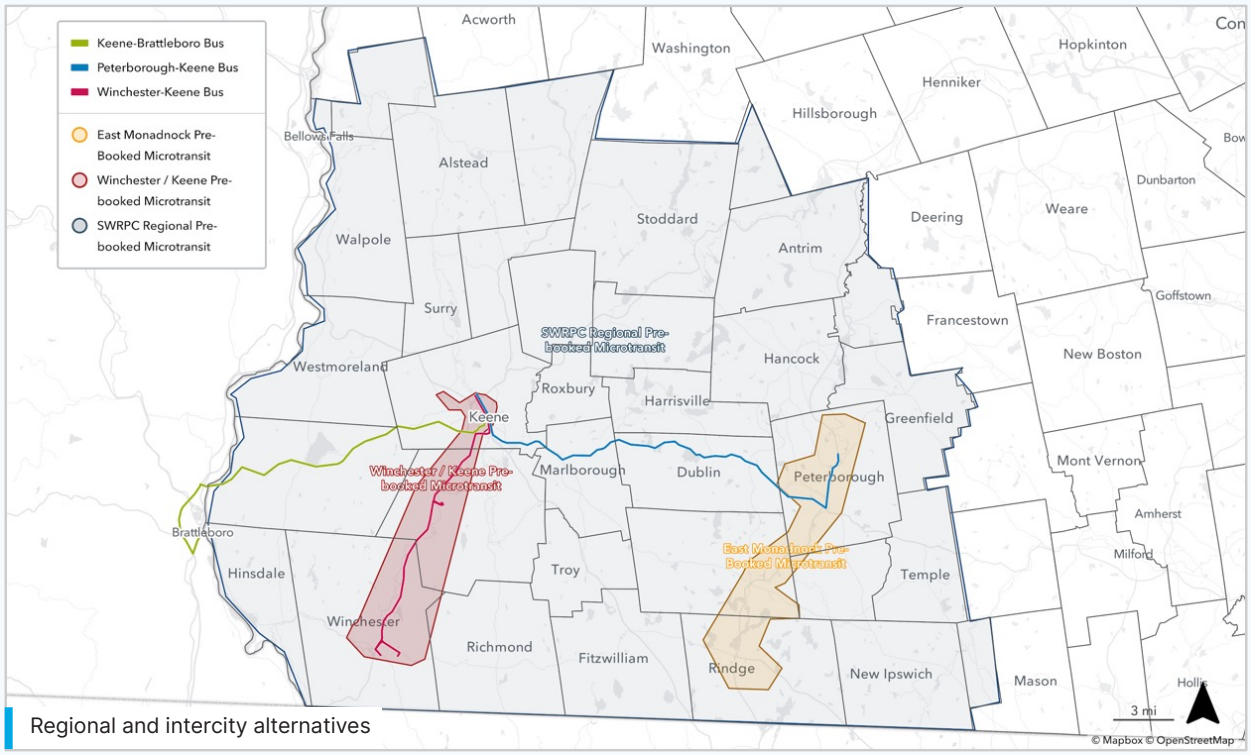
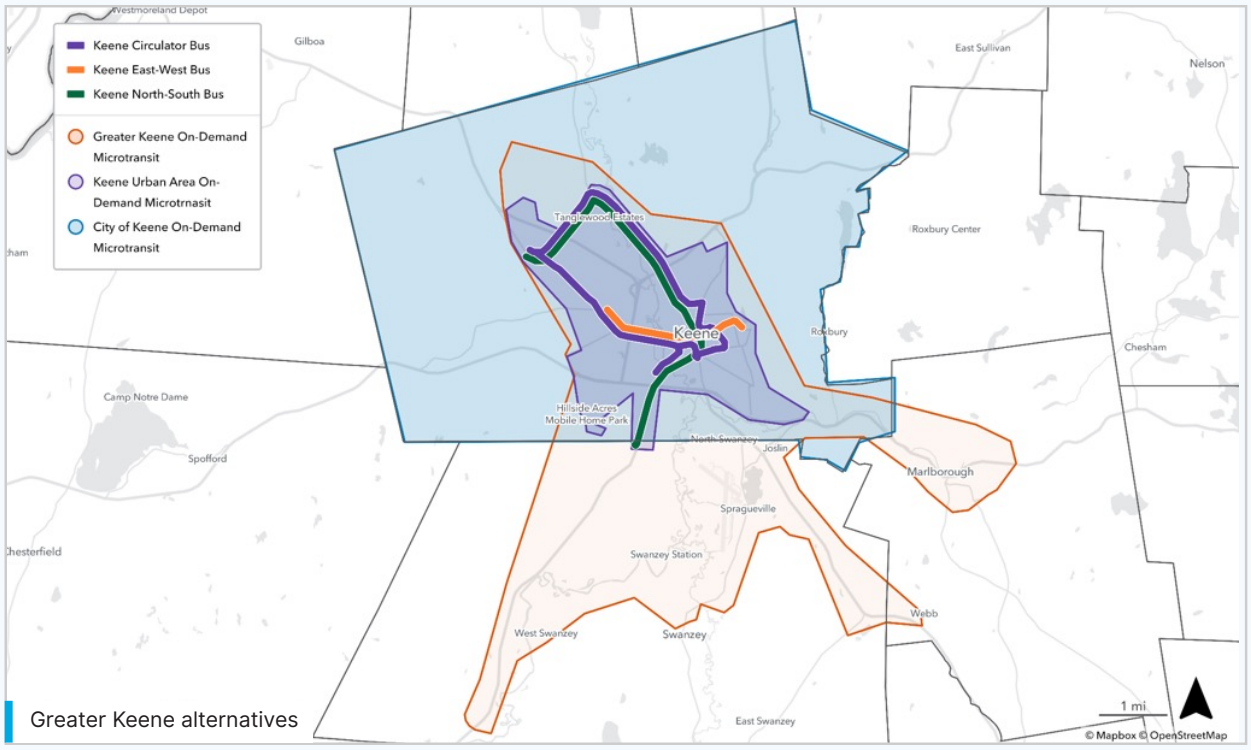
Map of Alternatives



Regional and intercity alternatives



Greater Keene alternatives

Recommendations

The project team recommends a phased approach to implementation with investments first in either the Greater Keene Microtransit alternative or the Hybrid Microtransit and North-South Bus Route alternative. Depending on interest and funding availability, the team suggests to then expand transit to new areas (Winchester and the East Monadnock area) followed by implementing regional alternatives. Phasing implementation eases the initial funding and operational requirements needed to launch service in Southwest New Hampshire.

New transit services can either be operated by HCS (the current operator of the Red and Black routes in Keene) or by a new transit agency. A new agency can either be formed by a municipality, Cheshire County, a regional transit district, a joint powers agreement between multiple entities, or another nonprofit agency. The managing entity will need to determine if it is advantageous directly operate the new services or contract out the transit operations using a "turnkey" model. For any alternative that is implemented, funding will need to be secured through federal, state, and/or local means. Depending on the alternative selected and the operating model, the managing entity may need to procure vehicles, software, or other capital assets in order to implement the service. If a microtransit alternative is selected, drivers and the public will need to be trained and educated, as the service type will be new to most. The project team also recommends continuous public engagement throughout the launch process and after the launch process to ensure that the service meets the needs of the community. See Section 7 for additional recommendations related to launching transit services.

SECTION 1

Project Overview.

1.

Project Overview

This Microtransit Feasibility and Fixed Route Transit Service Plan Design Assistance Study was conducted on behalf of the Southwest Region Planning Commission (SWRPC), in partnership with Home Healthcare, Hospice, and Community Services (HCS), the Monadnock Region Coordinating Council (MRCC), and the City of Keene. This project was funded with Federal Transit Administration 5305(e) State Planning and Research funds and administered by the New Hampshire Department of Transportation.

SWRPC is one of New Hampshire's nine regional planning agencies. SWRPC covers a planning district consisting of 34 towns (~1,000 square miles and ~100,000 people), comprising the Southwest Region of the state. A primary goal of the SWRPC is to represent member towns on issues which have a larger-than-local focus such as assisting municipalities in drafting transportation-related policies and plans.

As with many parts of New Hampshire, the areas surrounding Keene have very limited access to public transit. This is due to low population density and limited federal and state public transit investment in New Hampshire. Currently, the regional network features three fixed-route transit systems. However, two of these are systems that operate primarily in Vermont and have short route segments that enter parts of Hinsdale and Walpole, NH. The principal fixed route transit system in the region is the City Express, managed by the human service agency HCS, which operates in Keene and a small portion of the neighboring community of Swanzey. The service runs Monday through Friday, excluding holidays. Broadly, the service consists of two fixed routes—one bus operating on each route—from approximately 8:00 a.m. to 4:30 p.m. stopping at twenty-two locations including downtown Keene, major retail centers in Keene and Swanzey and many residential areas. The bus fare is currently set at $1 per ride with discount fares available.

HCS has operated the City Express service since 1993. Annual ridership across the City Express, Para Express (paratransit), and Friendly Bus (for seniors) was approximately 30,000-45,000 trips per year prior to the onset of COVID-19 in 2020.

The purpose of this Study is to examine opportunities to improve transit service in the City of Keene and surrounding communities. This includes:

1. An assessment of the existing fixed-route transit system in Keene, New Hampshire. This service is operated by HCS and known as the City Express.
2. An assessment of the feasibility of operating microtransit as a replacement and/or complement for the City Express service.
3. An assessment of the feasibility of expanding transit services beyond the current City Express service area.

The Study identifies several alternatives and develops cost estimates and ridership forecasts for each. The Study also includes recommendations to support the implementation of one or more of the alternatives in the future.

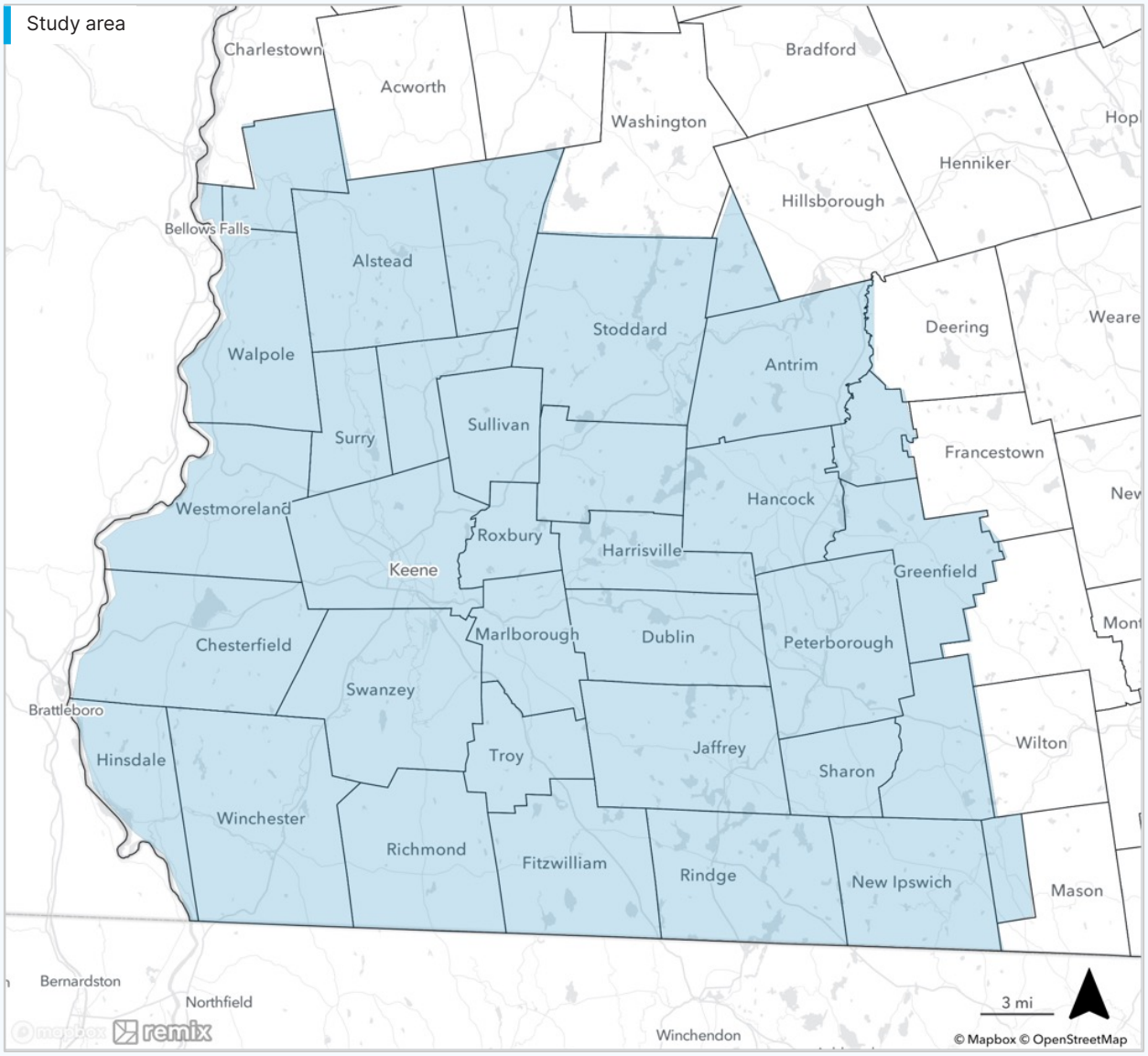
SECTION 2

Study Area.

2.

Study Area

The Southwest Region Planning Commission's planning district serves the areas shown on the map below. Based on guidance from stakeholders and the public, the Study focuses on Keene and surrounding towns, the eastern Monadnock region, and high-need areas such as the town of Winchester. While the Study was not restricted to these areas, nor is it intended to develop transit solutions for all of them, the Existing Conditions Analysis focuses on these three areas.



SECTION 3

Modes of Public Transit

3.

Modes of Public Transit

A key focus of this study is to understand if microtransit is well suited for Southwest New Hampshire. Microtransit, also known as “on-demand transit”, or “demand-responsive transit”, is a form of public transit that features flexible routing and flexible scheduling of vehicles. Passengers must request a trip and this is most commonly done using a smartphone application, or by calling a dispatcher.

While some passengers may prefer fixed-route buses because they offer a pre-determined schedule, and consistency in service, microtransit can also provide several benefits. Most notably, it can attract choice riders, who are passengers that have access to a private vehicle but choose to use public transit because it is the best alternative for their trip. The existing HCS City Express fixed-route buses have relatively low ridership, and microtransit services in similar communities have successfully attracted new public transit users, including those who have access to a private vehicle. This is due to shorter wait times, shorter walking distances, faster overall travel times, and a simplified technology-enabled booking process. This could help to reduce congestion, parking demand, and improve air quality by reducing private vehicle trips in the service area. There are several potential reasons why agencies consider offering microtransit, often as a substitute or complement to a regular bus route.

3.1 Microtransit Overview

Pre-Booking vs On-Demand: There are two common types of microtransit - pre-booked and on-demand. In a pre-booked service, passengers must book their journeys ahead of time, from as little as 30 minutes to several weeks in advance. On-demand microtransit services are most commonly implemented in areas with sufficient demand to support a relatively high density of vehicles, meaning a vehicle is likely to be nearby when a passenger requests a trip. Pre-booked microtransit is generally used in lower density areas where trips tend to be longer and less frequent. Some services allow both, where on-demand microtransit is the primary form of travel, but pre-booked trips are also allowed. These mixed services can provide the best experience for passengers. However, this approach sacrifices some degree of flexibility in operations as pre-booked vehicles must be committed to trips in advance.

Passenger Experience: To book a trip, a rider starts by indicating the number of passengers in their party and their desired pickup and dropoff locations. When booking using the app, riders will clearly see the zone in which service is offered. Requesting a trip beyond this zone is not possible, so passengers always know where the microtransit service is available. Once the

rider submits a ride request, they are given a proposal that tells them when the vehicle will arrive and where to meet it. For an on-demand microtransit service, a vehicle is typically routed to pick up passengers near their location in less than 30-45 minutes depending on the service quality goals. Most passengers are picked up in an average of 10-25 minutes, or around half the maximum acceptable wait time. They can track the vehicle in real-time using the app. The passenger is provided with vehicle information—for example: license plate, driver name, driver photo, and vehicle ID number. Riders can usually cancel a ride at any time before pickup, but as cancellations may negatively affect other passengers, a small fee is often charged to discourage cancellations. Once the vehicle arrives, the driver confirms the passenger's details using the driver app. In some microtransit services, riders may be asked to walk a few minutes to meet a vehicle. This allows the vehicle routing to be most efficient by minimizing detours. For passengers who are unable to walk to meet a vehicle or where there is no safe pedestrian infrastructure, the service can be configured to provide curb-to-curb service. Riders can pay using credit and debit cards (linked to the mobile app), a public transit pass, cash, vouchers, and more. Most public microtransit services include payment options for people without credit cards or bank accounts to ensure that the service is accessible to all. The rider is then taken to their destination. Along the way, the vehicle will pick up and drop off other riders heading in the same direction, but care is taken to avoid lengthy detours for riders already on board. The rider can track their progress using the app. After each trip, riders may be automatically emailed a receipt. Passengers may also be able to provide real-time and post-trip feedback through the app.

Vehicles: Vehicle type can vary, but microtransit is often operated with a van or small bus, typically with a capacity for 6 - 12 passengers. Smaller vehicles offer several benefits, such as increased maneuverability and lower operating costs due to improved fuel economy and less stringent driver licensing requirements. At least 20% of the fleet should be wheelchair accessible.

Fares: Fares are typically kept low (often comparable to other public buses) as operations are typically subsidized by municipal, state, and federal funding sources. While fare payment methods vary depending on operator preferences, accepted payment options typically include credit and debit cards, public transit passes issued by the transit agency, cash, and vouchers.

Diagram: Diagram of On-Demand Microtransit Passenger Experience

3.2 Fixed-Route Overview

Fixed-route buses are the most common form of public transit. They rely on a predetermined route with established stops and a regular schedule. Unlike microtransit, passengers do not need to book rides to use fixed-route buses but instead use the system as they choose based on the established schedules. While fixed-routes are not inherently technology-based, some transit agencies have live vehicle tracking available for passengers to see where the bus is and when they need to walk to a bus stop. Fixed-route buses can provide reliable and consistent service for communities and function best in areas with dense housing and businesses. Fixed-route buses are also often used to connect lower-density areas to a high-frequency rail system. Many fixed-routes use forty-foot buses, but in smaller urban areas like Keene, smaller cut-away vehicles are often used to operate the services.

SECTION 4

Existing Conditions Analysis

4.

Existing Conditions Analysis

This Existing Conditions Analysis covers 34 municipalities in the Monadnock Region of New Hampshire. In addition to documenting demographic and socioeconomic patterns in the region, this analysis evaluates the ridership patterns of fixed-route buses in Keene, the demand-response transit service in Keene, and the regional volunteer driver program operated by Community Volunteer Transportation Company (CVTC). Previous studies and plans have been reviewed to ensure that any new proposals align with other initiatives and goals.

Key conclusions from the existing conditions analysis include:

- **Study area focus:** Most of the existing public transportation options in the Region are in the City of Keene. While Keene is the largest community in the Region, areas with transit needs extend beyond the City boundaries and include the nearby areas of North and West Swanzey and Marlborough Town Center. This area is referred to in the Study as "Greater Keene." The Study also looks at the Eastern Monadnock region which includes the towns of Peterborough, Jaffrey, and Rindge, and separately the Route 10 corridor south of Keene including West Swanzey and Winchester which was noted as having potential higher transit need based on the demographics and socioeconomic characteristics of the areas.
- **Population patterns:** About 100,000 people live in the 34 municipalities included in the SWRPC Region. Keene is the most densely populated and largest with 23,000 residents. The Region is relatively rural, with small pockets of higher density populations in most towns. The overall density of the 1,000 square mile region is about 100 people per square mile.
- **Employment patterns:** In addition to population, employment density is a key indicator of where people may use transit. Keene is a major employment hub in the Region and the City has about 14,000 jobs (about 40% of the Region's jobs). Of these jobs, about 30% are held by Keene residents, the remaining about 9,500 jobs are held by those living outside of the City and travel to Keene for work. About 4,500 employees live in Keene but work elsewhere in the Region. Other regional employment clusters include the Eastern Monadnock area, especially around Peterborough, and in Brattleboro, Vermont.

- **High transit-need areas:** High transit-need areas have higher rates of demographic and socioeconomic characteristics that tend to rely more heavily on public transportation. These groups include seniors, youth, people with disabilities, minorities, car-free households, and people living below the poverty line. In addition to Greater Keene, parts of Winchester stand out as having higher poverty rates and people living with disabilities. The Eastern Monadnock region stands out as having higher rates of car-free households and seniors.
- **Existing bus network:** Home Healthcare Hospice & Community Services (HCS) of Keene operates the two fixed-route buses in Keene. These buses operate on weekdays once every hour and stop at key locations in the Keene urban area, focusing on large housing complexes, shopping centers, grocery stores, medical facilities, the YMCA, and the library. Together, the routes serve approximately 1,500 passenger trips per month.
- **Additional transit services:** HCS operates demand-response transportation services for the City of Keene, which includes the Para Express, an ADA complementary paratransit service that is available within three-quarters of a mile from the fixed routes, the Friendly Bus, which provides older adults with shared door-to-door service around Keene, and regularly scheduled trips to Market Basket in Swanzey and the Dartmouth-Hitchcock Medical Center in Lebanon, New Hampshire. Across all of these programs, HCS serves about 28 passenger trips per day. Community Volunteer Transportation Company (CVTC) coordinates a volunteer driver program across the Region. The volunteer driver program averages about 17 passenger trips per day.

4.1 Summary of Previous Studies and Plans

A review of existing studies was conducted to capture critical insights and ensure any recommendations from this Study align with previous studies. Some key themes from the reports include:

- Keene and others in the Region have committed to improving transportation in the Region and have begun to explore options like microtransit and intercity routes.
- The plans look at transit solutions as a way to address climate and energy goals, specifically reducing vehicle miles traveled in single occupancy vehicles.
- Keene is known as a regional hub for Southwest New Hampshire and travel between Keene and nearby communities is important.
- Transportation goals for the Region include improving access to goods and services (especially medical facilities), supporting and enhancing the regional economy, and serving the aging population better.
- Challenges to transit improvement in the Region include limited funding, difficulty attracting new riders, jurisdictional/administrative boundaries and responsibilities, topography, and geographic distances.

For a summary of each plan that was reviewed for the Study, please refer to Appendix A: Review of Previous Studies and Plans.

4.2 Demographic and Socioeconomic Analysis

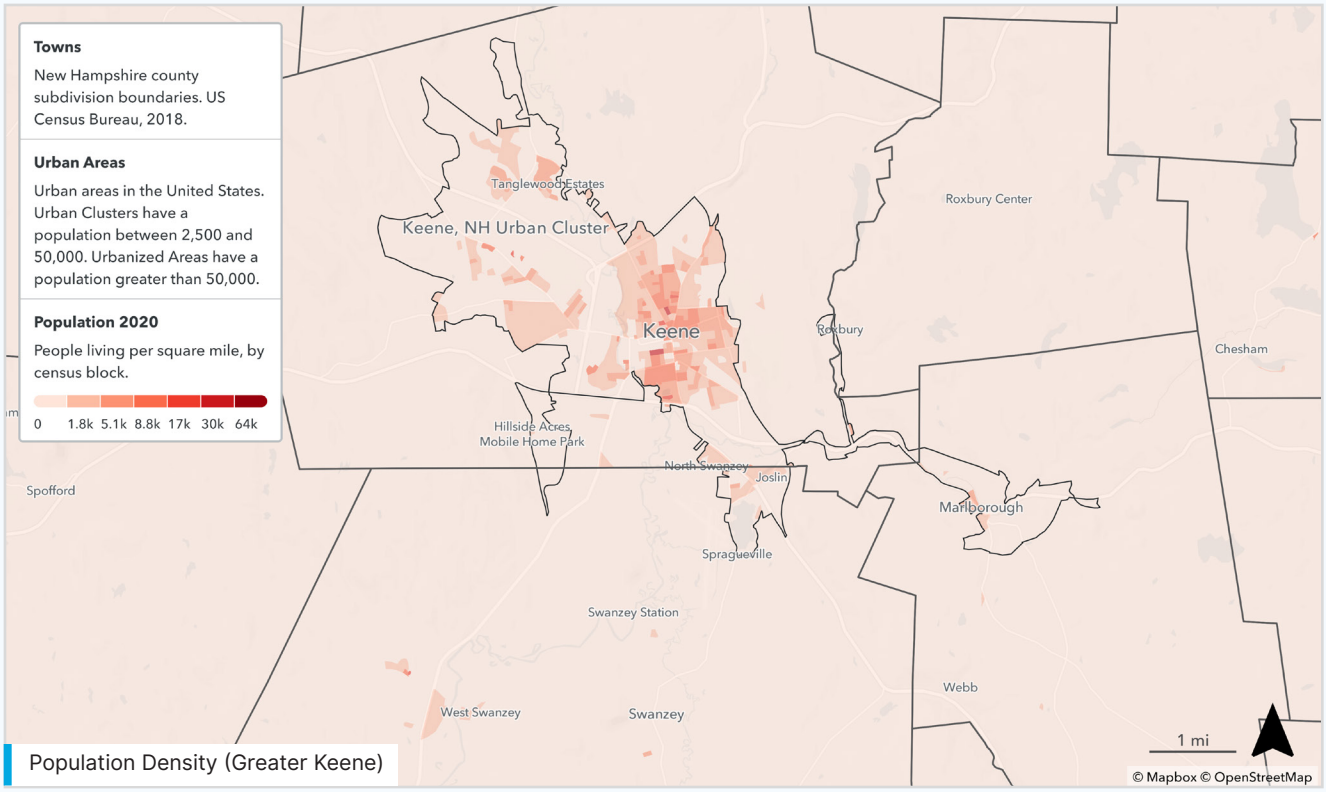
4.2.1 Population density

Keene has a population of 23,000 people and an average population density of 775 people per square mile. The Keene, NH Urban Cluster, which includes North Swanzey and Marlborough Town Center, has a population of 21,000 and a density of 3,850 people per square mile. This density is significantly higher than the New Hampshire average (155 people/ sq mile) and the USA average (95 people / sq mi).[6]

The Southwest New Hampshire area comprises 34 municipalities over 1,000 square miles. About 100,000 people live in this area. The top 5 most populated municipalities are:

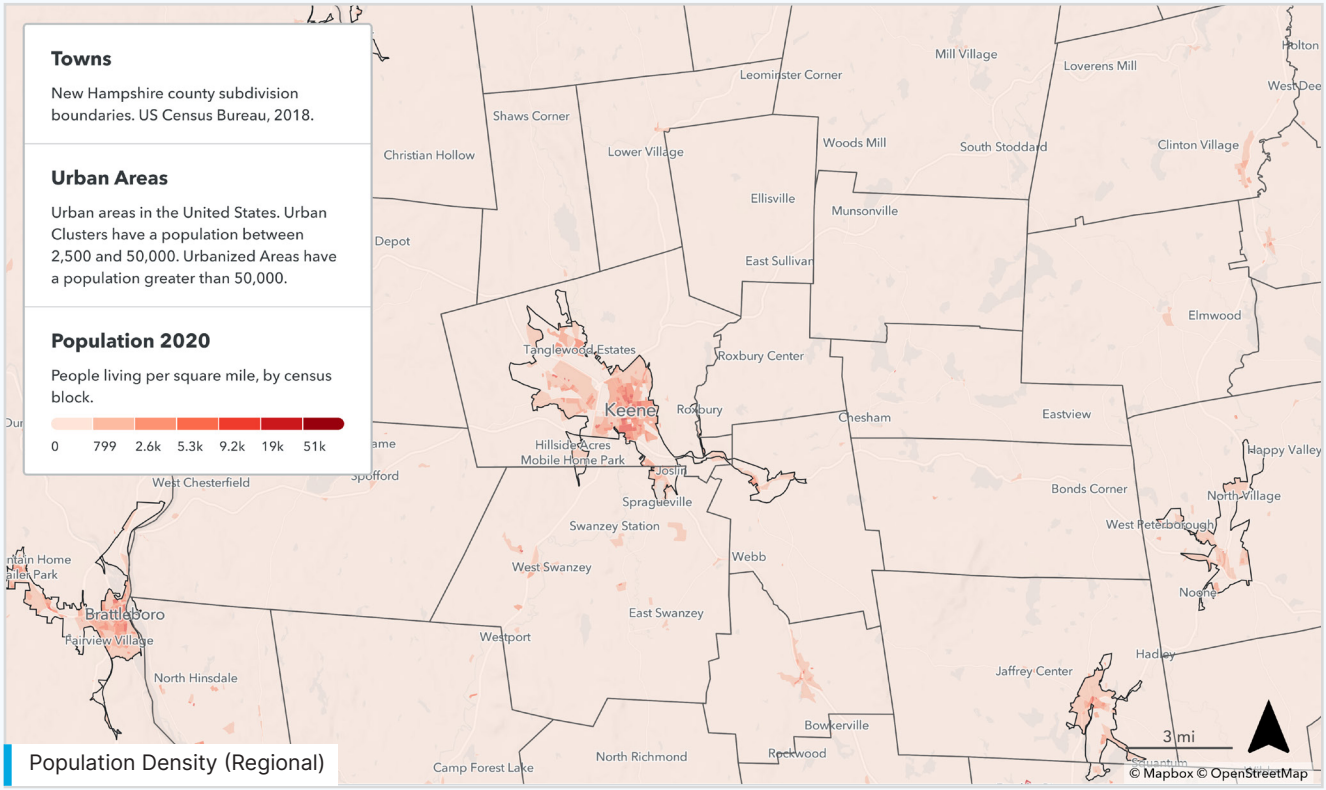
1. Keene (23k)
2. Swanzey (7.3k)
3. Rindge (6.5k)
4. Peterborough (6.4k)
5. Jaffrey (5.3k)

The average population density of the region is 100 people per square mile, and most of the population is clustered into small town centers. However, some clusters cross municipal boundaries. The largest urban cluster is the Keene, NH Urban Cluster which includes parts of Keene, Swanzey and Marlborough.



Population Density (Greater Keene)

[6]Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B01001, Block.



Population Density (Regional)

4.2.2 Employment Analysis

Employment density is an indicator of where people may commute to on a daily basis for work. The Keene Urban Cluster has about 14,200 jobs (over 90% are located within the City of Keene), while the total southwest New Hampshire area has an estimated 40,000 jobs. Most jobs are located in Keene (17,000 jobs), Peterborough (4,200 jobs), and Jaffrey (2,500).[7]

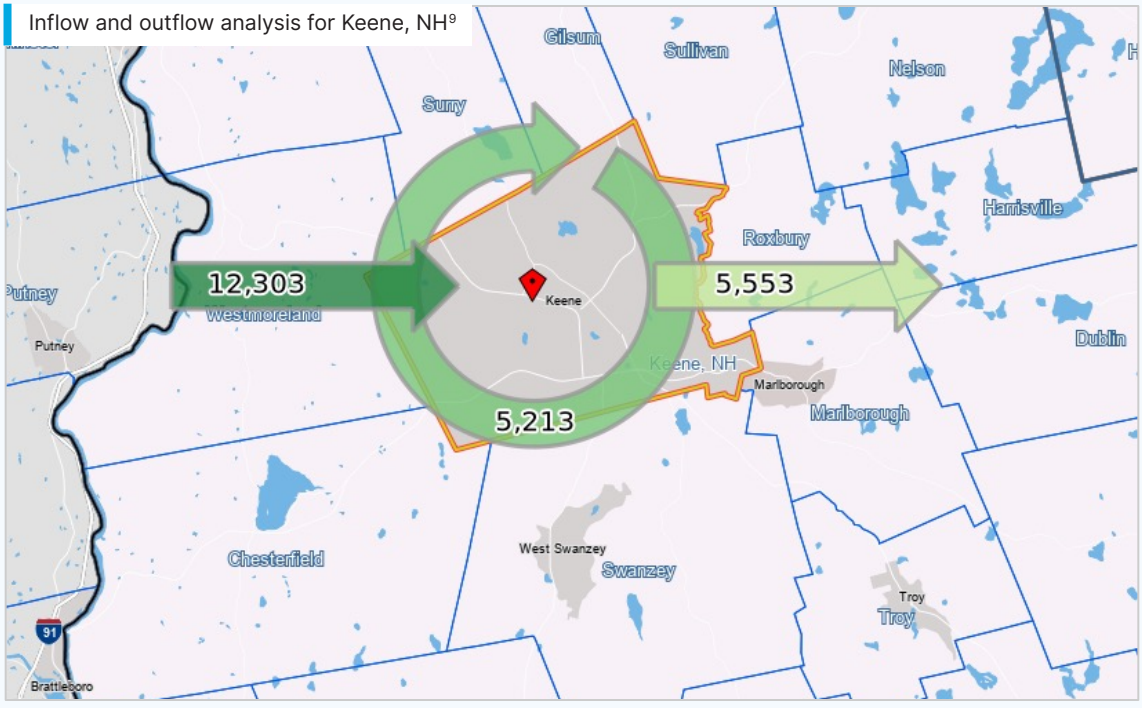
More people travel to Keene for jobs than leave from Keene for employment elsewhere. About 5,200 people live and work in Keene (about 30% of Keene's workforce). The other half of the working population in Keene (5,500 workers) travel outside of Keene for work. The most common destinations to travel to for work from Keene are Brattleboro, Swanzey, and Concord. The average Keene resident has an 18-minute commute to work.

About 70% of Keene's workforce (9,600 workers) live outside of Keene. People travel to Keene for work from many nearby towns, including Swanzey, Chesterfield, Winchester, and Marlborough. The average Cheshire County commute to work is 23 minutes.

