

NH 120 Claremont-  
Lebanon/Hanover Transit  
Planning Services

Final Report



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# Chapter 1 Introduction

## Overview

The Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) is collaborating with the Community Alliance Transportation Services (CATS) to study the feasibility of north-south transit services between Claremont (south) and the Lebanon/Hanover (north) area in New Hampshire (NH). UVLSRPC, a not-for-profit, voluntary association of 27 municipalities in western NH, and CATS, a public transit service of the Community Alliance of Human Services (CAHS) are specifically considering transit service along the NH Route 120 Corridor.

The study area for this analysis includes sixteen towns, most of which are in New Hampshire and several in Vermont. The five towns through which NH 120 runs are Claremont, Cornish, Plainfield, Lebanon, and Hanover. The eleven additional towns that serve as a catchment area include Newport, Croydon, Grantham, Enfield, and Canaan in New Hampshire, and Weathersfield, Windsor, West Windsor, Hartland, Hartford, and Norwich in Vermont. This area covers approximately 650 square miles, and has a population of more than 82,000 people.

UVLSRPC retained a study team comprised of Nelson\Nygaard Consulting Associates and Smart Mobility to conduct the technical analysis of the transit feasibility study for the Corridor. The Steering Committee and Nelson\Nygaard Consulting Associates (“the study team”) carried out the transit feasibility study through a deliberate process that involved data collection, mapping and analysis, and input from members of the community and the public. The study team adhered to an iterative process whereby the consultant team collected and analyzed data and then presented findings to the Steering Committee. This committee played an active role in interpreting the findings and applying them to local conditions. Once the study team agreed upon a proposed transit service, the findings were presented to members of the public for their comment and input. After members of the public weighed in on the service design, the study team developed a draft final service design.

This Draft Final Report documents the feasibility study. It includes all background research and findings and describes the service development process. The report also lays out an operational plan for the proposed NH 120 Transit Service and highlights potential funding. The Draft Final Report is organized around eight chapters, immediately following this introductory chapter:

- **Chapter 2: Existing Services** – describes the available transit services in the study area.
- **Chapter 3: Community Profile** – documenting the demographics and transportation needs within the study area.
- **Chapter 4: Stakeholder, Employer, and Employee Input** – providing the results of interviews of stakeholders and employers, as well as an employee survey.
- **Chapter 5: Service Development** – a summary of needs within the study area and characteristics of good transit service.
- **Chapter 6: Proposed NH 120 Transit Service** – a description of the propose service from NH 120.

- **Chapter 7: Public Input and Service Refinement** – guidance from the public to further tailor the proposed service to their needs.
- **Chapter 8: Implementation and Funding** – details regarding how the proposed service can be put in place and sustained.

## Chapter 2 Existing Transportation Services

As a first step in evaluating the potential for transit service along NH 120, the study team inventoried transportation resources currently available in the study area. The purpose of the inventory is to examine the extent to which existing services meet the regional needs and understand how a potential new service along NH 120 could best be integrated with these existing services. As part of the evaluation of existing transportation services, the study team also reviewed previously prepared plans, studies, and other documents that relate to the NH 120 corridor. The results of this document review are included with this report as Appendix A and the findings are woven throughout the analysis.

### Public Transportation Services

For purposes of this study, public transportation is defined as any service that can be used by any member of the public willing to pay a fare. Thus, private taxi companies or shuttle services, which may have high fares, are still considered public because they are available to anyone. Using this definition, there are a variety of providers with service in the NH 120 study area. The region is fairly unusual in that it has a high concentration of services. Most of the available services, while public, are specialized; they are commuter services specifically designed to bring commuters from outlying communities, especially from communities in Vermont, into the Hanover/Lebanon area. Many of these commuter services provide connections to Advance Transit, while others offer direct connections to the major employers, namely Dartmouth-Hitchcock Medical Center (DHMC). A description of these services is provided in the following text, summarized in Table 2-1, and mapped in Figure 2-1. Individual fixed route service maps are provided in Appendix A.

### Community Alliance Transportation Services

Community Alliance Transportation Services (CATS) are transportation services provided by the Community Alliance of Human Services, based in Sullivan County. CATS provides fixed route service connecting Charlestown, Claremont, Newport, and Unity, beginning at 6:30 am and continuing until 5:00 pm, Monday through Friday (with the exception of major holidays). In addition, CATS provides curb-to-curb demand response service in and between Claremont, Unity, and Charlestown for older adults and persons with disabilities.

### Advance Transit

Advance Transit (AT) operates a fare-free transportation system in eastern Vermont and western New Hampshire. Communities served include the towns of Hanover, Norwich, Wilder, Hartford Village, White River Junction, Lebanon, and West Lebanon, as well as Dartmouth College and the DHMC. Major transfer points are in West Lebanon, Lebanon, and at Vail/Dartmouth Medical School. Advance Transit operates five routes and two shuttles, as well as ADA complementary paratransit service, with curb-to-curb transport for qualified passengers with disabilities. All Advance Transit buses have equipment to accommodate wheelchairs on-board, making the fixed route service more accessible to a wider audience. AT operates service Monday through Friday, with most routes starting around 6:00 am and ending between 6:00 and 7:00 pm, with the exception of the Dartmouth/Hanover Shuttle, which operates later into the evening.

## Stagecoach Transportation Services

Stagecoach Transportation Services (Stagecoach) operates service between Randolph, Vermont, and the Lebanon/Hanover area through “The 89er,” which serves Dartmouth College, DHMC, and the VA Hospital. Stagecoach also runs “the River Route” from Wells River to the Lebanon/Hanover area with stops at the DHMC, the VA Hospital, and Hanover. Both routes operate three trips during morning and afternoon peak periods, Monday through Friday, beginning at 5:25 am and finishing at 6:45 pm. The routes connect with AT and charge \$3.50 for a one-way adult cash fare. Additionally, Stagecoach runs the West Lebanon deviated fixed route on the second Friday of the month and every Saturday, from towns in Vermont to West Lebanon for shopping trips. It also provides Medicaid transportation and offers the Ticket to Ride program, subsidizing the cost of rides for those who cannot afford them.

## Connecticut River Transit

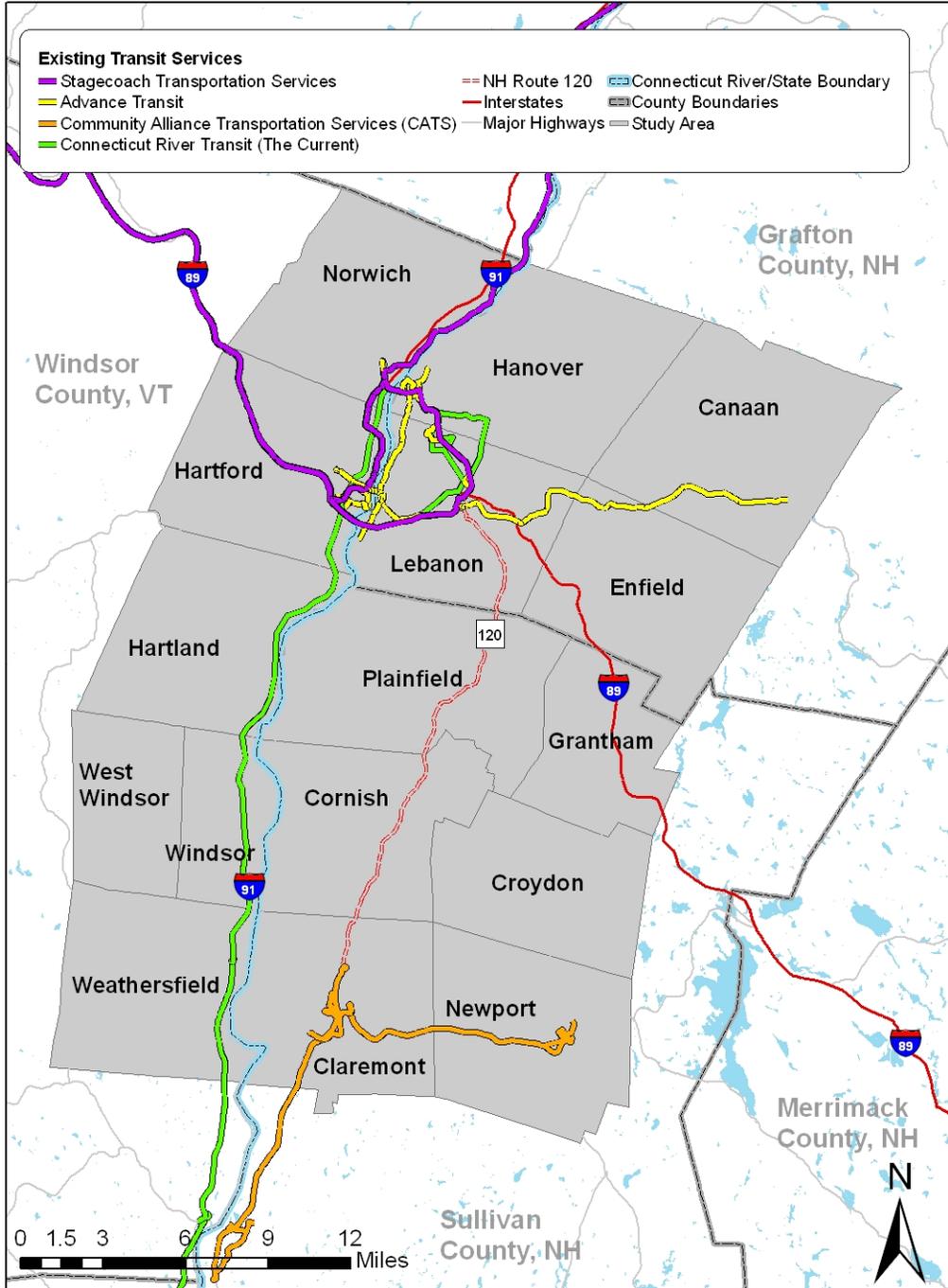
Connecticut River Transit (CRT), also known as The Current, provides five commuter routes that service the Lebanon/Hanover area. The routes begin at the Interstate 91 Exit 6 Park and Ride in Vermont and travel north on I-91 to Lebanon and Hanover. For Routes 71-74, there is one departure in the morning and one return at night. The operating times are approximately 5:13 am to 6:30 pm. Route 70, the DHMC 12 Hour Shift Commuter, has stops at DHMC, Centerra Park, and Dartmouth College, among others, and operates from Sunday evening to Saturday morning.<sup>1</sup> It begins service at 5:35 am and finishes around 8:55 pm, with return southbound service following each northbound trip.

Routes 71 and 72 also stop at DHMC, Colburn Hill, and Centerra Park, while Routes 73 and 74 have stops at Dartmouth College, and Fuji-Dimatix. Route 74 continues to the VA Hospital. Routes 71-74 operate Monday through Friday only. Fares are by donation only, with a suggested donation of \$3.00 for a one-way trip.

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<sup>1</sup> At the time this draft final report was prepared (June 2011) the DHMC 12 Hour Shift Commuter was in jeopardy of losing funding.

Figure 2-1 Public Transit Services in the Study Area



## Specialized Transportation Services

In addition to public transportation, there are a handful of specialized transportation services that are primarily available to special population groups, including older adults, persons with disabilities, and clients of human service programs. Each of these services is described individually in the following text and summarized in **Error! Reference source not found.** The Grafton-Coös and Sullivan County Community Transportation Services Directories provided much of the information for this section.

### Grafton County Senior Citizens Council

The Grafton County Senior Citizens Council (GCSCC) provides demand response transportation services to older adults and individuals with a disability traveling in Grafton County. Services are primarily oriented to clients traveling to/from GCSCC programs but they will also provide and/or arrange essential transportation to ensure people have transportation to medical appointments and other critical services. In general, the level of service offered by GCSCC is very high, with drivers often greeting passengers at their door and escorting them to the door of their destination (as necessary). No fares are charged to the passengers, but donations are accepted.

Communities served include Lebanon, West Lebanon, Hanover, Plainfield, and Enfield. This center has three lift-equipped buses, which operate Monday through Friday, 8:00 am to 4:00 pm.

## Statewide Transportation Services

There are a handful of statewide organizations that fund or provide transportation services. Most of these services are available only to older adults, individuals with disabilities, and/or particular sub-sets of the population. Services vary by organization; some of the larger organizations contract with private transportation operators to provide transportation, while other organizations rely on volunteer drivers for service. All of the organizations listed will provide service to individuals living in the study area; however, few are located in the study area.

- **Easter Seals New Hampshire** organized the Transportation Resource and Access Coordination (TRAC) initiative that provides transportation for Medicaid transportation, special needs students, and veterans statewide. The service operates according to contracts with eight for-profit transportation providers and taxi companies. Individuals who need transportation contact the transportation call-in center and the dispatcher will coordinate their needs with the appropriate provider. Depending on an individual's needs, the trip may be billed to Medicaid, a school district, or other social service program.
- **Granite State Independent Living (GSIL)** provides transportation to older adults and individuals with low incomes on a fee-for-service basis. Rides must be pre-approved and are available 24 hours a day, seven days per week based on the availability of drivers. GSIL Services are funded by the state, private donations, and other sources.
- **American Cancer Society of New Hampshire** has a network of volunteer drivers who provide transportation for individuals needing a ride to and from cancer treatments. Volunteer drivers are available Monday through Friday.

- **Disabled American Veterans (DAV)** also manages a network of volunteer drivers who drive sick and disabled veterans to and from Veterans Administration medical facilities for treatments. Veterans needing transportation can call the DAV and schedule a ride to their medical appointments.

There are also several non-profit and community organizations that provide services to clients or particular populations. These organizations and their target passengers are:

- Kearsarge Area Council on Aging (Older Adults)
- Northern Human Services (Behavioral Health or Developmental Disability Services Clients)
- Pathways of River Valley (Clients of Developmental Disability and Brain Injury Services)
- Sullivan County Healthcare (Residents of the County Nursing Home)
- West Central Behavioral Health (Clients of Mental Health Services)

Other specialized transportation services include non-emergency medical transportation, typically in the form of medically-focused taxis. The providers in the study area are:

- Golden Cross Ambulance
- Med Coach (a national service)
- North Country Medi-Van
- People Movers/Big Yellow Taxi (also provides general taxi service)

The Upper Valley Ride Share provides transportation demand management services, including ridematching.

**Table 2-1 Overview of Available Transportation Services**

Public Transit	Service Type	Service Area	Operating Hours	Service Features
Community Alliance Transportation Services	Fixed Route Demand Response	Claremont, Newport, Charlestown, Unity	Monday – Friday 6:30 am – 5:00 pm	One-way Newport-Claremont: \$2.00; One-way “in-town” ride: \$1.00; Town-to-town: \$4.00 one way Dial-A-Ride services: Claremont, Unity, and Charlestown Dial-A-Ride: \$2.00 one-way in town
Advance Transit	Fixed Route and ADA Para-transit Service	Lebanon, Hanover, Enfield, Canaan, NH; Hartford and Norwich, VT	Monday – Friday 6:00 am - 6:00/7:00 pm	General Public, Wheelchair accessible Fare Free
Stagecoach Transportation Services	Fixed Route	Wells River, VT - Lebanon, NH	Monday – Friday 5:25 am – 6:45 pm	One-way: \$3.50
Connecticut River Transit	Fixed Route	I-91 Corridor from Exit 6 to White River Junction, VT, Hanover and Lebanon, NH	Routes 71-74 Monday – Friday 5:25 am – 6:20 pm Route 70 Sunday – Saturday 5:35 am – 8:55 pm	No fare but suggested donation of \$3.00 Route 70 12-Hour Shift Commuter Route operates on weekend as well as weekdays
Transportation Available to the Public	Service Type	Service Area	Operating Hours	Service Features
Apex Car Service	Demand Responsive	Hanover, Lebanon, Upper Valley	Flexible	Tour groups, Sightseeing charters, Town Car, and Courier Services Fare depends upon service requested
CNC Cab Company	Long Distance Cab	Claremont	Flexible	Traditional Taxi Service (non-accessible) One-way in town: \$5; Fare varies by destination
Dartmouth Coach	Long Distance Transportation	Hanover/Lebanon to New London, NH, Boston, Logan Airport; Stamford, CT and New York, NY	5:00 am to 12:00 midnight	8 daily departures to Boston (approximately every 2 hours); 1 daily departure to New York City; Both have stops along way Fares range from \$28 for New London – South Station to \$74.50 from Hanover/Lebanon – New York
Greyhound	Long Distance Transportation	Service from Hanover to other NH cities and throughout US/Canada	3 Departures daily (4:35 am to 10:55 pm)	Fare is approximately \$40 one-way (Hanover to Boston)
People Movers/Big Yellow Taxi	Demand Responsive	Upper Valley, Local or Long Distance	Available 24/7	Taxi Services, Non-Emergency Medical Transports; Wheelchair accessible Fares or charges vary by destination

P & P Twin State Taxi	Sedan Taxi Services	Lebanon, NH Local/ Long Distance	Flexible	Charges \$2.75 per mile
<b>Specialized Transportation</b>	<b>Service Type</b>	<b>Service Area</b>	<b>Operating Hours</b>	<b>Service Features</b>
American Cancer Society	Demand Responsive	Statewide	Depending upon available volunteers	Rides to and from cancer centers; Available statewide; No fare
Easter Seals Special Transit Service	Demand Response	Statewide	Flexible	Door-to-door transportation with assistance for older adults and individuals with special needs and disabilities Fares or charges vary by destination
Golden Cross Ambulance	Demand Response	Lower Grafton County	Flexible	Medical transports 24/7; local or long distance; wheelchair van or ambulance Fares or charges vary by destination
Grafton County Senior Citizens Council	Demand Response	Grafton County	8:00 am to 4:00 am Monday-Friday (24 hour advance notice)	Door-to-door transportation for older adults and persons with disabilities Donations accepted
Granite State Independent Living	Demand Response	Statewide	Flexible	\$1.75/mile and \$20/hour charge Transportation Reimbursement Program to reimburse mileage of driver who takes qualified rider Persons with disabilities when public transportation is unavailable
Kearsarge Area Council on Aging	Demand Responsive	Grantham	Flexible	No-cost local and long-distance (Concord, Hanover, Claremont) transportation to residents living within the nine towns served by COA and who are 55 years old and older; No fare required; (Other towns served outside study area - Andover, Danbury, Newbury, New London, Sunapee, Springfield, Sutton, and Wilmot)
Med Coach	Long Distance Patient Transfer	Nationwide	Flexible	Charges determined by distance and services needed
North Country Medi-Van	Demand Responsive	NH, VT, ME, and MA	24 hours a day/7 days per week	Serves local and long distance medical and non-medical trips for individuals with disabilities; Primarily serves Medicaid clients; \$2/mile
Northern Human Services (NHS)	Demand Responsive	Grafton County	Flexible	Transportation services for clients receiving behavioral health or developmental disability services and substance abuse treatment and prevention; Wheelchair accessible; Also serves Coös and Carroll Counties

Pathways of River Valley	Demand Responsive	Sullivan and Lower Grafton Counties	Flexible	Community non-profit agency supporting people with developmental disabilities and brain injuries; Wheelchair accessible Transportation provided for clients
Sullivan County Healthcare	Resident Transportation	Sullivan County	Flexible	Services for residents of the County Nursing Home and Rehabilitation Center
Veterans Administration/Disabled American Veterans	Client Transportation	Statewide	Flexible	Free transportation services for veterans to medical health facilities
West Central Behavioral Health	Client Transportation	Lower Grafton and Sullivan Counties	Flexible	Transportation available for community mental health services for adults & children clients; Charges vary by destination and programs
<b>Non-Transportation Services</b>	<b>Service Type</b>	<b>Service Area</b>	<b>Operating Hours</b>	<b>Service Features</b>
Upper Valley Ride Share	Carpool Matching Program	Grafton County	NA	No cost to register

## Chapter 3 Community Profile

An essential aspect to planning and designing effective public transportation service is understanding the predominant markets for travel and the populations that are most in need of transportation services. While people travel for a variety of reasons, most trips are made between home and work, and home and services, e.g., shopping, medical clinics and hospitals, community or social services, and to visit friends and family. In this chapter, we look to demographic data to understand where people live (trip origins) and at the location of major destinations and places of employment to understand where people travel (trip destinations). The following section highlights the spatial distribution of the sixteen-town NH 120 area demographics and land uses, with a focus on demographic groups and activity centers most frequently associated with public transportation use. The results of this analysis are incorporated into the needs assessment.

### Overview of the NH 120 Corridor

The sixteen-town NH 120 area straddles the Connecticut River Valley and includes both New Hampshire and Vermont, with towns from Grafton and Sullivan Counties in New Hampshire and Windsor County in Vermont. The towns in New Hampshire all fall within the Upper Valley Lake Sunapee Regional Planning Commission service area, while the towns in Vermont are divided between the South Windsor County Regional Planning Commission and the Two Rivers-Ottawquechee Regional Commission. There are two main demographic centers within the study area: 1) Claremont in the south with approximately 12,970 residents and 2) Lebanon and Hanover in the north with a combined population of 23,938 (see Table 3-1).<sup>2</sup> These areas also have the highest population densities (see Table 3-1), although population densities are higher in the Lebanon area than other communities in the study area. Both Claremont and the Lebanon/Hanover area serve as anchors for employment, services, and residential communities at opposite ends of NH 120. Hartford and Windsor in Vermont also serve as activities west of NH 120.

**Table 3-1 Growth Rates in Study Area by Town**

Town Name	2000 Census	2009 Estimated Population	Growth Rate
Claremont	13,151	12,970	-1.38%
Cornish	1,661	1,768	6.44%
Plainfield	2,241	2,446	9.15%
Lebanon	12,568	12,896	2.61%
Hanover	10,850	11,042	1.77%
Newport	6,269	6,531	4.18%
Croydon	661	724	9.53%
Grantham	2,167	2,538	17.12%
Enfield	4,618	4,850	5.02%
Canaan	3,319	3,592	8.23%
<b>New Hampshire Total</b>	<b>57,505</b>	<b>59,357</b>	<b>3.22%</b>

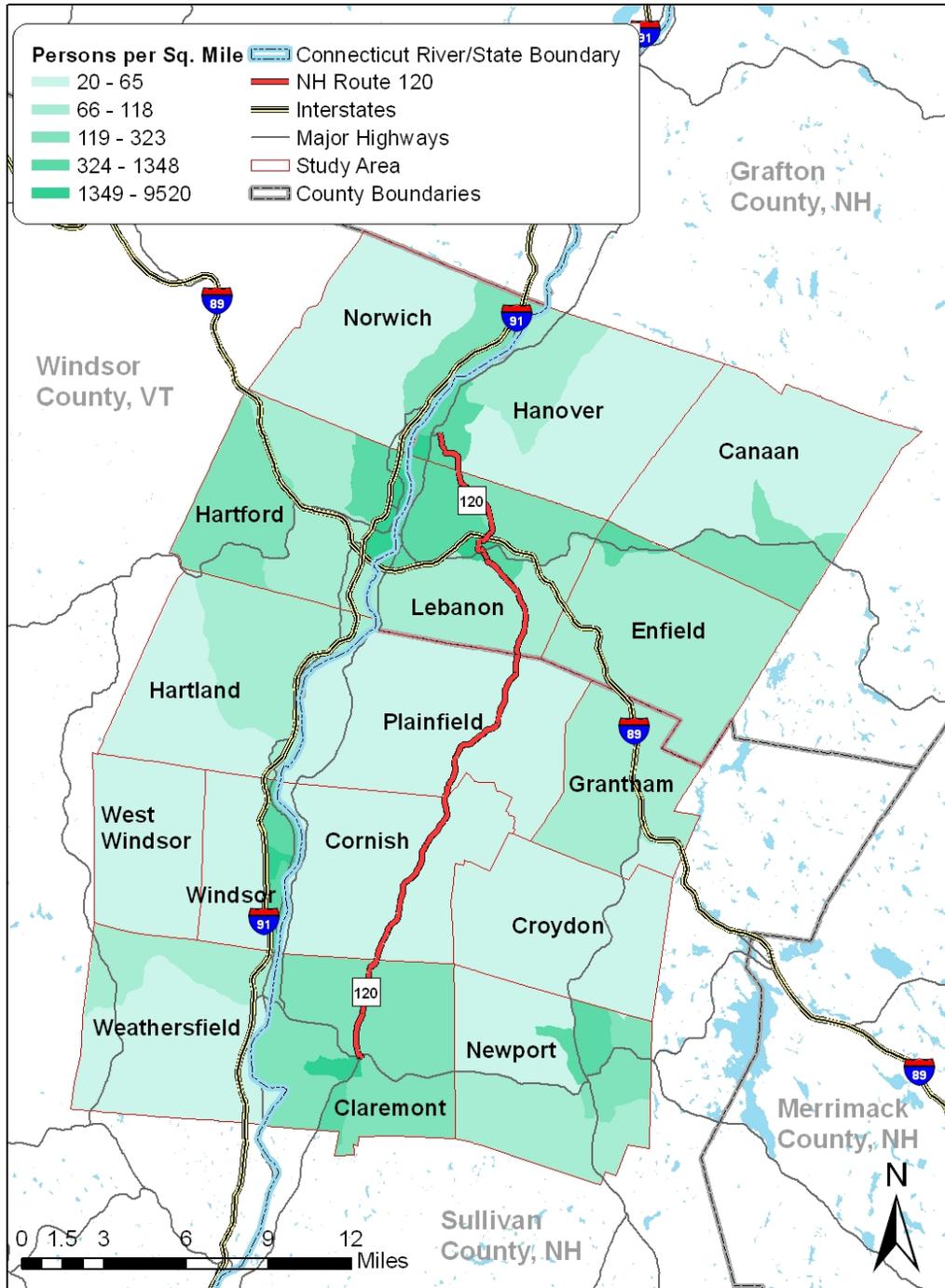
<sup>2</sup> US Census – American Community Survey

Town Name	2000 Census	2009 Estimated Population	Growth Rate
Weathersfield	2,788	2,856	2.44%
West Windsor	1,067	1,091	2.25%
Windsor	3,756	3,596	-4.26%
Hartland	3,223	3,033	-5.90%
Hartford	10,367	10,677	2.99%
Norwich	3,544	3,516	-0.79%
<b>Vermont Total</b>	<b>24,745</b>	<b>24,769</b>	<b>0.10%</b>

Source: US Census – 2000 Census and American Community Survey

Growth in the study area has remained fairly steady; only Claremont in New Hampshire experienced a slight decrease in population between 2000 and 2009, while three towns in Vermont experienced a very small to moderate decrease within the same time period. In general, the study area has undergone an approximately 3 percent growth since 2000. Figure 3-1 shows the population density in the study area, with parts of Claremont, Lebanon, and Hanover having the highest population densities in New Hampshire, and both Windsor and Hartford having the highest population densities in Vermont. Other parts of the study area with higher than average densities include parts of Newport and Enfield, as well as western Lebanon and a southern sliver of Claremont.

Figure 3-1 NH 120 Corridor: Population Density



## Study Area Demographics

The study team considered the two predominant markets for public transportation users:

- “Choice” riders who have adequate resources and abilities to operate a private vehicle but choose to use transit because it offers them comparable convenience and/or because of other personal lifestyle and value choices; and
- Transit dependent riders who use public transportation services because they lack the resources to own or maintain a private vehicle, or are unable to operate a private vehicle. Transit dependent individuals are typically characterized by age (older adults aged 65 or more), disability status, income, and households without a vehicle.

While both of these markets are important for public transportation services, each has distinct service needs, preferences, and priorities. Our broad assumption is that there are no definitive demographic characteristics that are linked with choice riders, because for these travelers, using public transportation is a choice. Instead, we understand choice rider travel patterns by looking at the overall demand for travel, which is largely influenced by the location of employment and activity/service centers.

Transit dependent riders, on the other hand, are more easily identified by demographic characteristics that typically indicate challenges associated with operating a private vehicle, such as age, abilities, and income. For purposes of this analysis, we examine the proportion of older adults, persons with disabilities, and persons with low income throughout the study area. The following analysis highlights the spatial distribution of these populations across the study area and maps each target population as the number of persons per square mile (see Table 3-2 and

through **Error! Reference source not found.**). Data is presented on the Census block group level and is drawn from Census 2000 data.