As of January 2021, major employers in Keene include:

- Cheshire Medical Center/Dartmouth Hitchcock Clinic-Keene (1,560 employees)
- C & S Wholesale Grocers (1,200 employees)
- Keene School District (1,100 employees)
- Keene State College (790 employees)
- Imaje Corporation (400 employees)[8]

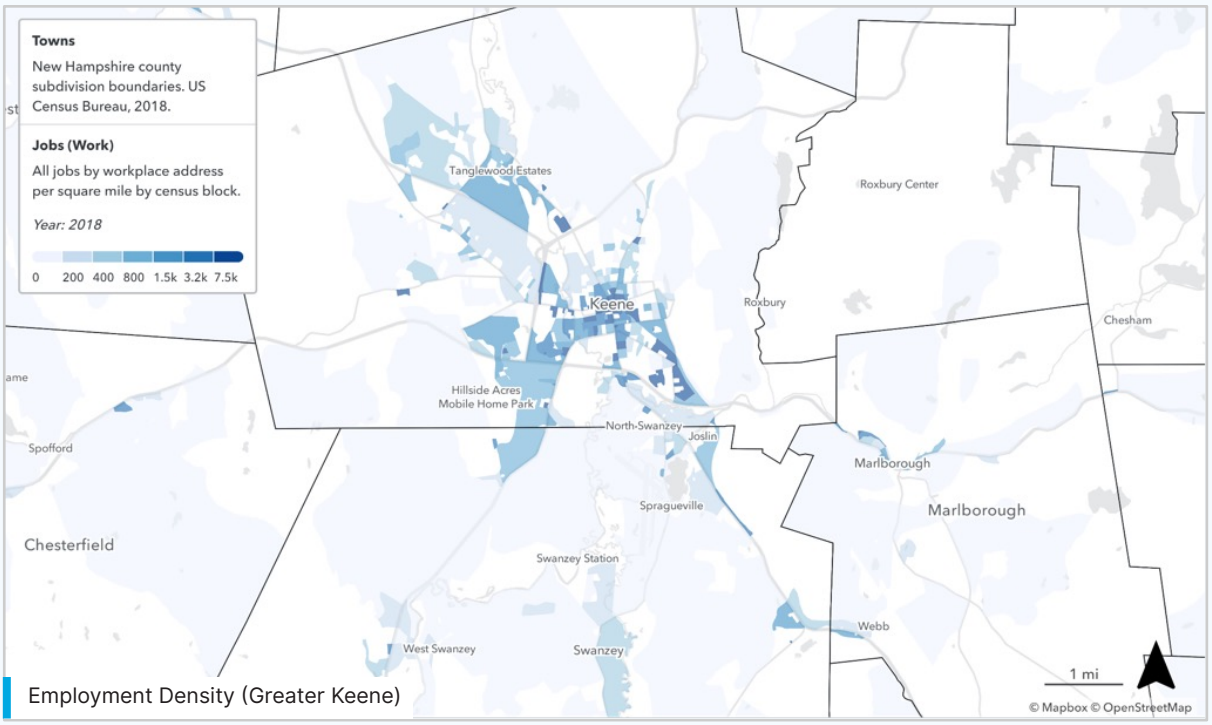
Inflow and outflow analysis for Keene, NH[9]



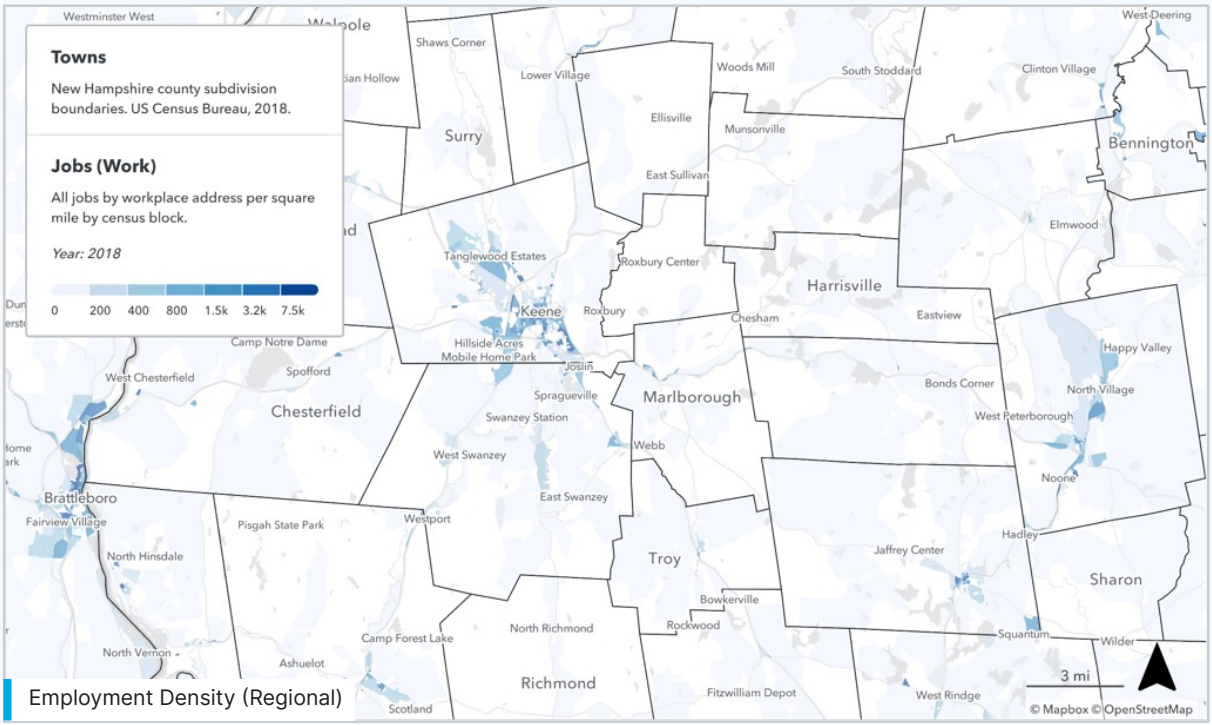
[7]Source: U.S. Census Bureau; Longitudinal Employer-Household Dynamics, Origin-Destination Employment Statistics, Table nv_wac_S000_JT_2018, Block.

[8]Source: Economic & Labor Market Information Bureau, NH Employment Security, January 2021.

[9]Source: U.S. Census Bureau, Center for Economic Studies, LEHD, 2019.



Employment Density (Greater Keene)



Employment Density (Regional)

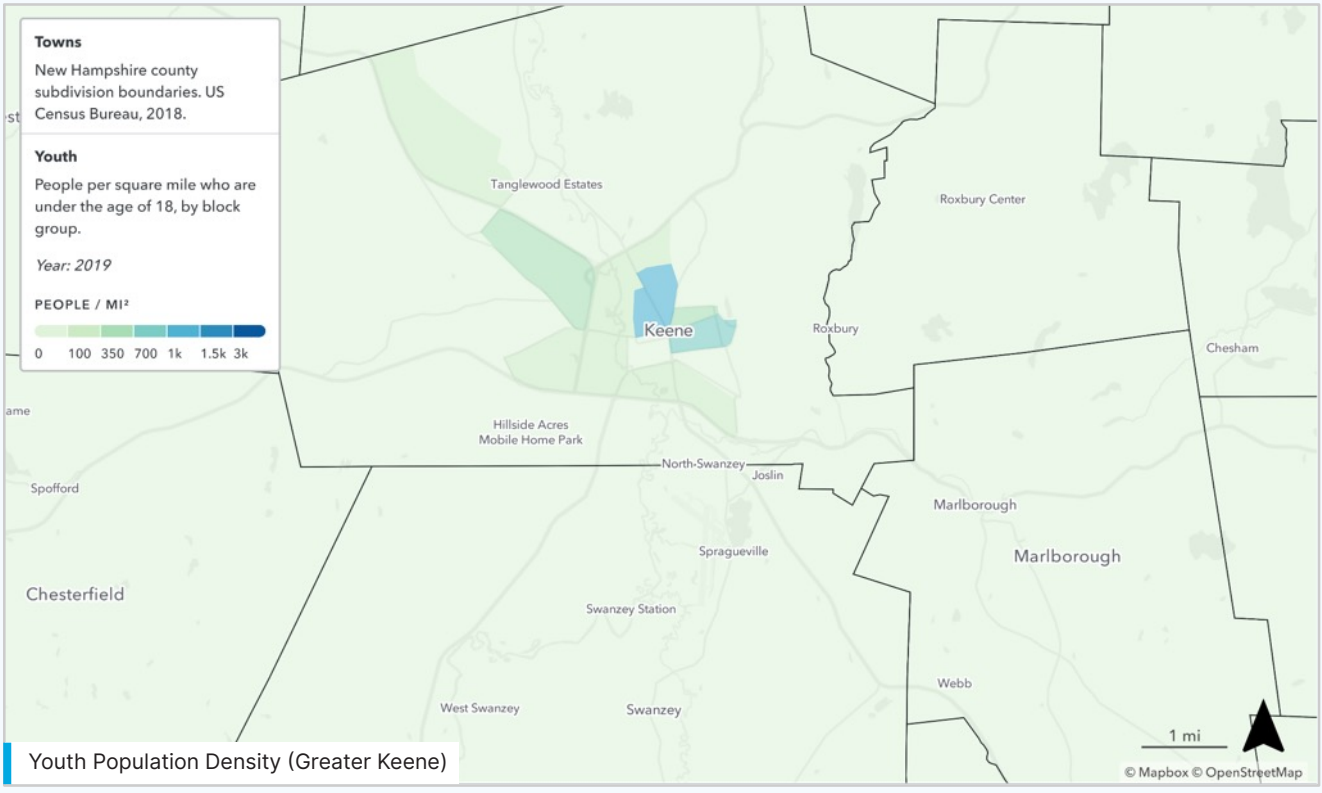
4.2.3 Youth population density

Youth are often frequent users of public transit as many are students and do not have access to a private vehicle or do not yet have a driver's license. The map below shows people under the age of 18, although college and university students are also often significant public transit users even though they are mostly over the age of 18.

Youth make up 18% of the region's population. While the highest densities of youth are located in Keene, they make up only 14% of the urban cluster population and 15% of the City of Keene population, which is lower than the New Hampshire state average (19%) and USA average (22.5%).[10]

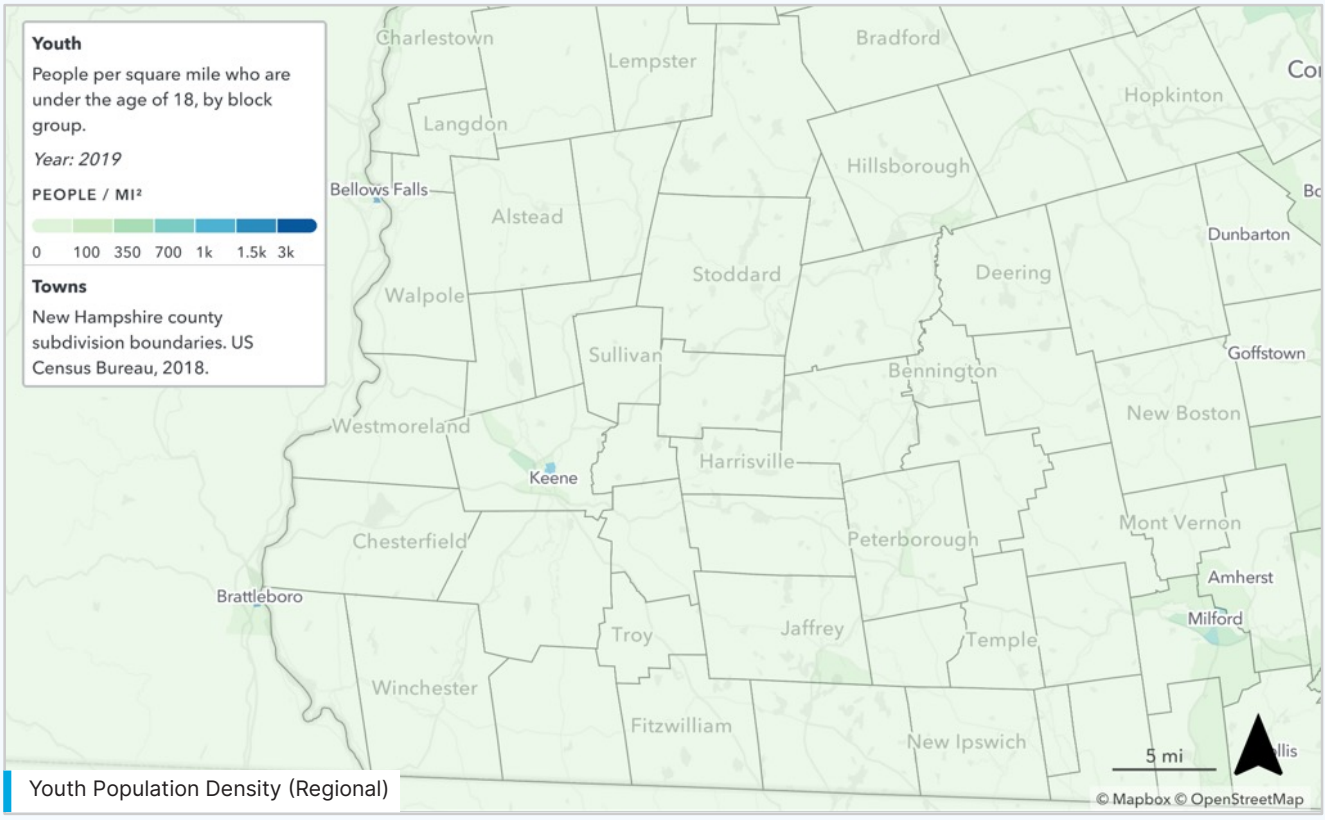
Major travel destinations for youth and young adults include:

- Keene High School, which serves Keene and ten nearby towns
- Keene Middle School
- Keene YMCA
- Downtown Keene
- The Fieldhouse at Homestead Mills in West Swanzey



Youth Population Density (Greater Keene)

[10] Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B01001, Census Tract.



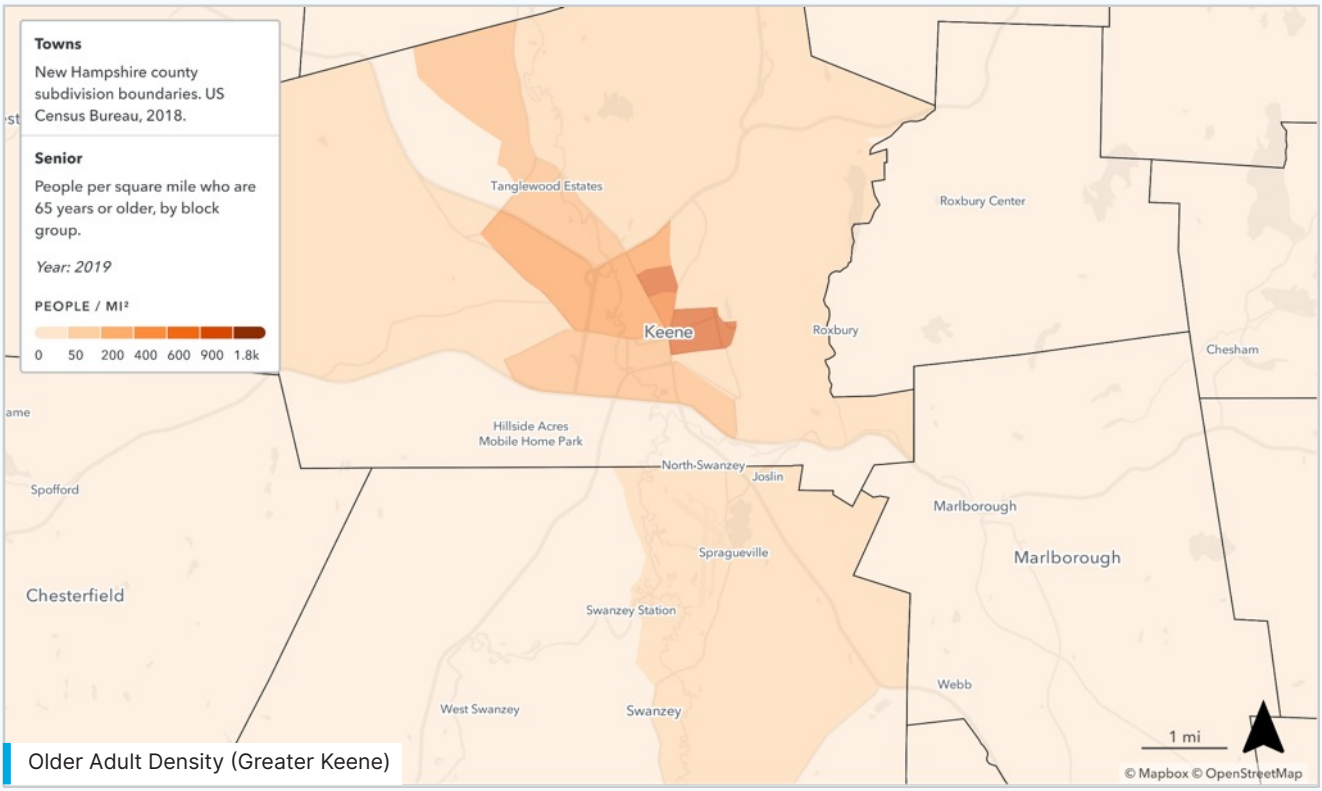
Youth Population Density (Regional)

4.2.4 Older adults

Older adults have a higher tendency to rely on public transit for many reasons, including lower fixed incomes and lower rates of vehicle ownership and usage.

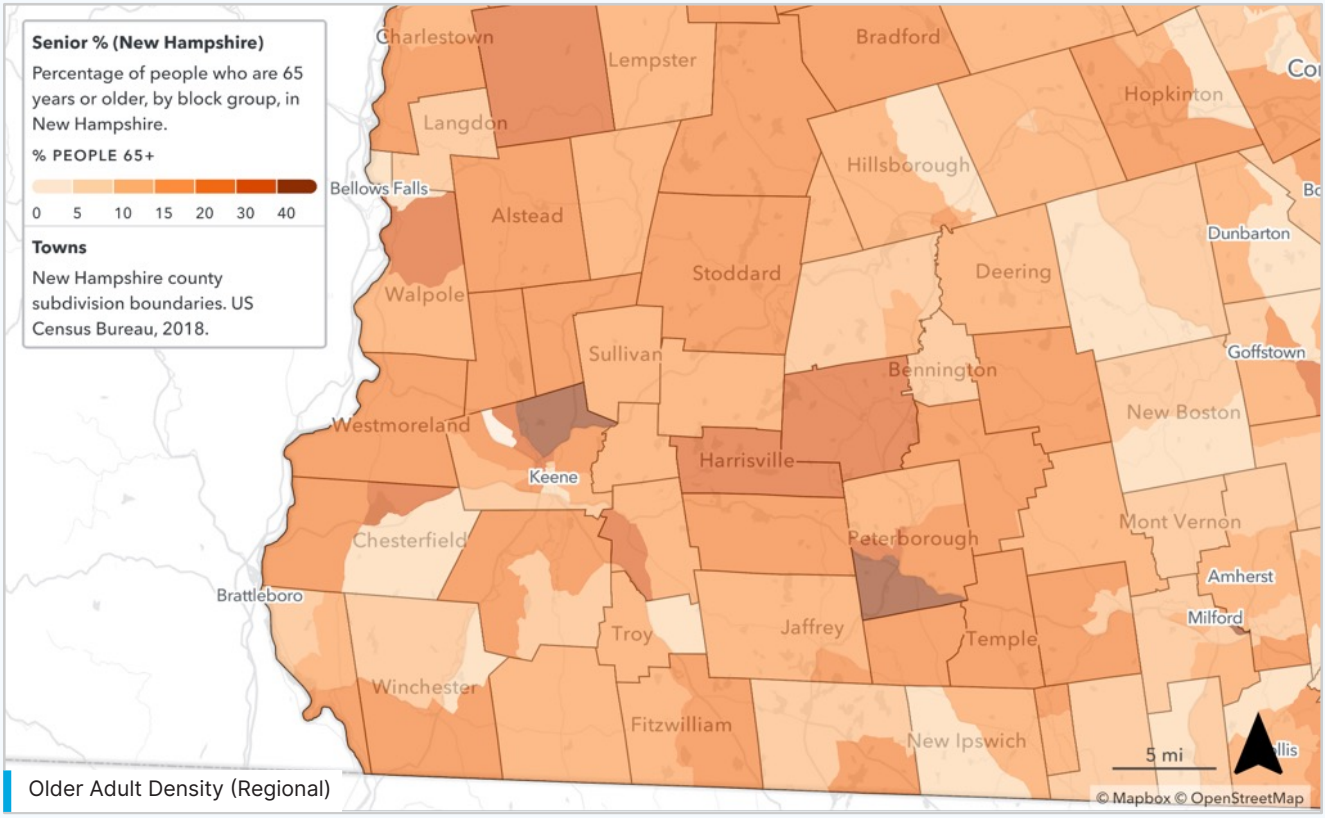
Eighteen percent of Keene's population is over the age of 65, which is similar to the state average of nineteen percent.[11] The urban cluster's senior population is slightly lower at 16%, which is similar to the US national average (16.5%). Seniors make up 20% of Southwest New Hampshire's population.

Keene hosts five assisted living facilities. Some nursing homes and retirement communities provide their residents with private transportation options.



Older Adult Density (Greater Keene)

[11] Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B01001, block group.

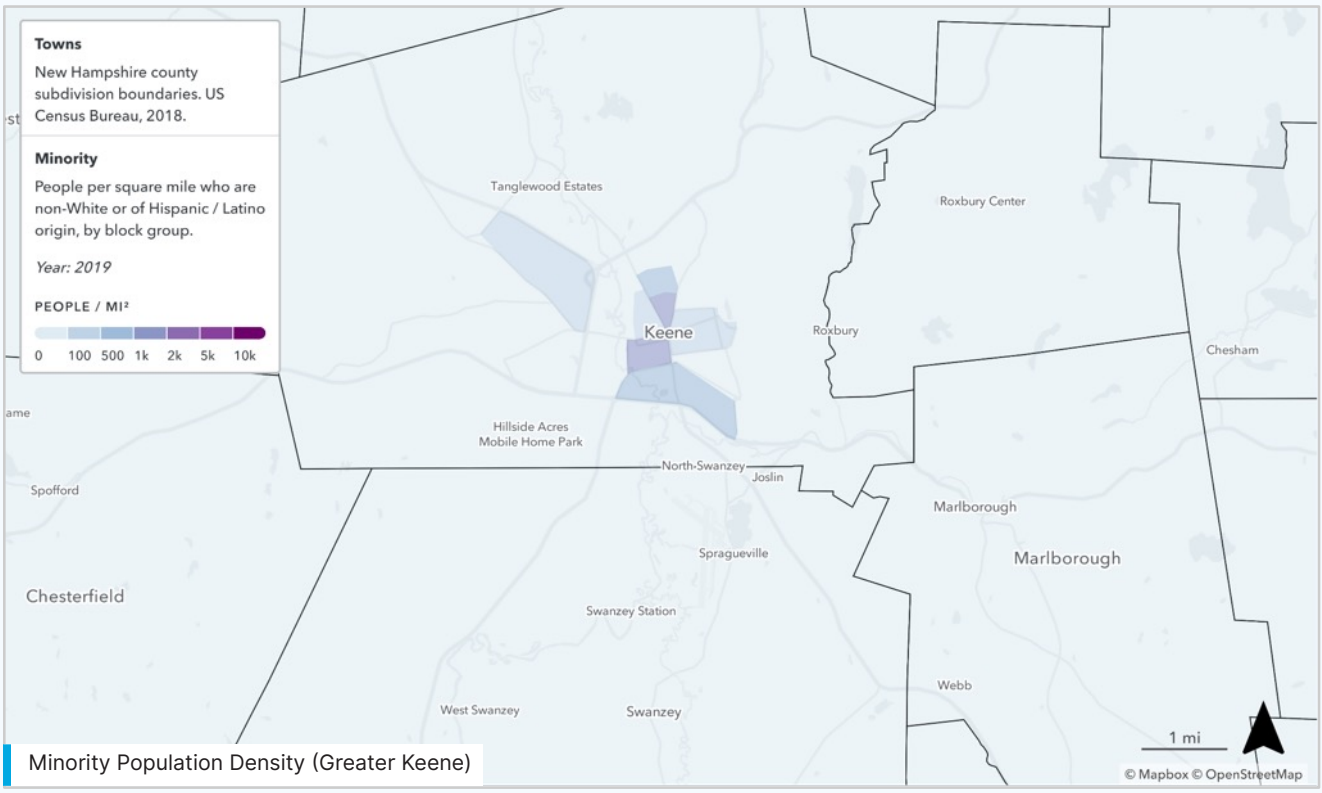


Older Adult Density (Regional)

4.2.5 Minority population

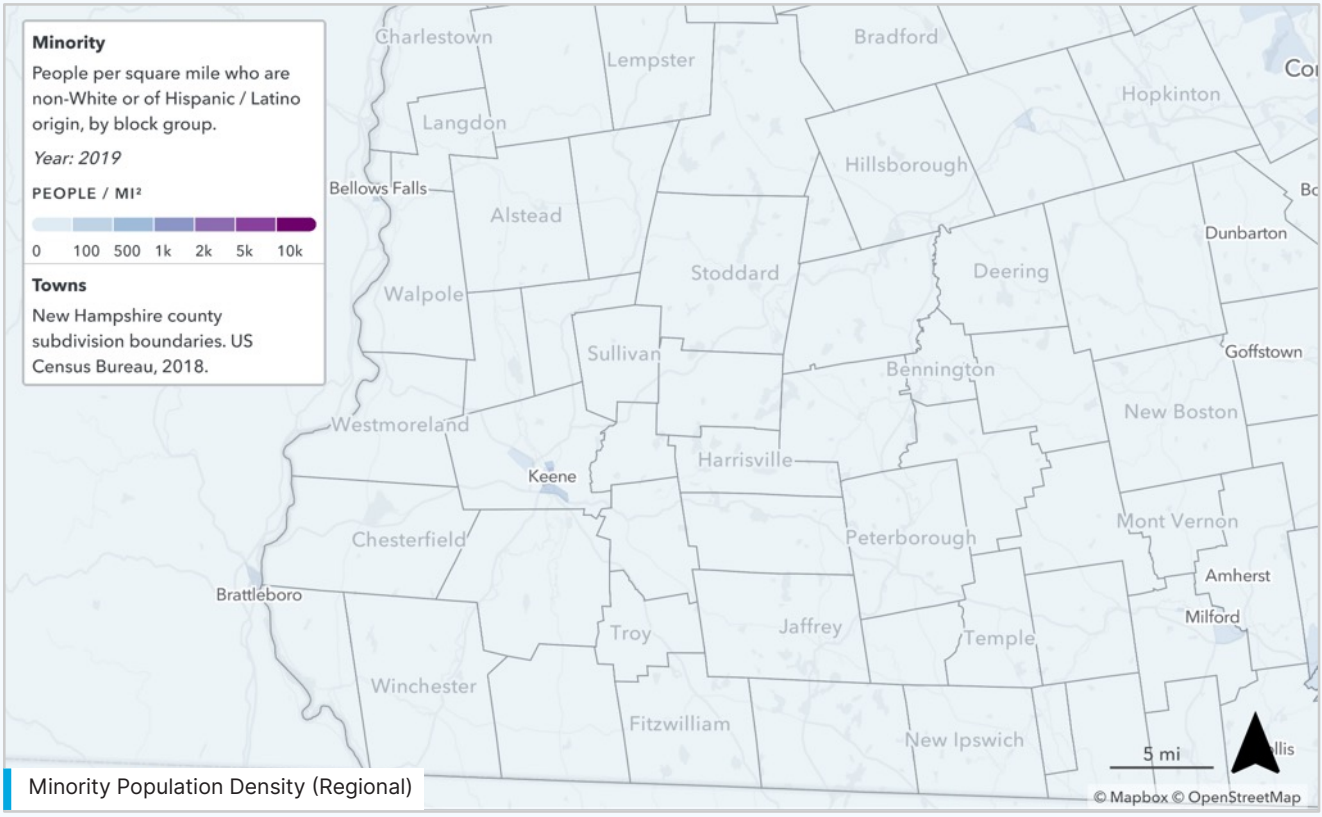
Nonwhite and Hispanic/Latino communities may have a higher tendency to use public transit, with lower incomes and vehicle ownership rates than white residents in most of the US. In some instances, communities of color have historically faced disadvantaged access to public transit.

Eleven percent of Keene's population are non-White or of Hispanic/Latino Origin, while nine percent of the people in the Southwest Region are non-white or of Hispanic/Latino origin. This is similar to the state-wide average (10%), but significantly lower than the US national average (40%).[12]



Minority Population Density (Greater Keene)

[12]Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B03002, block group.



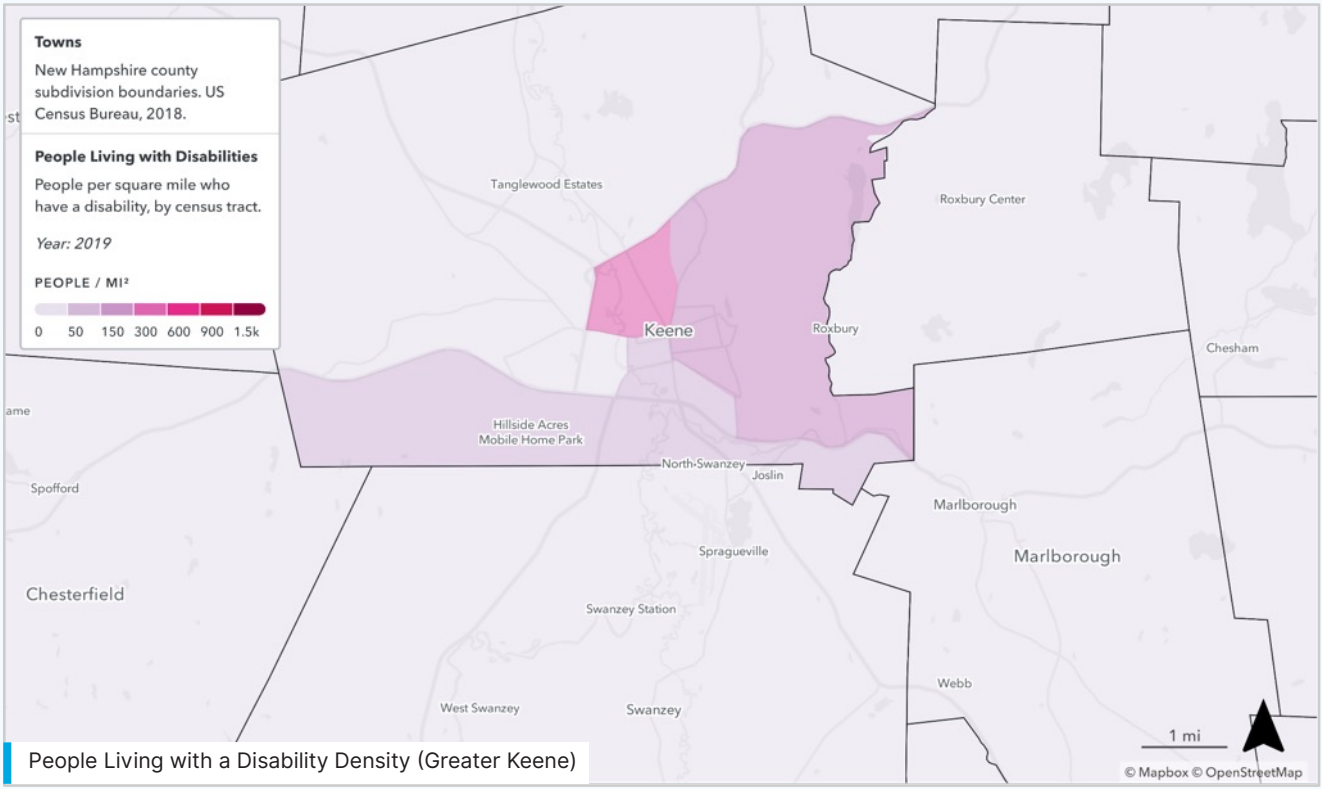
Minority Population Density (Regional)

4.2.6 People living with a disability

Many people with disabilities cannot drive themselves or afford a private vehicle and are more likely to rely on alternative forms of transportation, including public transit. In Keene, people with disabilities have access to the Para Express (ADA-compatible transit available within ¾ of a mile of a fixed-route bus stop). In the rest of the Monadnock Region, Community Volunteer Transportation Company operates a volunteer driver program that supports the transportation needs for people living with disabilities (see Section 4.4.2 Demand Response Review).

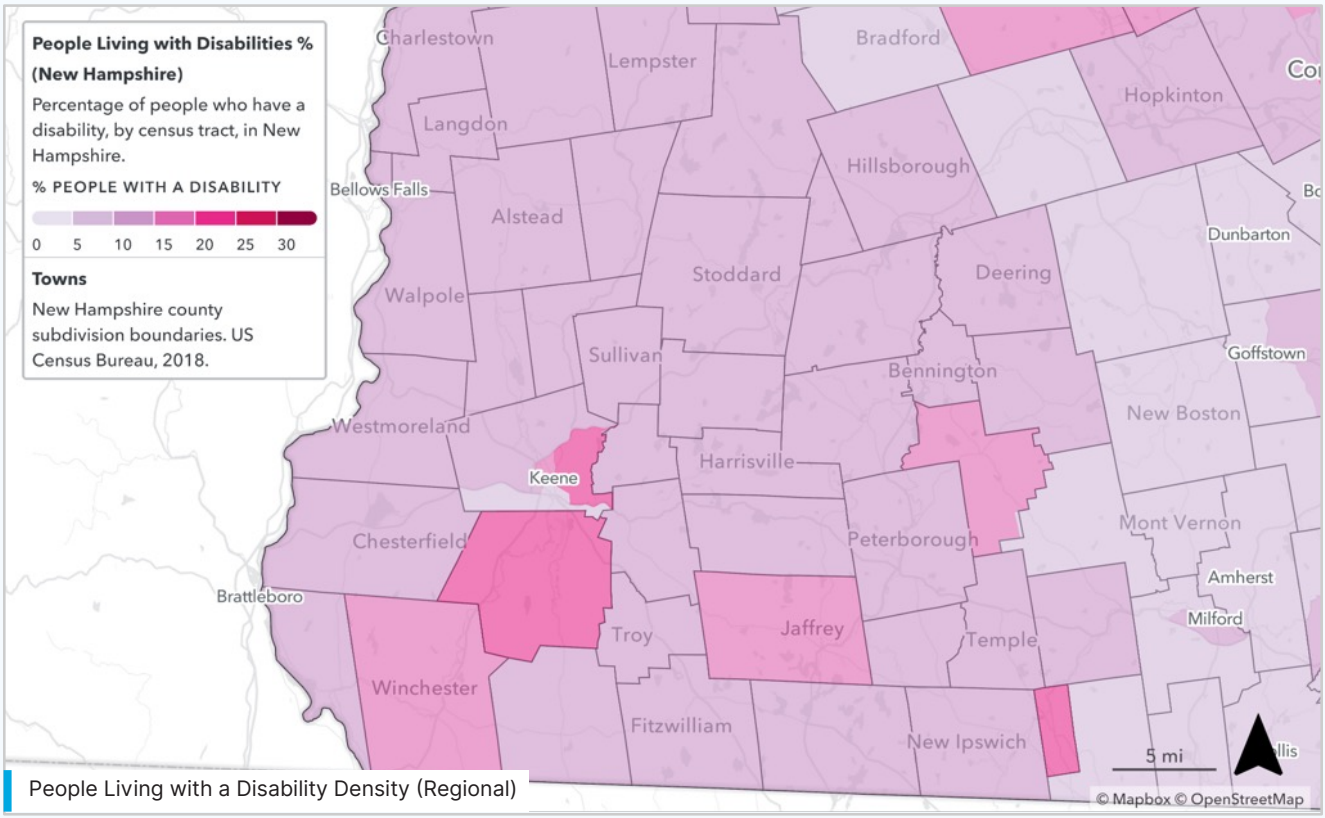
In Keene and Southwest New Hampshire, fourteen percent of people have a disability, significantly higher than the state average (9%) and US national average (9%). Of those, 65% are under the age of 65.[13]

By municipality, there are higher percentages of people living with a disability in Swanzey (21%), Jaffrey (17%), and Winchester (16%) than in the nearby areas. However, these towns are less populated than Keene and represent fewer people living with a disability per municipality.



People Living with a Disability Density (Greater Keene)

[13]Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B18101, Census Tract.