Our analysis of the market for both choice and transit-dependent riders suggests that communities with the highest potential demand for transit include:

The communities along the NH 120 Corridor, which are primarily rural in nature with low population densities overall.

Within the region, however, the cities of Claremont and Lebanon, as well as the town of Hanover, all have a relatively high concentration of employment, services, and transit dependent populations.

Claremont and Lebanon also have the highest concentration and numbers of older adults, persons with disabilities, and persons with low incomes.

Part of the towns of Enfield and Newport in New Hampshire and Windsor and Hartford in Vermont have relatively high concentrations of transit dependent populations, especially older adults, persons with disabilities, and persons with low incomes.

The northern part of Weathersfield in Vermont also demonstrates above average levels of transit need.

**Table 3-2 Transit Dependent Population Data by Town**

Town Name	2000 Census	Older Adults		Persons with Disabilities		Persons with Low Income	
		Persons	Percentage	Persons	Percentage	Persons	Percentage
Claremont	13,151	2,217	17%	2,780	21%	2,470	19%
Cornish	1,661	202	12%	222	13%	124	7%
Plainfield	2,241	228	10%	236	11%	149	7%
Lebanon	12,568	1,799	14%	1,822	14%	1,903	15%
Hanover	10,850	1,476	14%	761	7%	785	7%
Newport	6,269	961	15%	1,430	23%	1,364	22%
Croydon	661	107	16%	149	23%	94	14%
Grantham	2,167	445	21%	172	8%	113	5%
Enfield	4,618	502	11%	683	15%	473	10%
Canaan	3,319	322	10%	428	13%	431	13%
<b>New Hampshire Total</b>	<b>57,505</b>	<b>8,259</b>	<b>14%</b>	<b>8,683</b>	<b>15%</b>	<b>7,906</b>	<b>14%</b>
Weathersfield	2,788	455	16%	503	18%	437	16%
West Windsor	1,067	166	16%	158	15%	101	9%
Windsor	3,756	271	7%	579	15%	676	18%
Hartland	3,223	380	12%	461	14%	250	8%
Hartford	10,367	1,519	15%	1,653	16%	1,554	15%
Norwich	3,544	389	11%	351	10%	227	6%
<b>Vermont Total</b>	<b>24,745</b>	<b>3,180</b>	<b>13%</b>	<b>3,705</b>	<b>15%</b>	<b>3,245</b>	<b>13%</b>

Source: US Census – 2000 Census

## Older Adults

The distribution of older adults in the study area is primarily concentrated in the major population centers, including Claremont, Lebanon, and Hanover (Figure 3-2) In Claremont, the area at the start of NH 120 shows a high concentration of older adults, and similarly, the area adjacent to NH 120 in Lebanon also has a high density. There are, however, pockets with high densities of older adults, including a part of Newport and Enfield, Windsor between I-91 and the Connecticut River, and parts of Hartford, just across the state line from New Hampshire.

## Persons with Disabilities

As shown in Figure 3-3, the density of persons with disabilities reflects population density, with the highest densities in Claremont and Lebanon. Parts of Hartford and Windsor, close to the state boundary, again have high densities of persons with disabilities, as does the southwestern corner of Hanover. In Newport, a larger geographic area has a high density of disabled persons than the areas of high density for older adults.

## Persons with Low Income

For purposes of this analysis, persons with low income are defined as a household with a median income at 150 percent or less than the poverty level (US Census 2000 Summary File 3, Table P88).<sup>3</sup> This population, as shown in Figure 3-4 is concentrated in high densities in Lebanon, again with a particular pocket of persons with low income adjacent to NH 120. Western Hanover, eastern Norwich, and northeastern Hartford also demonstrate high densities of people with low income. In the south, Claremont as a whole has a high density of such persons, with a concentration close to the start of NH 120. The northeastern part of Newport, like the area with a high density of persons with disabilities, also shows a high density of persons with low income. Windsor, between I-91 and the Connecticut River, shares a high density of persons with low income.

## Composite Needs Index

Figure 3-5 depicts a composite of the three populations described above: older adults, persons with disabilities, and persons with low income. To create this map, the populations were added and normalized by square miles within each block group. Though there is some overlap between populations (for example, older adults who also have a disability), this map indicates density of need in the area. As with the individual transit dependent groups, the areas with the highest density of need are Claremont, Lebanon, and a small part of Windsor and Hartford between I-91 and the state boundary. Parts of Newport, Hanover, and Enfield also exhibit Medium-High needs.

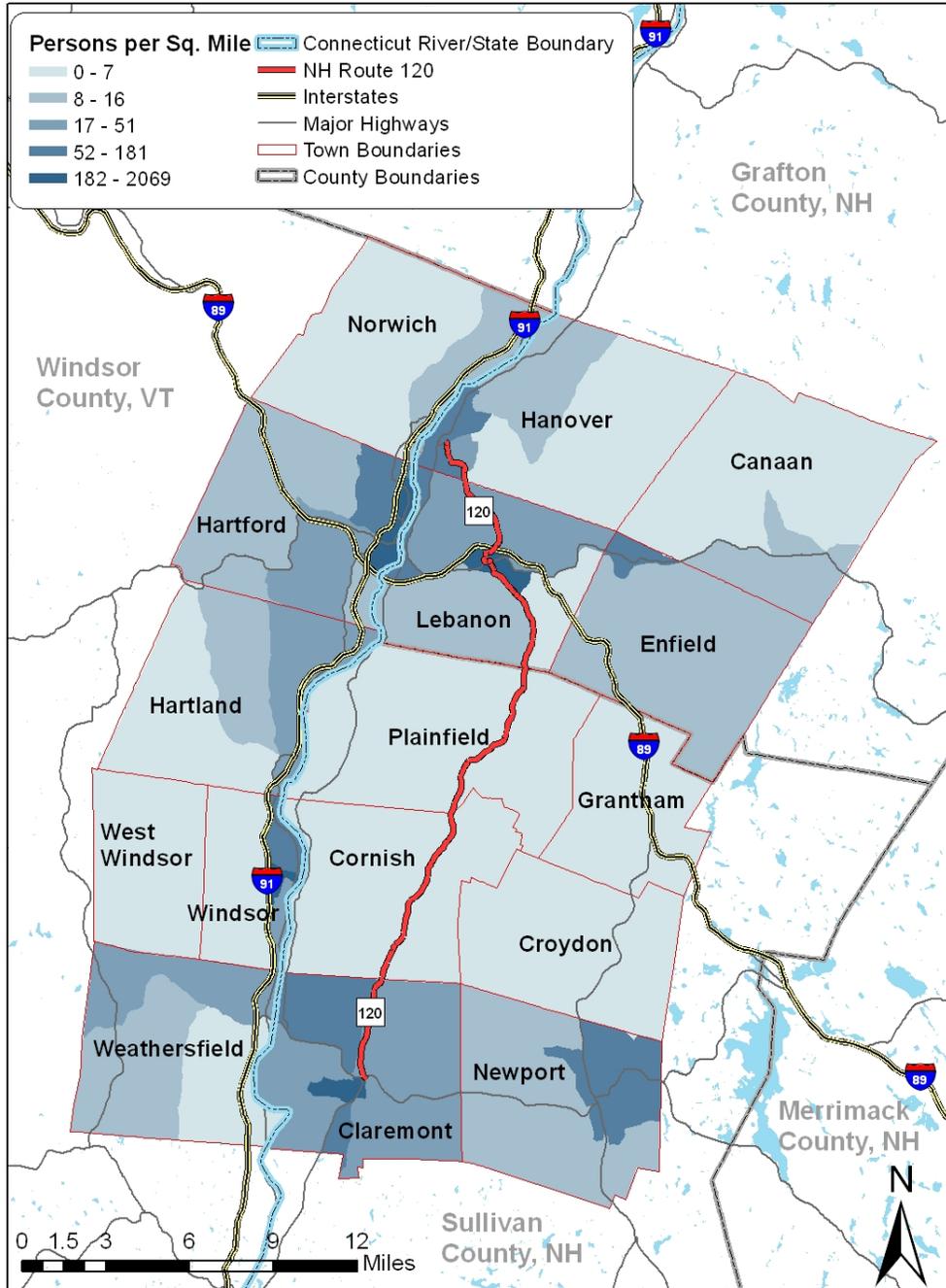
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<sup>3</sup> Federal poverty levels differ based on household size. Data included in the map, therefore, represent the proportion of the population that is below the poverty level for their individual household characteristics. For reference sake, in 2000, the poverty level for a family of four with two children under the ages of 18 was \$17,463; 150% of this would be \$26,195.

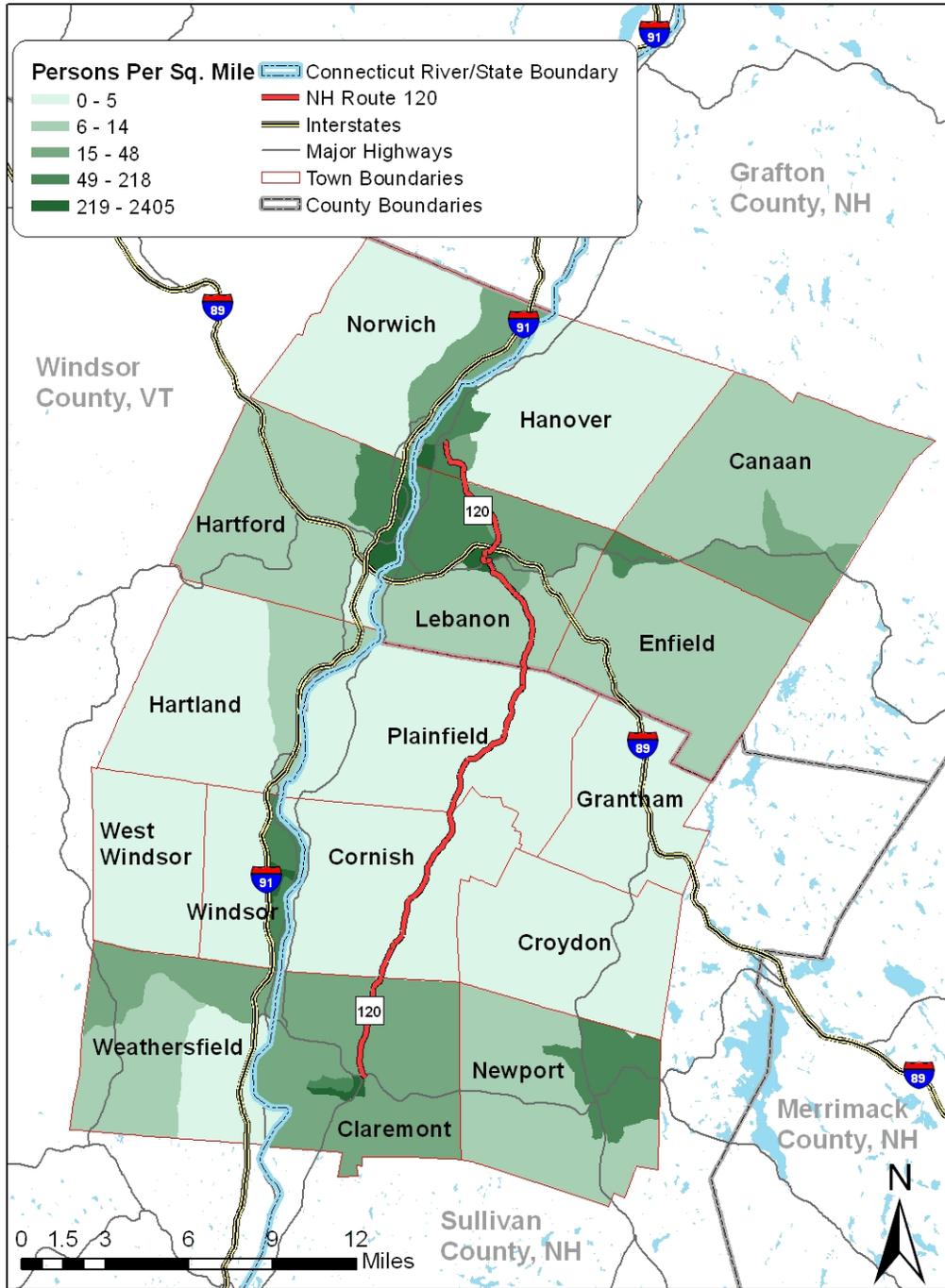
Figure 3-2 NH 120 Corridor: Older Adults (65+) per Square Mile