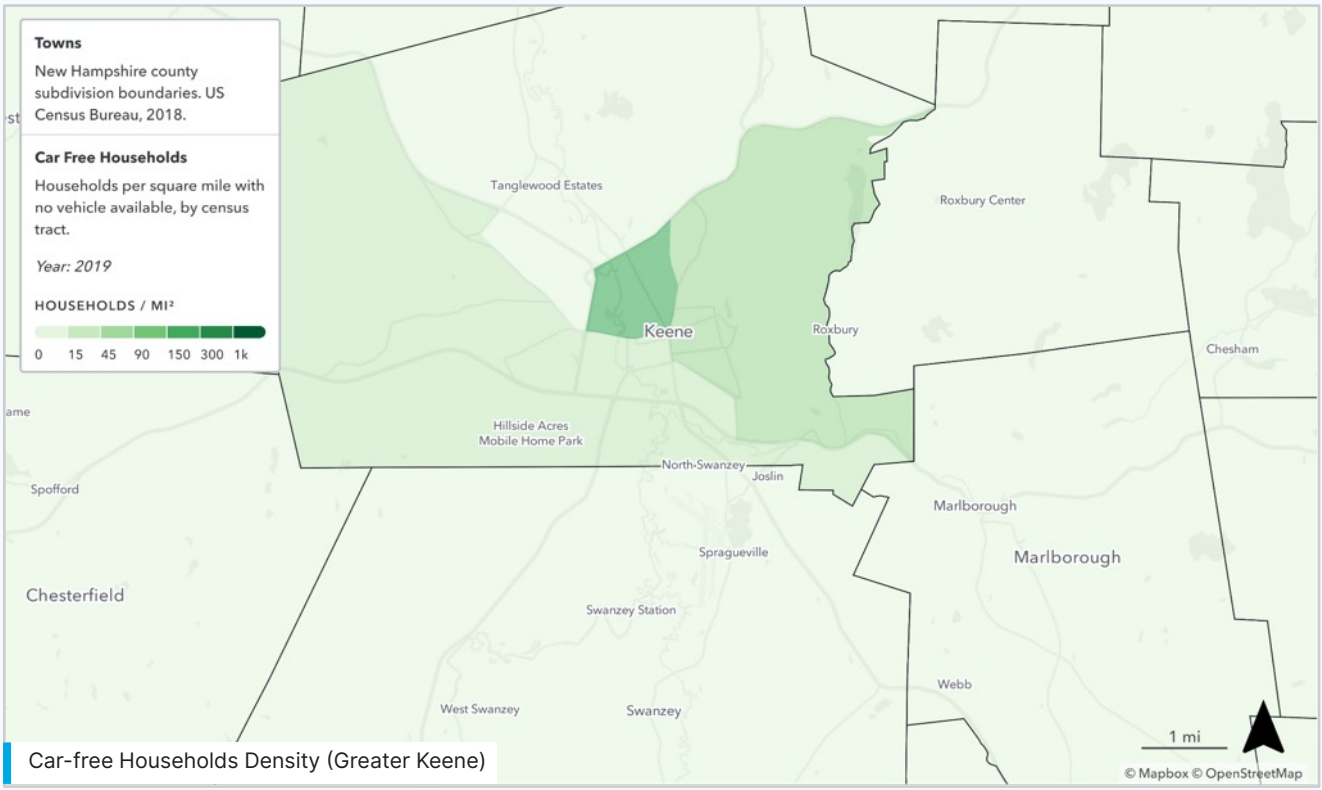


People Living with a Disability Density (Regional)

4.2.7 Car-free households

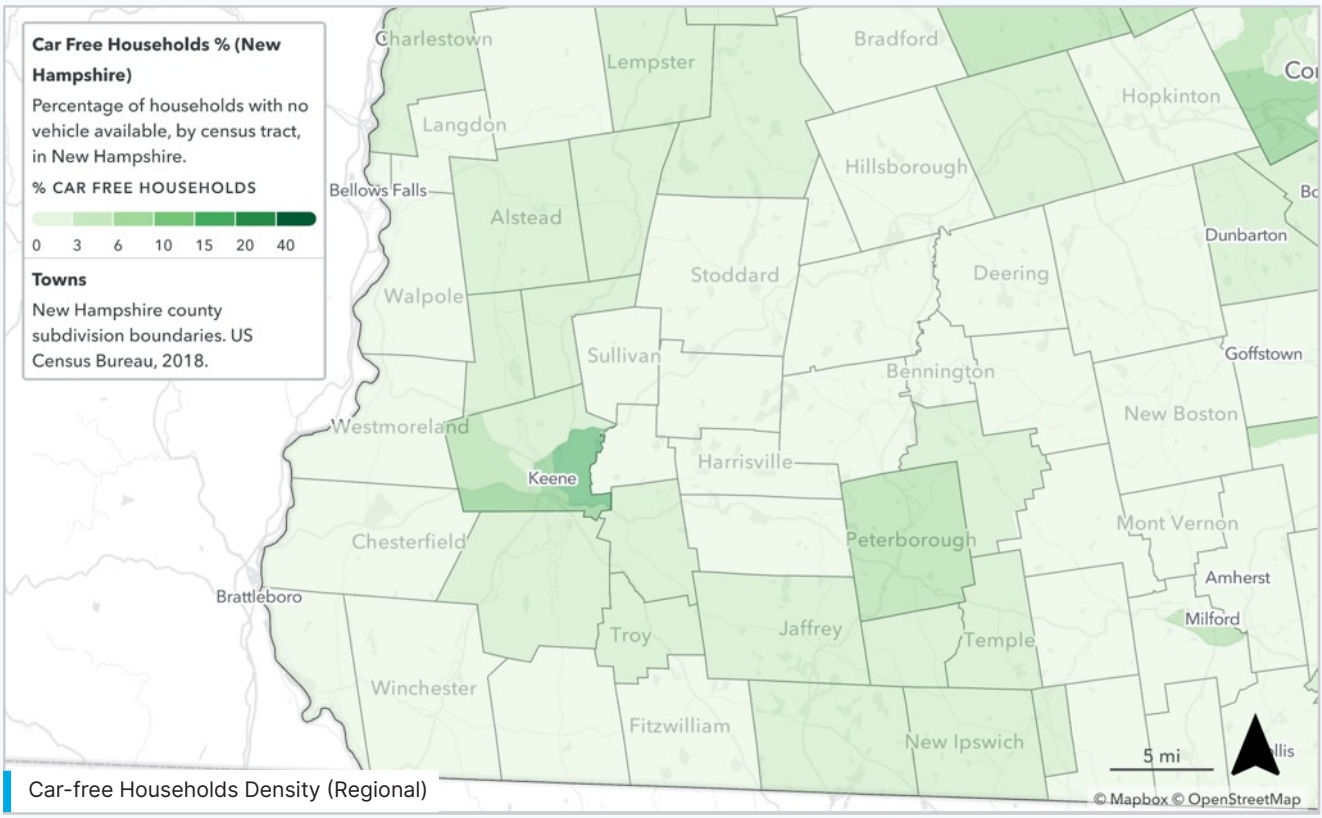
Households without access to a private vehicle often rely on public transit at higher rates than the general public. If public transit is not available, these households may rely on friends/family to drive them or have to take more expensive taxis (Uber and Lyft are largely unavailable in the Monadnock Region due to a lack of drivers). If neither of those options are available, they may be unable to travel at all.

Five percent of the Southwest New Hampshire study area households are car-free. This is roughly the same as the New Hampshire state average (also 5%) but lower than the US national average (9%).[14] The highest densities of car-free households are in Keene (11% of the households are car-free), where more public transit options are available. When comparing the percentage of car-free households by municipality, Peterborough is the only municipality (other than Keene) that is higher than the average at 7.6% of households without access to a personal vehicle.



Car-free Households Density (Greater Keene)

[14] Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table B08201, Census Tract.

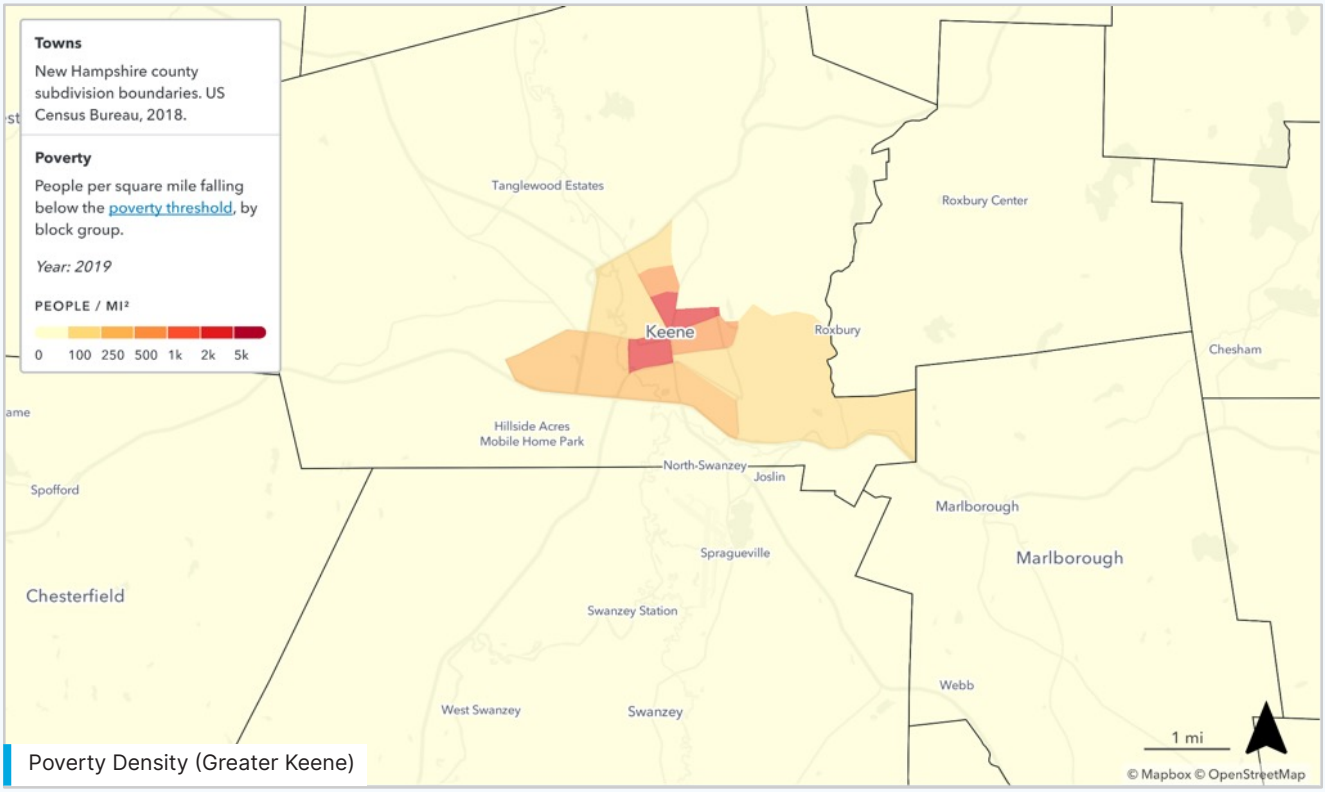


Car-free Households Density (Regional)

4.2.8 Poverty

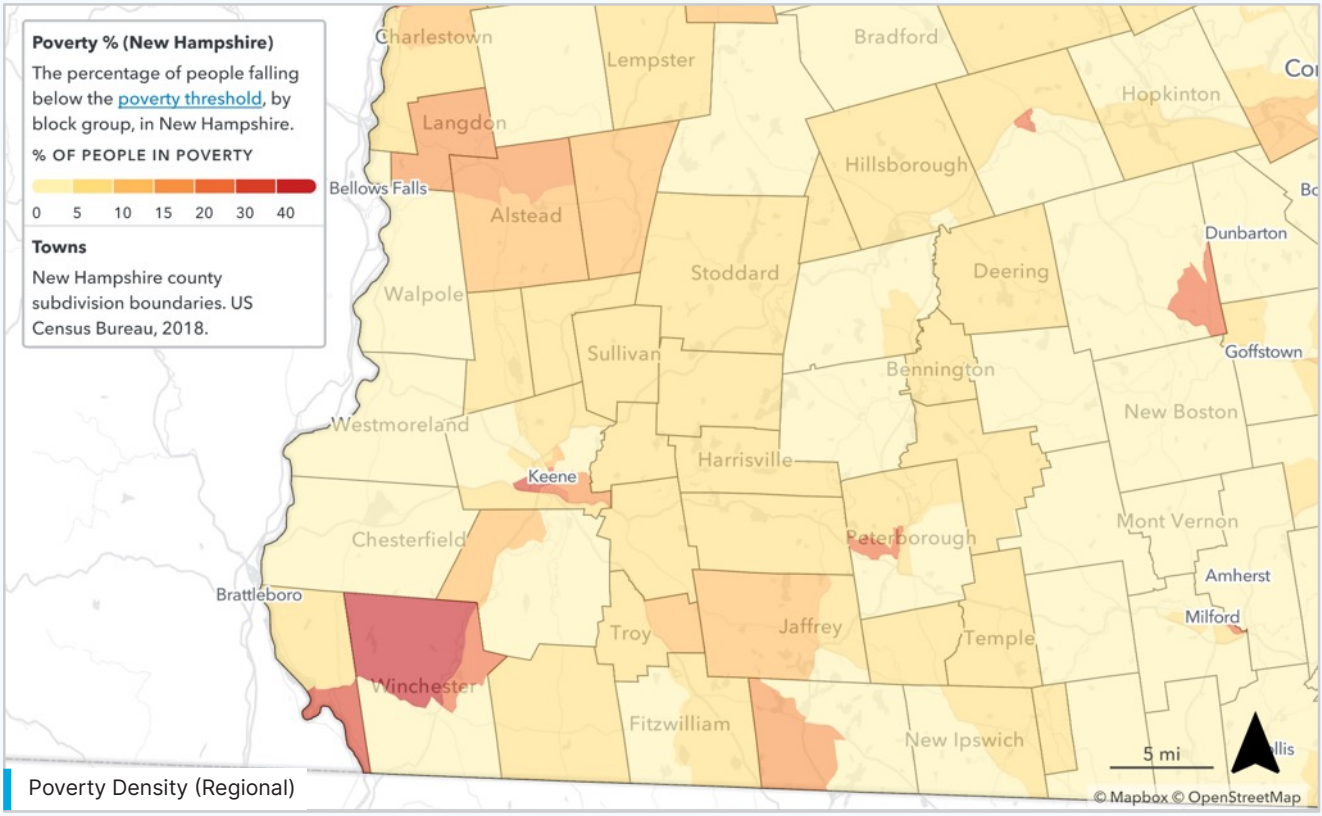
Individuals with income levels below the poverty threshold are more likely to use public transit as represents are more affordable option. The cost of vehicle ownership and operation can constitute a significant portion of a household's budget.

Thirteen percent of Keene's population falls below the poverty line, which is lower than the 16% observed in the larger urban cluster population. Only 8% of the Southwest New Hampshire population falls below the poverty line which is 5% lower than the proportion of people in poverty in the City of Keene and similar to the New Hampshire state average of 8%. The national average is higher at 11.5%. In addition to Keene, there are higher rates of poverty in northern Winchester and Peterborough.[15]



Poverty Density (Greater Keene)

[15]Source: U.S. Census Bureau; American Community Survey 2019 5-Year Estimates, Table C17002, Block Group.



Poverty Density (Regional)

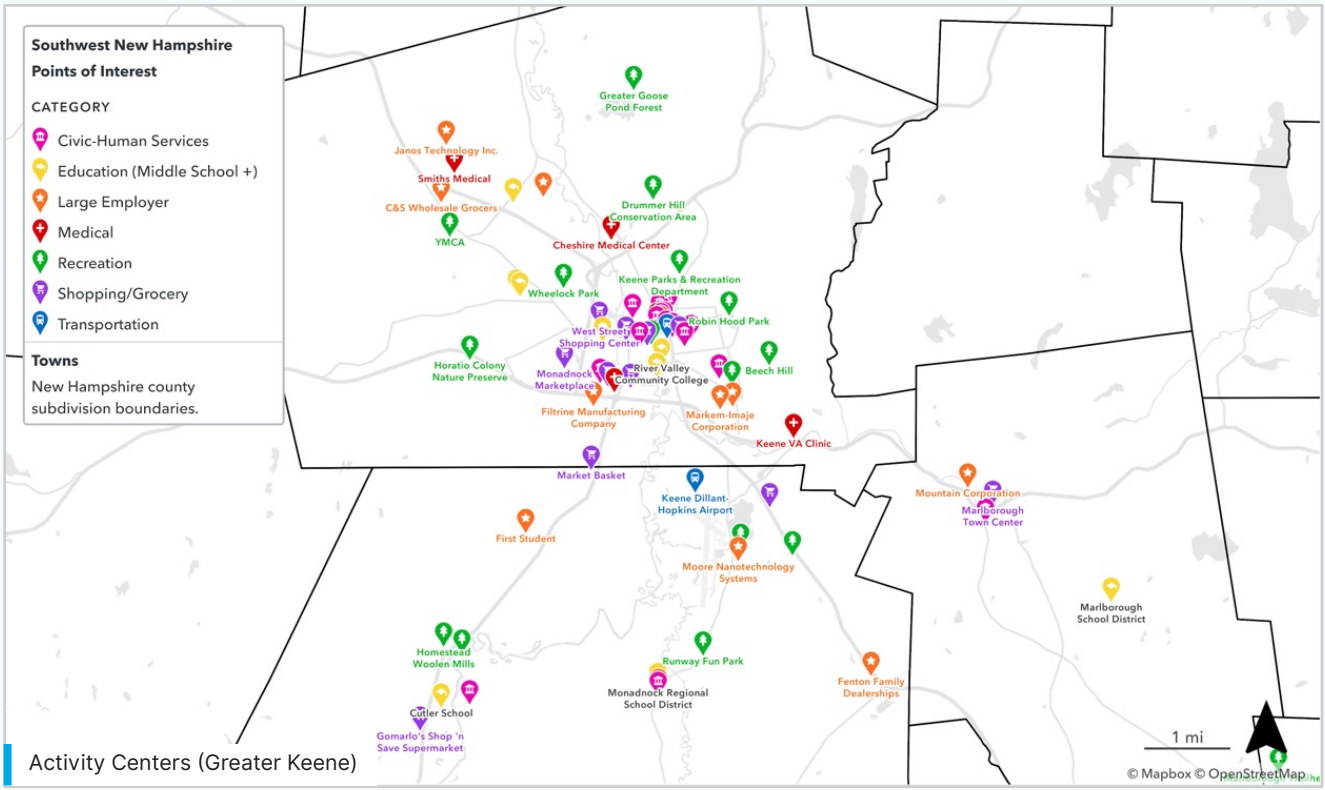
4.3 Points of interest and travel generators

4.3.1 Activity centers

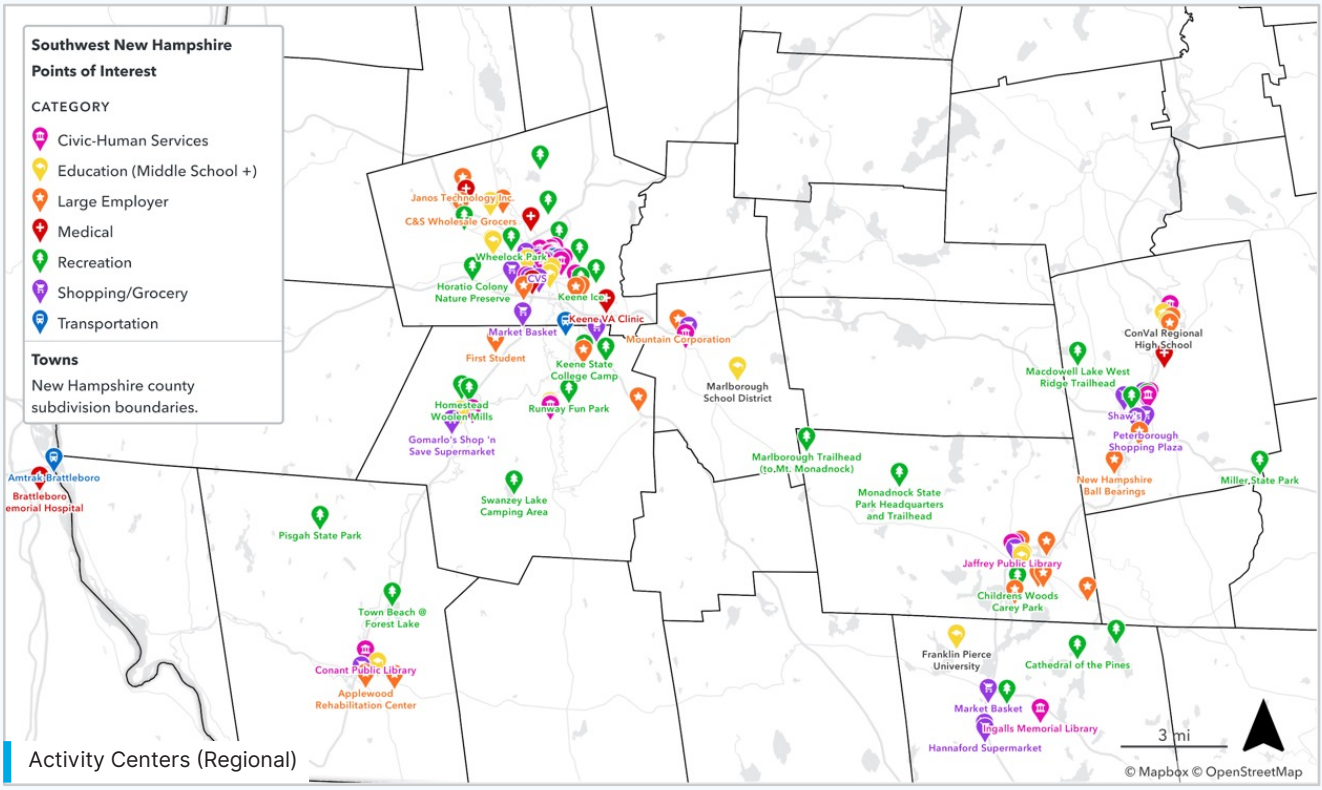
The map below identifies some common destinations people may want to using with public transit throughout the Greater Keene area (first map) and Southwest New Hampshire (second map). The maps include destinations such as:

- Shopping centers and grocery stores
- Schools
- Hospitals
- Major employers
- Human service locations
- Recreation (indoor and outdoor)

The first map shows many activity centers spread throughout Keene, Swanzey, and Marlborough, with the majority of facilities in downtown Keene. The second map highlights other key destinations, focusing on Peterborough, Jaffrey, Rindge, and Winchester.



Activity Centers (Greater Keene)



Activity Centers (Regional)

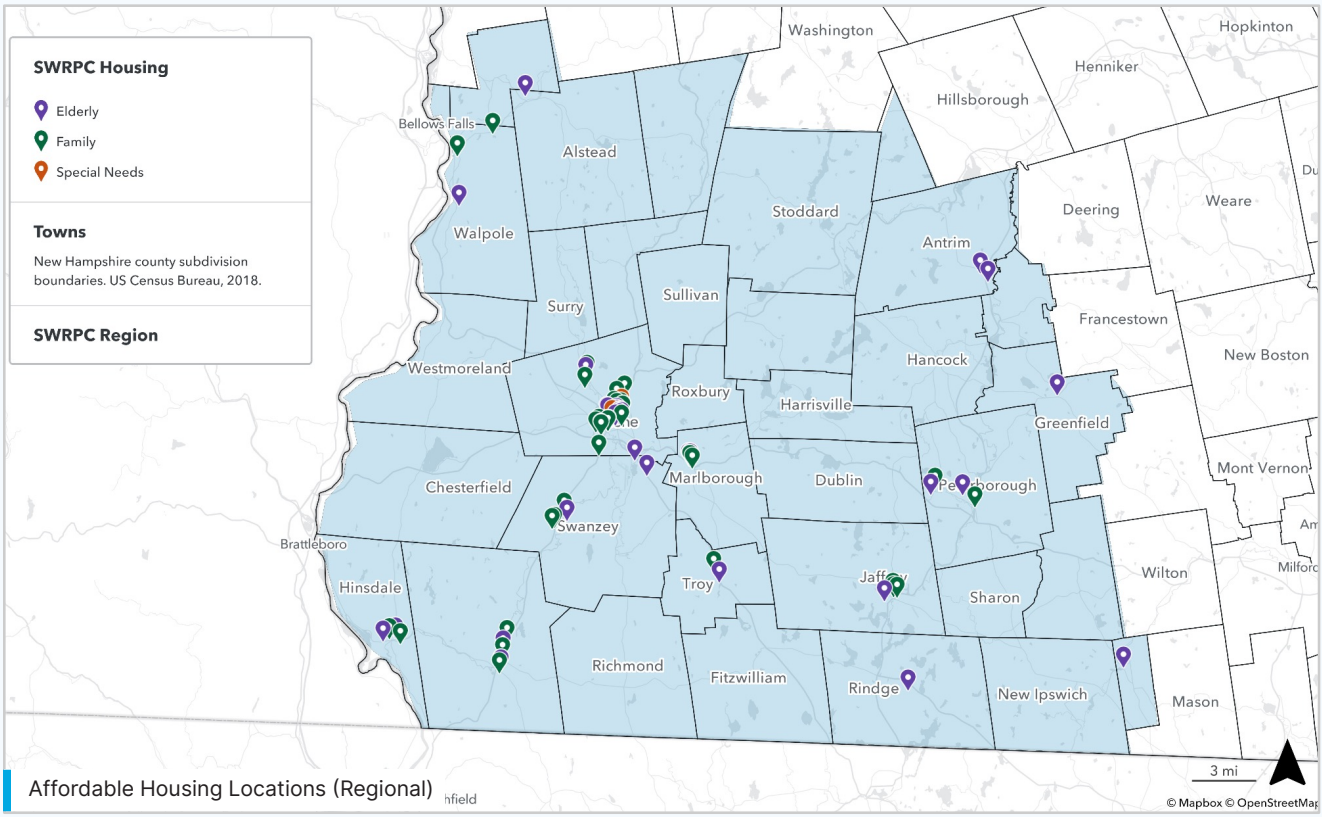
4.3.2 Housing affordability

Those living in affordable housing often have limited income to spend on transportation and may rely on public transit for daily commutes, shopping, and recreation. In general, there is often a mismatch between where affordable market-rate housing is located and where employment opportunities are available. This mismatch can result in lengthy and expensive commutes for those who need public transit access the most.

In total, there are 70 affordable housing properties displayed on the map that include the following units:[16]

- Elderly: 1,107
- Family: 733
- Special Needs: 22

Of these units, 97% are rent assisted, meaning the tenants do not pay market rates. 70% are income based, meaning that tenants have to fall below a certain income level to qualify for the subsidized units.



Affordable Housing Locations (Regional)

[16]Source: SWRPC Elderly, Family, and Special Needs Housing Database.

4.4 Analysis of Existing Public Transportation

Across the region, three primary forms of public transit are available: fixed-route buses, public demand-responsive services, and volunteer transportation services. The first two are operated by Home Healthcare Hospice & Community Services (HCS) and include fixed routes and demand-response services. There are two fixed routes, a red and black route which circulate in opposite directions around Keene's downtown area. The demand-response services include the Para Express (ADA paratransit services) and the Friendly Bus, which provides transit for those over 60. HCS also offers a shopping shuttle service to the Keene Market Basket on Tuesdays. HCS services are all within the Keene city boundary except for the shopping shuttle and transport to a medical center in Lebanon four times per month. In addition to HCS' services, Community Volunteer Transportation Company (CVTC) coordinates volunteer driver trips for the entire Monadnock Region. Southeast Vermont Transit Authority, also known as MOOver, operates a bus connecting parts of Hinsdale, New Hampshire with Brattleboro, Vermont. In addition, MOOver operates a bus connecting Walpole with Rockingham, Vermont.

Before the COVID-19 pandemic, HCS operated the Keene State College community shuttle that connected faculty, students, and staff between the college campus and various shopping locations, including Riverside Plaza and the Market Basket. The service was subsidized in part by the College. The campus shuttle has not operated since 2020. While Keene State College offers no transportation services as of Spring 2022 to ensure late-night safety, they offer escorts for students by request.

The analysis that follows outlines the trends and patterns of ridership and efficiency for these services. Across all HCS services, ridership has declined in the last fifteen years. Before the pandemic, in 2019, there were about 42,000 unlinked trips across all services. About 30,000 of those were on the fixed-routes, including trips on a Keene State College shuttle, which has since been discontinued. Moreover, the fixed-routes are relatively inefficient, with the red route completing 5.5 boardings per revenue hour and the black route with 2.6 passengers per vehicle hour.[17] Ridership on the fixed-routes may also be low because each route only operates once an hour, and the bus route's alignment can yield some long journey times.

The Para Express serves about 70 trips per month, which are relatively short trips (13 minutes). The Friendly Bus completes 300 trips per month, and these trips are, on average, slightly longer (19 minutes). The popularity of the shopping shuttle highlights Market Basket as a key travel destination. Popular travel destinations for the Friendly Bus and Para Express include the Cheshire Medical Center and shopping plazas.

[17] Based on monthly ridership from July 2021 to February 2022.

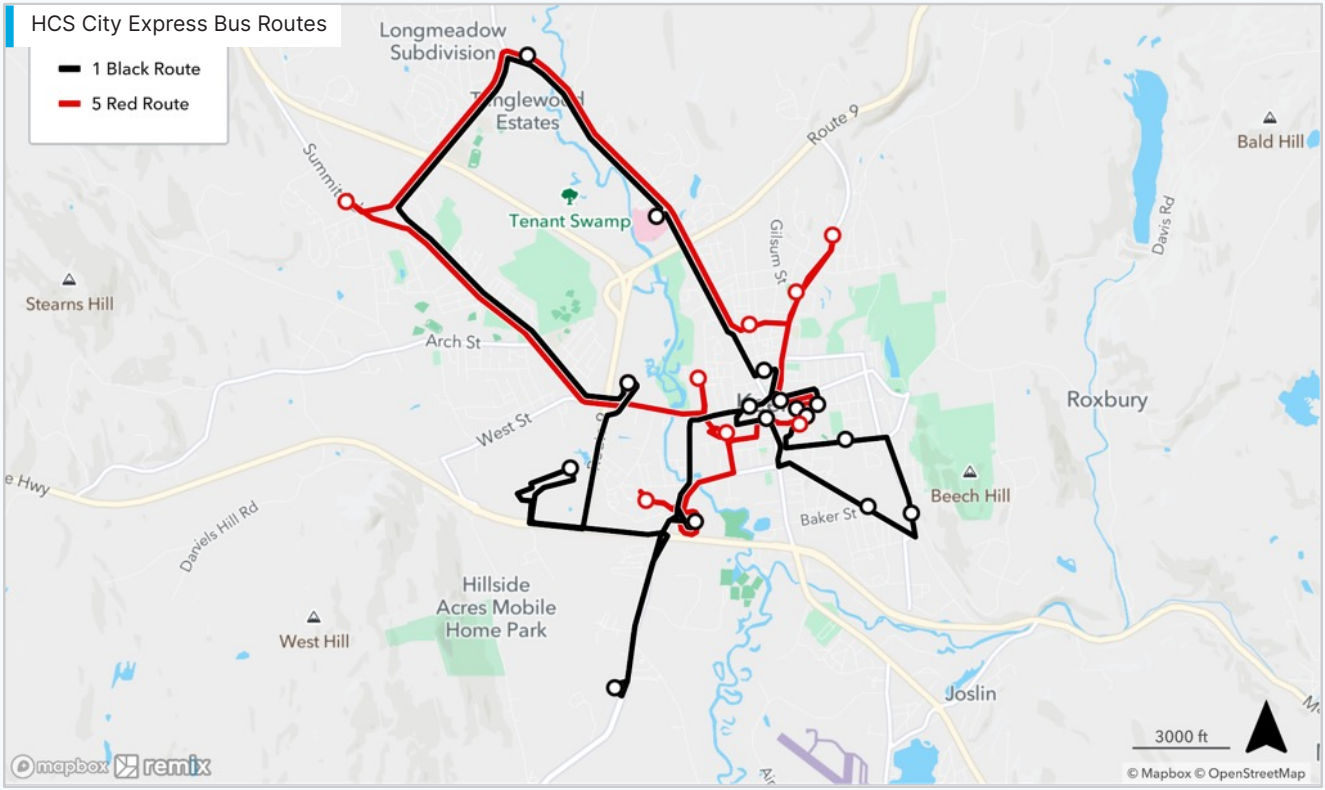
4.4.1 Fixed-Route Review

City Express currently has two circulator routes that run once per hour in opposite directions. The red route (Bus #5) operates counter-clockwise on the hour from 8:00 AM to 4:00 PM. The Black Route (Bus #1) runs clockwise from 8:30 AM to 4:30 PM, also once per hour. Both routes operate only on weekdays and complete eight trips per day.

The routes make slightly different route deviations. The Red Route stops at Upper Washington St., the YMCA, and Autumn Leaf Village. The Black Route deviates to Market Basket, Monadnock Market Place, HCS, Eastern Ave., and the Water St. stops.

HCS City Express Buses

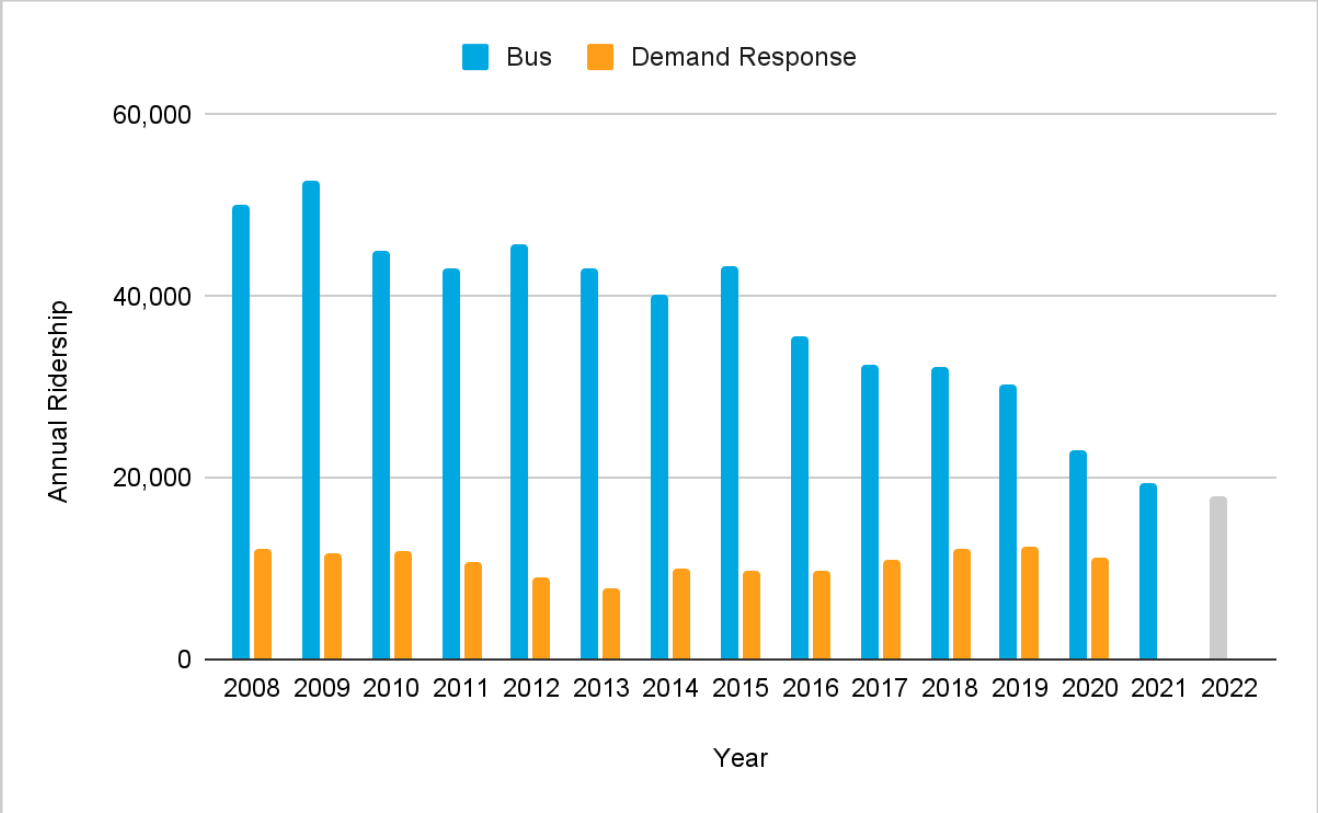
HCS City Express Bus Routes



Long-term ridership trends

City Express ridership peaked in 2009 at over 50,000 annual unlinked passenger trips and has steadily declined since then. This peak included HCS' campus shuttle bus that was offered to Keene State College students, faculty and staff, a service that is no longer provided. Friendly Bus and Para Express ridership is captured by the demand response category and has remained roughly steady over the past 15 years.[18]

Figure 1: Annual ridership for HCS transportation services.

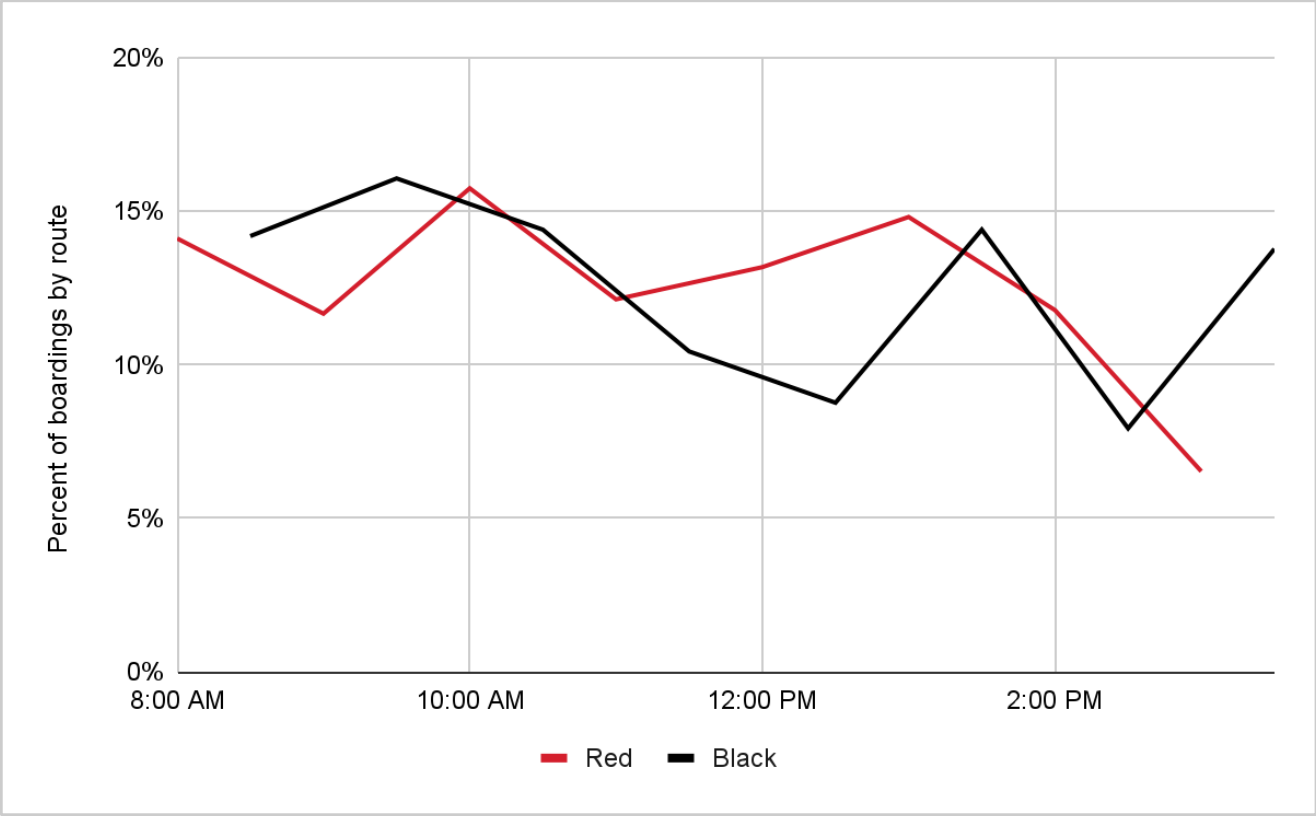


[18] Federal Transit Administration. National Transit Database, 2020 Time Series.