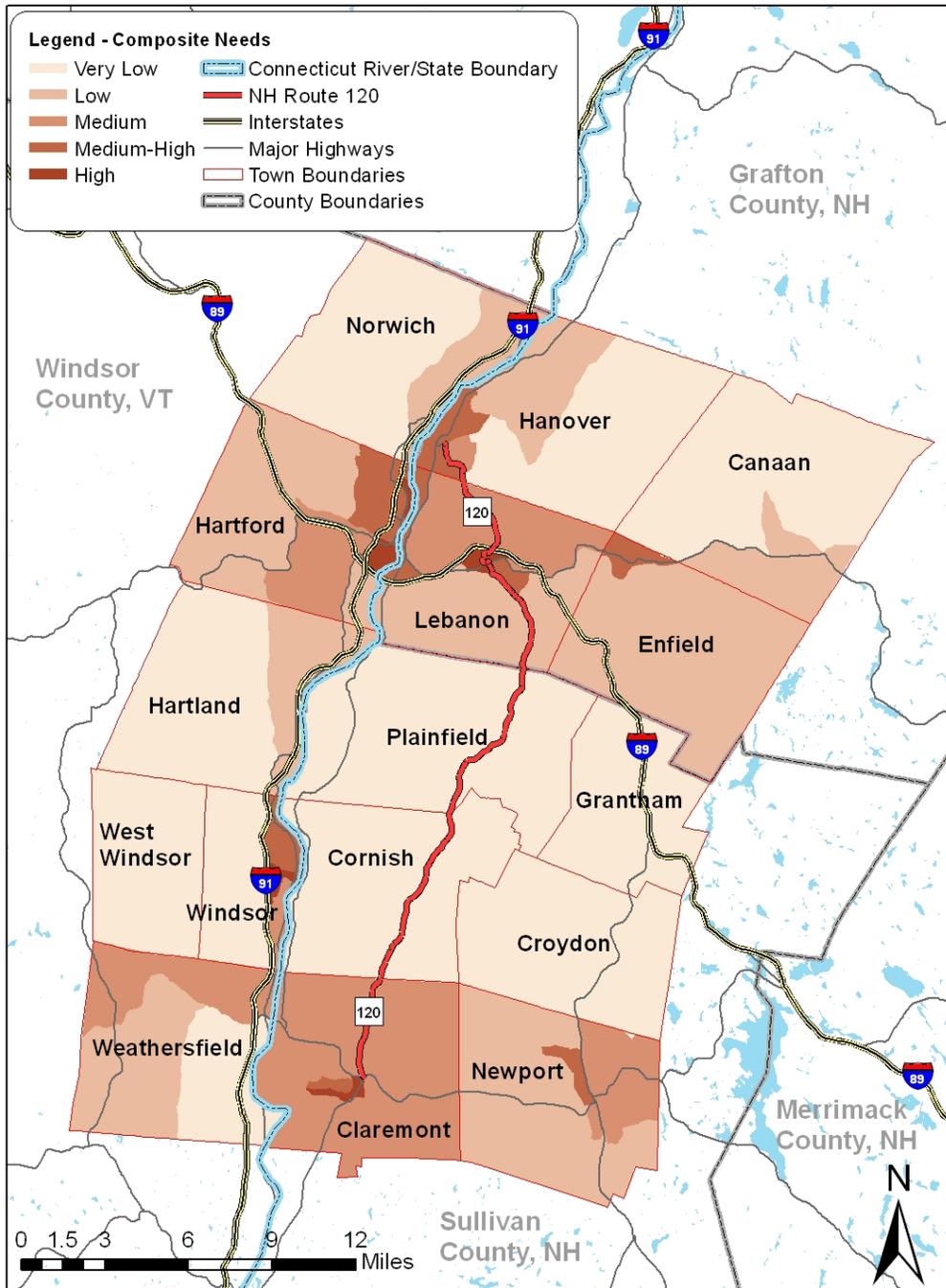
**Figure 3-3 NH 120 Corridor: Persons with Disabilities per Square Mile**



**Figure 3-4 NH 120 Corridor: Persons with Low Income per Square Mile**



**Figure 3-5 NH 120 Corridor: Transit Dependent Composite Needs Index**



## Employment, Land Uses and Major Destinations

Transportation infrastructure is almost always closely aligned with trip generators such as employment, shopping, and service centers. Areas with higher populations and employment densities are more easily served by public transportation, in part because high density areas have a larger market for travel. In rural areas, public transportation can also be successful by providing connections between village and town centers and employment or service sites, such as hospitals and shopping malls.

### Employment and Employment Density

In addition to population density, the location and density of employment is a key factor in determining where and how transit service should be developed. Figure 3-6 shows that the highest densities of employers are in Claremont, Lebanon, and Hanover. As with the findings for the transit dependent population, the eastern parts of Windsor and Hartford also demonstrate high densities of employees. Newport also has a higher than average employment density for the area.

The employment density patterns generally correspond to the locations of major employers. Hanover, home to Dartmouth College, a major regional employer that supports a variety of secondary employers, shows one of the highest densities for employment within the study area. Its counterpart, to the south, is Claremont, with a matching high density of workers in its downtown area.

There is also a high density of workers in Lebanon. Dartmouth Hitchcock Medical Center, just south of the Hanover-Lebanon border, is also a major regional employer. Similarly, other major employers are close to the Hanover-Lebanon border in the Mt. Etna Corridor, including Hypertherm, Fuji/Dimatix, and others in a variety of industries.

### Activity Centers and Destinations

Along the NH 120 Corridor, the centers for employment, retail, and other activities are primarily located in Lebanon, and Hanover, with the majority of activity centers clustered around the I-89 and I-91 interchanges and where NH 120 meets I-91 (Figure 3-7). Other clusters of activity centers are visible in Newport and along I-91 in Windsor, Vermont. Within the Corridor, but somewhat apart from the population centers are several important destinations, including Valley Regional Hospital, Kimball Union Academy, and River Valley Community College.

Figure 3-6 Major Employers and Employment Density

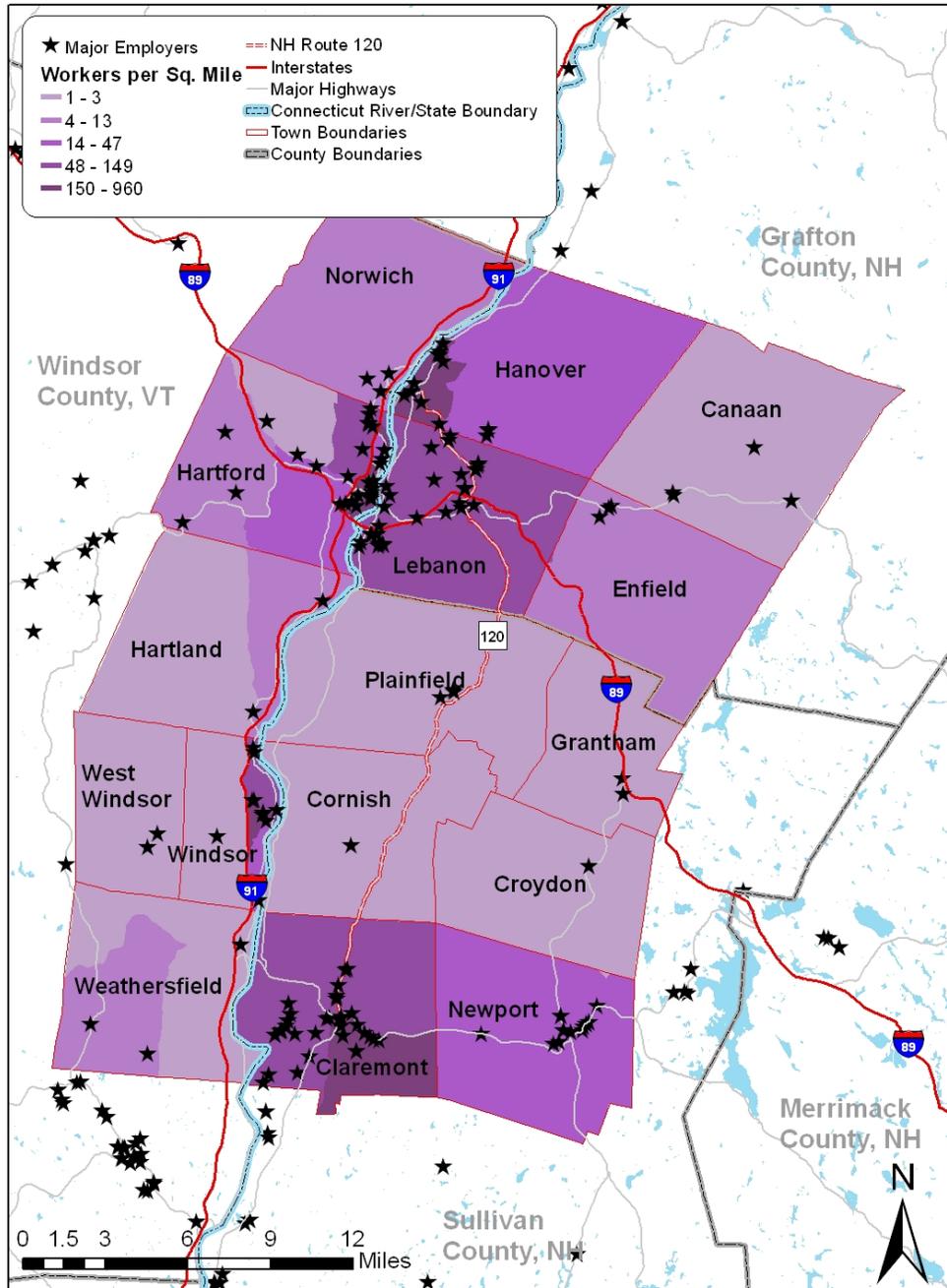
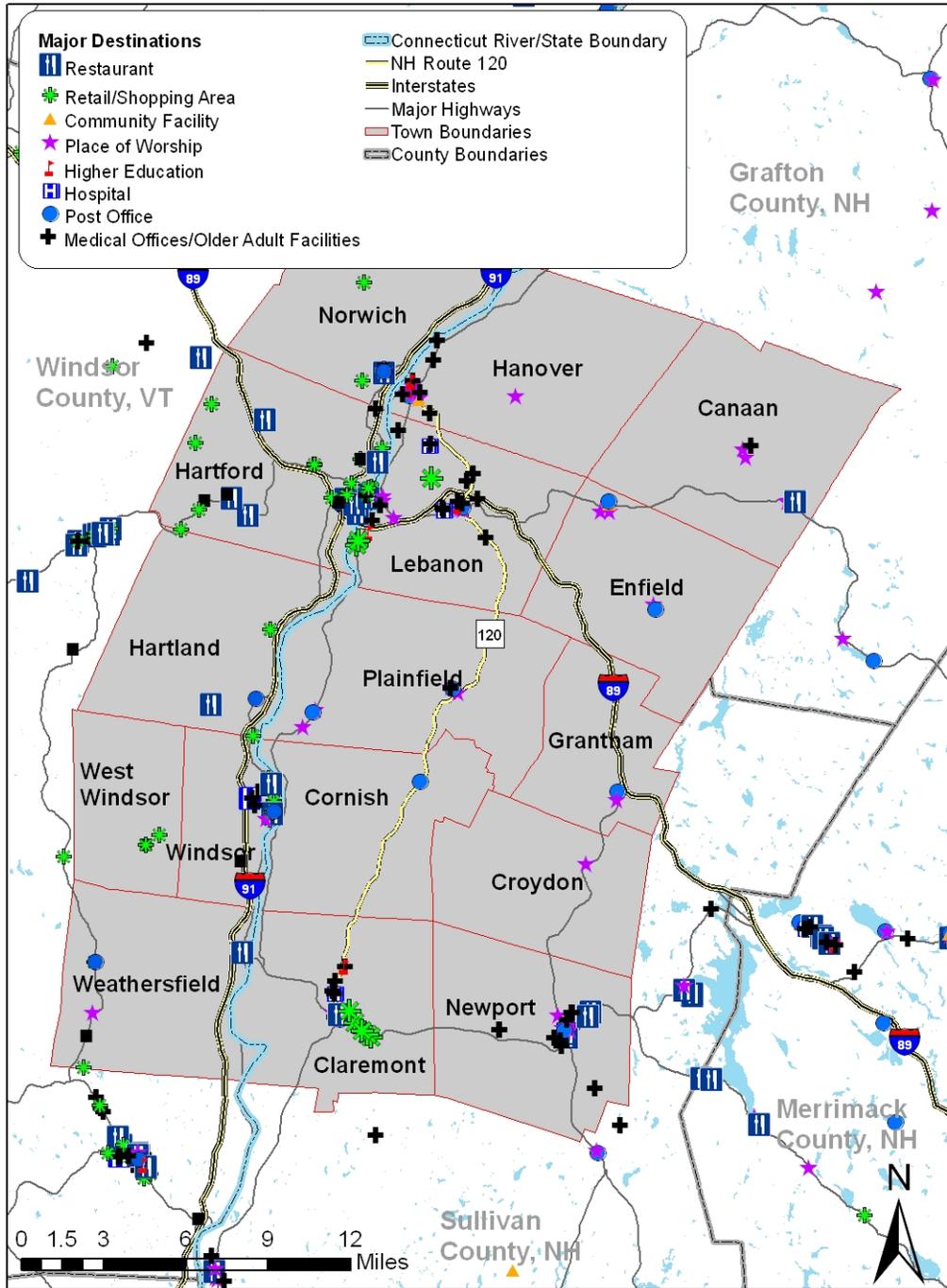


Figure 3-7 NH 120 Corridor: Activity Centers and Destinations



## Chapter 4 Stakeholder, Employer, and Employee Input

An important resource for understanding how transit services might best be designed is listening to members of the community. Individuals who work, live, and travel in the study area often have a unique and valuable perspective not only on the region's priorities, but also on what might work best and what might not work at all. To collect these opinions and include them as part of the public transportation feasibility analysis, the study team conducted a number of outreach efforts. These efforts included interviews with community stakeholders and area employers, as well as a survey of employees. The objective was to better understand travel patterns, regional priorities, and community needs.

### Stakeholder Interviews

For purposes of this study, stakeholders are considered individuals with an interest in public transportation service between the Claremont and Lebanon/Hanover areas. The Study Steering Committee helped identify a long list of stakeholders. From this list, the study team identified a shorter list of individuals to be included in the study. Stakeholders were chosen in order to collect a broad set of opinions and represent a range of geographic interests and community perspectives. A list of stakeholders interviewed can be found in Appendix B. The input from stakeholders is organized by the potential markets that could be served, as well as constraints that they identified.

### Potential Markets

#### Commuters from Claremont to Hanover/Lebanon

The need for transit service along the NH 120 Corridor is closely tied with the supply of affordable workforce housing. While the Hanover/Lebanon area has relatively low unemployment, housing is in short supply, and increasing numbers of workers are commuting from ever farther away. Several commuter bus services have started in recent years to address this need, but Claremont remains a big gap in the commuter system. With gas prices increasing, the cost of commuting from Claremont is becoming a burden. Some employers have been offering limited forms of travel demand management due to parking shortages at Dartmouth College and DHMC.

#### Commuters from the NH 120 Corridor into Claremont

There are some longer distance commuters along NH 120 from Hanover/Lebanon into Claremont who might use the bus, although the number is quite a bit smaller than the northbound commuters. A potential significant population of southbound commuters would be students attending the River Valley Community College (RVCC), which serves many students from the Hanover/Lebanon area. Many of the younger RVCC students do not have access to a car so transit would be particularly beneficial.

#### Non-Emergency Medical Services Transportation

Some medical services require travel to Lebanon, such as DHMC, Alice Peck Day Memorial Hospital (APD), or Hartford (VA Hospital). For non-emergency situations, a public transit service

connecting Claremont to these services would be useful. These are currently served by volunteer drivers.

## Low Income Population without Vehicles

Residents along the Corridor without a car or access to one would be able to use transit to access employment and/or services. However, many live in more dispersed locations, so there would still be challenges to get from their homes to the transit route.