Hourly travel patterns

Hourly boarding data indicates that the service is used for general trips throughout the day, rather than commuting during traditional business hours, where we would expect to see a morning and evening peak. Both routes have slight peaks in the mid-morning between 9 AM and 10 AM. There is also a minor afternoon peak on both routes around 1 PM.

Figure 2: Percent of boardings by time of day and route (Feb. 2022).

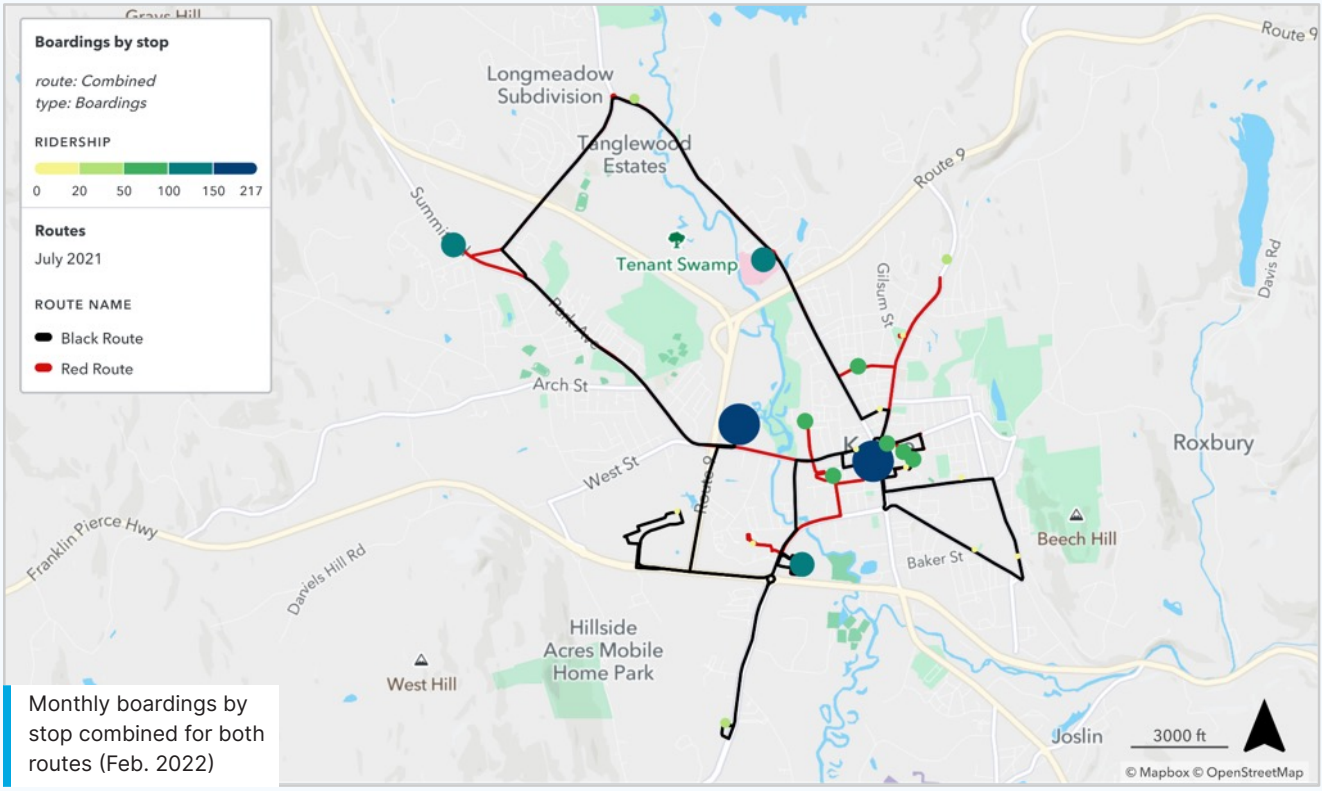


Stop-level travel patterns

The first map below shows boardings by bus stop.[19] Larger circles shown in darker colors indicate stops with relatively high ridership. The most popular stops by boardings include:

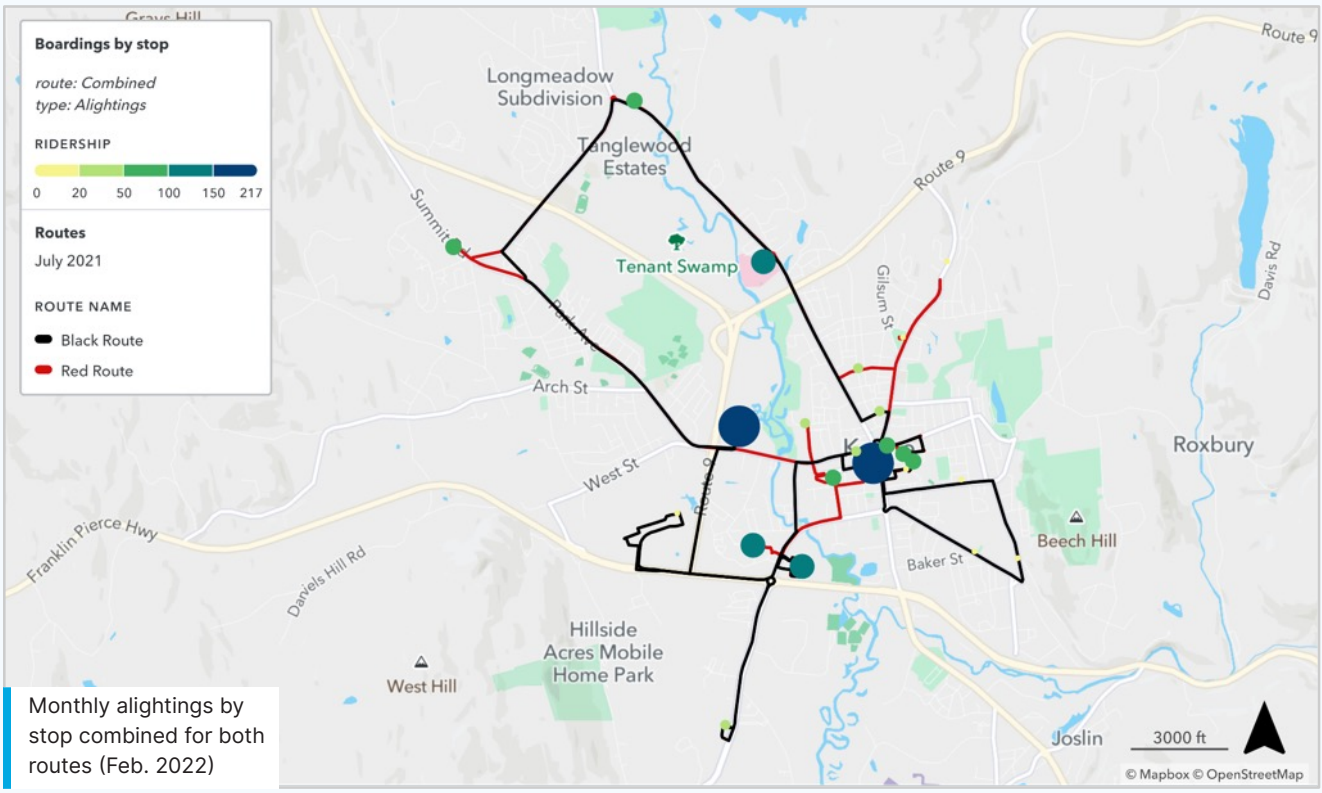
- Transportation Center
- West St. Plaza
- Riverside Plaza
- YMCA
- Cheshire Medical Center

The pattern of alightings (second map below) is quite similar to the boardings except slightly more alightings at Autumn Leaf Village and slightly less alightings at the YMCA.



Monthly boardings by stop combined for both routes (Feb. 2022)

[19]Stop level ridership is an approximation to the nearest demarcated stop. Some passengers board and alight between official stops.



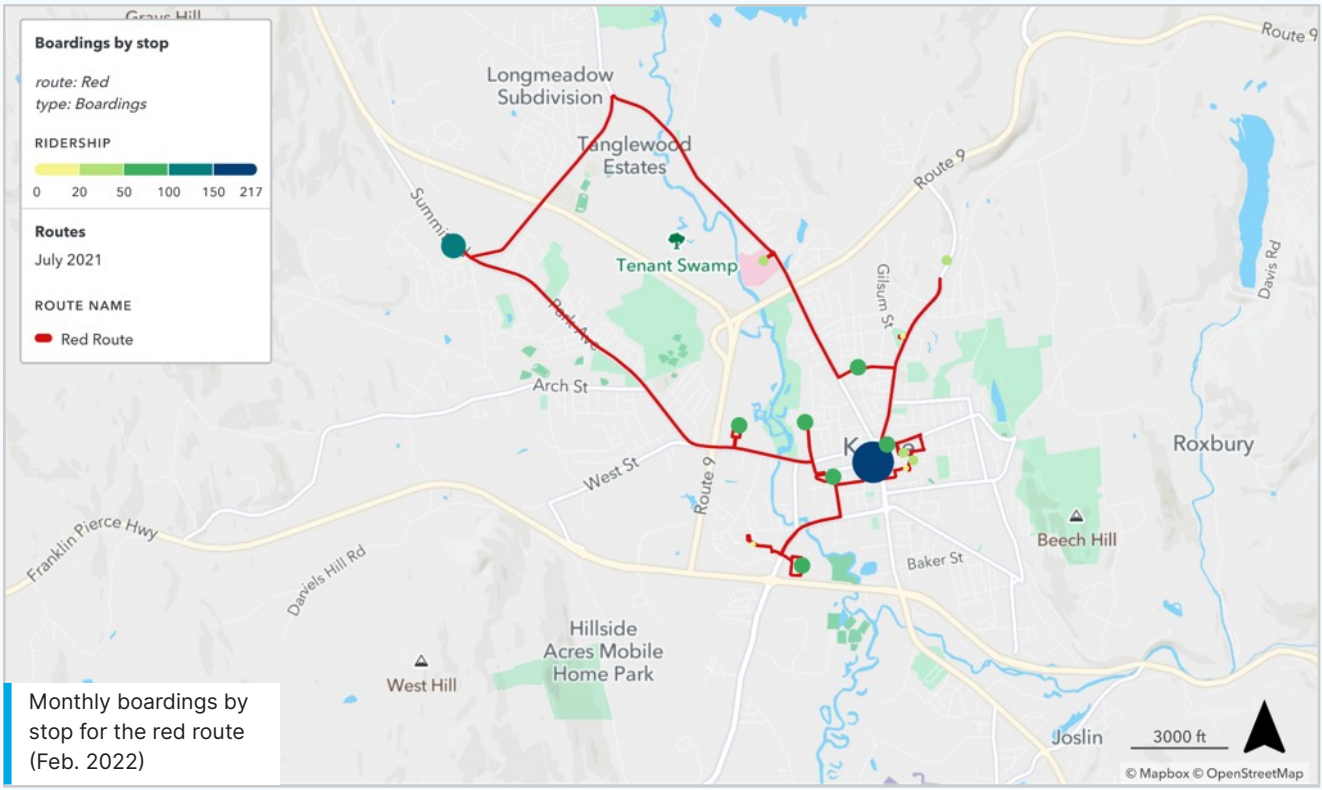
Monthly alightings by stop combined for both routes (Feb. 2022)

Red Route profile

The City Express Red Route operates along the alignment shown on the map below. This route has higher ridership and productivity than the City Express Black Route. The most popular stops by boardings are the Transportation Center and the YMCA. By alightings, the most common stops are the Transportation Center, Cheshire Medical Center, Autumn Leaf Village, and West S.. Plaza.[20]

Metric	Value
Span of Service	Monday - Friday 8:00 AM - 4:00 PM
Frequency	Every 60 minutes (counter-clockwise)
Average monthly boardings[20]	970
Monthly vehicle hours	175
Average productivity	5.5 passengers per vehicle hour
Population (within half mile)	14,100
Jobs (within half mile)	9,800

[20]Based on monthly ridership from July 2021 to February 2022.



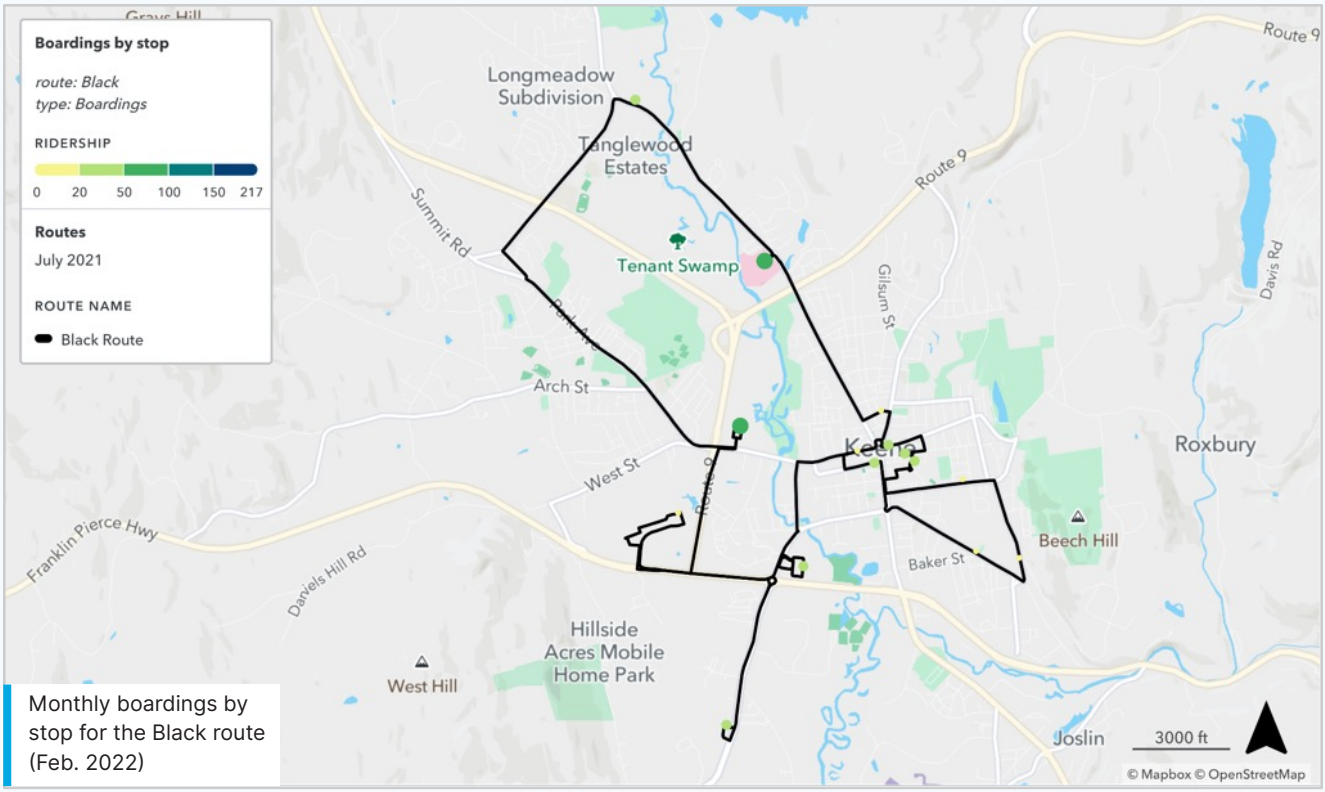
Monthly boardings by stop for the red route (Feb. 2022)

Black Route profile

The City Express Black Route operates along the alignment shown on the map below. While it provides access to a similar number of residents as the City Express Red Route, it is within a half mile of more jobs. The most popular stops by boardings are Cheshire Medical Center and West St. Plaza. By alightings, the most popular stops are at Stone Arch Senior Housing and West St. Plaza.[21]

Metric	Value
Span of Service	Monday - Friday 8:30 AM - 4:30 PM
Frequency	Every 60 minutes (clockwise)
Average monthly boardings[21]	530
Monthly vehicle hours	200
Average productivity	2.6 passengers per vehicle hour
Population (within half mile)	13,200
Jobs (within half mile)	11,500

[21] Based on monthly ridership from July 2021 to February 2022.



Monthly boardings by stop for the Black route (Feb. 2022)

4.4.2 Demand-Response Review

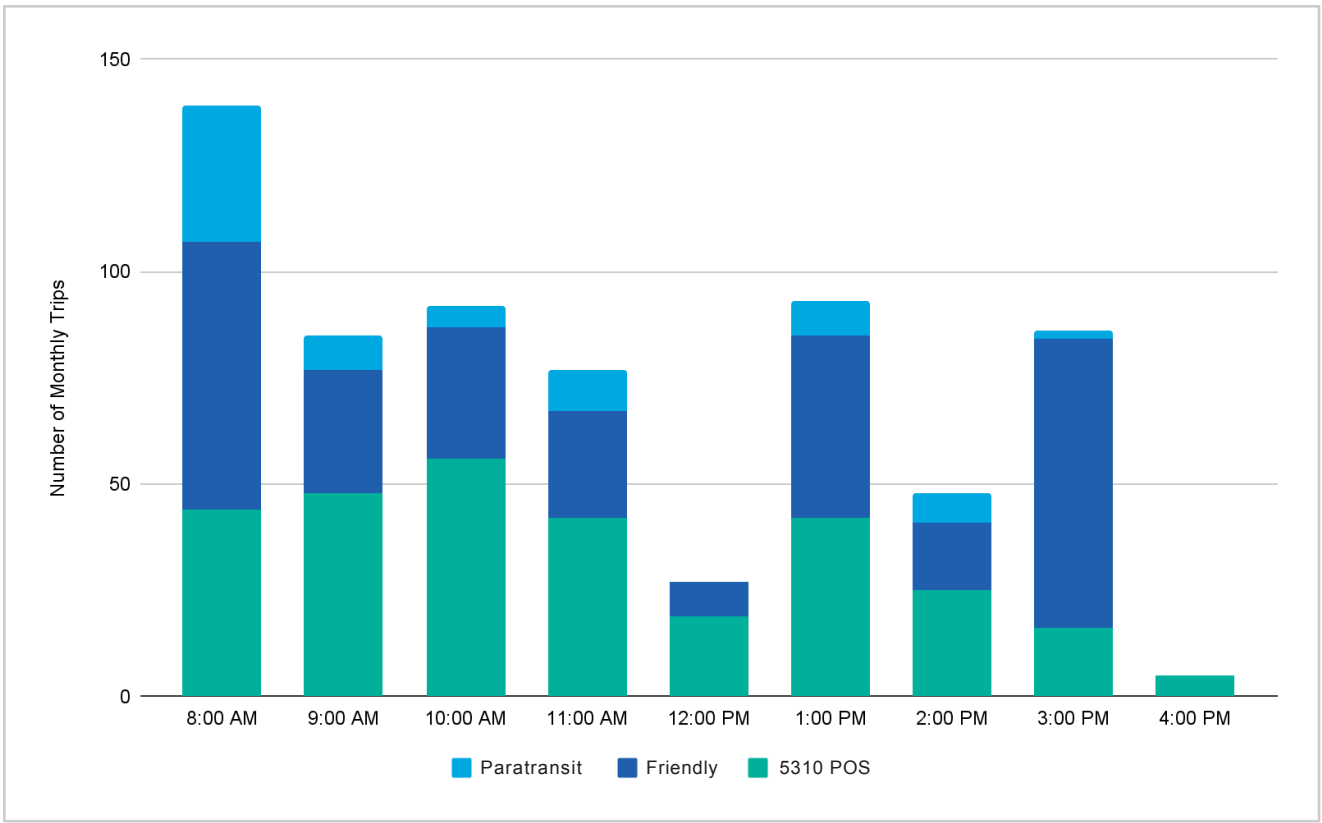
HCS also operates the Para Express and Friendly Bus demand-response services in the City of Keene. While combining operations and sharing vehicles, drivers, and dispatching processes, the services are split by funding and eligibility. The Para Express is an ADA accessible paratransit that is available within ¾ of a mile from fixed routes. The Friendly Bus provides shared rides for people over the age of 60 for medical appointments, grocery trips or "Friendly Meals". HCS also coordinates trips to their facilities for adult day care programs as well as non-emergency medical transportation (NEMT) trips funded through Medicaid.

Between January and April 2022, HCS averaged about 550 passenger trips per month (28 passenger trips per day) across all programs. More than half of these trips are Friendly Bus trips, about a third are funded through the Federal Transit Administration's Section 5310 program for seniors and people with disabilities, and another 13% are paratransit trips. Across all programs, about 8% of riders use wheelchairs.

Hourly travel patterns

Requests by the time of day also vary between programs. The Para Express has the fewest trips, peaks in the early morning at 8 AM, and has no rides between 11 AM and 1 PM. Both the Section 5310 Purchase of Service (POS) funded trips and the Friendly Bus had fluctuations throughout the day with no clear patterns. Section 5310 POS funded trips had the most requests at 10 AM and 1 PM. Friendly Bus trips peaked in the mornings at 8 AM and in the afternoons at 5 PM. When looking at all three programs, there are the most trips in the morning at 8 AM and the fewest trips around noon.[22]

Figure 3: Monthly trips by type and time of day



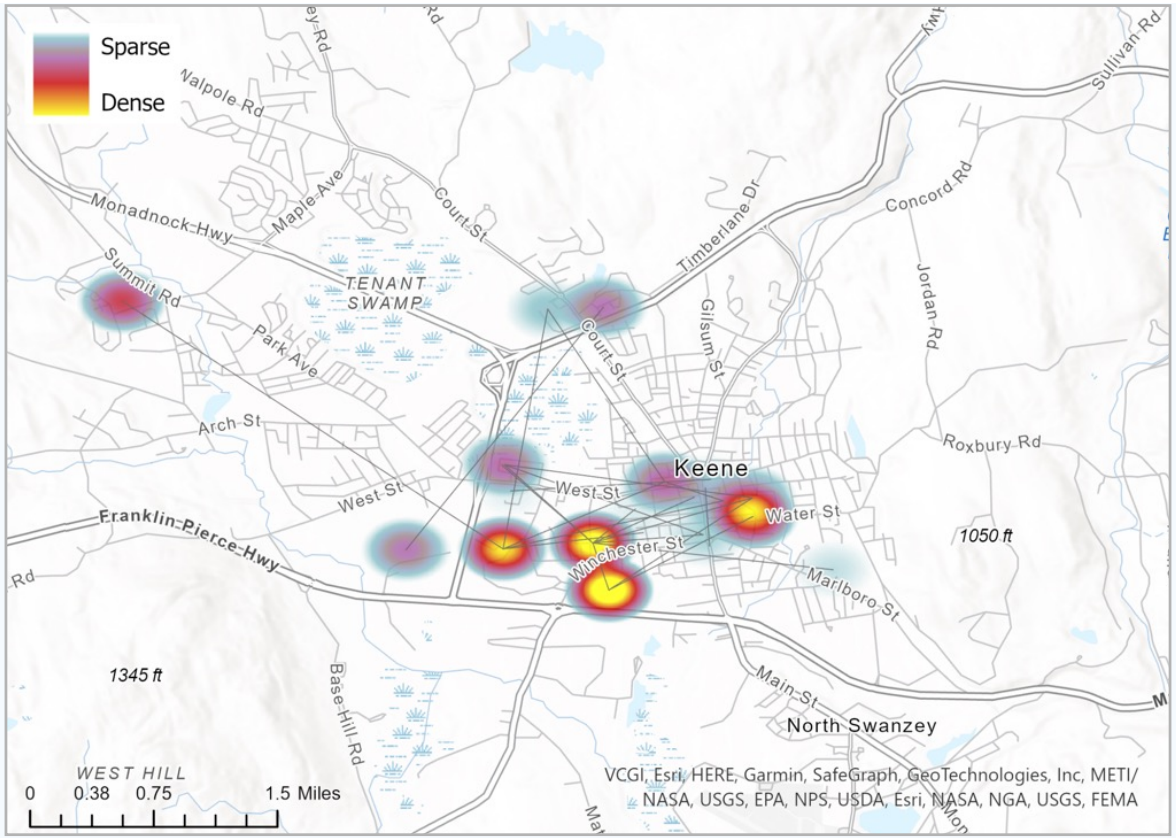
[22]Based on data from March 2022 (Source: HCS).

Para Express

The Para Express service provides paratransit for those traveling within ¾ of a mile from fixed-routes. This service is required under the federal Americans with Disabilities Act.

Metric	Value[23]
Monthly boardings	70 completed trips
Cancellation rate	20%
Average trip duration	13 minutes
Average trip distance	2 miles
Popular origins/destinations	• Riverside Plaza • Residential addresses • Cityside Family Housing • Monadnock Marketplace

A heat map of Para Express trips and origin-destination links is shown below.



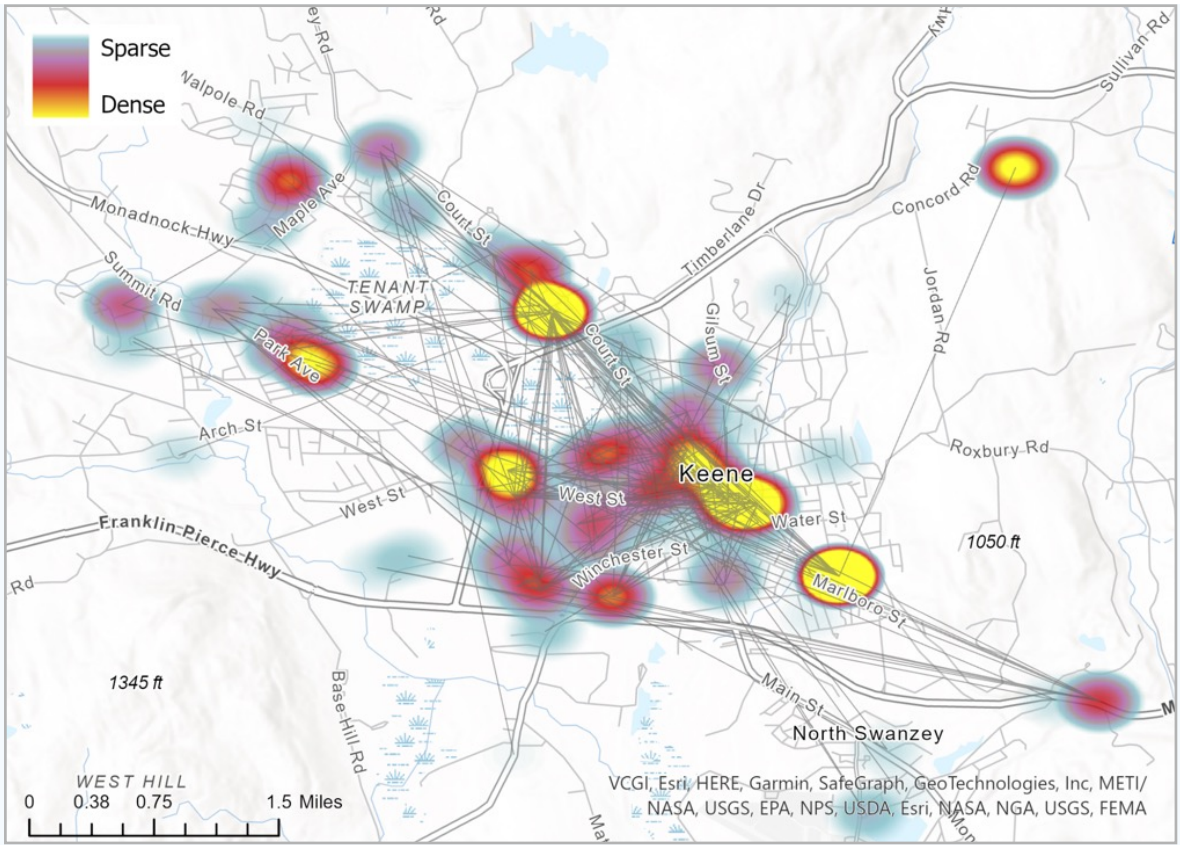
[23] Average monthly passenger trips from January to April 2022.

Friendly Bus

The Friendly Bus provides door-to-door shared rides for those over the age of 60. Trips must be reserved by calling a dispatcher at least one day in advance. The bus operates on weekdays from 8 AM to 4:30 PM and provides trips for older adults for grocery shopping, medical appointments, access to social services, and social or recreational purposes. A heat map of Friendly Bus trips and origin-destination links is shown below.

Metric	Value[24]
Monthly boardings	300 completed trips
Average trip duration	19 minutes
Average trip distance	3 miles
Popular origins/destinations	• HCS • Cheshire Medical Center • 93rd Street • West St. Plaza

A heat map of Friendly Bus trips and origin-destination links is shown below.

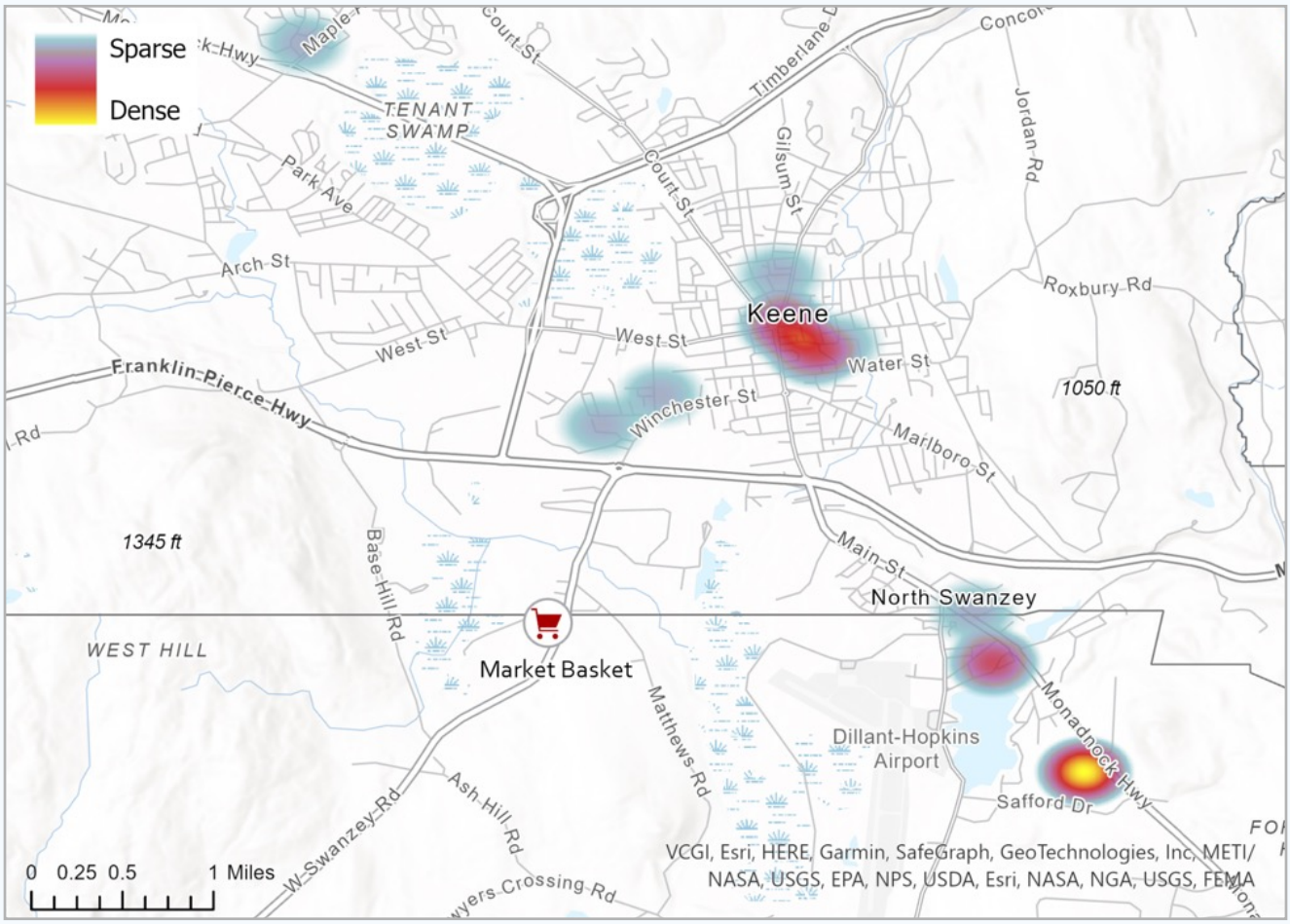


[24] Average monthly passenger trips from January to April 2022.

Shopping Shuttle Profile

On Tuesdays, HCS offers a shopping shuttle service to Market Basket. Trips must be reserved in advance through the same system as the Para Express and Friendly Bus services. The service is available to residents of Keene and areas of North Swanzey that were previously served by the City Express Black bus route. Passengers are picked up at their residence and dropped off at the grocery store in groups of five to eight passengers. They are allowed one hour to shop at the store before the vehicle returns them to their residence. The service is operated with one vehicle and provides round trip service to about 15 to 20 people per day.

A heat map of Shopping Shuttle trips is shown below.



4.4.3 Volunteer Driver Program

Community Volunteer Transportation Company (CVTC) coordinates a volunteer driver program across the Monadnock Region. The Program currently averages about 15 daily trips (slightly less than before the COVID-19 Pandemic when the program averaged 17 daily trips). The program is targeted to seniors and people with disabilities to fill essential transportation needs in areas with no other public transportation options. Requests for rides must be made at least five business days in advance.

Popular travel origin/destinations:

- Monadnock Dialysis Center
- Market Basket
- Monadnock Community Hospital
- Hannaford's/Walmart
- Shaw's
- Dartmouth-Hitchcock Keene

Figure 4: Trip purpose distribution

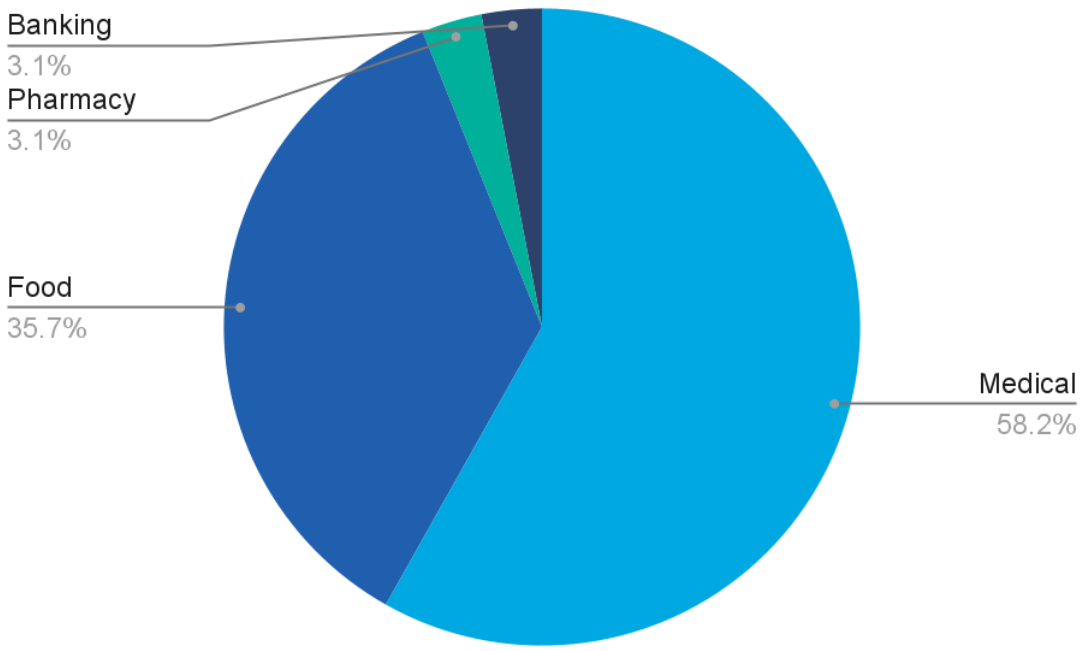


Figure 5: Trip cancellation reasons

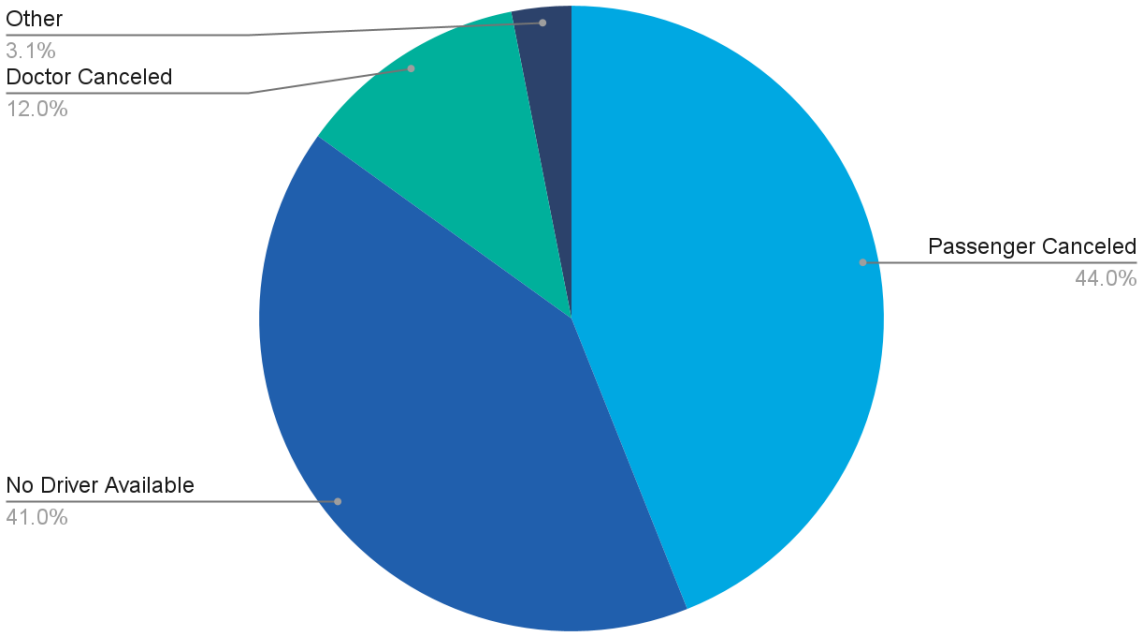
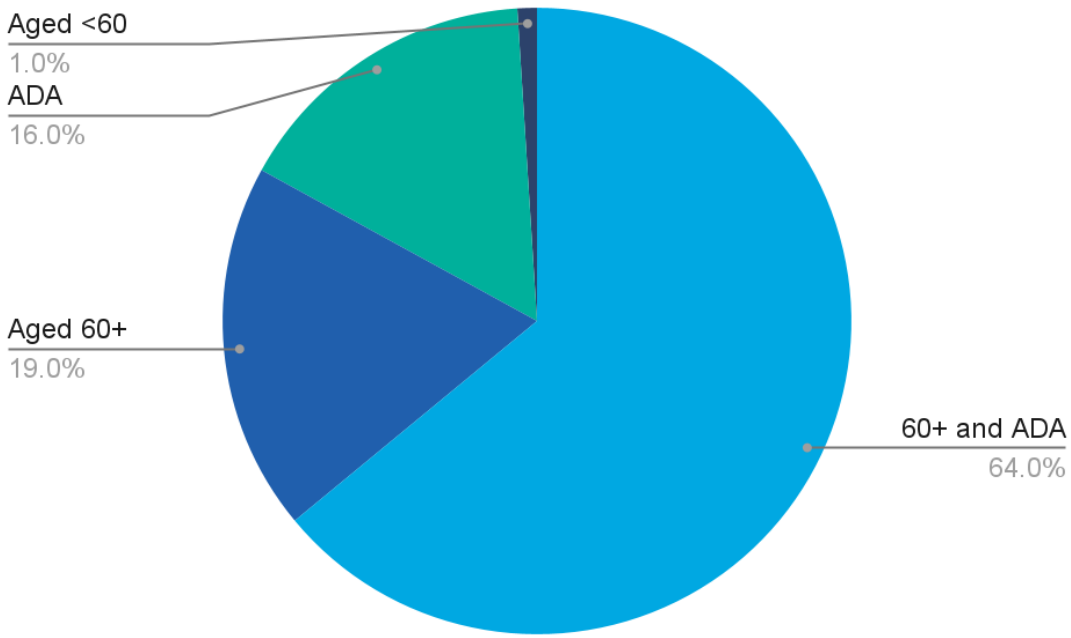
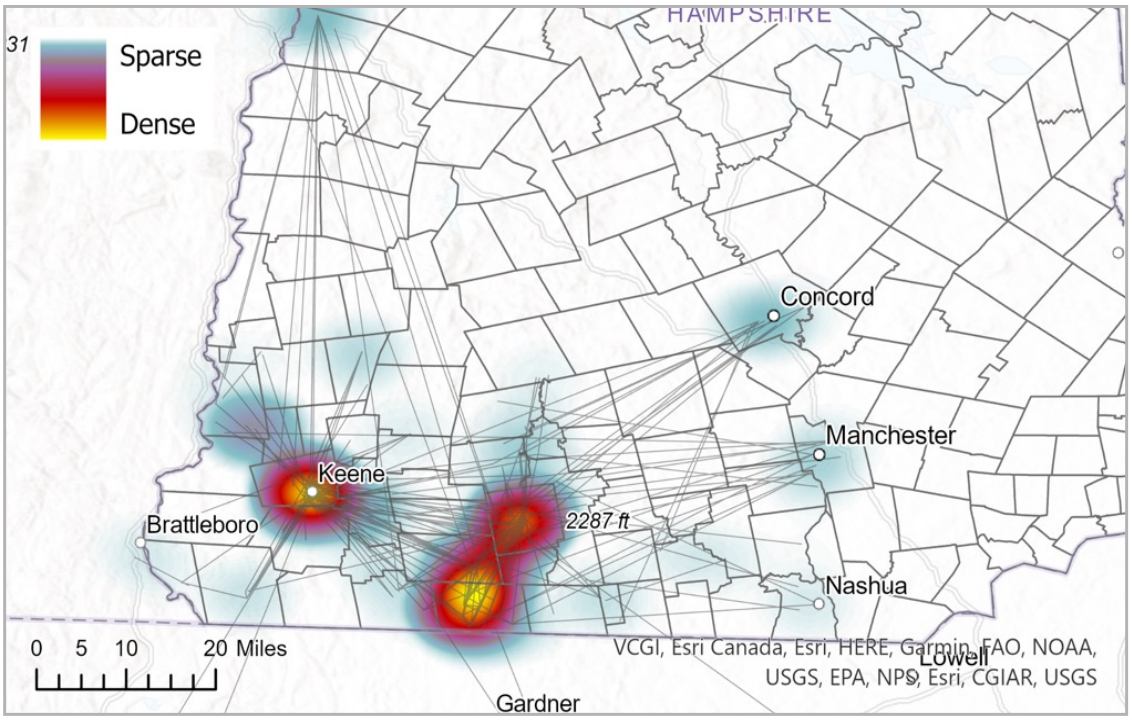


Figure 6: Trip eligibility 2021

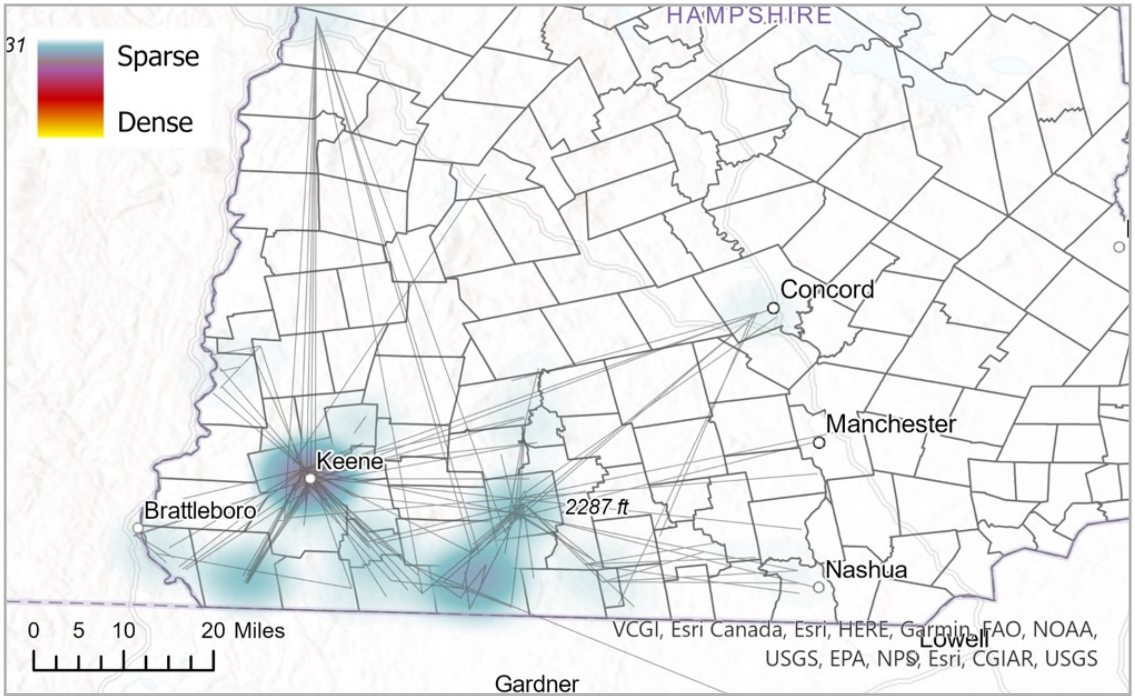


The maps below show the geographic patterns of CVTC trip origins and destinations around the region. There is no distinct difference between the locations of canceled and completed trips.

Heat map of completed CVTC volunteer driver trips and origin-destination links (2021):



Heat map of "no driver available" canceled volunteer driver trips and origin-destination links (2021):



4.5 Review of Resources and Inventory

As HCS is the primary provider of public transit services in Southwest New Hampshire, this section focuses on HCS inventory only.

4.5.1. Vehicles

As of November 2022, HCS has the following fleet:

- Six (6) Ford F450 cutaway buses with 16 seats each
- One (1) Ford Transit van with 9 seats

Ford F450 cutaway bus:

These are primarily used to operate the City Express Red and Black routes, as well as the shopping shuttle. All vehicles are wheelchair accessible and can accommodate two wheelchair passengers. Vehicles were purchased in 2016, 2017 (2), and 2020. Vehicles can last up to 10 years and are in good condition. The oldest vehicle (2016) has driven 110,000 miles (vehicles complete 100 miles per day). Two of the vehicles are required at any time to operate the Red and Black City Express routes, while one is often deployed to operate the Friendly Bus and Para Express services.

Ford Transit van:

This vehicle is primarily used to operate the Friendly Bus. It also operates the route to Lebanon Hospital and White River Junction once per week. It is wheelchair accessible and has capacity for up to 2 wheelchairs.

4.5.2 Operators / Drivers

HCS has two full-time drivers operating the City Express routes, with each having a dedicated route. Four full-time drivers operate the Friendly Bus, with an additional part-time driver providing support, and another full-time driver starting in June 2022. The part-time driver provides relief during lunch, operates the Friendly Bus and supports dispatch when required. The dispatcher is also able to operate a vehicle if required. All drivers are authorized to operate public transit vehicles by NHDOT, but only those who operate the cutaway buses require a Commercial Drivers License (CDL).

4.5.3 Dispatch and Administration

For HCS' demand-response services, passengers must book at least one day in advance and can book a ride by phone anytime between 8AM and 5PM. The Routematch technology platform is used to plan routes and trips for the HCS Para Express and Friendly Bus services. During the afternoon prior to the day of travel, trips are assigned to specific vehicles and drivers.

4.5.4 Funding

HCS is primarily funded using FTA Formula Grants for Rural Areas (5311 Grants), having received $338,600 from this source through NHDOT in 2022. The City of Keene provided $91,000 in 2022 which was used to provide local match for FTA funding. In addition, HCS received $52,000 through the FTA Enhanced Mobility of Seniors & Individuals with Disabilities (5310) Grant. The remainder of funding required is provided through donations to HCS. HCS annual operating costs are approximately $560,000 for the City Express and $150,000 for the Friendly Bus.

Fare revenue is minimal and the service was fare-free for periods during the COVID-19 pandemic. Historically, federal funding restrictions limited the types of vehicles that HCS was able to procure, however, future funding may allow the agency to procure smaller vehicles.

4.5.5 Other Facilities

HCS vehicles are stored indoors at a depot located next to the HCS facility. Vehicles are maintained at a local garage and there are no maintenance facilities on site. The depot is nearly at capacity and any additional vehicles would likely need to be stored outdoors. In addition to the vehicles described above, there are three Meals on Wheels vehicles (Ford F150 pickup trucks) which are stored at the same facility. Restrooms and other amenities are located in the HCS facility. Five bus shelters have been constructed in Keene, and they are maintained and cleared of snow by the City of Keene. All remaining bus stops are designated through the use of sign posts.

SECTION 5

Community and Stakeholder Engagement.

5.

Community and Stakeholder Engagement

To better understand the mobility needs of Southwest New Hampshire communities and how those needs might impact the design of public transit service, the project team conducted stakeholder and community engagement throughout the project. This included two main outreach methods, each of which is outlined in the following section:

1. Stakeholder Working Group
2. Public Meetings

In general, feedback from public and stakeholder engagement activities resulted in strong expressions of support for improved public transit services in the Region. Generally, stakeholders and the public favored transit services that focused on their specific geographies and common destinations. They provided detailed input on each of the alternatives described in Section 6. Alternatives Analysis and helped to shape the final service recommendations outlined in this report.

5.1 Stakeholder Working Group

A Stakeholder Working Group was established to provide ongoing guidance and input throughout the study. The Stakeholder Working Group met three times throughout the course of the project:

1. April 26th, 2022 - Introductions, study goals, and microtransit education
2. July 20, 2022 - Public engagement update and presentation of draft alternatives
3. October 18, 2022 - Presentation of final alternatives, operating model, and funding scenarios

In addition to these meetings, the Stakeholder Working Group was provided with several opportunities to provide comments on materials by email. The Stakeholder Working Group included representatives from:

- Home Healthcare, Hospice Community Services (HCS)
- City of Keene
- Monadnock United Way
- Southwestern Community Services
- Antioch University
- Town of Swanzey
- New Hampshire Department of Transportation (NHDOT)
- NH Department of Health and Human Services, Keene District Office
- Sustainability Partner (Monadnock Sustainability Hub/MAST/Keene Energy Committee)
- Cheshire Medical Center
- Keene State College
- Contoocook Volunteer Transportation Company
- Keene Senior Center

5.2 Public Meetings

5.2.1 Engagement overview

A total of six public meetings were conducted during two separate phases of the project:

- **Round 1:** Conducted between July 18 and July 25, 2022, these meetings presented an overview of the project, explained how microtransit works, and presented the preliminary transit alternatives for feedback. The alternatives presented included fixed-routes, on-demand microtransit, and pre-booked microtransit. During this phase of the Study, the alternatives were in a preliminary concept phase. Exact routes, stops, zone boundaries, and schedules had not yet been determined. The alternatives specifically focused on four areas: Greater Keene (including north and West Swanzey and Marlborough Town Center), Keene to Winchester, Keene to Troy, and the East Monadnock Region (Peterborough, Jaffrey, and Rindge). Many inter-city alternatives were also explored. The feedback received during this first round of engagement informed which alternatives the project team analyzed further.
- **Round 2:** Conducted between October 17 and October 25, 2022, these meetings presented a narrowed down list of alternatives along with ridership and cost estimates. The alternatives were specifically focused on four areas: Greater Keene (including North and West Swanzey and Marlborough Town Center), Keene to Winchester, the East Monadnock Region (Peterborough, Jaffrey, and Rindge), and regional connections across SWRPC's planning district. Both local and inter-city alternatives were shared. For each alternative, estimated ridership, annual operating costs, and estimated costs per trip were presented. The feedback received during this second round of engagement informed the recommendations around the phasing and prioritization of each alternative.

Public meeting at Peterborough town library

5.2.2 Meeting details

Round 1, Meeting 1: East Monadnock Region Public Meeting

- **Date: July 20, 2022, 5:30 - 7:00 PM**
- Location: Peterborough Town Library, Peterborough, NH
- Attendees: 6

Round 1, Meeting 2: Greater Keene Public Meeting

- **Date: July 21, 2022, 2:30 - 4:00 PM**
- Location: HCS Offices in Keene, NH
- Attendees: 7

Round 1, Meeting 3: Regional Meeting

- **Date: July 25, 2022, 6:00 - 7:30 PM**
- Location: virtual (on Zoom)
- Attendees: 16

Round 2, Meeting 1: East Monadnock Region Public Meeting

- **Date: October 17, 2022, 4:30 - 5:30 PM**
- Location: Peterborough Town Library, Peterborough, NH
- Attendees: 3

Round 2, Meeting 2: Greater Keene Public Meeting

- **Date: October 18, 2022, 10:00 - 11:30 AM**
- Location: HCS Offices in Keene, NH
- Attendees: 7

Round 2, Meeting 3: Virtual Meeting

- **Date: October 25, 2022, 6:00 - 7:30 PM**
- Location: virtual (on Zoom)
- Attendees: 6

5.2.3 Round 1 Meetings Summary

Overall, attendees were excited about improved public transit in Southwest New Hampshire. There was a general consensus that there is significant transit need in the Region. Both microtransit and fixed-route services would be useful according to attendees. Microtransit was viewed as a good way to attract new public transit riders and reduce walking distances, while some people preferred fixed-routes for their ability to serve long-distance trips more efficiently. In general, there was a view that any type of additional public transit service is valuable and would be popular.

In all three meetings, participants raised various questions about microtransit, these topics included:

- Funding transit services/ costs to passengers
- Operating and managing the service
- Timeline for implementation
- Accessibility and accommodations for people with disabilities
- Walking requirements and safety in areas with no sidewalk infrastructure
- Service hours of microtransit (and frequency and schedules of fixed-routes in comparison)
- Fixed-route and microtransit/demand-response comingling of services on one platform
- Vehicle sharing and detours to pick up/drop off additional passengers
- Car seats in vehicles
- Bike racks on vehicles and integration with rail trails
- Applications of microtransit for larger areas and regional/intercity trips

Feedback on Alternatives

Attendees generally were most in favor of additional transit services where they lived.

In Keene, attendees felt that the microtransit alternatives could attract more choice riders who would not be willing to take a fixed-route bus. Because these services would be direct and shorter (compared to the existing fixed-routes), they could be used to send teens who cannot drive. Overall, they thought it would be a benefit to have microtransit service in Keene. Some attendees commented that the current system does not run late enough and can take some time to get around, but generally serves most of the key destinations in Keene. Attendees noted that fixed-routes would need to cover every part of the City and some of the shorter alternatives would not do that. For example, Wheelock Park and the YMCA were mentioned as important destinations that were not covered by all alternatives.

In the East Monadnock Region (Peterborough, Jaffrey, Rindge), attendees stated that a microtransit zone would likely need to be curb to curb (except maybe in Peterborough town center the service could be corner to corner). A fixed-route bus could also succeed. However, it was noted that people don't live close to the main corridor (US Route 202), and they would need to walk long distances to reach the bus (which would dissuade ridership). Another attendee mentioned that a park and ride could also help people access the intercity routes.

Some attendees asked for additional alternatives, such as connections to Claremont, Lebanon, Brattleboro, Hancock, Harrisville, and Greenfield, MA. Even a limited service a few times a week was noted to be useful to these attendees as many of these towns are smaller and have fewer resources and jobs.

5.2.4 Round 2 Meetings Summary

Review and Discussion of Alternatives

The main difference between the first and second round of public meetings was that the alternatives presented had been adjusted and refined and further analysis was conducted, allowing a more detailed discussion informed by ridership and cost estimates.

In Greater Keene, multiple attendees noted that the hybrid alternative would be a great option because It provides more opportunities for places to travel while using the fixed-route to service the most popular destinations. The hybrid service would also attract choice riders and get people where they need to go most directly. The North/South & East/West alternative was preferred by some over the circulator because it included Market Basket.

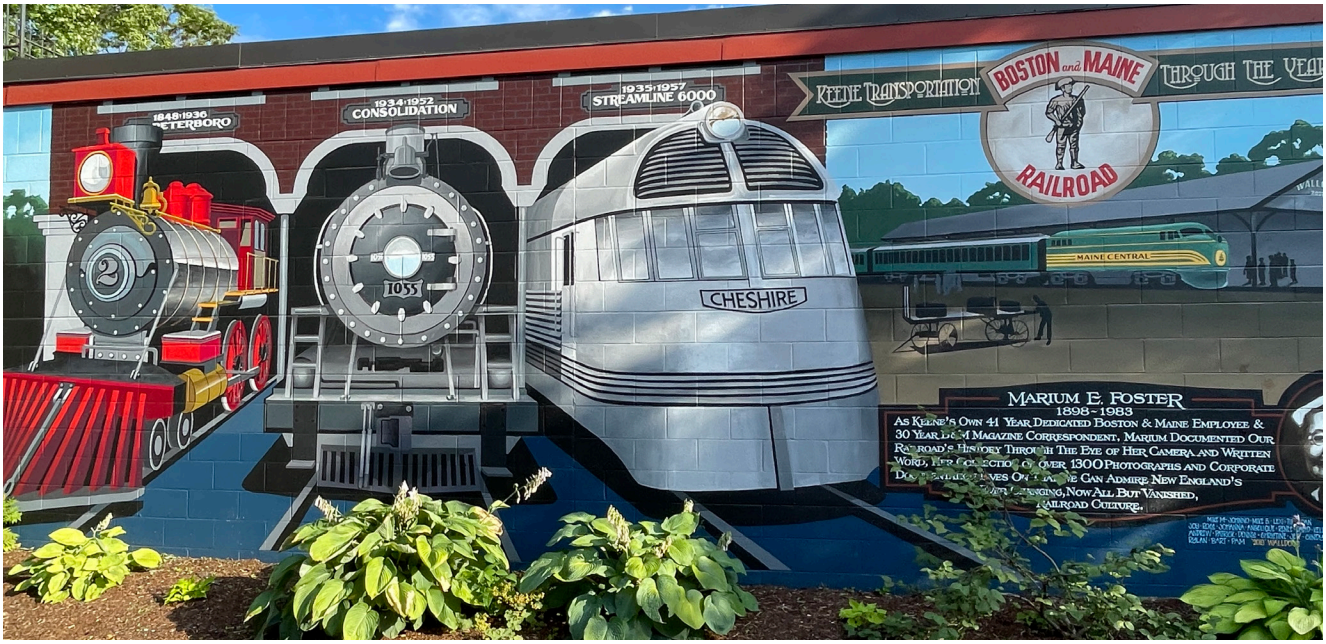
For the Winchester alternatives, a pre-booked microtransit service was preferred by some because it would be difficult to walk to the fixed-route in this area, and it covers a larger corridor (NH Route 10).

For the East Monadnock region alternatives, most attendees agreed it would be ideal to have both alternatives operating in parallel. Those who preferred the Keene to Peterborough bus said it would be more popular since Keene is a larger attractor than Jaffrey/ Rindge. Those who preferred the East Monadnock Region microtransit alternative noted that it would be helpful for people to get to the Monadnock Community Hospital and Market Basket. It was also noted that this service could be useful to members of the RiverMead Community, who cannot drive themselves but would also like to travel within Peterborough. Another attendee said that teens could also use the service to get around Peterborough and would be more sustainable than driving.

The Keene to Brattleboro alternative was also a priority for several attendees. One attendee said that currently, a taxi between Keene and Brattleboro can cost up to $80, and bus service would be very useful.

SECTION 6

Alternatives Analysis



6.

Alternatives Analysis

The project team identified several microtransit and fixed-route alternatives within the study area. These alternatives were categorized into two groups:

1. Alternatives focused on improving public transit service within the Greater Keene area (including the City of Keene, and parts of Swanzey and Marlborough); and
2. Alternatives focused on expanding public transit to new areas beyond Greater Keene, including the East Monadnock Region and intercity connections between Keene and towns such as Peterborough, Winchester, and Brattleboro, VT.

The initial list of alternatives was developed by the project team based on the Existing Conditions Analysis (see Section 4. of this report), public and stakeholder input (outlined in Section 5. Community and Stakeholder, Engagement), and the team's expertise in planning transit services in areas similar to the Monadnock Region.

These alternatives were selected and evaluated using the following methodology:

1. **Identified areas with transit needs.** Alternatives were designed based on the density of population and jobs, area demographics, key destinations, and patterns of existing transit services. These alternatives were edited and refined by the project team based on input from the community and the stakeholder advisory group.
2. **Determined service hours and quality of service targets** that best achieved the goals, as determined by SWRPC and other stakeholders. The quality of service parameters that were modeled are listed starting on page 69.
3. **Estimated demand** by assessing each zone's population, employment, and demographic attributes. For fixed-route alternatives, the generally accepted benchmark of a quarter-mile around each route was analyzed as the route's "catchment area." A low, medium, and high estimate for daily and annual ridership was developed.
4. **Modeled each alternative** to determine the number of necessary vehicles and estimated operating costs

required to implement the alternative. For each microtransit alternative, a simulation was performed to allow the project team to assess the tradeoffs between service parameters and compare different zones.

5. **Comparison of alternatives** based on a set of criteria determined by the project team that measures each alternative's expected performance against the service's goals. These summary tables help to facilitate the prioritization of the alternatives for implementation.

6.1 Development of Alternatives

Both fixed-route and microtransit alternatives were developed for this Study and were selected and designed based on similar criteria. The main goal of the Study was to develop alternatives that improve and expand transit service in the City of Keene and surrounding communities.

Generally, the following frameworks were used when considering whether to explore fixed-route buses, microtransit, or both:

- **Fixed-route bus** services perform well when connecting relatively densely developed areas with easily aggregated demand patterns (for example, two town centers with bidirectional travel demand, or a linear corridor with a mix of housing and employment). The route should be on roads with good pedestrian infrastructure to allow easy and safe access to and from bus stops.
- **Microtransit** services perform well in a range of densities and can successfully operate in areas with a lower density than is considered necessary for a fixed-route bus. They are able to capture more dispersed demand patterns than fixed-route buses and do not require the same level of pedestrian infrastructure, as a curb-to-curb service can be used in areas where passengers cannot walk to meet a vehicle.

The transit alternatives were developed in response to the takeaways from the existing conditions analysis and learnings from the stakeholder engagement and public meetings. These efforts identified gaps in the current transit services, thus informing alternatives that best addressed these gaps. For example, the mapping showed a higher concentration of poverty and people with disabilities in Winchester and no existing transit service (except for a new shopping shuttle that was recently launched), indicating that some alternatives should provide new transit coverage in this area. In addition, the stakeholders indicated a need for transit options for commuters. Commuter services would require alternatives with longer hours than the current services to allow for travel back home in the evenings and to accommodate shift workers. In response to the public and stakeholders identifying the need for additional regional connections, the project team also developed a Keene-Brattleboro Bus alternative that would provide connections to other regional transit services (Amtrak and intercity bus). The table on the next page illustrates more specifically the criteria used to design each alternative beyond addressing the needs identified and the project's overarching goal.

Criteria Used for the Development of Alternatives

Criteria	Influence on Development of Fixed-Route Alternatives	Influence on Development of Fixed-Route Alternatives Influence on Development of Microtransit Alternatives
Key destinations (e.g., hospitals, schools, community centers, and grocery stores)	Fixed-routes were designed to connect as many key destinations as possible without creating excessive deviations and long routes.	To maximize the utility of the microtransit service, zones that increase access to key destinations were developed.
Route length / zone size	Routes were designed to provide a balance between direct and quick service between destinations and provide geographic coverage. Longer, more circuitous routes while providing access to more destinations result in longer travel times and less frequent service.	Zones that are too small limit the attractiveness of a service and offer fewer destinations for users. However, very large zones are more expensive to operate and may not be suitable for the initial launch, given the limited funding for transit.
Residential and employment density	Routes that have stops in a mix of residential and commercial areas are likely to enable trips that are useful to passengers. Employment density not only indicates areas people may travel for work, but also the presence of commercial establishments where individuals may travel for retail, healthcare, education, and other purposes. Different types of destinations and use-cases help drive ridership to a service.	Zones with a mix of residential and commercial areas are more likely to enable trips that are useful to passengers. Employment density not only indicates areas people may travel for work, but also the presence of commercial establishments where individuals may travel for retail, healthcare, education, and other purposes. Different types of destinations and trip types help spread the demand for trips throughout the day and contribute to the success of a microtransit service. For example, commute trips often occur in the mornings and evenings, and many medical appointments and shopping trips occur midday, thus balancing demand. However, areas with a very high density may be more expensive to operate or be better served by fixed-routes.
Stakeholder and community input	The project team received comments and feedback from stakeholders and the community at various public meetings held throughout the project. These comments were used to adjust the zone boundaries and route alignments to better reflect the transportation needs of the community.	

The microtransit alternatives evaluated as part of this Study include:

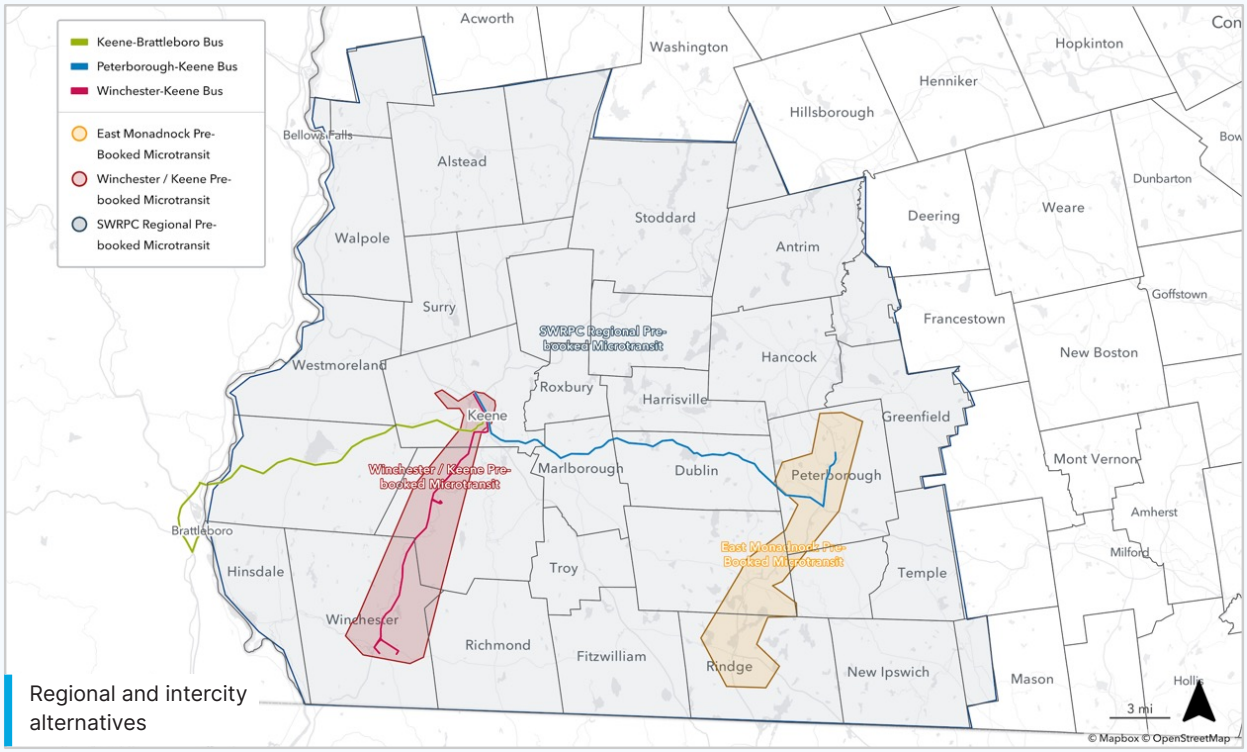
- Greater Keene on-demand microtransit
- Keene Urban Area on-demand microtransit
- City of Keene on-demand microtransit
- Winchester-Keene pre-booked microtransit
- East Monadnock Region (Peterborough, Jaffrey, Rindge) pre-booked microtransit
- SWRPC Region pre-booked microtransit

The fixed-route alternatives evaluated as part of this Study include:

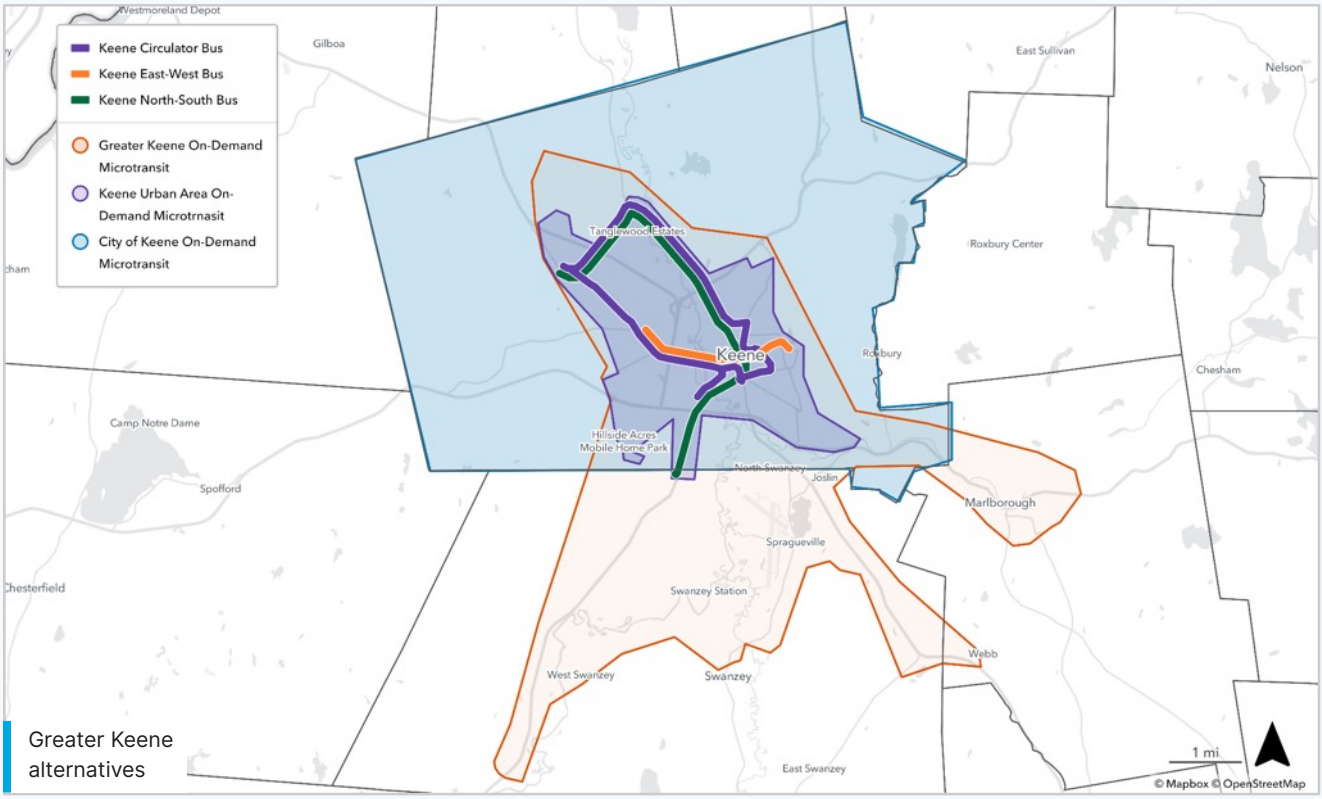
- Keene Circulator bus
- Keene North/South bus and East/West bus
- Keene - Winchester bus
- Keene - Peterborough bus
- Keene - Brattleboro bus

In addition, one hybrid alternative was evaluated combining the Greater Keene on-demand microtransit zone and the North/South Keene bus route.

Descriptions of each alternative can be found below in section 6.3 Modeling Results by Alternative.



Regional and intercity alternatives



6.2 Modeling Methodology and Ridership Estimates

Once the alternatives were developed, they were each modeled to assess their potential impact, feasibility and costs of implementation.