## Plainfield and Cornish Residents

There are several potential markets in these communities, which have similar needs and opportunities:

- **Older Adults** - Older adults may find the bus useful to seek medical or other services that are somewhat concentrated in Lebanon, including DHMC and APD. The area generally has an aging population, so this is a growing group.
- **Students** - Students from Plainfield and Cornish attend their local elementary schools, but travel to high schools from other towns. The majority of Plainfield residents attend Lebanon High School, while students from Cornish, can chose from a number of areas schools for high school. While a school bus is provided during school hours from Plainfield to Lebanon High School, students participating in activities after school at Lebanon, or attending other areas schools, could use public transportation to get back home.
- **Commuters** - Some residents who commute to work might use the transit service, as higher fuel prices have sparked more interest in carpooling. Some residents who do not have an automobile would likely find transit service a great asset, though the dispersed development pattern in these communities means that most people would still need to drive to the transit stop. Most commuters have jobs north on NH 120 but some also commute south to Claremont.

## Kimball Union Academy Commuting Students

Not all towns and communities in New Hampshire have a local, or in some cases, an assigned regional high school. These communities are known as “choice communities” because students can choose to attend any of the area schools, including private schools, such as Kimball Union Academy. There are several choice communities in the study area, including Cornish, West Windsor, Weathersfield and Hartland. Some students attend Kimball Union Academy, and might bus service if it was available. In addition, the school has day students from other towns in the study area who might use bus service.

## Constraints to Transit Service

Stakeholders also noted a variety of constraints or challenges that public transportation services would potentially face. Concerns about potential new services include:

- **Schedule** - Many commuters and students could only use the service if it was compatible with their work or school schedule.
- **Stop Locations** - Worksites, schools, and medical services in all the three destination communities (Claremont, Lebanon, and Hanover) are quite dispersed and not

concentrated in a single location, or even along the NH 120 Corridor. Serving all of these important uses will require many stops.

- **Convenience** - In order for choice commuters to ride the bus (i.e. those with a car available), the service will need to be efficient and provide direct service to the employment sites with minimal deviations.
- **Parking** - For choice riders, there will need to be reasonably convenient parking available. For commuters, service would need to be convenient to their worksite. Park and Ride lots may be available or feasible to expand in Cornish and Plainfield, but parking in Claremont, Lebanon, and Hanover is more constrained and could be a barrier to use.
- **Cost** - Some businesses and institutions that will see benefits from the transit service would be able to offer some support. The towns and cities along the Corridor are all facing stressful financial times, so financial support for transit service may not be possible. Suggestions for funding included: employer sponsorship (either direct contribution, or purchasing/subsidizing employees' bus pass purchase), municipal contributions, student fees, and fares.
- **Awareness** - Because this area has been with limited or no transit service, there is a lack of awareness of the potential benefits and utility of public transit, which could serve to limit both ridership and community support for funding.

## Employer Survey

In addition to talking with stakeholders, the study team also conducted telephone interviews with area employers. This survey was conducted with ten of the region's largest employers. A list of the employers contacted is included as Appendix C. Key findings from the survey are summarized in the following text.

### Employer Size

There was a large range of the size of employers interviewed. Manufacturing and business-to-business sales were the largest employers, with two manufacturing locations employing around 200, and a business-to-business sales location employing approximately 300. The smallest was also manufacturing at 25. Only one location, a hotel/restaurant, indicated seasonal fluctuation, with about 35 in the winter and about 60 in the summer.

### Modes for Commuting

All employers reported that the majority of workers commuted via automobile. At some locations, nearly all or all employees drove alone. At the same time, most employers did indicate that there was a small number getting dropped off or carpooling. One location indicated that 40 percent walk, and many employers had one or two employees who walked or rode a bicycle to work. One manufacturing location indicated that a substantial portion of their laborers take transit.

### Challenges in Getting to Work

Five employers cited no challenges in getting to work. Of those that did cite challenges, all except one were financial in nature. Four of the five cited the rising cost of gas, and two talked about how

costs were changing behavior: for one employer, the price of gas has led to 40 percent walking, and for another, it is leading to more carpooling.

## Potential Employee Use

A slight majority of employers felt their employees would utilize a public transportation system to get to work. Of employers who believed their employees would use transit, all except one said demand responsive transportation would be best for their employees. One manufacturing facility, where workers must be at work on time, felt fixed route service would be more reliable, and therefore a better fit.

One company said that its labor staff (which makes up 60 percent of their workforce) feels that they have to drive alone to the work site in order to transport and monitor their tools. An attempted carpooling program was not able to overcome this preference. When gas prices were high, workers talked about leaving their cars at the office, taking transit to work, and then driving in their individual vehicles from the office to the work site.

## Potential Customer Use

Half of the employers said that they don't have many or any customers who come on-site. Of the five that have customers, three said demand responsive transportation would be preferable, while none preferred fixed route. One Claremont employer expressed some dissatisfaction with the current transit offering in the town.

One hotel said that there would be demand among customers, many of whom are business people who drive to the hotel, but who use taxis to go for a drink at night. Weekend guests might use demand responsive transportation to see Route 12A scenic route to Windsor. For their needs, therefore, service would have to stretch into the evenings and weekends.

Two companies said they do not believe their customers would take transit. One store said their customers do not plan their days around shopping at that store, so they tend to drive. A manufacturing location said that their out-of-town customers stay at a hotel in the same complex, and the hotel has a free shuttle.

## Financial Support for System

While all employers said that a decision regarding a financial contribution would have to be made at a higher level, all indicated that they would entertain the possibility of a financial contribution, but two said financial contributions were unlikely. One that said financial contributions were unlikely said they would help spread the word about the service once it is in place.

One company said they were likely to contribute by way of direct financial contributions, subsidizing and selling passes to employees and advertising. One said they might subsidize employees and advertise, while one said they were likely to advertise, and one might subsidize workers should they use transit. Four simply said "maybe" when asked if they might contribute.

## Area Employee Survey

The study area has already been the subject of surveys regarding employees and their commuting patterns. The Vital Communities/Upper Valley Transportation Management Association is in the process of gathering this data for many of the major employers in Lebanon

and Hanover through its Smart Commute Survey. Coordinating with the Vital Communities/Upper Valley TMA so as not to duplicate collection and in conjunction with the employer survey as a part of this study, a survey of NH 120 area employees (NH 120 Survey) was distributed by the consultant team. Participants included individuals who work in retail, hospitality, and construction industries, as well as law enforcement and local government. More than half the respondents live in Claremont, while the rest generally live in other nearby cities and towns, including Lebanon, Unity, Sunapee, Grantham, and Plainfield. Forty-three responses to this survey were received.

The NH 120 Survey results have been analyzed alongside the results from the Smart Commute Survey and a survey administered to Dartmouth College on-campus and downtown Hanover employees. A second Dartmouth College survey, one for off-campus employees, primarily at Centerra and DHMC, focused on connections between campus and off-campus offices, and is referenced as relevant.

The Smart Commute Survey includes results from Dartmouth Hitchcock Medical Center, Hypertherm, and Kendal at Hanover, a retirement community on Route 10, just north of NH 120.

## Respondent Characteristics

The vast majority of the NH 120 Survey respondents are full-time workers, working five days a week, while 12 percent work more than five days a week. Among DHMC respondents, 65 percent work five days a week, while almost 15 percent work four days a week, and 12 percent work three days a week. Among Dartmouth College at Hanover employees, nearly 74 percent work five days a week, with 15 percent working more than five days a week.

Citing the previous work day's travel mode to work, more than 90 percent of respondents to the NH 120 Survey drive alone to work. Similarly, 83 percent of DHMC, nearly 90 percent of Hypertherm, and 88 percent of Kendal's employees drive alone. Of Dartmouth College on-campus employees, nearly 68 percent drive alone. Dartmouth College on-campus employees are unique in having a relatively high carpool and public transit utilization rate, at 12.4 percent and 7 percent respectively. While off-campus employees do not often travel to the main campus (40 percent said less than once per month), nearly 63 percent said that they drive alone when making that trip.

## Current Travel Patterns

Survey participants overwhelmingly cited a morning arrival time, with 88 percent of NH 120 Survey respondents citing an arrival time between 6:00 and 8:30 am. Seventy-four percent of DHMC employees and 71 percent at both Hypertherm and Kendal arrive during that same window. Dartmouth College on-campus employees have a later arrival schedule, with 15 percent arriving between 8:30-9:00 am. Table 4-1 shows the morning travel patterns, with the highest percentage of arrivals in each time window in bold.

**Table 4-1 Morning Arrival Times**

Arrival Time at Work (AM)	NH 120 Survey	DHMC	Hypertherm	Kendal at Hanover	Dartmouth College (on-campus)
6:00-6:30	7.1%	4.7%	4.6%	1.7%	1.5%
6:30-7:00	9.5%	17.4%	11.6%	10.0%	3.0%
7:00-7:30	21.4%	15.2%	17.8%	20.0%	12.1%
7:30-8:00	14.3%	<b>25.5%</b>	18.1%	<b>26.7%</b>	23.0%
8:00-8:30	<b>35.7%</b>	15.9%	<b>23.9%</b>	15%	<b>25.7%</b>

Almost 75 percent of NH 120 Survey participants said that their job requires that they be at work at a particular time, with a majority (65 percent) at DHMC, 44 percent at Hypertherm, and 71 percent at Kendal. Of on-campus Dartmouth College employees, 41 percent have scheduled or required work hours.

The afternoon is the primary time for departures, with most falling in the range of 3:00 pm to 6:00 pm (Table 4-2).

**Table 4-2 Afternoon Departure Times**

Departure Time from Work (PM)	NH 120 Survey	DHMC	Hypertherm	Kendal at Hanover	Dartmouth College (on-campus)
3:00-3:30	11.9%	1.8%	3.9%	0.0%	2.4%
3:30-4:00	2.4%	6.5%	15.4%	15.0%	2.2%
4:00-4:30	16.7%	9.6%	9.3%	13.3%	13.1%
4:30-5:00	0.0%	12.4%	19.3%	<b>30.0%</b>	20.7%
5:00-5:30	<b>38.1%</b>	<b>25.8%</b>	<b>21.2%</b>	11.7%	<b>22.2%</b>
5:30-6:00	11.9%	9.6%	8.5%	1.7%	13.9%
6:00-6:30	2.4%	6.1%	3.5%	3.3%	9.3%
6:30-7:00	0.0%	3.4%	1.2%	1.7%	3.1%

On average, NH 120 Survey respondents travel eighteen minutes to get to work. Table 4-3 shows a breakdown of the travel times to work for respondents.

**Table 4-3 Travel Time to Work**

Travel Time (Minutes)	NH 120 Survey	DHMC	Hypertherm	Kendal at Hanover	Dartmouth College (on-campus)
10-15	12.2%	9.3%	12.2%	7.5%	12.2%
15-20	17.1%	14.6%	14.3%	5.7%	12.6%
20-30	19.5%	25.9%	19.7%	26.4%	17.1%
30-40	9.8%	18.2%	18.1%	20.8%	11.6%
40-50	4.9%	14.7%	14.7%	20.8%	6.3%

In considering travel patterns in the last month, most NH 120 Survey participants indicate that they drive alone to work five days a week, with a very small number saying that they are dropped off at work less than one day a week. None of those respondents use public transit, while one walks to work more than five days a week, and three others either bike or walk less than one day a week.

From the other surveys, 7.5 percent of DHMC, 1.2 percent Hypertherm, and 6.7 percent Kendal participants used public transit. For each of these surveys, being dropped off and carpooling are the next most popular modes after driving alone, generally with 10 percent of participants for each of those modes. Valley Regional Hospital reported that its major shift is a 12 hour one for nurses, who work from 7:00 am to 7:00 pm. The next largest shift is an 8 hour shift, starting at either 7:00 or 8:00 am, with the greatest number of departures between 4:00 and 5:00 pm.

## Incentives for Using Public Transit

Across all surveys (with the exception of the survey at Dartmouth College, which did not ask the same question), adding a route/stop near the participant's home was the most popular response to incentivize increased transit use. This response was selected by 23 percent of the NH 120 Survey participants and 41 percent of DHMC, 40 percent of Hypertherm, and 44 percent of Kendal employees. The second most popular response was also the same for each survey, indicating that "nothing will encourage [the respondent] to take transit to work," with 18.9 percent for the NH 120 Survey respondents and 29 percent for DHMC, 34 percent for Hypertherm, and 33 percent for Kendal employees.

When responding to the statement, "I am willing to take public transit to work more frequently," almost 50 percent of DHMC participants agree or strongly agree, with 41 percent for Hypertherm, and 35 percent for Kendal responding similarly as well.

## Potential Destinations

Primary destinations mentioned by NH 120 Survey respondents if public transit were available along NH 120 include DHMC, Hanover, Lebanon, Claremont, Plainfield, and the Centerra business park area.

## Primary Shifts

Exploring the shifts and general work hours in the study area can provide some insight into times of increased demand. Based on the data gathered through the Employer Survey and Smart Commute Survey, a sample of area employers have the following shifts, indicating a strong gravitation to traditional workday schedules, with some smaller second and third shifts (Table 4-4).

**Table 4-4 Daytime Work Shifts for Study Area Employers**

Employers	Daytime Work Shifts	Estimated Employees Working
2 Employers	6:00 am - 2:00/3:00 pm	65
1 Employer	6:30 am - 4:00 pm	185
5 Employers 1 Additional Employer	7:00/7:30 am - 3:00/3:30/4:30 pm 7:00/8:00 am - 3:30/4:00 pm (Flexible)	212
2 Employers 2 Additional Employers	8:00/8:30 am - 5:00 pm Same general hours but flexible	447
1 Employer	11:00 am - 6:00 pm	42
1 Employer	4:00 pm - 9:30 pm	42
5 Employers	3:00 pm – 11:00 pm/12:00/12:30 am	180
3 Employers	10:30/11:00 pm - 7:00 am	9

## Chapter 5 Service Development

The beginning sections of the draft final report describe the conditions in the study area and develop an understanding of the key markets for public transportation services, where they are located, and their primary travel characteristics. The analysis also provides a detailed look into commuter travel patterns including shift times. The second half of the feasibility study describes the process whereby the Steering Committee reviewed the need for services, revisited their service goals, and from this vantage point identified a series of potential service options for the NH 120 Corridor.

### Needs Assessment

Taking into account the community profile, stakeholder and employer comments, and survey results, the study team identified a set of preliminary findings and key community transportation needs. This needs assessment guided the development of options for transit service in the NH 120 Corridor. The study findings suggest the following needs:

- Demographic and employment data suggests the communities with the greatest proportional need for transportation are Claremont and Lebanon, with some need in Hanover, Enfield, and Newport. The areas with the most employment, services, and activities are Claremont, Lebanon, and Hanover.
- Claremont, Lebanon, and Hanover have the highest concentrations and absolute numbers of population overall, as well as older adults and persons with disabilities. Persons with low incomes are less concentrated in Hanover, however, and more concentrated in communities at the southern end of the Corridor.
- Older adults have a high need for travel and are one of the largest population groups that have limited access to private automobiles. There are several organizations providing some level of service for this group, but the need is growing as the population ages.
- Persons with disabilities also have a high need for travel. This is particularly true for persons with disabilities who do not or cannot drive but have the same travel needs as their counterparts who can drive. There are both statewide and local organizations that provide service, but the local service is often client-based.
- Employment connections from Claremont to Lebanon/Hanover are critical, as evidenced by both the concentration of major employers and the input of stakeholders. There is clearly a need for northbound, employment-related transit service.
- Existing public transit covers its service area well, with a fairly high concentration of services around Lebanon and Hanover. There is also another cluster of transit services in Claremont and Newport. The lack of service connecting Claremont and Lebanon is striking when viewed from a regional perspective.
- Previous plans and studies indicate a need for both employment-related transit service on NH 120 to address traffic congestion as well as service to hospitals and medical offices along and near the Corridor.
- While southbound service from Lebanon/Hanover is less in demand, it could be structured to meet the needs of students attending River Valley Community College.

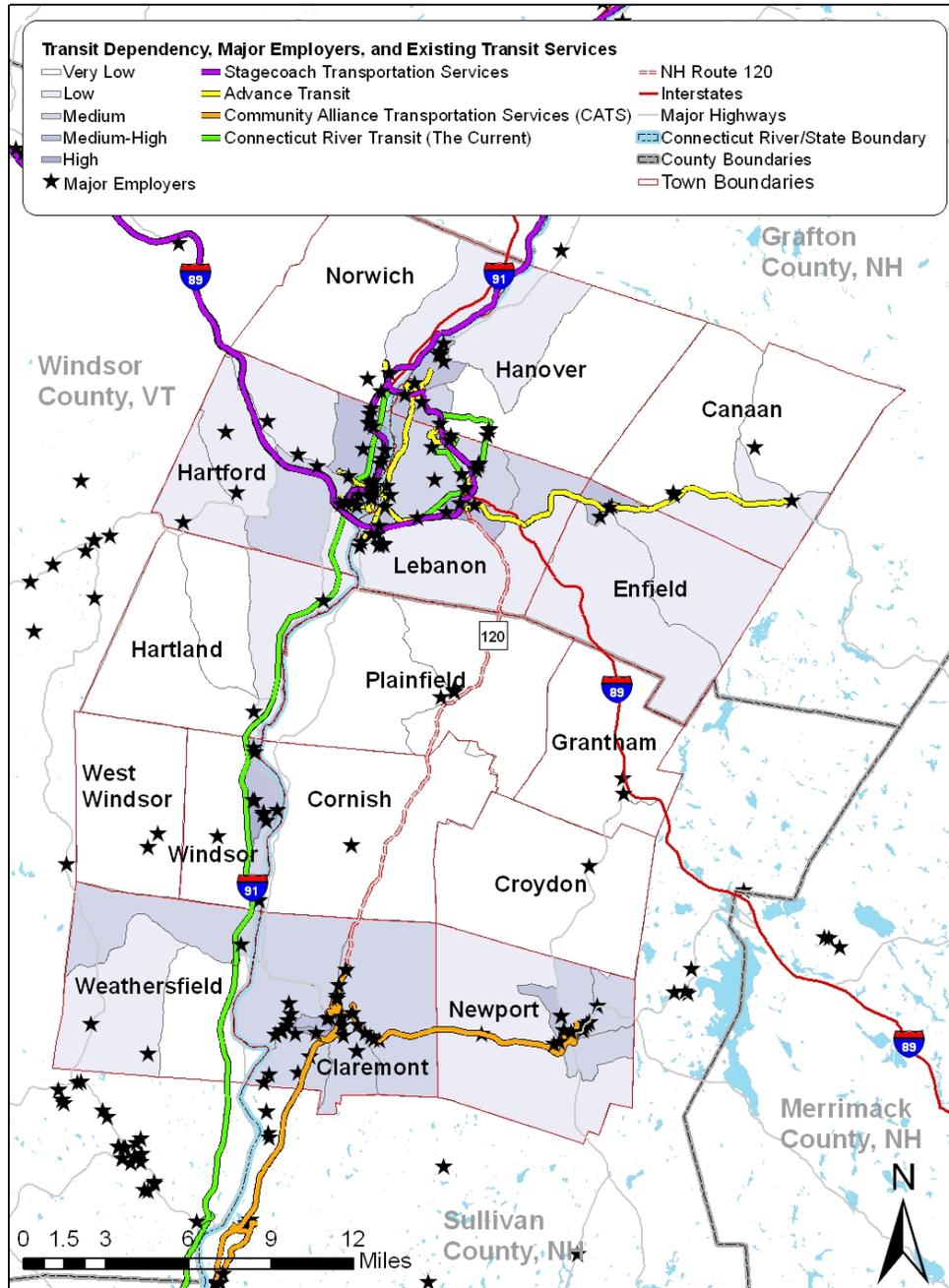
- Residents within the NH 120 Corridor, particularly older adults, students, and some commuters, have a need for stops between the population centers at the ends of the Route.
- For transit service to be successful along Route 120, there must be a focus on public education regarding the need for and benefits of such service.
- Most surveyed employers feel that demand-responsive service would be more effective for their employees and customers.
- Commuting patterns, as provided in the employee survey responses, indicate there is clear morning/afternoon windows in which transit service could be beneficial.

Based on the shift data from employers and from the responses of employees, two windows of time become clear as the times of highest demand for service. In the morning, the time from 7:30 to 8:30 am is indicated as the arrival time for the highest proportion of employees. For manufacturers, the start of scheduled shifts is slightly earlier at 7:00 am. In the afternoon, employees of manufacturers generally leave earlier, 3:00 pm, but most respondents to the NH 120 and Smart Commute Survey depart between 4:30 and 5:30 pm.

As these potential service times become evident, so too do directional travel flows. Based again on the stakeholder and employer interviews, as well as the responses to surveys, there appears to be a strong northward travel direction along NH 120 in the morning and a return south in the afternoon. If transit along the NH 120 Corridor is to serve primarily the needs of a commuting population, these peak periods of arrival and departure, as well as the direction of travel, indicate a good starting point for the scheduling of service.

Similarly, looking at the existing transit service, it is clear that the missing link in public transportation provision is a connection from Claremont to Lebanon/Hanover (Figure 5-1). When adding both major employer locations and the transit dependent composite needs index to the map, the picture is even sharper, indicating a strong need for transit service to connect the population centers in the NH 120 Corridor.

**Figure 5-1 Transit Dependent Index, Major Employers, and Current Transit Services**



## Transit Goals and Priorities

As part of one of the initial project meetings, the Steering Committee discussed their goals and priorities for transportation services along NH 120, and in particular considered some of the service trade-offs. These perspectives were combined into a set of goals and priorities that reflect the most commonly cited and strongest voiced objectives for public transportation in the study, including:

- Strengthen links between Claremont and the Lebanon/Hanover area.
- Increase access to employment in both communities and support regional and local economic development goals.
- Provide a cost effective and efficient use of public resources.
- Offer connections to existing public transportation services.
- Be easily communicated, reliable, and reflective of industry innovations.
- Ensure the service design is built on realistic project costs, financially sustainable, and sufficiently flexible to meet the changing needs over time.

In addition to reviewing service goals, the study team also discussed a series of transit guidelines that will be kept in mind as new services are created. As outlined in earlier chapters, public transportation typically seeks to serve a wide variety of travelers, trip types, and transportation demands. The needs of individual markets, however, frequently conflict with each other. For example, most riders want fast service, but others want stops located close together to minimize the distances that they have to walk. Providing frequent stops results in slower service. Thus, service elements that will attract one type of rider to transit can drive other riders away. As the Steering Committee considered how to structure new transit services, they also worked to balance competing demands and avoid eroding the objectives associated with an individual service design.

The following includes several critical transit service design guidelines. These are the guidelines that were used to develop the implementation plan. In some cases, the guidelines were compromised to meet a compelling need but only after careful consideration and thought.

### **Service Should be Simple**

First and foremost, for people to use transit they must be able to understand it. Accordingly, service should be designed so that it is easy to remember, understand, and use. This makes it easier for potential riders to learn about the options that are available, and help ensure that riders get where they want to go, when they want to, without experiencing frustration and problems. Most of the transit planning guidelines listed here are aimed at making service intuitive, logical, and easy to understand.

### **Routes Should Operate Along a Direct Path**

The fewer directional changes a route makes, the easier it is to understand. Further, circuitous alignments are disorienting and difficult to remember. Routes should not deviate from the most direct alignment unless there is a compelling reason to.

## **Routes Should be Symmetrical**

Routes should operate along the same alignment in both directions. This will make it easier for riders to know how to get back to where they came from. All routes should operate along the same alignment in both directions except in cases where such operation is not possible due to one-way streets or turn restrictions. In those cases, routes should be designed so that the opposite directions parallel each other as closely as possible. This design principle is often difficult to follow in rural and small town locations because as compared with looping services, symmetrical routes will reduce the service area (or geographic coverage). Routes that operate with a looping alignment, however, will nearly always create longer travel times in at least one direction of travel and consequently, will be less attractive to riders.

## **Route Deviations Should be Minimized**

As described above, service should be relatively direct, and to make service direct, the use of route deviations—traveling off of the most direct route such as into a housing complex—should be minimized. However, there are many instances when the deviation of service off of the most direct route is appropriate; for example, to provide service to major shopping centers, employment sites, schools, etc. In these cases, the benefits of operating the route off of the main route must be weighed against the inconvenience caused to passengers already on board.

## **Transit Routes Should Operate Along Arterials**

Potential transit users have at least a basic knowledge of an area's arterial road system and use that knowledge as points of reference. In central New Hampshire, major arterials are also likely to pass through the center of most towns and villages, and in most cases, travel is fairly high speed. The operation of bus service along arterials therefore makes transit service more visible as well as easier to figure out and to use. It also makes service faster.

## **Service Should be Consistent and Operate at Regular Intervals**

People can easily remember repeating patterns but have difficulty remembering irregular sequences. For this reason, routes should operate along consistent alignments and at regular intervals (headways). This is true even if the route operates limited departures during certain times of the day, such as commuting hours. Thus, even if there are only two trips per day, the departures ideally will be scheduled at 6:15 am and then again at 7:15 am, or potentially 8:15 am, depending on service schedules.

## **Services Should be Well Coordinated**

In the NH 120 study area, there are a variety of existing services, including services provided by Advance Transit, CATS, and Connecticut River Transit. A key objective is to design services so they are coordinated. In the case of NH 120, coordinating service primarily means ensuring services meet at some locations to support transfers. Keeping this in mind as new services are designed will help expand the network of services, improve service efficiency, and increase consumer confidence.

## **Stops Should be Spaced Appropriately**

Transit stops are the access and egress points for transit services and should be conveniently located; many rural operators address this need by permitting riders to hail or flag the bus

anywhere along the route. However, transit stops are also the major reason that transit service is slower than automobile trips. Most riders want service that balances convenience and speed; the number and location of stops is a key component of determining that balance.

The study area can encourage use of designated stops by installing transit shelters with service information posted at high visibility locations and locating the stops along streets and corridors with transit supportive pedestrian infrastructure (sidewalks and crosswalks) where possible. The shelters will encourage passengers to congregate at this location and improve transit operations.

## Service Options

Using the available information about travel patterns, operating conditions, and transit planning design guidelines, the Steering Committee identified four primary alternatives (plus two sub-options) for structuring potential public transportation services along NH 120. The objective of the proposed service is to strengthen the links between Claremont and the Lebanon/Hanover area and increase access to employment in both communities. The identified public transportation service options include:

- **Alternative 1:** Fixed-route bus service between the Claremont Visitors Center and the Dartmouth Hitchcock Medical Center (DHMC) Parking Lot 9.
- **Alternative 1a:** Fixed-route bus service between the Moody Building in downtown Claremont and DHMC Parking Lot 9.
- **Alternative 1b:** Fixed-route bus service that is designed to be a continuation of the CATS Newport to Claremont route so that the bus continues to Lebanon and DHMC Parking Lot 9.
- **Alternative 2:** Fixed-route bus service between the Claremont Visitors Center and the main hospital entrance on the DHMC campus.
- **Alternative 3:** Fixed-route bus service between the Claremont Visitors Center and the DHMC Parking Lot 9 with Flex Service, or providing pick up and drop off at a variety of locations off the route but within a certain distance at each end, to benefit transit dependent populations.
- **Alternative 4:** Fixed-route bus service between the Claremont Visitors Center and the DHMC Parking Lot 9 returning to downtown Lebanon via Etna Road.

For each alternative, the study team prepared a map, estimated ridership, and calculated the indicative costs of operating the service based on schedule and the hourly cost of service. The study team also calculated a series of performance measures that show the annual cost of service, average daily ridership, and the estimated cost per passenger trips. These performance measures were used by the Steering Committee to help understand the relative strengths and weaknesses of each option. More details on each alternative, including maps and an overview of ridership projections and cost estimates are provided in Appendix D.

In summary, the study team estimated that operating the NH 120 bus route would require between \$140,000 and \$180,000 in operating costs. Operating the service would also require capital investments, such as a transit vehicle. These costs may range between \$60,000 and \$100,000 depending on the vehicle model; transit vehicles in this price range typically have a useful life of about seven years.