Microtransit: Designing a microtransit service is a trade-off between supply, demand, and service quality within a specific zone. Simulations allowed the project team to evaluate these tradeoffs and make service design recommendations including, the booking model, wait times, service hours, and vehicle sizes. For each microtransit alternative, various simulations were conducted to understand the average wait times, walking distances, service efficiency, vehicle and driver requirements, and estimated operating costs.

Fixed-Route Bus: To evaluate the fixed-route alternatives, the team used Remix planning software to estimate route headways, journey times, driver and vehicle requirements, service efficiency, and estimated operating costs. The fixed-route estimates are based on the route and stop alignments, travel demand patterns, service hours, vehicle speeds and layover parameters.

6.2.1 Modeling assumptions and simulation parameters

In order to simulate each zone's performance, it was necessary to first make several assumptions regarding service quality targets. The set targets reflected a balance between the costs of providing the best service (i.e., short wait times, minimal walking, and few detours) with the costs of operating a service.

Typically, improving the quality of service requires additional vehicles and/or drivers and thus increases the cost of operating transit services.

There are two types of booking models the operator could choose from for a microtransit service. The first is an on-demand model in which passengers can book rides when they want to use the service, right before they travel, and vehicles are routed as requests are made for trips. While this model allows for the most flexibility on the side of the customer, it also requires customers to correctly book rides with enough time to get to their destination, and wait times may fluctuate at different times of the day.

Alternatively, the operator could opt for a pre-booked service in which passengers must request rides in advance (such as the day before) and are given a booking window (for example, one hour before or after their requested pickup time) in which the vehicle may pick them up. Passengers will get a shorter window for their pickup times closer to the time of their trip. Pre-booked service allows for more optimization of routing, greater sharing of trips, and therefore fewer vehicles. For most customers, on-demand is also usually a simpler user experience than pre-booked microtransit. However, other customers may appreciate the higher level of guarantee that a pre-booked service offers. On-demand service is usually more successful in denser, smaller zones with higher demand for trips and shorter trips. Pre-booked is usually used in larger, more rural zones, where demand is sparse, and trips are longer. In some on-demand microtransit services, customers can also pre-book rides.

The table below indicates the main parameters used for the on-demand and pre-booked microtransit simulations.

Modeling Parameter	Description	Recommendation for On-demand Microtransit Alternatives
Service Hours	Service hours are the times when a customer can request a ride and should, at a minimum, be set to match the existing transit service hours, or extended to also provide service during times when there currently is no service such as later in the evenings or weekends. While longer service hours are useful for many people, they also make the service more expensive to operate, especially during low ridership hours. The simulations assume 52 weeks per year with five weekdays, Saturdays and Sundays. The simulations do not take into account holidays.	Mon - Fri: 7 AM to 6 PM Sat - Sun: 9 AM to 4 PM

Modeling Parameter	Description	Recommendation for On-demand Microtransit Alternatives
Residential and employment density	Routes that have stops in a mix of residential and commercial areas are likely to enable trips that are useful to passengers. Employment density not only indicates areas people may travel for work, but also the presence of commercial establishments where individuals may travel for retail, healthcare, education, and other purposes. Different types of destinations and use-cases help drive ridership to a service.	Zones with a mix of residential and commercial areas are more likely to enable trips that are useful to passengers. Employment density not only indicates areas people may travel for work, but also the presence of commercial establishments where individuals may travel for retail, healthcare, education, and other purposes. Different types of destinations and trip types help spread the demand for trips throughout the day and contribute to the success of a microtransit service. For example, commute trips often occur in the mornings and evenings, and many medical appointments and shopping trips occur midday, thus balancing demand. However, areas with a very high density may be more expensive to operate or be better served by fixed-routes.
Walking Distances	This refers to the maximum and average distances a passenger must walk from their origin to their vehicle and from their vehicle to their destination. In most cases, there are multiple potential pickup locations. Allowing longer 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 but result in lower ridership as 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. Walking distances are not relevant for curb-to-curb services.	Average: 300 - 500 ft Maximum: .25 miles (total walking distance is ~twice the distance shown as passengers walk at both ends of the trip)

Modeling Parameter	Description	Recommendation for On-demand Microtransit Alternatives
Wait Times	This refers to the maximum and average time a passenger must wait for a vehicle to arrive at their pickup location from when they request a ride and only applies to on-demand microtransit. Shorter wait times are targeted in dense areas, while longer wait times are often more acceptable in rural areas. Longer maximum wait times allow for more flexibility in vehicle routing and may require fewer vehicles. However, longer maximum wait times can lead to more significant fluctuations in waiting times experienced by passengers, which can be a poor experience for passengers.	Average: 15-25 minutes Maximum: 40 minutes
Allowed pickup/ dropoff window	This only applies to pre-booked microtransit simulations and refers to the length of the pickup/dropoff window that a passenger has when initiating a trip request. This can also be thought of as how long before/after a requested time can a ride be scheduled.	n/a
Allowed pickup/dropoff communication window	On the actual travel day for a pre-booked trip, a passenger will receive communication from the microtransit service indicating a smaller window within the allowed pickup/dropoff window, in which their actual pickup/dropoff time will occur. The communication window is only applicable for a pre-booked trip.	n/a
Detour Threshold	This 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 either in real-time for on-demand microtransit or in advance for pre-booked microtransit. 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 and the option to drive the direct route.	1.5x direct trip journey length/duration

Modeling Parameter	Description	Recommendation for On-demand Microtransit Alternatives
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.	6+ regular seats including 1 wheelchair space

For the fixed-route modeling, the following assumptions were taken into consideration:

- **Service hours:** The fixed-route alternatives were modeled using the same service hours as the microtransit alternatives, Monday through Friday 7:00 AM to 6:00 PM and Saturday and Sundays from 9:00 AM to 4:00 PM. The modeling assume 52 weeks per year with five weekdays, Saturdays and Sundays. The simulations do not take into account holidays.
- **Vehicle speeds:** Journey times are slower on fixed-routes than with private vehicles because of stopping time. Average speed along a route varies depending on the number of stops, and the type of roads vehicles drive on.
- **Bus stop placement:** Per HCS's current policy, passengers would be able to board and ascend at any points along the route, as long as the vehicle can safely stop.
- **Route alignment:** Routes were designed to minimize deviations into parking lots, with the assumption that there was a safe pedestrian infrastructure to get between the main roads and key destination entrances. In cases where there is no such pedestrian infrastructure, it is recommended that routes continue to deviate to a safe stopping location.
- **Ridership:** Ridership estimates were based on the number of jobs and population served by the route, service hours, and route frequency.

All operating cost estimates were based on inflation-adjusted hourly costs per vehicle revenue hour as reported by HCS in their 2020 NTD Transit Profile. This cost was $95 per vehicle revenue hour. The assumed estimated cost to purchase a new microtransit vehicle was $50,000, such as a Mercedes Sprinter with up to 12 seats. This cost includes purchasing a new vehicle as well as any modifications needed to prepare the vehicle for service. The capital cost for a fixed-route vehicle was assumed to be $90,000 for a cutaway bus with 15 seats, such as the Ford E450. See the implementation section on acquiring vehicles for more information. The estimated capital costs for the alternatives below do not include any vehicle depots or other infrastructure that may be needed to store or maintain the vehicles, but does include additional vehicles required as spares.

Finally, while assumptions were made on routing, bus stops and zone boundaries for the study, exact routing, bus stops, and zone boundaries may be modified during service implementation.

6.2.2 Ridership Estimates

The demand estimates for a service represent the expected ridership that an area or route will have when a new service is launched. These estimates impact important decisions regarding the size of the fleet and the level of funding required for each alternative. It can take twelve months or longer for the ridership of a zone to mature and reach these estimates. Ridership can be especially slow to grow in areas where there is no existing transit. Moreover, ridership growth rates

are strongly correlated with marketing efforts (see 7.3 Launch Planning for more details). The demand estimates were based on three factors:

- The number of residents living in each catchment area,
- The number of jobs located in each catchment area, and
- The expected transit mode share (the percentage of individuals who live or work in the catchment area that are likely to use the service).

For microtransit alternatives, the "catchment area" was considered to be the zone boundary in which customers can travel within. For fixed-route alternatives, the "catchment area" was anywhere within a quarter mile of the route. Currently, on the HCS City Express routes, passengers are allowed to board and alight wherever it is safe for the vehicle to stop along the route. Therefore the catchment area for fixed-routes reflects the entire geographic area in which a resident could access the route. A quarter mile, is approximately a five minute walk, which is a reasonable distance people can be expected to travel to reach a bus route.

Mode share varied between alternatives, and some areas are likely to have a higher mode share than others. A mode share score represents the percentage of travelers using a particular type of transportation. For example, an on-demand microtransit zone with a high mode share score will capture a larger percentage of trips than one with a lower mode share. We developed a mode share for each alternative based on the criteria described below. In practice, many factors can influence ridership, such as the marketing budget, fare structure, service design, and availability of other transportation options. Mode share will also vary between fixed-routes and microtransit services and new transit services are likely to have a lower mode share than services that are replacing or enhancing existing transit. The factors that were decided to have the most significant impact on the mode share for this Study include:

- **Car-free households:** People without access to private vehicles are more likely to rely on alternative modes to move around the city, including public transit.
- **Poverty rate:** Lower-income households are more likely to use public transit as it tends to be more affordable than owning and driving a private vehicle.
- **Existing transit ridership:** In areas that already have significant transit ridership, people are more likely to continue using alternative transportation modes. In areas where car ownership and use are dominant, attracting people to try a new service is typically more challenging.
- **People living with a disability:** Many people with disabilities who cannot drive themselves or afford a private vehicle are more likely to rely on alternative forms of transportation, including public transit.
- **Older adults:** Older adults, typically over the age of 60, tend to have lower fixed incomes and lower rates of vehicle ownership and usage, thus resulting in a higher likelihood of relying on public transit for transportation.
- **Service quality:** Transit services that get people to their destinations quickly and easily are more likely to attract new and frequent riders. For a fixed-route service, this means routes with relatively short headways and direct journeys are more attractive to potential users. For a microtransit service, service quality can be measured by wait times, journey lengths, and ease of booking the service. Services that provide on-demand microtransit will likely attract more riders than pre-booked microtransit services.

For each alternative, a low, medium, and high ridership estimate were developed.

- **Low:** This scenario assumes the service does not perform as well as comparable peer services. While there are several potential reasons for this, the most common reasons for low ridership include poor marketing, a lack of community support, or unforeseen technical or operational challenges that affect the reliability of the service.
- **Medium:** The medium scenario is the project team's best estimate for the ridership within the first 12 to 24 months of operation. This estimate assumes that ridership is similar to peer services.
- **High:** This scenario assumes the service is more successful than most peers. Common reasons for a highly successful service include strong community support and viral marketing campaigns (often through refer-a-friend campaigns). If the decision is made to offer a free service, this will also increase ridership.

Services being implemented in areas where no previous transit exists are likely to take longer to build ridership than services that are added to areas where transit already exists or services that replace existing transit services. For example, if the existing Keene bus routes are replaced with a new route, most existing riders are likely to continue using the service, resulting in significant ridership from day one. Alternatively, introducing transit service in Peterborough, where no service currently exists, will likely take a longer amount of time to build ridership.

6.3 Modeling Results by Alternative

Modeling each alternative allowed the project team to understand how different service parameters, route alignments, zone boundaries, and fleet configurations will perform as an actual service. Modeling also helped predict the number of vehicles needed for a service and the initial capital costs that may be associated with each alternative. Simulations predicted various performance indicators, such as service utilization (a measure of service productivity) and average trip durations.

Three alternatives were initially considered but not modeled as preliminary analysis deemed them least promising and the first round of public meetings showed little interest from the public for these alternatives compared to the others. These alternatives include:

1. **East Monadnock Region fixed-route between Peterborough, Jaffrey, and Rindge.** This alternative was eliminated as it would be difficult to walk to/from the bus stops in this area or require a very long circuitous route to hit residential locations in addition to the commercial destinations. Moreover, given the relative ruralness of the area, the East Monadnock Region microtransit alternative was more appealing to the community and would serve the same area.
2. **Fixed-route between Keene and Troy.** This route was eliminated due to the low expected demand relative to other more promising inter-city fixed-routes. It was concluded that there was a greater need between Peterborough and Keene and Winchester and Keene than between Troy and Keene.
3. **Keene single route.** This option was eliminated as it only covers key destinations but not a significant number of residents and was deemed the least useful of the fixed-route alternatives in Keene.

As noted above, the transit alternatives were categorized into two groups. The first are alternatives that focused on travel within the “Greater Keene” area where transit already exists. For these alternatives, only one should be selected for implementation as the alternatives overlap in the area they service. The second category of alternatives looks at expanding transit in new areas and creating intercity connections. Within this category, there are many different geographies, and multiple alternatives could be implemented and complement each other without providing duplicative service. The one exception is the two Winchester to Keene options which serve the same area. Section 6.4 Summary and Recommendations further discusses combining alternatives and how to phase implementation.

The following section presents the modeling results for each alternative. Each microtransit alternative includes the following details:

- **Zone Description:** A map of the zone, the zone size, the number of people living in the zone, population density, and the number of jobs in the zone.
- **Demand Hot Spots:** Key destinations in the zone where we would expect a high proportion of trips to start or end. These include hospitals, grocery stores, shopping centers, libraries, community centers, schools, social service offices, and large employers. Travel is not limited to these destinations.
- **Zone Statistics:** The percentage of zero-vehicle households, households in poverty, older adults, young adults, and people with disabilities living in the zone.
- **Estimated Ridership:** The estimated number of weekday and annual passengers expected for each zone. Low, medium, and high demand estimates are provided.
- **Estimated Supply:** The number of vehicles required to operate the service at peak hours, the average number of weekday revenue hours expected, and annual revenue hours for each alternative.
- **Estimated Quality of Service:** The simulations provided measurements of the expected quality of service for each zone at each level of demand

and service quality. This includes average wait time at the peak, average trip duration at the peak, and average total walking distance at the peak. The average total walking distance aggregates both the walk to the vehicle and the walk from the vehicle to a passenger's final destination. For pre-booked microtransit services there is no average wait time. Instead, a measure of service quality is the average difference between the requested pickup time and the assigned pickup time for a trip request. Trip durations, wait times, and walking distances are likely to be highest during peak hours as this is when demand is highest and thus there are more trip requests that can be shared. When there are more rides being shared, the vehicle routing may ask people to walk slightly further to minimize detours. The route deviations may also be slightly longer to accommodate as much trip aggregation as possible resulting in longer average journey times.

- **Estimated Productivity:** Productivity (also known as utilization) is a measure of how efficient a service is. Average utilization is measured as the average number of passenger boardings per vehicle revenue hour. Vehicle revenue hours excluded times when vehicles were not serving trips or available for trips, including driver breaks and driving time to/from vehicle depots.
- **Estimated Costs:** For each zone, we have used the simulation results to estimate the annual cost to operate the service and the average cost per ride. All operating cost estimates are based on costs per vehicle revenue hour as reported by HCS in their 2020 NTD Transit Profile adjusted for inflation to the 2022 expected value, or $95 per vehicle revenue hour. We also included estimated costs for initial capital investment based on the number of vehicles needed to implement the scenario, including the cost of spare vehicles. Microtransit vehicles are assumed to cost $50,000.

The following results and metrics are detailed for each fixed-route alternative:

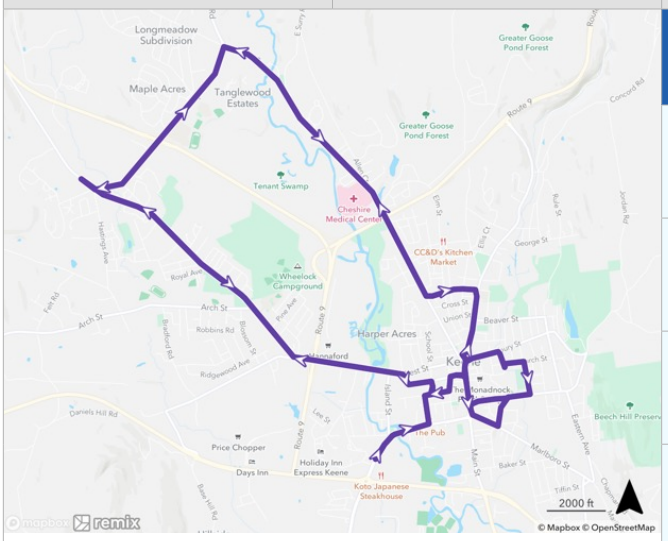
- **Route Description:** A map of the proposed route, frequency, runtime, and route length.
- **Demand Hot Spots:** Key destinations in the zone where we would expect a high proportion of trips to start or end. These include hospitals, grocery stores, shopping centers, libraries, community centers, schools, social service offices, and large employers. These should all be timed stops. However, customers will be able to board and ascend the buses anywhere that is safe for the bus to stop along the route.
- **Route Catchment Area Statistics:** The number of people living within the routes catchment area and the number of jobs within the routes catchment area. As well as the percentage of zero-vehicle households, households in poverty, older adults, young adults, and people with disabilities living in the routes catchment area.
- **Estimated Ridership:** The estimated number of weekday and annual passengers expected for each route. Low, medium, and high demand estimates are provided.
- **Estimated Supply:** The number of vehicles required to operate the service, the average number of weekday revenue hours expected, and annual revenue hours for each alternative.
- **Estimated Productivity:** Productivity (also known as utilization) is a measure of how efficient a service is. Average utilization is measured as the average number of passenger boardings per vehicle revenue hour. Vehicle revenue hours include the layover time between routes but not driver breaks and travel time to/from routes and vehicle depots.
- **Estimated Costs:** For each alternative, we have used the modeling to estimate the annual cost to operate the service and the average cost per ride. All operating cost estimates are based on costs per vehicle revenue hour as reported by HCS in their 2020 NTD Transit Profile adjusted for inflation to the 2022 expected value, or $95 per vehicle revenue hour. We also include estimated costs for initial capital investment based on the number of vehicles needed to implement the scenario, including the costs of spare vehicles. Fixed-route vehicles were assumed to cost $90,000.

6.3.1 Greater Keene Alternatives

Keene Circulator Bus Route

Route Description: This alternative is the most similar to the current service in Keene. In comparison to the current City Express Red and Black routes, this circulator provides more direct service with fewer deviations and would operate once every hour in opposite directions, with departure times staggered by 30 minutes leaving from the Transportation Center. This alternative assumes that the Friendly Bus will continue to operate and serve door-to-door trips for older adults and people with disabilities that may not be able to use the fixed route. The results below assume weekday service hours of 7 AM to 6 PM and weekend service hours from 9 AM to 4 PM.

Length: 11 miles	**Frequency:** 60 min	**Vehicles required to operate the service:** 2	**Daily Runs:** 22



Bus Stops (* indicates demand hot spot):
Keene Transportation Center*, Water Street, High Street/Elm Street, Cheshire Medical Center*, Stone Arch, YMCA, Hannaford*, Walmart*, Keene State College*

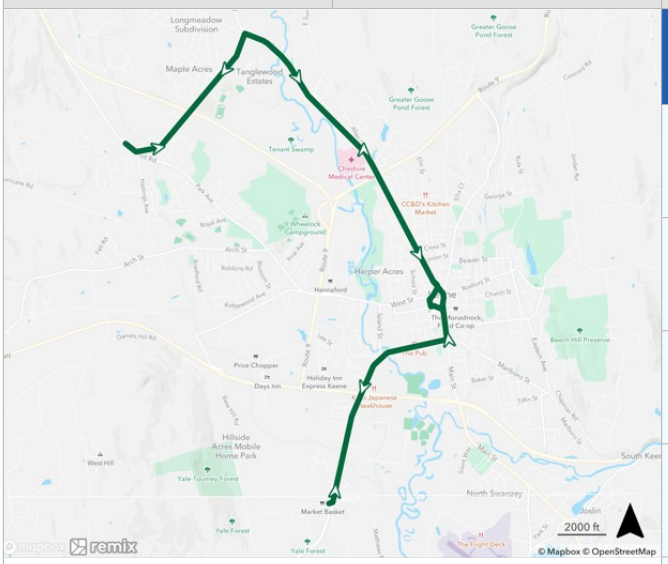
Within a quarter mile of the route:	
Population	12,500
Jobs	8,900
Zero-vehicle households (percent)	11%
Households in poverty (percent)	17%
Older adults, 65+ (percent)	14%
Young adults, 18 -29 (percent)	42%
People with disabilities (percent)	17%

Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	100	160	230
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	32,000	50,000	73,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 6,700		**Annual Vehicle Miles:** 80,000	
Annual Operating Costs: $0.6M		**Annual Operating Costs Weekday Service Only:** $0.5M	
Estimated Operating Cost per Trip (med. Demand): $12		**Weekday Productivity (passengers per vehicle hour):** 7 - 9	
Initial Capital Costs: $270,000			

Keene North/South Bus Route

Route Description: This route runs north-south through the most popular destinations in Keene and is recommended to be combined with the East/West Route. The route would run every 30 minutes between 7 AM to 6 PM on weekdays and from 9 AM to 4 PM on weekends. With the East/West Route, this alternative could replace the existing fixed-route network but assumes that the Friendly Bus will continue to operate and serve door-to-door trips for older adults and people with disabilities that may not be able to use the fixed route. The ridership estimates below assume that the East/West Route is implemented at the same time. If only the North/South Route was implemented, ridership would be slightly lower as the fixed-route system as a whole would be less useful for those traveling longer distances and requiring transfers.

Length: 13 miles	**Frequency:** 30 min	**Vehicles required to operate the service:** 2	**Daily Runs:** 22



Bus Stops (* indicates demand hot spot):
Market Basket*, Walmart*, Keene State College*, Transportation Center*, Keene City Hall, Cheshire Medical Center*, Stone Arch, YMCA

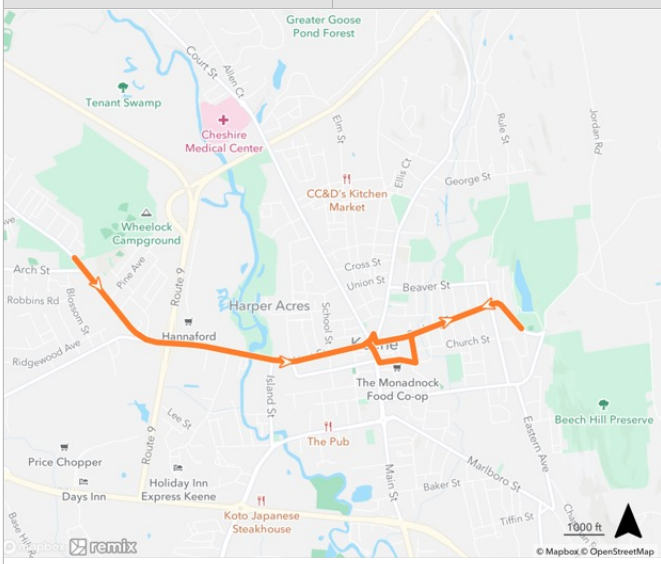
Within a quarter mile of the route:	
Population	8,500
Jobs	7,400
Zero-vehicle households (percent)	10%
Households in poverty (percent)	19%
Older adults, 65+ (percent)	12%
Young adults, 18 -29 (percent)	49%
People with disabilities (percent)	16%

Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	110	130	150
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	35,000	41,000	48,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 8,300		**Annual Vehicle Miles:** 110,000	
Annual Operating Costs: $0.8M		**Annual Operating Costs Weekday Service Only:** $0.5M	
Estimated Operating Cost per Trip (med. Demand): $19		**Weekday Productivity (passengers per vehicle hour):** 5 - 7	
Initial Capital Costs: $270,000			

Keene East/West Bus Route

Route Description: The East/West Route is intended to complement the North/South Route by providing direct and frequent transit between Wheelock Park and Robin Hood Park. It would operate from 7 AM to 6 PM on weekdays and from 9 AM to 4 PM on weekends with service every 30 minutes. With the North/South Route, this network could replace the existing HCS City Express network. However, the Friendly Bus would continue to operate for individuals who are unable to walk to a bus stop, such as some older adults and people with disabilities. The ridership estimates below assume that the North/South Route would also be implemented. If only the East/West Bus Route were to be implemented, ridership would be slightly lower as the fixed-route system as a whole would be less useful for those traveling longer distances and requiring transfers.

Length: 5 miles	**Frequency:** 30 min	**Vehicles required to operate the service:** 1	**Daily Runs:** 22



Bus Stops (* indicates demand hot spot):
Wheelock Park, Hannaford*, Colony Mill, Library, Keene Transportation Center*, 93rd Street/5 Central Square, Guernsey Street, Robin Hood Park

Within a quarter mile of the route:	
Population	5,300
Jobs	4,900
Zero-vehicle households (percent)	13%
Households in poverty (percent)	18%
Older adults, 65+ (percent)	16%
Young adults, 18 -29 (percent)	35%
People with disabilities (percent)	17%

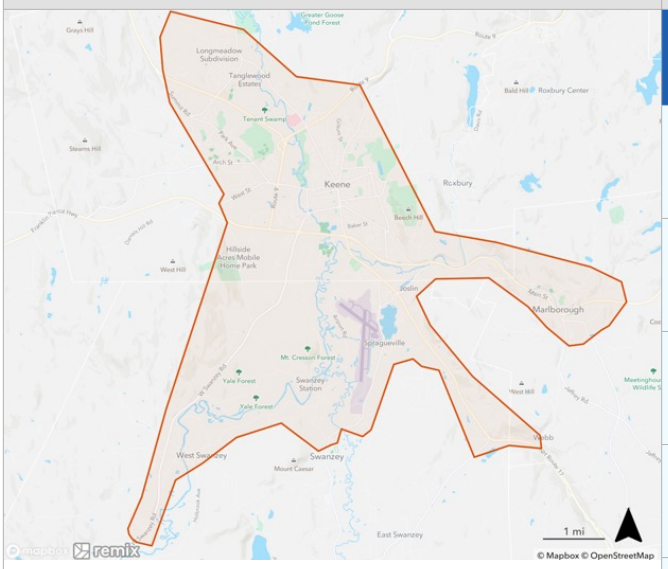
Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	40	70	100
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	12,000	22,000	32,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 3,400		**Annual Vehicle Miles:** 36,000	
Annual Operating Costs: $0.3M		**Annual Operating Costs Weekday Service Only:** $0.25M	
Estimated Operating Cost per Trip (med. Demand): $15		**Weekday Productivity (passengers per vehicle hour):** 7 - 9	
Initial Capital Costs: $180,000			

Greater Keene On-Demand Microtransit

Zone Description: This is the second largest of three Keene-based microtransit alternatives. It covers all relatively populated areas within Keene and the nearby communities in North and West Swanzey and Marlborough Town Center. It prioritizes covering key destinations and population centers but does not observe any municipal jurisdictions. As all microtransit services are accessible, this alternative could replace the Friendly Bus and City Express transit services. This service was modeled to operate from 7 AM to 6 PM on weekdays and 9 AM to 4 PM on weekends.

Zone Size: 25.5 mi^2

Vehicles Required: 4 - 6



Demand Hot Spots: Keene downtown/ Keene Transportation Center, Market Basket, Keene State College, West St. Plaza, Cheshire Medical Center, West Swanzey, Swanzey Town Hall, Marlborough Town Center

Within the zone:	
Population	23,900
Jobs	16,800
Zero-vehicle households (percent)	10%
Households in poverty (percent)	14%
Older adults, 65+ (percent)	17%
Young adults, 18 -29 (percent)	32%
People with disabilities (percent)	15%

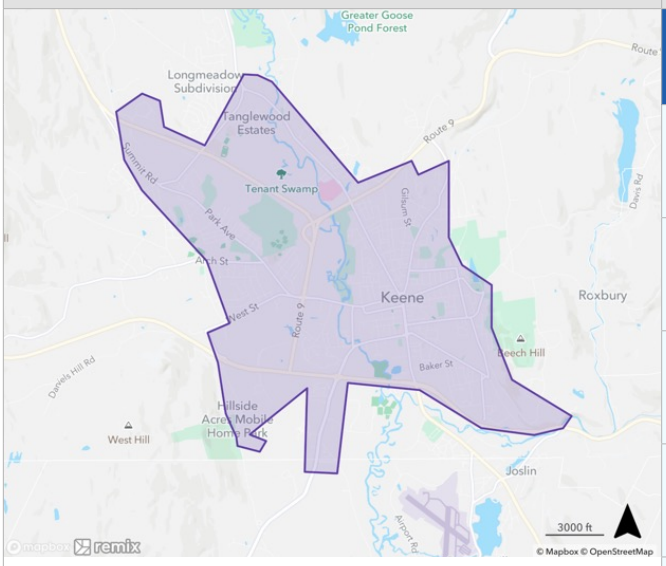
Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	250	280	310
Ridership Estimate (trips per year)	79,000	89,000	99,000
Fleet size (vehicles required at peak)	4	5	6
Average weekday revenue hours (hours)	40	55	65
Annual revenue hours (hours)	12,600	17,000	20,200
Average wait time at peak (minutes)	11 - 16	9 - 14	8 - 13
Average trip duration at peak (minutes)	10 - 13	9 - 12	10 - 13
Average total walking distance at peak (feet)	500 - 600	450 - 550	400 - 500
Average weekday productivity (passengers perrevenue hour)	5.8 - 6.8	4.7 - 5.2	4.3 - 5.3
Annual operating cost (Millions of USD)	$1.2M	$1.6M	$1.9M
Annual Operating Costs Weekday Service Only (Millions of USD)	$1.0M	$1.3M	$1.6M
Average cost per ride (USD)	$15	$18	$19
Initial Capital Costs (Millions of USD):	$0.25M	$0.3M	$0.4M

Keene Urban Area On-Demand Microtransit

Zone Description: This is the second largest of three Keene-based microtransit alternatives. It covers all relatively populated areas within Keene and the nearby communities in North and West Swanzey and Marlborough Town Center. It prioritizes covering key destinations and population centers but does not observe any municipal jurisdictions. As all microtransit services are accessible, this alternative could replace the Friendly Bus and City Express transit services. This service was modeled to operate from 7 AM to 6 PM on weekdays and 9 AM to 4 PM on weekends.

Zone Size: 7 mi^2

Vehicles Required: 3 - 4



Demand Hot Spots: Downtown Keene, Keene Transportation Center, Market Basket, Keene State College, West St. Plaza, Cheshire Medical Center

Within the zone:	
Population	16,400
Jobs	14,100
Zero-vehicle households (percent)	11%
Households in poverty (percent)	16%
Older adults, 65+ (percent)	15%
Young adults, 18 -29 (percent)	38%
People with disabilities (percent)	16%

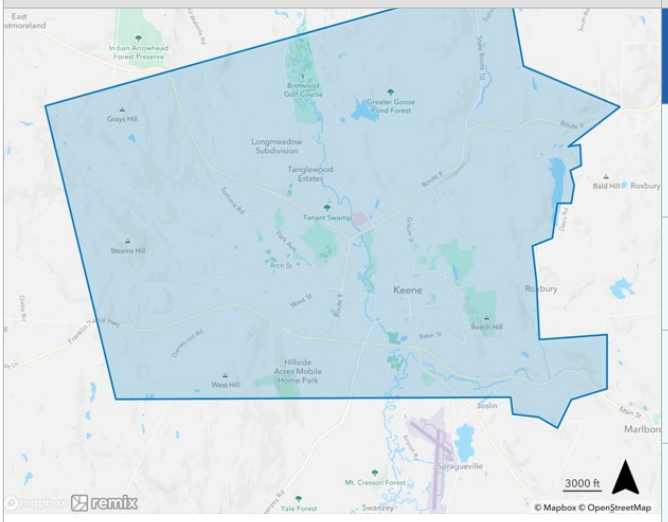
Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	170	210	250
Ridership Estimate (trips per year)	54,000	65,000	79,000
Fleet size (vehicles required at peak)	3	4	4
Average weekday revenue hours (hours)	30	40	45
Annual revenue hours (hours)	9,000	12,200	13,600
Average wait time at peak (minutes)	17 - 22	8 - 13	12 - 17
Average trip duration at peak (minutes)	9 - 12	8 - 11	9 - 12
Average total walking distance at peak (feet)	700 - 800	550 - 650	700 - 800
Average weekday productivity (passengers perrevenue hour)	5.4 - 6.4	4.7 - 5.7	5.2 - 6.2
Annual operating cost (Millions of USD)	$0.9M	$1.2M	$1.3M
Annual Operating Costs Weekday Service Only (Millions of USD)	$0.7M	$1.0M	$1.1M
Average cost per ride (USD)	$16	$18	$16
Initial Capital Costs (Millions of USD):	$0.2M	$0.25M	$0.25M

City of Keene On-Demand Microtransit

Zone Description: This zone only serves areas within Keene's municipal boundaries. As all microtransit services are accessible, this alternative could replace the City Express and Friendly Bus services. The service was simulated to operate from 7 AM to 6 PM on weekdays and 9 AM to 4 PM on weekends. The zone covers most of the Keene Urban Area Zone and many of the same key destinations but not the Market Basket in Swanzey or nearby populated areas in Swanzey or Marlborough. Given that the City of Keene is one of the largest contributors in funding the current transit services, this model simulated covering their entire City and not just the densely populated parts of the City.

Zone Size: 37.5 mi^2

Vehicles Required: 5 - 7



Demand Hot Spots: Downtown Keene, Keene Transportation Center, Keene State College, West St. Plaza, Cheshire Medical Center

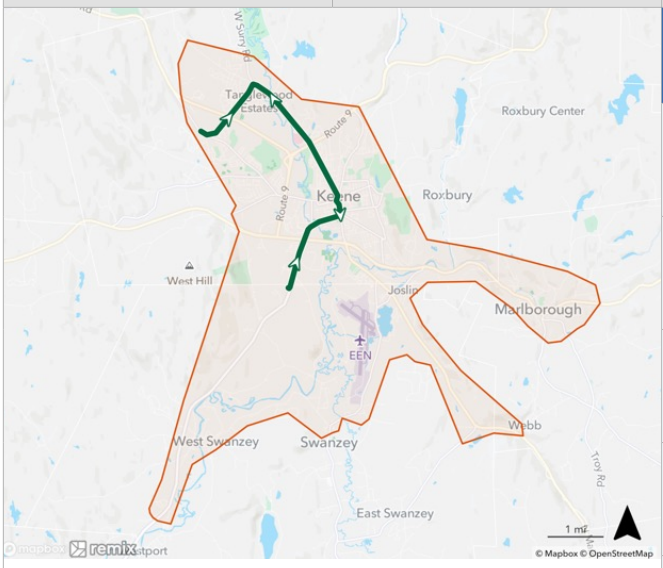
Within the zone:	
Population	16,400
Jobs	14,100
Zero-vehicle households (percent)	10%
Households in poverty (percent)	12%
Older adults, 65+ (percent)	18%
Young adults, 18 -29 (percent)	28%
People with disabilities (percent)	14%

Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	185	230	285
Ridership Estimate (trips per year)	57,000	73,000	90,000
Fleet size (vehicles required at peak)	5	6	7
Average weekday revenue hours (hours)	52	65	75
Annual revenue hours (hours)	16,400	19,700	23,200
Average wait time at peak (minutes)	10 - 15	10 - 15	13 - 18
Average trip duration at peak (minutes)	10 - 13	11 - 14	11 - 14
Average total walking distance at peak (feet)	500 - 600	400 - 500	550 - 650
Average weekday productivity (passengers perrevenue hour)	3.1 - 4.1	3.2 - 4.2	3.4 - 4.4
Annual operating cost (Millions of USD)	$1.6M	$1.9M	$2.2M
Annual Operating Costs Weekday Service Only (Millions of USD)	$1.3M	$1.6M	$1.8M
Average cost per ride (USD)	$27	$25	$24
Initial Capital Costs (Millions of USD):	$0.3M	$0.4M	$0.45M

Hybrid On-Demand Microtransit and fixed-route

Zone Description: This alternative combines the Greater Keene on-demand microtransit zone to provide coverage and the north-south fixed-route to provide frequent service between key destinations. For any passengers unable to walk to a bus stop, they would be eligible for curb-to-curb service in a microtransit vehicle, meaning that this alternative could replace both the City Express and Friendly Bus services. The hybrid scenario was modeled to operate between 7 AM and 6 PM on weekdays and between 9 AM and 4 PM on weekends.