The demand for service (i.e. estimated ridership) was calculated using a variety of sources, including local counts of population and employment provided by the census, existing mode splits (i.e. the percentage of people currently using public transportation), and the experience of other regional transit providers. In some areas, where the study team had more detailed information about employment levels, shift starting times, wages and/or employee zip codes data, the study team used this information to gauge the number of employees likely to use public transit. Ridership for non-work trips was based on an estimate of the number of older adults and persons with disabilities within walking distance (a quarter-mile) of the NH 120 bus stops. In each case, the study team created a low, medium, and high estimate for potential ridership and compared the estimate against the experience of other transit services in the region. Taking all this information into consideration, the study team was able to broadly estimate ridership for a potential new bus service.

To compare the performance of each of the service options, the study team used the “medium” case of ridership together with the estimated costs. This analysis suggests that the NH 120 bus route could carry between 110 and 135 people per day for a cost per passenger trip between \$4.00 and \$5.00, not including fares. It is important to remember, however, that these are indicative estimates only and do not include capital costs.

**Table 5-1 Summary of Performance Measurements by Service Alternative**

Service Alternative	Annual Service Cost	Average Daily Ridership*	Estimated Cost per Passenger Trip*
Alternative 1	\$137,500	109.4	\$5.03
Alternative 1a	\$152,500	124.4	\$4.42
Alternative 1b	\$137,500	134.4	\$4.09
Alternative 2	\$137,500	136.3	\$4.03
Alternative 3	\$179,167	112.1	\$4.91
Alternative 4	\$150,000	115.1	\$4.78

Source: Nelson\Nygaard

Notes: \* Based on “medium” estimate of ridership

From a transit planning perspective, routes that can operate with a cost per passenger of less than \$5.00 are considered effective. As a reference, the Vermont Agency of Transportation (Vtrans) identifies a bus route as “successful” if it operates in a small town setting and achieves a cost per passenger of \$5.98.<sup>4</sup> Vtrans’ “acceptable” cost per passenger benchmark for service in a small town setting is set at \$11.96. Ultimately, however, each alternative offers different strengths and weaknesses and may be preferred based on a variety of factors.

<sup>4</sup> Vermont Agency of Transportation 2009 Transit Route Performance Review

# Chapter 6 Proposed NH 120 Transit Service

## Overview

After discussion and debate, the Steering Committee identified a proposed service design for potential transit services operating along NH Route 120. The proposed service design represents a hybrid of the different alternatives presented to the Steering Committee. The service would travel between downtown Claremont, and downtown Lebanon with stops along NH 120 and service to DHMC and the Great Hollow Road/Etna Road corridor (see Figure 6-1). The key design characteristics of the proposed service include:

The proposed service is primarily oriented around improving access to employment markets in Claremont and Lebanon with direct access to the largest employers along the NH 120 corridor. A mid-day trip is also included to support non-work trips.

The largest employer in the region is the DHMC with over 6,000 employees. The proposed operating schedule is specifically designed to meet the largest employment shift at this facility.

The proposed route will also travel along Etna Road to serve employment located along this corridor. Currently, Etna Road has very limited public transportation services.

The proposed service is intended to be direct, easy to understand, and easy to use. As a result, there are few variations in the service. Following this design principle, however, means that with the exception of the service to the DHMC East Entrance, riders will have to walk from the bus route to their final destination.

The proposed NH 120 service will connect to other regional transit services, including the Community Alliance Transportation Services (CATS) in Claremont (at the Moody Building) and Advance Transit (at the Lebanon Green and at DHMC). This approach reduces service redundancies and increases regional accessibility.

There are several potential opportunities for passengers to park and ride, including at the Moody Building at Claremont, but also at a handful of locations along NH 120.

The service is designed to provide five round trips per day: two during the morning commute times, one mid-day trip, and two trips during the afternoon commute hours.

The proposed service is estimated to cost approximately \$180,000 per year and carry about 115 passengers per day. The estimated cost per passenger trip is \$6.30. The cost may be reduced by passenger fares.

Partial funding for the service may be available from federal grants. However, local funding sources will be required to match federal resources.

## Service Design

The proposed route alignment would begin/end in downtown Claremont at the Moody Building to provide connections with Community Alliance Transportation Service (CATS). Stopping in front of the Moody Building also provides park and ride opportunity from municipal spaces in the downtown parking garage. From the Moody Building, the route will travel from Tremont Square to

Main Street, turning right onto Elm Street, stopping at the entrance to the Valley Regional Hospital. It then turns right onto Dunning Street and left onto NH 120 heading north.

Stops along NH 120 will vary, depending upon the time of day but will include Valley Regional Hospital, River Valley Community College, Cornish General Store, and Meriden Store for Kimball Union Academy. The service is designed to stay on NH 120 and assumes individuals disembarking from the bus will walk from NH 120 to their destination.

The route will then go into downtown Lebanon to allow for connections with Advance Transit's (AT) Red and Blue Routes at the City Hall/Opera House stop by the green. The NH 120 service will then continue north to the east entrance of DHMC. After that, the service will head south on NH 120 for a short time and then take a left on Etna Road to provide service to employers there and on the continuation of the road as Great Hollow.<sup>5</sup> At the last stop, the bus will turn around to continue to downtown Lebanon, and then continue south to Claremont along NH 120. For the return, the Valley Regional Hospital stop is along NH 120, allowing for entry at the back entrance.

With this alignment, the one-way northbound trip is approximately 29.8 miles, with a southbound return of 25.8 miles, bringing the roundtrip to 56.6 miles. The northbound travel time is approximately 1 hour and sixteen minutes, with the southbound at one hour and ten minutes. With recovery times at the end, the round trip takes approximately two hours and 25 minutes.

**Table 6-1 Strengths and Weaknesses of Proposed NH 120 Service**

Strengths	Weaknesses
Route offers direct service between Claremont and Lebanon.	The travel times limit the ability to perfectly serve all peak commuting times in Claremont and Lebanon unless some employment allowed for flexible schedules.
Connects with AT Red and Blue routes at Lebanon Green and with CATS route at the Moody Building.	Park and ride opportunities in northern end of route are limited.
Meets primary morning commuting time for DHMC.	
Serves Etna Road employment not served by transit.	
Provides Park and Ride opportunities.	

Source: Nelson\Nygaard

## Connections to Other Transit Service

By connecting to other transit services, both in Claremont and Lebanon, the proposed NH 120 service will significantly increase mobility and accessibility for the entire region. The Moody Building, for example, serves as the main downtown stop location for all of the CATS fixed routes, serving Claremont, Newport, and Charlestown. Thus, the proposed NH 120 service will support connections from Newport and Charleston to Lebanon and DHMC. Similarly, by bringing NH 120 service to downtown Lebanon, the NH 120 service can offer transfers to AT services and support linkages to Hanover and West Lebanon. Figure 6-3 shows how the NH 120 service links the regional transit systems. The service schedule also identifies transfer opportunities between NH 120 transit and other services.

<sup>5</sup> The Etna Road service will not operate during the midday trip.

Figure 6-1 Proposed NH 120 Service: Route Alignment

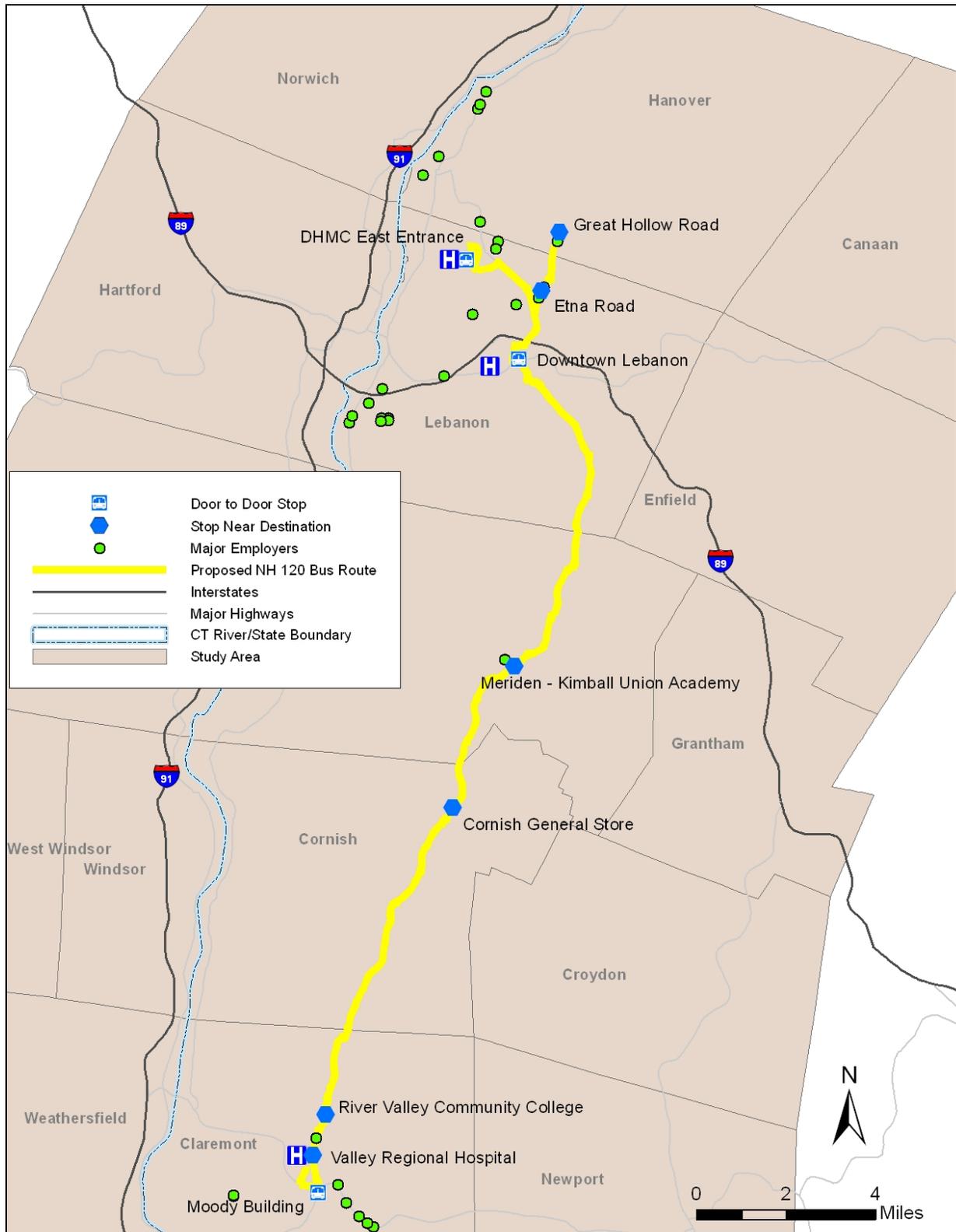
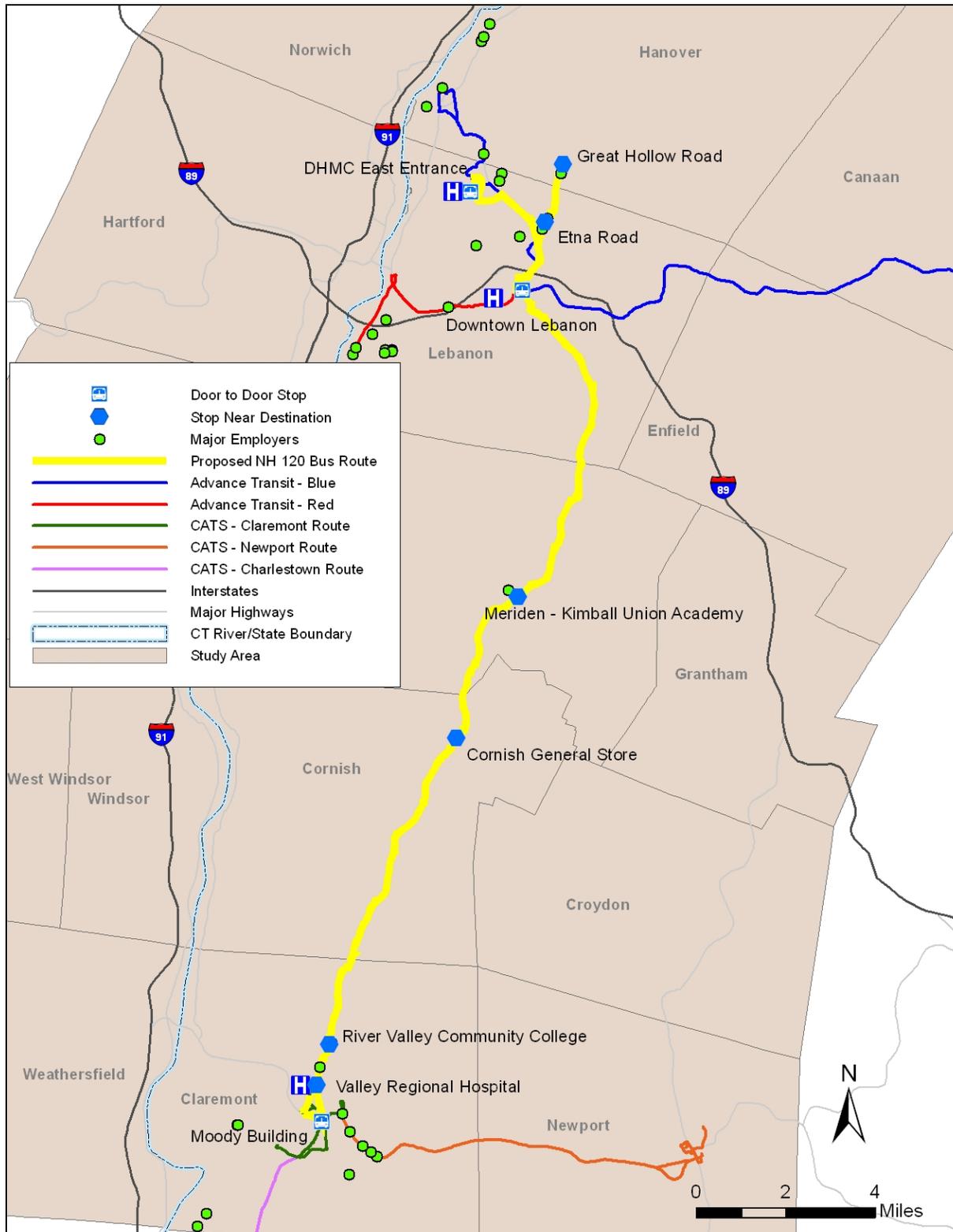


Figure 6-2 Proposed NH 120 Service: Connections to Regional Transit Services



## Indicative Service Schedule and Costs

The study team prepared an indicative schedule for the proposed NH 120 service. This schedule is built around the demand at DHMC and is constrained by the assumption that the service would be provided with a single vehicle that would have to circle between destinations. As a result, scheduling the first trip of the day drives the rest of the schedule. A round-trip on the corridor is estimated to require 2 hours and 25 minutes, inclusive of time set aside to allow passengers to board and alight and a few minutes at the end of the trip to “recover” any time lost en route.