Zone Size: 25.5 mi^2		**Vehicles Required to operate the Fixed-Route:** 2	**Vehicles Required to operate Microtransit at peak:** 4 - 5
Route Length: 13 miles	**Route Frequency:** 30 min		



Demand Hot Spots: Keene downtown/ Keene Transportation Center, Market Basket, Keene State College, West St. Plaza, Cheshire Medical Center, West Swanzey, Swanzey Town Hall, Marlborough Town Center

Within the zone:	
Population	23,900
Jobs	16,800
Zero-vehicle households (percent)	10%
Households in poverty (percent)	14%
Older adults, 65+ (percent)	17%
Young adults, 18 -29 (percent)	32%
People with disabilities (percent)	15%

Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	280	315	350
Ridership Estimate (trips per year)	90,000	100,000	110,000
Microtransit Fleet size (vehicles required at peak)	4	4	5
Fixed-Route Fleet Size	2	2	2
Average weekday revenue hours (hours)	62	67	74
Annual revenue hours (hours)	20,500	22,300	24,400
Average wait time at peak (minutes)	10 - 15	11 - 16	12 - 17
Average trip duration at peak on microtransit (minutes)	10 - 13	10 - 13	11 - 14
Average total walking distance at peak on Microtransit (feet)	550 - 660	550 - 650	550 -650
Average weekday productivity on Microtransit (passengers per revenue hour)	3.3 - 4.3	3.7 - 4.7	4.0 - 5.0
Annual cost (Millions of USD)	$2.0M	$2.1M	$2.3M
Annual Operating Costs Weekday Service Only (Millions of USD)	$1.5M	$1.6M	$1.8
Average cost per ride (USD)	$22	$21	$21
Initial Capital Costs (Millions of USD):	$0.52M	$0.52M	$.57M

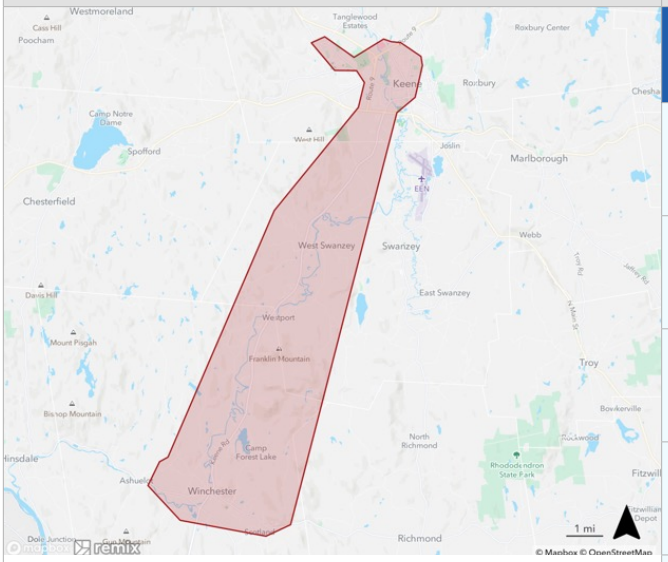
6.3.2 Alternatives Beyond Greater Keene

Winchester-Keene Pre-booked Microtransit

Zone Description: This zone would provide demand-response transit along the Route 10 corridor between Keene and Winchester. Due to the size of the zone, trips would need to be pre-booked (rather than on-demand) to provide passengers with consistent and reliable service. Given the lack of pedestrian infrastructure in most of the zone, the service would mostly be curb-to-curb outside of Keene. Passengers traveling to other parts of Keene could transfer to local Keene transit services at the Keene Transportation Center. This alternative was modeled using service hours from 7 AM to 6 PM on weekdays and 9 AM to 4 PM on weekends.

Zone Size: 31 mi^2

Vehicles Required: 1 - 2



Demand Hot Spots: Downtown Keene, Keene Transportation Center, Market Basket, West Swanzey, Conant Public Library, Winchester Town Center, Applewood Rehabilitation Center, YMCA

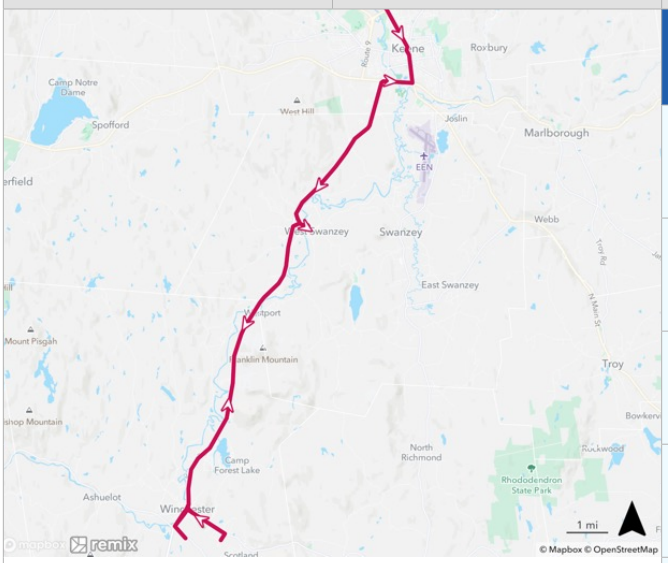
Within the zone:	
Population	15,800
Jobs	9,700
Zero-vehicle households (percent)	8%
Households in poverty (percent)	16%
Older adults, 65+ (percent)	16%
Young adults, 18 -29 (percent)	33%
People with disabilities (percent)	17%

Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	45	70	100
Ridership Estimate (trips per year)	14,000	22,000	31,000
Fleet size (vehicles required at peak)	1	2	2
Average weekday revenue hours (hours)	11	20	22
Annual revenue hours (hours)	3,600	5,700	6,800
Average difference from requested pickup time at peak (minutes)	18 - 23	11 - 16	25 - 30
Average trip duration at peak (minutes)	26 - 29	28 - 31	31 - 34
Average total walking distance at peak (feet)	0	0	0
Average productivity (passengers per revenue hour)	3.4 - 4.4	3.1 - 4.1	4.0 - 5.0
Annual cost (Millions of USD)	$0.3M	$0.5M	$0.6M
Annual Operating Costs Weekday Service Only (Millions of USD)	$0.3M	$0.5M	$0.5M
Average cost per ride (USD)	$25	$25	$21
Initial Capital Costs (Millions of USD):	$0.1M	$0.15M	$0.15M

Keene - Winchester Bus Route

Route Description: This alternative would provide transit connections along the Route 10 corridor between Winchester and Keene, passing through areas of North and West Swanzey. It would operate every two hours and take approximately 55 minutes in each direction. The modeling assumes weekday service hours between 7 AM and 6 PM with 5 round trip runs per day. Weekend hours are between 9 AM and 4 PM with 3 runs per day.

Length: 35 miles	**Frequency:** 120 min.	**Vehicles required to operate the service:** 1	**Daily Runs:** 5



Bus Stops (* indicates demand hot spot): Winchester School, Conant Public Library (Winchester center), West Swanzey, Market Basket*, Keene Transportation Center*, Cheshire Medical Center*

Within a quarter mile of the route:	
Population	9,600
Jobs	8,100
Zero-vehicle households (percent)	9%
Households in poverty (percent)	19%
Older adults, 65+ (percent)	11%
Young adults, 18 -29 (percent)	50%
People with disabilities (percent)	16%

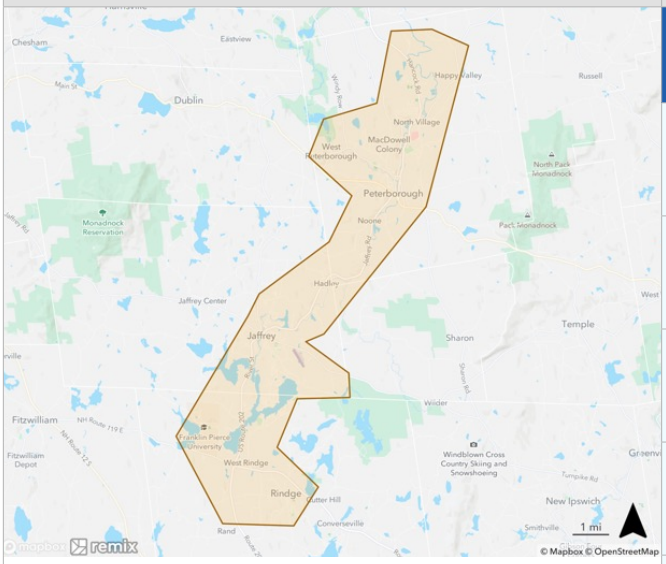
Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	38	45	52
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	12,000	14,000	16,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 3,100		**Annual Vehicle Miles:** 57,000	
Annual Operating Costs: $0.3M		**Annual Operating Costs Weekday Service Only:** $0.25M	
Estimated Operating Cost per Trip (med. Demand): $21		**Weekday Productivity (passengers per vehicle hour):** 3 - 5	
Initial Capital Costs: $180,000			

East Monadnock Region (Peterborough, Jaffrey, Rindge) Pre-booked Microtransit

Zone Description: This zone would provide demand-response transit in a corridor between West Rindge and Peterborough. Due to the size of the zone, trips would need to be pre-booked (rather than on-demand) to provide passengers with consistent and reliable service. Given the lack of pedestrian infrastructure in most parts of the zone, the service would mostly be curb-to-curb, with exceptions for parts of downtown Peterborough and downtown Jaffrey. If the Peterborough-Keene bus alternative gets implemented, this zone could provide connections to the route and enable easier travel to Keene. Service for this alternative would operate on weekdays from 7 AM to 6 PM and on weekends from 9 AM to 4 PM.

Length: 36 miles

Vehicles Required: 1 - 2



Demand Hot Spots: Downtown Peterborough, Peterborough Shopping Plaza, Monadnock Community Hospital, Downtown Jaffrey, Market Basket West Rindge, Walmart West Rindge, RiverMead Lifecare Community

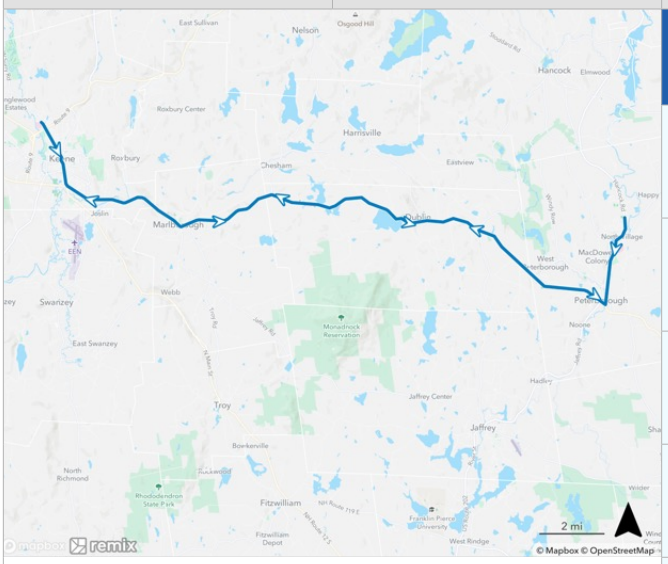
Within the zone:	
Population	11,600
Jobs	8,100
Zero-vehicle households (percent)	6%
Households in poverty (percent)	7%
Older adults, 65+ (percent)	23%
Young adults, 18 -29 (percent)	13%
People with disabilities (percent)	13%

Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	20	35	50
Ridership Estimate (trips per year)	7,000	11,000	16,000
Fleet size (vehicles required at peak)	1	2	2
Average weekday revenue hours (hours)	11	20	22
Annual revenue hours (hours)	3,600	5,400	6,400
Average difference from requested pickup time at peak (minutes)	12 - 17	6 - 11	9 - 14
Average trip duration at peak (minutes)	24 - 29	22 - 27	22 - 27
Average total walking distance at peak (feet)	0	0	0
Average productivity (passengers per revenue hour)	1.5 - 2.5	1.4 - 2.4	1.8 - 2.8
Annual cost (Millions of USD)	$0.3M	$0.5M	$0.6M
Annual Operating Costs Weekday Service Only (Millions of USD)	$0.3M	$0.4M	$0.5M
Average cost per ride (USD)	$51	$47	$38
Initial Capital Costs (Millions of USD):	$0.1M	$0.15M	$0.15M

Keene - Peterborough Bus Route

Route Description: The Keene-Peterborough bus would run between the City of Keene and Peterborough on the Route 101 corridor with stops in Dublin and Marlborough Town Center. The Route would run every two hours, making 5 round trips per day between 7 AM and 6 pm on weekdays and 3 round trips on weekends between 9 AM and 4 PM.

Length: 50 miles	**Frequency:** 120 min.	**Vehicles required to operate the service:** 1	**Daily Runs:** 5



Bus Stops (* indicates demand hot spot): ConVal Regional High School, Monadnock Community Hospital*, Downtown Peterborough*, Dublin Town Center, Marlborough Town Center, Keene Transportation Center*, Cheshire Medical Center*

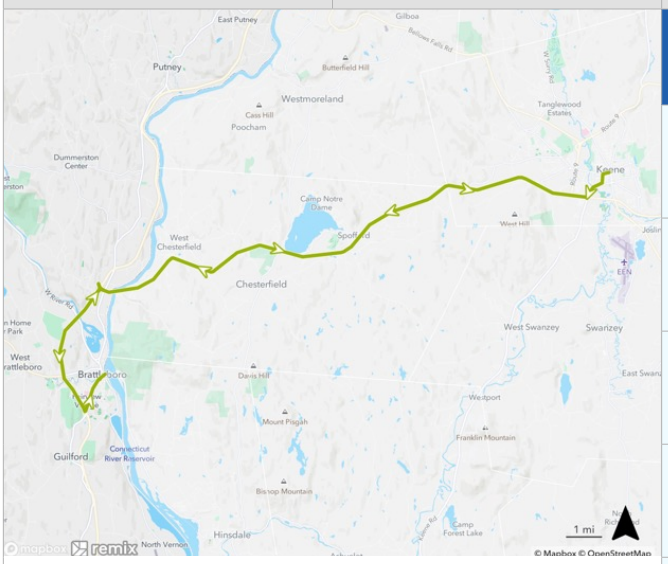
Within the zone:	
Population	9,700
Jobs	9,400
Zero-vehicle households (percent)	11%
Households in poverty (percent)	17%
Older adults, 65+ (percent)	14%
Young adults, 18 -29 (percent)	40%
People with disabilities (percent)	15%

Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	42	50	58
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	13,000	16,000	18,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 3,500		**Annual Vehicle Miles:** 107,000	
Annual Operating Costs: $0.3M		**Annual Operating Costs Weekday Service Only:** $0.25M	
Estimated Operating Cost per Trip (med. Demand): $21		**Weekday Productivity (passengers per vehicle hour):** 4 - 6	
Initial Capital Costs: $180,000			

Keene - Brattleboro Bus Route

Route Description: The Keene-Brattleboro bus would provide connections between Brattleboro, VT and Keene via Route 9. This intercity route would facilitate regional connections to the Amtrak and Greyhound Stations in Brattleboro. It would run every 90 minutes from 7 AM to 6 PM on weekdays and from 9 AM to 4 PM on weekends.

Length: 45 miles	**Frequency:** 90 min.	**Vehicles required to operate the service:** 1	**Daily Runs:** 7



Bus Stops (* indicates demand hot spot): Brattleboro Amtrak*, Brattleboro Memorial Hospital*, Price Chopper, Chesterfield Industrial Park, Walmart, Keene State College, Keene center*

Within a quarter mile of the route:	
Population	8,700
Jobs	9,500
Zero-vehicle households (percent)	11%
Households in poverty (percent)	27%
Older adults, 65+ (percent)	14%
Young adults, 18 -29 (percent)	40%
People with disabilities (percent)	21%

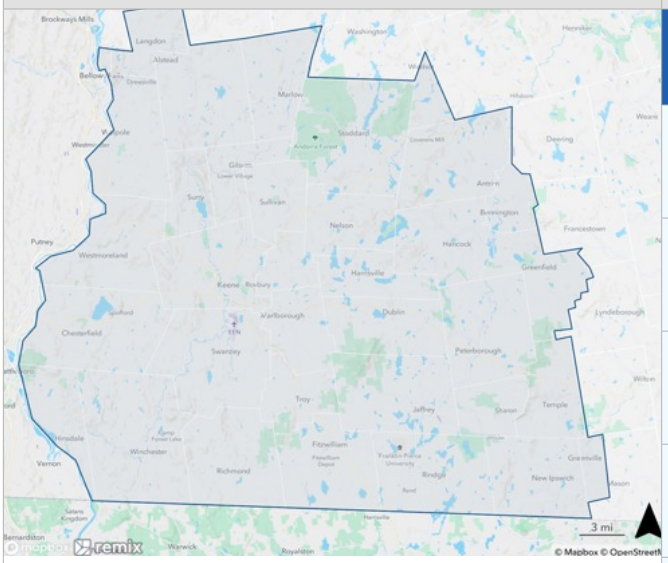
Weekday Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	42	50	58
Annual Demand Estimates			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per year)	13,000	16,000	18,000
Hours, Productivity, and Costs			
Annual Vehicle Hours: 3,300		**Annual Vehicle Miles:** 80,000	
Annual Operating Costs: $0.3M		**Annual Operating Costs Weekday Service Only:** $0.25M	
Estimated Operating Cost per Trip (med. Demand): $20		**Weekday Productivity (passengers per vehicle hour):** 3 - 5	
Initial Capital Costs: $180,000			

SWRPC Region Pre-booked Microtransit

Zone Description: This zone would provide demand-response transit across all of SWRPC's planning district. Due to the size of the zone, trips would need to be pre-booked (rather than on-demand) to provide passengers with consistent and reliable service. To further improve efficiency, trips may be limited to either start or end at key destinations such as grocery stores, town centers, and medical facilities.

Zone Size: 970 mi²

Vehicles Required: 6 - 9



Demand Hot Spots: Keene Town Center, Peterborough Town Center, grocery stores, shopping plazas, Cheshire Medical Center, Monadnock Community Hospital

Within the zone:	
Population	100,000
Jobs	37,000
Zero-vehicle households (percent)	5%
Households in poverty (percent)	8%
Older adults, 65+ (percent)	20%
Young adults, 18 -29 (percent)	16%
People with disabilities (percent)	13%

Ridership Estimates and Simulation Results			
Demand Scenario	**Low**	**Medium**	**High**
Ridership Estimate (trips per weekday)	105	170	245
Ridership Estimate (trips per year)	33,000	54,000	77,000
Fleet size (vehicles required at peak)	6	7	9
Average weekday revenue hours (hours)	65	75	95
Annual revenue hours (hours)	19,700	23,800	29,500
Average difference from requested pickup time at peak (minutes)	20 - 25	25 - 30	23 -28
Average trip duration at peak (minutes)	38 - 43	49 - 54	49 - 54
Average total walking distance at peak (feet)	0	0	0
Average productivity (passengers per revenue hour)	1.2 - 2.2	1.7 - 2.7	2.1 - 3.1
Annual cost (Millions of USD)	$1.9M	$2.3M	$2.8M
Annual Operating Costs Weekday Service Only (Millions of USD)	$1.6M	$1.9M	$2.3M
Average cost per ride (USD)	$56	$42	$36
Initial Capital Costs (Millions of USD):	$0.4M	$0.45M	$0.55M

6.4 Summary and Recommendations

The previous section presents 12 different transit alternatives for Southwest New Hampshire. It is unlikely that all alternatives will be initially implemented due to limited funding and operational constraints. This section of the report is intended to help decision-makers and the community determine which alternatives should be prioritized by providing comparisons between various options. At the end of this section, the project team's recommendations for a phased implementation of alternatives are outlined.

The first set of alternatives covers a similar geographic area and focuses on Keene. These alternatives include the three on-demand microtransit alternatives, two fixed-route alternatives, and a hybrid approach. Because these alternatives cover similar geographic areas, it is recommended that only one option be implemented. Of the three on-demand microtransit alternatives—the City of Keene, Keene Urban Area, and the Greater Keene zones—the Greater Keene zone is the most promising. It is likely to be the most successful because it prioritizes covering areas with the most demand, regardless of municipal boundaries, and is therefore the only Keene-based microtransit option discussed from this point forward in the report. The table on the next page outlines the overall ridership, vehicle requirements, and costs of each alternative compared to HCS' current service. For fixed-route options that assumes the Friendly Bus continues to operate, the estimates below include the ridership and costs of continuing that service.

Alternative	Weekday Demand Estimates	Annual Demand Estimates	Peak Fleet Size	Annual Cost (7 days / week)[25]	Annual Cost (weekdays)[26]	Cost per Trip
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / year	$ / Trip
Keene Circulator Bus Route + Friendly Bus	200	53,000 - 86,000	4	$1.2M	$1.1M	$20
Greater Keene Microtransit	280	79,000 - 99,000	5	$1.7M	$1.4M	$19
East-West + North-South Bus Routes + Friendly Bus	240	66,000 - 91,000	5	$1.6M	$1.4M	$21
Hybrid Microtransit and North-South Bus Route	315	90,000 - 110,000	6	$2.1M	$1.7M	$21
HCS Red and Black Routes + Friendly Bus (2019)[27]	170	43,000	5	N/A	$0.7M	$16

[25]Service Hours: Monday - Friday 7 AM - 6 PM, Saturday - Sunday 9 AM - 4 PM.
[26]Service Hours: Monday - Friday 7 AM - 6 PM.
[27]HCS services run weekdays between 8:00 AM and 4:30 PM.

Of the two alternatives that cover the Winchester-Keene corridor, the pre-booked microtransit alternative is expected to have higher ridership but also a higher cost as it requires a second vehicle. Because the two options cover a similar geography, it is recommended that only one be implemented. Either alternative could be complemented by the Greater Keene alternatives above and allow for transfers at the Keene Transportation Center, thus improving access to other destinations. As noted previously in the report, the advantage of the Pre-booked Microtransit service is that it would offer curb-to-curb service and potentially cover more origins and destinations. However, the fixed route service would be beneficial to riders preferring a predictable schedule. The table below compares the two options.

Alternative	Weekday Demand Estimates	Annual Demand Estimates	Peak Fleet Size	Annual Cost	Cost per Trip
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / Trip
Winchester - Keene Pre-booked Microtransit	70	14,000 - 31,000	2	$0.5M	$24
Winchester - Keene Bus Route	45	12,000 - 16,000	1	$0.3M	$21

Unlike the previous sets of alternatives, the remaining options each cover a different geography and could all be implemented without duplicating service. The two East Monadnock Region-focused alternatives, shown in the next table, overlap in Peterborough but provide different services. The pre-booked microtransit zone would provide connections within Peterborough and nearby towns of Jaffrey and Rindge, whereas the fixed-route alternative would provide connectivity between Keene and Peterborough. If both alternatives were implemented, the microtransit service could complement the fixed-route by providing first/last-mile connections to the bus. Like the Winchester alternatives, if the Keene-Peterborough alternative were to be implemented, passengers could travel to the Keene Transportation Center to reach other parts of Keene. Of the two alternatives, the fixed-route between Peterborough and Keene would likely have higher ridership and cost less than the East Monadnock Region microtransit option.

Alternative	Weekday Demand Estimates	Annual Demand Estimates	Peak Fleet Size	Annual Cost	Cost per Trip
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / Trip
Keene-Peterborough Bus Route	50	13,000 - 18,000	1	$0.3M	$20
Eastern Monadnock Pre-booked Microtransit	35	7,000 - 16,000	2	$0.5M	$47

The last table shows the two alternatives that are focused on other regional transit connections that offer very different services. The first is the Keene to Brattleboro bus, which would provide connections between two larger cities in New Hampshire and Vermont and allow New Hampshire residents additional connections to regional transit (Greyhound and Amtrak). The Southwest Regional Pre-booked Microtransit service would provide transit opportunities to any town in SWRPC's jurisdiction. While this microtransit alternative could serve up to 50,000 riders per year, it is one of the most costly alternatives with an expected average cost per trip of 46 dollars.

The project team recommends that transit improvements be implemented first in the Greater Keene area for several reasons. First, this area has the highest concentration of population and jobs, resulting in the greatest impact and reach. In addition, the Keene-based alternatives also represent the lowest cost per trip, providing the greatest value for money. Finally, since transit services are already in operation in this area, operated by HCS, these alternatives are likely the quickest and easiest to implement.

After improving transit in the Greater Keene area, the project team suggests expanding transit to new areas (Winchester and the East Monadnock Region as part of a second phase). These areas have smaller population centers, and many of the alternatives provide connections to Keene, where there are more resources and job opportunities. However, these trips would be more costly to serve and harder to implement since there is no current public transit operator in some of these areas. Third, the project team recommends investment in the other regional alternatives, which would require significantly more funding and coordination between municipalities.

This phased approach eases the initial funding and operational requirements needed at one time to serve the area and prioritizes the alternatives that are most feasible, serve the most people, and are the most cost-effective. Because local funding matches may be required for implementation (if using federal funds), municipalities that are more willing to support local services may get prioritized sooner. Additionally, certain operating parties may have preferences over certain alternatives, which could also dictate which alternatives get implemented and when.

Alternative	Weekday Demand Estimates	Annual Demand Estimates	Peak Fleet Size	Annual Cost	Cost per Trip
	Trips / weekday	Trips / year	# of vehicles	$ / year	$ / Trip
Keene-Brattleboro Bus	50	13,000 - 18,000	1	$0.3M	$21
SWRPC Region Pre-booked Microtransit	170	33,000 - 77,000	7	$2.3M	$42

SECTION 7

Implementation Recommendations

7.

Implementation Recommendations

7.1 Operating Model

Determine Managing Governance Structure

In order to implement new or expanded transit services, there needs to be a managing entity that is responsible for the service. Currently, HCS directly operates most public transit services in Southwest New Hampshire. They could continue as the operator in the region and expand their service offerings to the rest of the region. Alternatively, if HCS opts to no longer provide transit services or would like to only operate the transit services within Keene, another entity will be required to manage any other new transit services. There are a variety of different types of organizational structures that could manage public transit in the Region, and include:

- **Municipal Transit System:** Municipal Transit System: A municipal transit system would involve the City of Keene (or another municipality) managing the public transit service. The municipality could operate transit service in-house using municipal staff and vehicles or contract the operations to a third-party vendor (a purchased transportation model). As the municipality may not currently have sufficient staff and infrastructure to operate and manage transit service, a purchase transportation model could be compelling. Alternatively, a primary advantage of creating a municipal transit system is that the municipality could have a greater degree of local control over service delivery. To access federal and state transit funding for capital programs and operations, the municipality would need to become a designated subrecipient of FTA funds. As a subrecipient of FTA funds, the City could have access to FTA Section 5339 funds which could be used to help fund a new intermodal transportation center, a project that the City nominated for a Congressional Directed Spending project in 2021. In New Hampshire, towns and cities can establish transit authorities without legislative consent under RSA 38A. Municipalities can also use their bonding and taxing authority to support public transit services.

- **County Transit System** County Transit System Similar to a municipal transit system, Cheshire County (which covers SWRPC's jurisdiction) could manage the transit service either directly or through third-party vendors. One advantage of a county-led transit system is that its jurisdiction covers most of the alternatives presented in this study and could provide a unified transit system in the Region. Like municipalities, counties have bonding and taxing authority.

- **Inter-Municipal Regional System** Inter-Municipal Regional System: One way multiple municipalities can form a transit managing entity is through a Regional Transit District which is authorized in New Hampshire under RSA Chapter 38-B.[28] Cities and towns can form or join a Regional Transit District through a majority vote through their city council or by way of a town meeting. RSA 38-B sets up Regional Transit Districts to be governed by a regional transit district board. Representatives on the board are appointed by a city council or selectboard, and each city or town is provided a certain number of seats depending on their population size. In the case of Southwest New Hampshire, the City of Keene would have 3 voting representatives, and all other municipalities would have 2 voting representatives. Among the powers and duties of a regional transit district, districts can purchase, hold, lease or use real or personal property for the purposes of operating a public transit system, can accept gifts, grants, or loans of money or other property, adopt rules governing the operations and affairs of the district, and set fares. Each year the regional transit district board would prepare a proposed budget for the next fiscal year and request an amount from each member city or town based on a fair-share formula adopted by the board. The primary advantage of the Regional Transit District is to consolidate resources from multiple parties to address the shared challenge of mobility in Southwest New Hampshire. The combined resources of the member municipalities would significantly exceed the capacities of any single member municipality to fund and operate public transportation. Likewise, the economy of scale of a larger service area and scope of operations could result in more cost-effective service than a scenario in which each member municipality pays for separate transit services.

  Another alternative is what is sometimes referred to as a Joint Powers Agreement (JPA), which is permitted in New Hampshire under RSA Chapter 53-A. A JPA is a legal relationship entered into by two or more government agencies or municipalities to establish a joint approach to work on a common problem or fund a common project, such as public transportation. Unlike a Regional Transit District, a JPA is not restricted to only municipalities. Additional entities recognized by the State of New Hampshire as political subdivisions can be a party to the agreement including but not limited to counties, municipalities from other states, school districts, school administrative districts, village districts and other special districts. Like a Regional Transit District, JPAs are typically overseen by a board with representatives from each participating entity. Sometimes, JPAs award proportional representation to each member entity (in terms of board seats) that reflects the relative contributions of each of its members. This ensures that representation is equitable and proportional to the local funding each member contributes to the JPA. The JPA has similar consolidation and economies of scale benefits to a Regional Transit District. While the JPA would still face the same challenges in accessing state and federal formula funding as would a municipal transit system or a regional transit district, in New Hampshire JPAs are also authorized under RSA 53-A:6 to issue bonds.

- **Nonprofit organization** Similar to how HCS currently operates and manages the transportation system, a different nonprofit organization, such as Southwestern Community Services (which operates transit in nearby Sullivan County) or CVTC (which operates a volunteer driver program), could expand their services to provide the transportation alternatives outlined in this study. One advantage is that nonprofit organizations can become eligible for FTA funding. Nonprofit agencies often have clear missions that are independent of municipalities and politics. Nonprofits also have access to other funding sources such as from private donors. However, if a new nonprofit organization was established to provide these transit services, it would face the same startup challenges outlined for a municipal transit system.

[28] Source: https://www.nhmunicipal.org/town-city-article/laws-governing-inter-municipal-regional-cooperation

Determine Operating Model

Once the managing entity is determined, they will need to decide how they would like to operate the transit services. There are two possible options. The first is that the managing entity directly operates the transit services, including hiring and managing staff and drivers and procuring vehicles. If a microtransit alternative is selected, they will need to procure a software platform to manage the requests and routing (Procuring Microtransit Technology). The other alternative would be that the managing entity contracts with a third-party vendor who will provide the operations, as well as a microtransit software platform (if required). This partnership model may be described as Transportation-as-a-Service (TaaS), or as a "turnkey" model. Turnkey services are typically easier to scale up quickly compared to agency-operated alternatives, as third-party vendors can flex vehicle supply or extend operating hours more easily than transit agencies. Disadvantages of using a turnkey model include reliance on a vendor for all aspects of service delivery and less direct agency control over operational decisions (potentially including vehicle make/model, driver recruitment and pay, and maintenance). However, a well-designed contract can address many of these concerns. A turnkey model is specifically recommended for managing entities that are new or do not already have the capacity, staff, vehicles, and other capital assets required to operate transit services.

7.2 Funding

A common challenge that agencies face when launching new services or expanding existing services is identifying and securing sustainable funding for initial capital and ongoing operating costs. One of the first steps in implementing any of the alternatives will be determining how the service will be funded. The subsequent sections outline several potential funding sources, including federal funding programs, local funding, and fares. For details on HCS' current funding sources, see Section 4.5.4 Funding.

7.2.1 Federal Funding

Despite federal resources accounting for only 17% of overall public transit funding in the United States, it can be an important component for launching microtransit and fixed-route services. The Federal Transit Administration (FTA) began recognizing microtransit as public transportation in 2016, allowing formula funds to be used for microtransit projects. Depending on a transit agency's preferred approach, federal funding can be used in different ways and requires different levels of local match.

Federal funding mainly comes in two forms:

1. **Formula funds** are apportioned to all states including New Hampshire. The New Hampshire Department of Transportation (NHDOT), acting on behalf of the State, then distributes these funds to transit agencies or cities based on area population, existing transit service, and other factors. Examples of formula funds that are often used for on-demand and fixed-route transit services include:

    - **5310 Enhanced Mobility of Seniors & People with Disabilities** – Funding for transit services that improve mobility for seniors and individuals with disabilities (Enhanced Mobility of Seniors & Individuals with Disabilities program). 5310 funded projects could include buses and vans, wheelchair lifts, transit-related information technology systems, and acquired transportation services. 5310 funding requires a 20% match for capital expenses and a 50% match for operating expenses. However, NHDOT has indicated that the turnkey operating model described above is treated as a capital expense even if it is paying for operating services.

    - **5311 Formula Grants for Rural Areas** – This program provides formula-based funding for capital, planning, and operating expenses for public transportation in rural areas. Other states have used this funding to support microtransit services. The federal share is 80 percent for capital projects, 50 percent for operating assistance, and 80 percent for Americans with Disabilities Act (ADA) non-fixed route paratransit service. For a turnkey service, the federal share is 65 percent of contracted expenses.

    - **5307 Urbanized Area Formula Grants** – This is not applicable for Southwest New Hampshire as this is funding is specifically for urban areas (urban regions with more than 50,000

population).

- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)**[29] – The CMAQ grant program is administered by the Federal Highway Administration to support projects and programs that work to improve air quality and maintain or attain the requirements set forth by the Clean Air Act. In New Hampshire, this discretionary grant program is administered by NHDOT.
- **Bus or Bus Facilities Capital Program (Section 5339)** – Administered by FTA, this discretionary grant program provides capital funding to agencies and cities that are looking to purchase new public transit vehicles, replace vehicles, or to build or upgrade transit facilities. Eligible applicants include transit agencies, and state or local governments that operate fixed route bus service or microtransit service. Applicants should consider how their projects will improve access and mobility, particularly for underserved communities, and improve system conditions. Grant applications open up annually, typically in the spring, and require a 20% local match.
- **Carbon Reduction Program**[30] – USDOT will distribute roughly $6.4 billion over the next five years ($1.234 billion in 2022) to states and metropolitan planning organizations (MPOs) to reduce carbon emissions in the transportation sector. New Hampshire will receive ~$26 million in cumulative funding for Fiscal Years 2022-2026. This funding can be allocated towards projects that will reduce emissions by helping users take transit; this includes on-demand transportation service technologies such as microtransit.

2. **Competitive grant programs** that are open to transit agencies, as well as cities and states.
   - **Advanced Transportation Technologies and INNOVATION (ATTAIN)**[31] – Administered by the Federal Highway Administration and formerly known as the Advanced Transportation & Congestion Management Technologies Deployment (ATCMTD), this program provides competitive grants for the development of model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment. Grant recipients may use funds under this program to deploy advanced transportation and congestion management technologies, including operating and capital microtransit expenses. As of 2022, $60 million of ATTAIN funding is available annually.
   - **SMART Program (Strengthening Mobility**

[29] FHWA | Federal Highway Administration. 2016. "Congestion Mitigation and Air Quality Improvement Program - FAST Act Fact Sheets - FHWA | Federal Highway Administration." March 10, 2016. https://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm.

[30] FHWA | Federal Highway Administration. 2022. "President Biden, USDOT Announce New Guidance and $6.4 Billion to Help States Reduce Carbon Emissions Under the Bipartisan Infrastructure Law." April 21, 2022. https://highways.dot.gov/newsroom/president-biden-usdot-announce-new-guidance-and-64-billion-help-states-reduce-carbon.

[31] Bipartisan Infrastructure Law Fact Sheets - FHWA | Federal Highway Administration. 2022. "Advanced Transportation Technologies and Innovation." Accessed November 23, 2022. https://www.fhwa.dot.gov/bipartisan-infrastructure-law/attain.cfm.

and Revolutionizing Transportation)[32] – Part of a broader initiative to create "smart cities," USDOT will fund automated vehicle projects, among other initiatives including smart traffic sensors and connected vehicles, that seek to improve access to and coordination of those technologies. Starting in September 2022, applicants can apply for up to $2 million in planning funds and in 2023, can apply to fund the implementation phase. This program is particularly relevant to financing mobility hubs, which often feature several eligible ITS technologies.

- **Low or No Emission Bus Program** – Also known as "Low-No," this funding may be used to lease or purchase low or no emission buses, or to construct or rehabilitate bus facilities to accommodate such buses, including charging infrastructure. Low or no emissions vehicles include zero emission vehicles powered by hydrogen fuel-cells, electric batteries, and overhead catenary wires, as well as other buses which offer emission reductions over standard vehicles. Vehicles can be used for either fixed-route or microtransit service. Applicants should consider the extent to which projects reduce energy usage, air pollution, and greenhouse gas emissions. Grant applications are made available annually, typically in the spring, and require a 20% local match.

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.

7.2.2 State funding

Most state transit funding in New Hampshire comes from the federal government, in the form of formula funds. In the past, a modest amount of State funds have been raised to go towards public transit related capital expenses, though no State funds have been made available for operating expenses. For Southwest New Hampshire, the NHDOT distributes and manages federal transit funding. In New Hampshire, the state Constitution prohibits the use of gas tax revenues for non-highway expenses such as public transit. New Hampshire lags behind other New England states in per capita state spending on public transportation, and recently ranked 49th out of 50 in combined federal and state transit investment per capita.[33]

7.2.3 Local funding

Local and regional funding accounts for most transportation funding in the United States. Local sources include transit fares, local government budgets, sales tax revenues, other tax revenues raised through ballot measures and other mechanisms, and local partnerships. Since NH does not have a state sales tax and does not enable municipalities to set up a local sales tax option, fundraising options are more limited than other states.

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 States have also come from fees, such as for parking, vehicle registration (up to $5 per vehicle), vehicle leasing, rental, and mortgage recording fees. New Hampshire municipalities are authorized to appropriate funds for mass transportation under RSA 47:11-a with either a two-thirds vote of the governing body or a public referendum. For municipalities that operate with the town meeting- style of government, residents would vote on "warrant articles," instead of ballot initiatives, at town meetings, likely either as part of the proposed budget or as a standalone item for transit funding. In New Hampshire, municipalities are also expected to have the option to use Tax Increment Financing Districts as a tool for the provision public transit including operating costs, although there is no known example of this strategy being implemented.

[32] USDOT. 2022. "Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program." August 1, 2022. https://www.transportation.gov/grants/SMART.

[33] Mobility Needs In The State Of New Hampshire https://www.nashuanh.gov/1475/Public-Transportation-Needs-in-New-Hamps

Local partnerships. Key stakeholders in the region could partially fund the transit service. For example, community organizations and nonprofits that believe funding transit services furthers their mission and helps the communities they work in may choose to support transit services. Schools such as Antioch University New England, Franklin Pierce University, or Keene State College may be willing to contribute funding to a new transportation service if it increases access for students and employees, meets climate goals and/or addresses excessive parking expenses. Similarly, assisted-living facilities (many of which already provide transportation services for their residents) may choose to support local public transit initiatives in order to help get their residents to medical appointments or other services in a more cost-effective manner. Like educational providers, healthcare providers may be willing to fund a new transportation service if it helps get patients and employees to their facilities. And similarly, private employers may be willing to support the service if it improves accessibility for their current employees or helps attract new workers. These partners can contribute funding in various ways, including lump-sum annual contributions, direct reimbursements for specific trips, or the purchase of transportation passes for particular groups.

Fare Revenue. While transit fares rarely cover the entire operating costs of a service, low fares can reduce the subsidy required to operate a service. However, high fares can create a barrier to low-income individuals. This means that if the new transit service has significantly higher fares than the current HSC system, ridership could be lower than the demand predictions outlined in this study. Longer routes, such as those connecting Keene with Peterborough or Brattleboro, may justify slightly higher fares.

Local Match for Federal Funding Sources

Most federal funds will require a local match of up to 50% of allocated funds. Depending on the type of funding and operating model, local match requirements may be as low as 20%. Local match requirements also vary for operating and capital expenses (see 7.2.1 Federal Funding for more details). Because many of the alternatives proposed in this study cover more than one municipality, the local match may be shared across these jurisdictions. One way to divide the local match is proportionally based on the percent of the population in each municipality that is covered by the service. For example, the Greater Keene on-demand microtransit zone provides service for 24,000 people, of which nearly 20,000 live in the City of Keene. In this example, the City of Keene could be expected to provide 83% of the local funding match for the service. The table below outlines the local match that may be expected from each municipality, based on the population distribution served by each alternative.

Alternative	Percent of Local Match for Each Municipality										
	Keene	Swanzey	Marlborough	Winchester	Peterborough	Jaffrey	Rindge	Chesterfield	Brattleboro	Dublin	Other
Greater Keene On-Demand Microtransit	83%	13%	4%								
Winchester - Keene Pre-booked Microtransit	66%	17%		17%							
Winchester - Keene Bus Route	72%	14%		15%							
Keene-Peterborough Bus Route	72%		9%		14%					4%	
Eastern Monadnock Pre-booked Microtransit					42%	33%	25%				
Keene-Brattleboro Bus	49%							13%	39%		
SWRPC Region Pre-booked Microtransit	23%	7%	2%	4%	6%	5%	7%	4%		2%	40%

The remaining alternatives, not included in the table above, are fully within the City of Keene.

7.2.4 Additional potential funding sources

Additional potential funding sources include:

- **NEMT Trips Reimbursed by Medicaid.** Customers that are insured by Medicaid can be reimbursed for medical transportation (e.g., trips for doctors' appointments). Public transportation providers can contract with the state agency responsible for Medicaid administration for reimbursement for eligible medical trips taken by their customers. This funding source applies only to microtransit trips.
- **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 in the microtransit app itself. 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.

  Advertising revenue varies significantly depending on the density and visibility of the service. For a service in Southwest New Hampshire, with vehicles that have both in-vehicle screens and vehicle wraps on the outside, advertising could generate a total of approximately $5,000 - $10,000 in annual revenue.

7.3 Launch Planning

After the preliminary service design process is complete and funding is secured, there are several steps before expanding or launching a new bus route or microtransit service. This process can be divided into three phases. During the first phase, the pre-launch process, the operator must procure any technology or vehicles necessary for the service and finalize the service design. After this, the operator can proceed with launch preparations, including training drivers and dispatchers, educating the public, and marketing the new or adjusted service. Once a service has been launched, it is recommended that the service be continually evaluated against a set of predetermined Key Performance Indicators (KPIs).

7.3.1 Pre-launch tasks

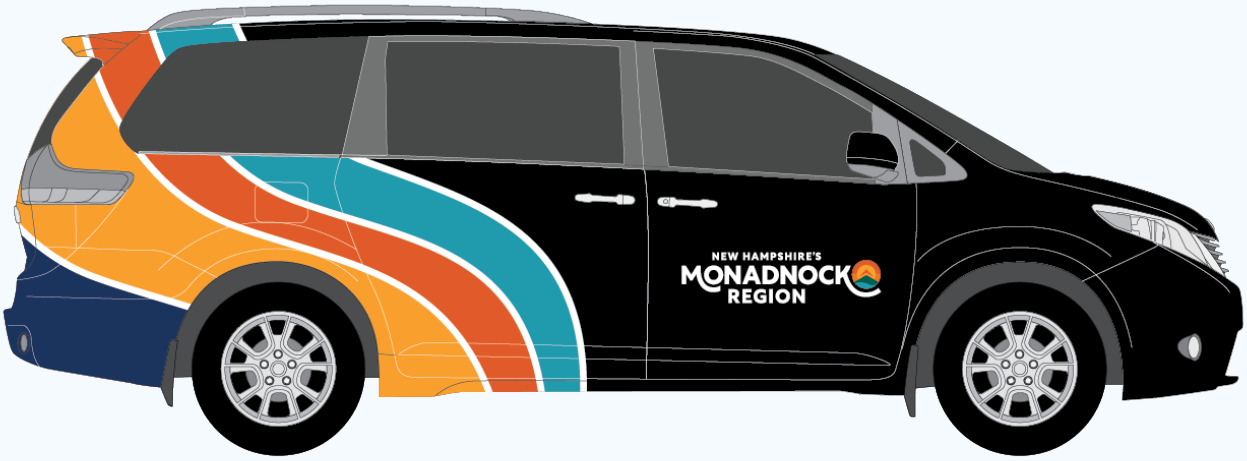
The time taken to launch a new or adjusted transit service in Southwest New Hampshire will vary depending on the alternative selected. For example, if a microtransit service is selected, we advise budgeting between 6 and 12 months from publishing the procurement for any required service through to launch day. If one of the fixed-route bus alternatives in Keene is selected, and HCS continues to manage the service, the launch timeframe can be likely compressed to just a few months. If new vehicles are needed, vehicle procurement timelines are likely to be one of the critical factors for determining the time to launch the service.

Acquire Vehicles

The results in section 6.3 Modeling Results by Alternative outline the estimated number of vehicles needed to serve each alternative during peak hours. The agency should also maintain spare vehicles in its fleet—at least 15% more vehicles than the minimum fleet size needed during peak hours (or a minimum of one spare vehicle if the fleet size is less than 6 vehicles). These additional vehicles may be necessary to cover shift changes or fill in for vehicles that are out for regularly scheduled cleaning or maintenance. Having spare vehicles available also ensures consistent and reliable service in case of a vehicle malfunction or if an incident occurs that requires long-term repairs.

Vehicle types. At this stage, it has not yet been determined who will operate the alternatives. It may be possible to launch the service using HCS' existing fleet, which would result in lower upfront costs. However, new custom-branded vehicles can often help to grow the service by creating awareness, especially if they have an eye-catching design.

Illustrative examples of custom branded vehicles are shown below. The vehicles demonstrate how vehicle branding could be integrated with destination marketing efforts in the region. The service name, branding, and vehicle wraps should be determined based on stakeholder input prior to launch.



If a new fleet is procured for these alternatives, Via recommends different vehicle types depending on the type of service:

- **Microtransit:** Vehicles with at least 6 seats are recommended for a microtransit service. A portion of the fleet should be Wheelchair Accessible Vehicles (WAVs). See section 7.5.1 Customers with limited mobility for more details on WAVs. If a turnkey model is pursued, vehicle specifications are typically included in the contract.
- **Fixed-route buses:** Vehicles with at least 12 seats (such as the Ford Transit, Mercedes Sprinter, or even larger cutaway buses) are recommended for fixed-route services. Larger vehicles are typically better suited to fixed-route services where peak demand may be higher, or for longer journeys such as trips between Keene and Peterborough, Brattleboro, or Winchester.

A list of potential vehicles are shown below. Due to the limited availability of high-capacity electric vehicles, several smaller models are included below though they are not recommended for these services:

Vehicle Table			
Small ICE / Hybrid			
Vehicle	Toyota Sienna	Chrysler Voyager	Ford Connect
Image			
Capacity (incl. driver)	6	6	4
Estimated Cost	$35,000	$35,000	$25,000
Wheelchair Accessibility	$15,000 - $25,000 additional cost	$15,000 - $25,000 additional cost	$25,000 additional cost
Small Electric			
Vehicle	Chrysler/Nissan Leaf	Toyota/Kia Niro	Tesla Model Y
Image			
Capacity (incl. driver)	4	4	4
Estimated Cost	$30,000	$40,000	$65,000
Wheelchair Accessibility	Non-WAV	Non-WAV	Non-WAV

Vehicle Table			
High-Capacity Vehicles			
Vehicle	Ford F450	Mercedes Sprinter	Greenpower EV Star+ (Electric)
Image			
Capacity (incl. driver)	15	13	Up to 24
Estimated Cost	$90,000	$50,000	$235,000
Wheelchair Accessibility	WAV-available	WAV-available	WAV-available

Electric Vehicles. Several stakeholders and members of the public expressed a desire for zero-emission electric vehicles (EVs). As of 2022, most larger EVs are retrofitted vehicles produced by companies like Lightning Motors and GreenPower Motor Company. For example, a retrofitted Ford Transit with 14 seats, a driving range of up to 140 miles (80 kWh battery capacity) and fast charging capabilities is one option.[34] The EV Star is a wheelchair-accessible option that fits 12 passengers including 2 wheelchair spaces. The EV Star has a range of up to 150 miles (118 kWh battery capacity).[35] It is also possible to choose a mixed fleet, with some EVs and some non-electric vehicles.

The table below outlines the key considerations for evaluating whether or not to select an EV versus an internal combustion-powered vehicle. These considerations include cost, environmental impact, and vehicle layout.

Consideration	Benefits and Drawbacks
Cost	**Benefits:** • **Lower energy cost:** The electricity used per km is often cheaper than the fuel used per mile • **Lower maintenance cost:** Less wear & tear (e.g., regenerative braking reduces use of brakes), fewer components to be maintained (e.g., no engine oil changes, no starter or generator), less downtime cost **Drawbacks:** • **Higher list price:** Especially battery, high-voltage components and reduced economies of scale increase up-front cost; in the short term this can be mitigated by subsidies and grant programs that may be available for electric vehicles • **Larger fleet size:** Due to the time taken to charge the vehicles, a larger number of spare vehicles may be needed compared to a non-electric fleet. • **EV charging station installation:** Dedicated EV charging stations for RTC vehicles will need to be installed at strategic locations throughout the zone to facilitate overnight and/or mid-shift charging
Environmental	**Benefits:** • **Reduced emissions:** Locally emission-free service, overall emissions will depend on the electricity source used with up to 100% emission-free transit with energy from renewables • **Reduced noise:** No or very quiet engine noise, especially at low speeds and when stopped **Drawbacks:** • **Increased emissions:** Higher emissions during production can only be mitigated over long lifecycle • **Use of rare materials:** Rare earth and other elements with questionable supply chains (e.g., environmental/social issues in mining) are used in the production, recycling needs to be increased

[34] Source: https://lightningemotors.com//lightningelectric-ford-transit-shuttle/
[35] Source: https://greenpowermotor.com/gp-products/ev-star/

Consideration	Benefits and Drawbacks
Vehicle Layout	**Benefits:** • **More usable space:** More interior space possible due to smaller components at front/ back of the vehicle and no transmission tunnel from front engine to rear wheels, batteries use underfloor spaces **Drawback:** • **Current generation not optimized:** Available vehicles are usually conversions from conventional vehicles and do not yet take full advantage of opportunities for electric vehicle layouts

Procure microtransit technology

If a microtransit service is selected for implementation, a software platform will be required to operate the microtransit service. We recommend requiring the following capabilities at a minimum:

- Dynamic vehicle routing and passenger aggregation (shared rides)
- 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 and trip information
- The ability for administrators/schedulers to book trips on behalf of customers (so customers can book trips over the phone)
- Ongoing technical, operational, and marketing support

Microtransit software contracts are typically subscription-based, priced either by vehicle hour or by the number of vehicles used in a service per month. In other cases, charging is done on a per-passenger or per-trip basis. In some cases, per-unit costs may be lower for larger services as there can be sharing of overhead items like app maintenance. Moreover, since HCS currently pays for dispatch and routing technology for its demand-response services, if a single technology solution is selected that supports multiple services, those resources could help contribute to that technology solution. In addition, some software providers will also charge an "installation" fee
to be paid when a service is first launched.

Finalize fare structure

Most microtransit services charge fares that are comparable to their existing public transit services. HCS currently charges $1 per trip for the City Express service, $2 per trip for Para Express, and operates on a donation basis for Friendly Bus and Medical and Shopping Shuttle trips. Many transit services are moving toward fare-free models, which can eliminate a barrier to using the service and encourage higher ridership.

In general, fares can be set as flat rates per trip or charged by distance or journey length. Fares can also be set as a combination of the two types. For example, a base fare of $2 plus an additional $0.50 for every mile could be charged. Fares should be affordable for residents and offering reduced fares for vulnerable populations like seniors, people with disabilities and low income groups can ensure the accessibility of the service. While it is not recommended to charge fares that mirror the actual cost of a service, fares can still contribute to the economic viability of a service. Farebox recovery ratios measure how much of the total operating expenses are covered by fares. For microtransit services this can vary significantly, however, as a point of reference, a microtransit service in West Sacramento has a farebox recovery ratio of 20%.[36] In the case of the Greater Keene Microtransit alternative, with an estimated cost per trip of $19, to

[36] Source: https://www.bcg.com/publications/2019/on-demand-transit-can-unlock-urban-mobility

achieve a 20% farebox recovery ratio, fares will need to be priced at least at $3.80 per trip. Fares can be used to influence passenger behaviors and encourage certain trip patterns. For example, free transfers between on-demand microtransit and fixed-routes can encourage usage of the on-demand microtransit services as a first/last-mile service. Charging by distance can encourage shorter trips. Finally, different fares can be set for different modes or types of services. Longer fixed-routes (such as between Keene and Brattleboro), may justify a higher fare than a short microtransit or bus trip within Keene.

Finalize service setup

These steps vary depending on the model being implemented and the capital assets required:

- **Microtransit:** Once a software platform is procured, the agency should work with the vendor to finalize the service design. This includes finalizing the zone boundaries, trip restrictions, target quality of service metrics, and service hours. All possible pickup and dropoff locations that the platform can assign trips to are safe places for vehicles to stop. The contractor may be responsible for some of these tasks if a turnkey approach is chosen.
- **Fixed-Route Bus:** Before launching any of the alternatives above, the operator will need to validate trip times, confirm the exact routing and schedule, and finalize the timed stop locations. Some infrastructure may be required at high-ridership stops, such as signage, seating, and curb cutouts. Drivers should be trained on their specific route and schedule.

7.3.2 Launch tasks

The following steps are recommended to prepare for launch:

Drivers and training

The operator of the service should allow time to train drivers in delivering the new or expanded service. For a microtransit service, it is important to train drivers as the technology is likely to be unfamiliar to them at first. This includes teaching them how to use the software platform, best practices for service delivery, and best practices for customer service.

For example, drivers are often inclined to follow their preferred route rather than following directions provided through the microtransit driver app. While a driver's preferred route may be more direct for an individual customer, the microtransit system generates routes that consider all trips, allowing the system to aggregate passengers traveling along a similar route. Non-adherence to routes limits the system's ability to aggregate passengers and can create downstream delays and errors for customers awaiting pickup. Driver training should ensure drivers understand how the microtransit system operates and why adherence to directions provided by the system is essential.

Dispatch and administrative requirements

If a microtransit alternative is implemented, administrative staff (such as dispatchers) will need to be trained to use the microtransit platform. Administrative requirements may include supervision of live service and responding to issues when needed, booking trips for customers making reservations over the phone, and familiarity with microtransit metrics (in order to assess system performance over time). Services of this scale typically require the supervision of one dispatcher at any point in time.

The call center agents should also be trained in the case of emergencies and have procedures in place to ensure the safety of both passengers and drivers. In addition, the agency may choose to create a specific passenger Code of Conduct for public transit users. Offering in-app live support for microtransit users can also be beneficial to passengers and creates an additional level of security offered to riders. Call center agents can also help passengers request rides through the app or troubleshoot any technical issues.

Some cases of service misuse can be unintentional, and users might need additional education on the service. Fraud can result in the form of a small error, a larger disruption, or a serious violation, so make sure the actions you take match the severity of the incident. For example, the reaction to a rider that threatens the safety of others while on a ride should be handled very differently (i.e., immediately blocked) than a rider whose payment fails for the first time (i.e., emailed and asked to provide a new payment method).

Marketing and rider education

Marketing and community engagement are important steps to inform the public about new services, particularly in instances where existing services will be adjusted. Many potential customers will be unfamiliar with these new routes and the concept of microtransit, and will need to learn how to book rides and use the service. This can be done in various ways, including creating a dedicated website for the service, developing informational videos, sharing information on social media channels, and meeting with local community organizations. Please find additional information in Section 7.4 Community Engagement and Marketing.

7.3.3 Post-launch tasks

After a service has been launched, consistent monitoring and additional community engagement activities can be used to inform necessary changes to the system. Service design adjustments can also be made to encourage further growth of the service.

Service evaluation and Key Performance Indicators (KPIs)

After the service is launched, data from a live service can be used to identify opportunities for improvement, and the service can be adjusted accordingly. A microtransit technology platform can provide detailed trip level data for this mode. For fixed-route buses, ridership data is currently collected manually by the driver. Automated Passenger Counters (APCs) can also be installed.

In order to assess the performance of the new service, the agency should set several targets prior to the launch of the service. Potential targets are outlined in the table below:

Metric	Rationale	Targets
Ridership	A successful service must attract riders. If ridership is high, this indicates that the service is providing a useful form of mobility for residents.	Potential ridership targets are shown in the tables in Section 6: Alternatives Analysis. Alternatives Analysis. It is important to note that ridership will grow over time, so it is recommended to allow 6-18 months or longer to reach these levels. Areas where completely new routes are being introduced typically take longer to mature when compared to areas with existing public transit service, such as in Keene.
Efficiency	To ensure the transit service delivers value-for-money, the agency should set targets for the efficiency of the service. Several potential metrics can be used including: ◦ Passengers per vehicle hour (also known as utilization or productivity) ◦ Cost per passenger ride	Estimated efficiency (passengers per vehicle hour) and costs per passenger is provided for each scenario in Section 6: Alternatives Analysis. Alternatives Analysis. As with ridership, the operator should allow 6-18 months for ridership to grow as the service will become more efficient as the density of trips increases.

Metric	Rationale	Targets
Quality of Service	Quality of service can impact ridership. Several possible measures can be collected to measure the quality of a service: • Average passenger wait time (for microtransit) or on-time performance (for bus routes) • Average passenger walking distance (for microtransit) • Average customer satisfaction rating (for both modes) • Percent of seat-unavailable trip requests (for microtransit)	Estimated passenger wait times and walking distances are listed for each scenario in Section 6: Alternatives Analysis. Alternatives Analysis. For customer satisfaction, an average trip rating of 4.6 / 5 or higher is generally considered good. A microtransit rider app can be used to collect feedback after each trip. Customer surveys can be used to collect feedback on fixed-routes. Seat availability for a microtransit service should exceed 95%, ensuring passengers can get a vehicle when requested. This means that passengers will be offered a trip that meets the desired quality of service targets at least 95% of the time.
Accessibility	Transit services are often popular for individuals with a disability. In order to track whether the service is meeting these individuals' needs, there are several possible KPIs: • Customer satisfaction of disabled riders • Average wait times for persons with disabilities requesting wheelchair-accessible vehicles (WAVs) compared to the overall wait times of a microtransit service. • Number of trips made by riders with a disability	One challenge with tracking these metrics is that it may not be possible to know which passengers have a disability. While it can be assumed that all passengers requesting a WAV have a disability, there may be disabled passengers who are comfortable using a standard vehicle. Therefore, this metric may be best tracked through a survey sent to passengers, where individuals may self-identify if they have a disability.
Equity	It is important to track whether or not disadvantaged communities have equal access to a service. One way to measure this is to see if the demographics of riders are proportional to the demographics of the community.	Similar to tracking accessibility, the agency may not know the demographics of each passenger. It may be best to collect this information instead through a survey sent to passengers, where individuals can self-report their race/ethnicity, income, and age.

Service adjustments and growth

In order to sustain growth in ridership, the service should be continually marketed. Fare promotions such as free first rides, referral discounts, and subscription models can also be implemented to attract new riders (see section 7.4.2 Marketing).

7.4 Community Engagement and Marketing

In addition to the community engagement conducted during the planning phases (see section 5. Stakeholder and Community Engagement), we recommend conducting community engagement and marketing activities before, during, and after the launch process to ensure successful implementation.

7.4.1 Community engagement

Public transit plays a crucial role in people's everyday lives, and any changes to these systems — even positive ones — can naturally be a source of apprehension. Service changes have the potential to catch customers unaware, and some customers may even assume they are excluded from the new service offering. Service changes can be particularly fear-inducing for vulnerable populations, for whom public transit serves as a vital lifeline.

Fears can be exacerbated by a lack of information regarding what changes to transit means for the community. Concerns about cost, access for those with accessibility needs, and/or lack of familiarity with technology, service coverage, and more, routinely create opposition to projects before they even get off the ground.

A high-touch and proactive approach to community engagement helps mitigate concerns and can turn those in the community who could be opponents of change into advocates. When launching a new service, support from the community is essential to ensure a smooth launch and set the service up for continued success and growth.

Pre-Launch

Community engagement initiatives can be an opportunity to inform the public and a chance for local leaders to learn more about the community's transit needs and how best to implement a new service. Leading up to the launch of the new or expanded service, the following community engagement channels are recommended:

- **Stakeholder Organizations.** The stakeholder working group established during this study should be enlisted to help in publicizing key information about the service. In addition to the stakeholder list prepared as part of this project, other organizations may include libraries, food pantries, health centers, care 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. Stakeholders can be helpful connections to transit-dependent groups and for microtransit services, ensure these riders have accounts and know how to request rides. Stakeholders can also be trained to book rides on behalf of their clients once the service has been launched.
- **Employers** Similar to stakeholders, major employers in the area can be advocates for transit services, especially for solutions that support their employees getting to work or that attract new employees. Employers can support transit solutions by helping educate or advertise the new services to their employees or customers and may even choose to financially support the service by subsidizing the service, buying passes, or purchasing advertisement space.
- **Customers with high barriers to entry.** By building a list of users who are likely to have trouble accessing the new service, it is possible to conduct phone calls to help them prepare for service changes. For example, if a microtransit service is launched, help can be provided to create accounts and alleviate any concerns they may have. This will be their first interaction with the service 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.** Engage directly with the public through virtual outreach, focus groups, or public meetings held via Zoom or other communication tools. Focus groups can serve as a good opportunity to inform current and potential transit users who may be interested in transit services, like seniors, students, and people without access to a personal vehicle.

Post-Launch

After the service has been launched, community engagement activities can inform continuing improvements to the system. For example, conversations with stakeholders can be useful to see how the service is performing and identify opportunities for improvement. Stakeholder organizations can also play a central role in promoting service to their constituent communities. Surveys and other engagement tools can be used to get better feedback from riders about the service.

7.4.2 Marketing

Marketing is an important step to ensure the public is aware of the new or expanded service, both to ensure existing transit customers are prepared for the changes to the system and to attract new customers to the service. If a microtransit service is selected, many potential customers will be unfamiliar and will need to learn how to book rides and use the service. Creating sustained awareness of the new service prior to launch is essential, and an agency may choose to hire marketing professionals to spearhead service promotion. Some of the following strategies may be useful:

- **Webpage.** Create a dedicated website for all public transit services with key service information.
- **Press release.** Develop a pre-launch press release for distribution in local media that directs readers to the microtransit app or new bus schedule and route map.
- **How-to video.** Create a short informative video on how to use the service and share it on the service website and social media pages.
- **Targeted outreach.** Targeted emails or print and social media advertisements. Targeted outreach, including "how-to" instructions, may be beneficial for particular groups such as seniors living in retirement communities.
- **Community announcements.** Announce service changes in local newsletters and social groups.

The following topics are suggested to be included in the marketing materials, particularly if a microtransit service is selected:

- Instructions on how to book a ride and use the microtransit app
- Safety protocols
- Service zone(s) and/or route maps and timetables
- Service hours
- Expected wait times and walking requirements
- How to request a curb-to-curb ride and who is eligible for this service
- Service fares and ways to pay
- Customer service contact information

Encouraging awareness of service changes through word of mouth is especially important. Generating awareness via word of mouth can be achieved through some of the following approaches:

- **Street marketing.** Placing a wrapped vehicle in highly trafficked areas can increase awareness and encourage conversation about the service.
- **Promotional fare discounts or free rides.** Offer reduced or promotional fares for new users. Suggested promotions include:
  - First (or first 2) rides are free for new users.
  - Refer a new customer, and both parties get a free ride.
  - A friend rides with a paying customer for free.
  - Discounted fares during off-peak periods.
  - Subscriptions such as flat fares for unlimited rides during a certain period (1 day, 1 week, or 1 month).
  - Discounted fares for frequent users, such as getting the 10th ride for free after 9 rides.

Marketing activities should be conducted at each phase of the service's lifecycle:

	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

7.5 Accessibility

A public transit service should prioritize accessibility to ensure all potential customers have access to the service, including passengers with disabilities, and those without smartphones and credit cards. We recommend the following accessibility measures be implemented:

7.5.1 Customers with limited mobility

The service may be operated using HCS's existing fleet of cutaway buses, each of which can accommodate a wheelchair. Alternatively, a new fleet may be acquired for this service. For a fixed-route bus service, all vehicles should be wheelchair accessible. For a microtransit service, the entire fleet does not need to be 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% wheelchair-accessible vehicles (WAV). If the service only has 1-2 vehicles, all vehicles should be WAVs. About two to five percent of trips are expected to require an accessible vehicle. A fleet with 20% WAVs will ensure an equivalent quality of service can be offered for customers using wheelchairs, thus complying with ADA policies.

For fixed-route alternatives, the operator must offer ADA complementary paratransit service within ¾ of a mile from the bus route. For routes located within a microtransit service zone (such as in the Hybrid approach) or fixed-route alternatives that assume the Friendly Bus continues to operate, the demand-response services would satisfy the ADA requirements. For the intercity routes that are not covered by a microtransit service or the Friendly Bus, one way to comply with this requirement would be to have the bus deviate upon request by up to ¾ of a mile from the route to pickup/dropoff passengers. This may impact the on-time performance of the route, but live vehicle tracking and adding a buffer into the schedule could help provide high quality service for all passengers.

To make the microtransit booking process simple for 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, customers 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 choose a more formal process that may require a form or an interview. All current Para Express customers should automatically be eligible for door-to-door service.

Accessible microtransit vehicle

7.5.2 Customers with hearing, vision, or cognitive impairments

Passengers should be able to voluntarily indicate their disability status, either directly through the app or by notifying the customer service agent at the time of booking. 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, concessionary pricing, or notification to the driver to provide additional assistance. Voiceover (reads the text on the screen out loud for those with visual impairments), adaptive font size, and Switch Control app capabilities can also make the request process easier for some riders.

7.5.3 Microtransit Booking

For a microtransit service, 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 on-demand microtransit rides for customers 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.

7.5.4 Payment

Unbanked or underbanked 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 on board the vehicle.

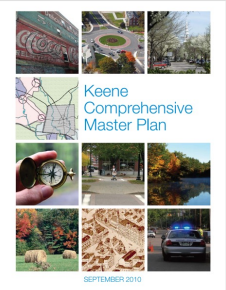
Some agencies choose to have cashless services as cash payments can slow down the boarding process, introduce additional logistics around collecting cash from vehicles, and be more costly for the agency to collect. For riders that prefer paying with cash, there should be opportunities to purchase vouchers or passes at kiosks or key destinations such as recreation centers or grocery stores.

7.5.5 Language

To ensure the service is accessible to non-English speakers, the app can be made available in multiple languages. However, this may not be necessary as over 99% of the residents in the study area speak English, so there is not likely to be significant demand for other languages. Using clear and universal symbols on the app can also make booking easier for non-native English speakers.

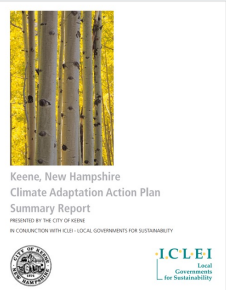
APPENDIX A

Review of Previous Studies and Plans



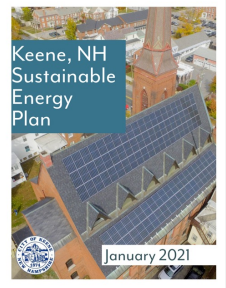
1. Keene Comprehensive Master Plan (2010)

- Clean and efficient transportation has been a long-term goal in Keene.
- Transportation strategies identified:
  - Create linkages between transportation and land use.
  - Establish a park & walk community.
  - Encourage a shift in commuter transportation choice from private vehicles to carpooling and public transit.
  - Adopt a "complete streets" policy and design program.
  - Explore alternative transportation options to improve environmental quality, personal health, and well-being.



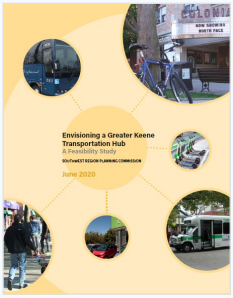
2. Keene, New Hampshire Climate Adaptation Action Plan (2010)

- Transportation infrastructure is an opportunity for improvements in climate resilience. The plan identifies three goals related to transportation:
  a. Create alternative route options for the movements of goods and people.
  b. Design and reconstruct roadways to handle changes in temperature and precipitation as a result of a change in the climate.
  c. Provide sustainable transportation mode choices (locally and regionally), including developing a local public transportation system that connects with the regional one.



3. Keene Energy Plan (2021)

- Keene aims to be a community that is powered by affordable, clean, and renewable energy by 2050 (this includes energy for all ground transportation).
- In 2015, ground transportation was almost half of all GHG emissions in Keene. Less than 0.1% attributed to HCS services. (84% on-road gasoline use).
- Strategies identified: reduce vehicle miles traveled (VMT), accelerate the shift to electric vehicles, promote efficient growth patterns, and conduct ongoing advocacy and information-sharing.
- Further reduce VMT by promoting active transportation and intercity/intracity transit options.

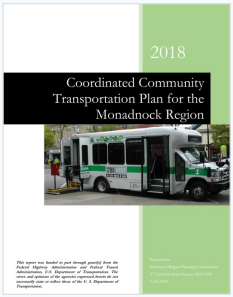


4. Envisioning a Greater Keene Transportation Hub (2020)

- Keene was identified as a regional hub, and this study identifies the need for a multimodal transportation hub.
- The existing Keene Transportation Center is in poor condition and lacks amenities.
- A transportation hub could encourage active transportation modes and discourage driving (the dominant transportation mode).

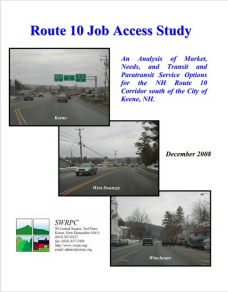
5. Southwest Connects: Southwest Region Transportation Plan 2014 - 2035

- Transport system goals include:
  - To support and enhance the regional economy.
  - Preserve resources (natural, cultural, and historic).
  - Provide timely access to goods, services, recreation, entertainment, and community connections.
- Significant challenges include jurisdictions/administration, topography, and geographic distances.
- The expansion of City Express is constrained by limited funding.
- Suggests that West Swanzey and Winchester would benefit from transit connections to Keene.



6. Coordinated Community Transportation Plan for the Monadnock Region (2018)

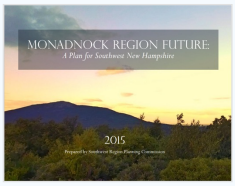
- Medical facilities are the most common destinations for POS-supported rides.
- Ridership is heaviest in the morning and is constant year-round.
- A core group of "super volunteers" provide most POS-supported rides.
- Most of the transportation funding in the region comes from federal sources.
- MRCC's main priority is to "sustain the community transportation services that are currently provided, and through coordination activities, try to improve service quality, efficiency, and effectiveness."



7. Route 10 Job Access Study (2008)

Route 10 corridor includes Keene, Swanzey, and Winchester (6,000 people within ½ mile).

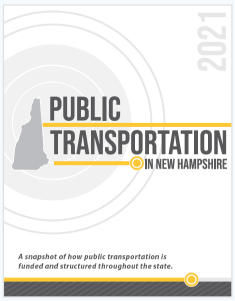
- A Route 10 bus connected to City Express would improve accessibility for 80% of the areas workforce and low-income households
- 59% said they would use public transit; 69% would use a shuttle to reach employment
- The most ridership could be gained through a demand-response service (estimated 80,000 annual trips)
- Also recommended rideshare promotion with an emergency ride home program and a commuter shuttle



8. Monadnock Region Future: Plan for Southwest New Hampshire (2015)

The community identified wanting more transportation options and improved infrastructure, specifically:

- Fixed-route service expanded beyond Keene
- Mobility options for an aging population
- Innovative financing tools to fund transportation
- Non-motorized options
- Increased considerations for land use planning
- Complete street policies for active transportation
- Cost-effective solutions
- Consider energy and climate change in transportation planning
- Safer walking & biking infrastructure
- Increased trail connectivity



9. Public Transportation in New Hampshire (2021)

- The state-wide snapshot covers the current state of public transportation in New Hampshire, including demographics of riders, service models, funding, and profiles on each of the state's transit agencies.
- The vision for the state's future includes four goals:
  1. Better serve older populations,
  2. Connect people to employment and services,
  3. Build ridership to improve transit system productivity, and
  4. Continue to improve service coordination.
- In the profile on HCS, the multimodal transit center in downtown Keene is noted as a success. The report also emphasizes three main challenges facing HCS:
  1. An aging population
  2. Insufficient operating funds for demand-response service.
  3. Attracting younger riders

10. Microtransit in the Monadnock Region: Factors of Feasibility (2021)

This white paper written by SWRPC defines microtransit, outlines the history of demand response technology in the United States, and discusses essential factors when evaluating microtransit feasibility. Within the paper SWRPC categorizes multiple types of Microtransit:

- On-demand zone-based service,
- Last-mile/first-mile feeder to fixed-route service,
- Point deviation,
- and Flex route.

Key learnings to successfully implementing microtransit include:

- Considering a customer-first approach that prioritizes transit needs over technology.
- Educating and promoting services as microtransit will be new to most Monadnock region riders.
- Co-mingling paratransit services with microtransit can offer cost savings compared to traditional ADA paratransit service (however, microtransit is usually more expensive than fixed-route bus service in areas with high demand).
- Measuring success and analyzing microtransit data after launch can help optimize a service. Factors to consider include ridership, VMT, passengers per vehicle hour, deadhead mileage, costs, average wait times, reliability, greenhouse gas emissions, and demographic and socioeconomic diversity of ridership.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