### Northbound

Trip	Moody Building <sup>6</sup>	Valley Regional Hospital	River Valley Community College	Cornish General Store	Meriden	Downtown Lebanon <sup>7</sup>	DHMC East Entrance <sup>8</sup>	Etna Road	Great Hollow Road
Trip 1	6:00 AM	6:04 AM	-	6:18 AM	6:24 AM	6:45 AM	7:01 AM	7:11 AM	7:14 AM
Trip 2	8:30 AM	8:34 AM	8:36 AM	8:50 AM	8:56 AM	9:17 AM	9:33 AM	9:43 AM	9:49 AM
Trip 3	11:00 AM	11:04 AM	11:06 AM	11:20 AM	11:26 AM	11:47 AM	12:03 PM	-	-
Trip 4	2:30 PM	2:34 PM	2:36 PM	2:50 PM	2:56 PM	3:17 PM	3:33 PM	3:43 PM	3:49 PM
Trip 5	5:00 PM	5:04 PM	5:06 PM	5:20 PM	5:26 PM	5:47 PM	6:03 PM	6:13 PM	6:19 PM

### Southbound

Trip	Great Hollow Road	Etna Road	Downtown Lebanon	Meriden	Cornish General Store	River Valley Community College	Valley Regional Hospital	Moody Building
Trip 1	7:20 AM	7:25 AM	7:33 AM	7:54 AM	8:00 AM	8:14 AM	8:16 AM	8:20 AM
Trip 2	9:50 AM	9:55 AM	10:07 AM	10:26 AM	10:32 AM	10:46 AM	10:48 AM	10:55 AM
Trip 3	-	-	12:15 PM	12:34 PM	12:40 PM	12:54 PM	12:56 PM	1:02 PM
Trip 4	3:50 PM	3:55 PM	4:07 PM	4:26 PM	4:32 PM	4:46 PM	4:48 PM	4:55 PM
Trip 5	6:20 PM	6:25 PM	6:37 PM	6:56 PM	7:02 PM	7:16 PM	7:18 PM	7:25 PM

<sup>6</sup> CATS Connections: Newport - AM: 6:25, 8:35, 10:53, PM: 2:30, 4:30; Claremont - AM: 8:20, 8:51, 10:51, 11:20, PM: 12:20, 12:51, 2:25, 2:55, 4:20, 4:44, 5:05; Charlestown AM - 9:41, 11:15, PM: 3:00, 4:30

<sup>7</sup> Advance Transit Connections: Red Route - Service departs every thirty minutes at :15 and :45 between 8:15 AM and 6:15 PM (also at 6:15 and 7:15 AM); Blue Route – Service times vary, but generally service every half hour, at quarter past and quarter until the hour

<sup>8</sup> Advance Transit Connections: Blue Route - Service times vary, but generally service every 15 minutes, starting on the hour

## Estimated Cost

Based on the schedule and assuming that the service will operate on weekdays, exclusive of holidays, for approximately 250 days a year with an hourly operating cost of \$60, the annual cost of service is estimated at \$181,250.

## Vehicle Specifications

Based on the experience of other local and regional transit agencies, we recommend operating the route with a heavy duty, mid-sized transit vehicle that would be capable of accommodating 34 to 36 passengers. While some trips would not need this much seating, this vehicle size may be necessary for some trips and would also allow the ridership to grow over time.

## Estimated Ridership and Performance

As part of our development of the alternative, the study team estimated likely ridership for this service based on a variety of sources. We considered the communities served by the route and referenced the US 2000 Census<sup>9</sup> data that reports the number of people working in the Claremont and Lebanon census tracts. We removed one Claremont census tract that is not directly served by transit, and took 50 percent of the Claremont and Lebanon totals as the market that could potentially use this service. This discount factor allows for jobs that are outside of the “traditional” business hours that the bus route is designed to serve. Using half of the jobs in Claremont and Lebanon as our market (i.e. the commuter travel market), we created three sets of assumptions (low, medium and high) of the number of people who might use the bus; these assumptions are 1, 2, and 3 percent of the commuter market. These ratios are consistent with the survey data collected as part of this study and with anticipated increased transit ridership due to serving the new Etna/Great Hollow Road Market.

Given our more detailed understanding of the hospital employment market and taking into consideration parking shortages and existing transit mode split, we assumed employees traveling to DHMC, Alice Peck Day Memorial Hospital, and Valley Regional Hospital would use public transportation services at the following rates of 1 (low), 1.5 (medium), and 2.5 (high) percent. These assumptions are conservative based on the experience at DHMC, but account for the longer travel time associated with the route and other medical facilities that have not recorded high transit use. Ridership for the midday trip was based on an estimate of the older adults and persons with disabilities within walking distance (a quarter-mile) of the NH 120 stops. Estimates of ridership on the proposed NH 120 service are shown in Table 6-2.

**Table 6-2 Proposed NH 120 Service: Estimated Demand and Performance Measures**

Preferred Alternative	Low	Medium	High
Annual Ridership	15,484	28,786	40,977
Passengers per Day	61.9	115.1	163.9
Passengers per Trip	6.2	11.5	16.4
Cost per Trip	\$72.5	\$72.5	\$72.5
Cost per Passenger Trip	\$11.71	\$6.30	\$4.42

Source: Nelson\Nygaard

<sup>9</sup> The 2000 Census data was the most recently available data at the time this analysis was prepared.

# Chapter 7 Public Input and Service Refinement

## Public Input

As part of the planning process, the study team held two public meetings. The purpose of these meetings was to share the study findings, present the proposed service, and collect input and refinements on the service proposal. The meetings were held in Claremont (May 9, 2011) and Lebanon (May 10, 2011) and both were held from 5:00 pm to 7:00 pm. The Claremont meeting was also broadcast live on public access television. In both cases, the meetings were well attended with on the order of 25 to 30 individuals attending each meeting. The meeting format involved an introduction from the UVLSRPC, a presentation on the study findings, followed by a facilitated discussion of the proposed service.

The discussion about the NH 120 bus service was lively, with many of the meeting attendees commenting on several aspects of the proposed service. In addition to the comments made verbally at the meeting, many individuals submitted written comments. These comments generally are summarized and categorized in the following text. A copy of the comments submitted to the study team either in writing or by email is also included in Appendix E.

### Need for Transit Service

The most frequent comment received at the public meetings was support for the service. Several people attended the meeting on their way home from work to express their interest in and willingness to use bus service between Claremont and Lebanon. Many people said having the bus would open employment opportunities and others talked about how the rising gas prices are increasing their interest in having another way to get to and from work.

The meeting was also attended by people who represent health care industries. These people talked about how useful the service would be for people needing transportation to/from medical appointments. They also noted that because no transit service exists, some people have to use very expensive forms of transportation, such as an ambulance.

### Schedule

Several individuals and employers commented on the proposed schedule.

One of the employers is a manufacturer and said there are nearly 100 employees living along the bus route, who must be on the floor ready to work by 6:50 am. Because staff needs to be working with machinery, there is no flexibility in start times; to serve this employer, the bus would need to get people to work by 6:40 am or 6:45 am.

A second employer, also on Etna road, said their employees arrive between 8 am and 9 am.

Other employees suggested the bus should be timed to meet an 8 am start time at DHMC.

Members of the public discussed the proposed schedule and noted the constraints associated with trying to meet the needs of multiple employers and locations and serve the greatest number of individuals possible. A potential solution raised was the possibility of operating two buses, with one scheduled to meet the southbound schedules and the other the northbound schedules.

Although this approach would not increase the operating costs estimated for the service, it requires a second vehicle, thereby increasing capital costs.

Based on the input and comment about the schedule, the study team adjusted both the proposed alignment and schedule (see below). Even as the proposed transit route is finalized for purposes of this analysis, it is important to remember that the schedule and alignment are indicative only. The schedule will be finalized as the proposed service gets closer to implementation; this will ensure the final schedule reflects the most up-to-date and accurate travel conditions possible.

## Route Alignment and Stops

Where the route travels (alignment) and stops also received several comments at the public meetings. Several people asked about service to the Alice Peck Day Hospital. In addition, members of the public also suggested that the bus should stop at the Visitors Center in Claremont to serve people traveling from the west. Others also expressed the importance of bringing the bus into Valley Regional Hospital.

The study team also took these comments into consideration. The proposed NH 120 bus route will not directly serve Alice Peck Day Hospital; however, it will offer connections to the proposed Flex Service that is being planned. The connection will support access from Claremont to the Alice Peck Day Hospital.

The decision to stop at the Visitors Center and/or Valley Regional Hospital is challenging. On one hand, the Visitors Center has available parking and offers a more direct routing for people potentially traveling to the bus route from neighborhoods west of downtown Claremont. Likewise, driving into the Valley Regional Hospital would greatly improve the convenience of the bus stop for people going to the hospital, especially those who may have mobility constraints or challenges. On the other hand, the proposed schedule for the NH 120 bus is very tight, such that adding even a few minutes to the schedule jeopardizes the ability of the bus to meet key employer start times. In our revised schedule, therefore, we recommend not serving the Visitors Center. This decision may be revisited after the service is started, especially if parking in the Moody Building becomes constrained. With regard to driving into Valley Regional Hospital, the study team recommends directly serving the Hospital campus on a request basis. People on the bus can request to be dropped off, but people seeking a pick-up will need to request a ride. While slightly inconvenient for some potential riders, this approach balances the need to drive on campus with the desire to offer fast and direct service.

### Amenities

At both meetings, people emphasized the importance of amenities for the bus service, such as providing bike racks, offering comfortable seating and providing wireless internet “wifi” access. The study team recognizes the importance of passenger amenities in encouraging ridership. These amenities will be included in the final service design, noting that there may be constraints to implementation, such as the availability of wireless internet service on all parts of the proposed bus route.

### Funding

One of the most important topics discussed at the public meetings was the cost of the service, especially the ability of the communities to raise the resources needed to support new transit services. Local officials were also in attendance at both meetings. While their comments were in support of the proposed transit service, they also reiterated the financial constraints facing their administrations.

Meeting attendees suggested that employers help with finding local match funds. While some employers indicated a willingness to consider financial support, others said it would be difficult for them to support bus service until they are sure their employees will use it. Once the service is operating and they see their employees riding it, they may be convinced to help contribute.

## Preferred Alternative

### Route Alignment

The proposed route alignment would begin/end in downtown Claremont at the Moody Building to provide connections with Community Alliance Transportation Service (CATS). Stopping in front of the Moody Building also provides park and ride opportunity from municipal spaces in the downtown parking garage. From the Moody Building, the route will travel from Tremont Square to Main Street, turning right onto Elm Street, stopping at the entrance to the Valley Regional Hospital, turning right onto Dunning Street and then left onto NH 120 heading north.

Stops along NH 120 will vary, depending upon the time of day but will include River Valley Community College, Cornish General Store, and Meriden Store for Kimball Union Academy. The service is designed to stay on NH 120 and assumes individuals disembarking from the bus will walk from NH 120 to their destination. An exception to this rule will be made for the Valley Regional Hospital; the bus will be allowed to deviate into the Valley Regional Hospital campus on a request basis.

The NH 120 bus route, as discussed, is planned to have defined stops and no service deviations. The intention is to ensure the bus is reliable and meets employment schedules. However, travelers on the mid-day runs are likely to be slightly less time sensitive, therefore, the NH 120 service may operate as a “hail and ride” service for the mid-day trips and allow the bus to stop along NH 120 as requested. The hail and ride service will be available outside of Lebanon and Claremont along the more rural sections of the route. Allowing this flexibility will make the route more convenient for individuals who may not be able to walk to a designated stop.

The route will then go into downtown Lebanon to allow for connections with Advance Transit’s (AT) Red and Blue Routes at the City Hall/Opera House stop by the green. The NH 120 service will then continue north to Etna Road and Great Hollow Road, turning west on Greensboro Road and on to the East Entrance of DHMC.<sup>10</sup> DHMC will be the route terminus and the southbound alignment will reverse direction back to the Lebanon Green and southbound to Claremont. As discussed, the route alignment will support connections to CATS (at the Moody Building) and AT (at the Lebanon Green and the DHMC East Entrance).

With this alignment, the round trip travel distance is approximately 60 miles. With recovery times at the end, the round trip takes approximately two hours and 40 minutes.

Using the methodology outlined in Chapter 6, the study team estimated demand at between 62 and 164 riders per day. As discussed, the demand for service will be affected by many factors including factors within local control such as marketing and schedule as well as macroeconomic factors such as the cost of a gallon gasoline, the weather, and the overall health of the economy. Estimates of ridership on the proposed NH 120 service are shown in Table 7-1.

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<sup>10</sup> The Etna Road service will not operate during the midday trip.

It is also important to note that our estimate of ridership will not be realized on day one of operations, but are developed over time, as more people learn of the service and the success of the service builds ridership. Typically, pilot projects funded by the federal government allow a three year period for a new service to build and develop ridership and wait until the end of this period before determining if the route is a success or not. Accordingly, we anticipate that the NH 120 will achieve the estimated ridership, but the service will need a period of two to three years to achieve these levels.

**Table 7-1 Proposed NH 120 Service: Estimated Demand and Performance Measures**

Preferred Alternative	Low	Medium	High
Annual Ridership	15,498	28,806	41,007
Passengers per Day	61.9	115.2	164.0
Passengers per Trip	6.2	11.5	16.4
Cost per Trip	\$80.38	\$80.38	\$80.38
Cost per Passenger Trip	\$12.99	\$6.98	\$4.90

Source: Nelson\Nygaard

Figure 7-1 Proposed NH 120 Service: Route Alignment

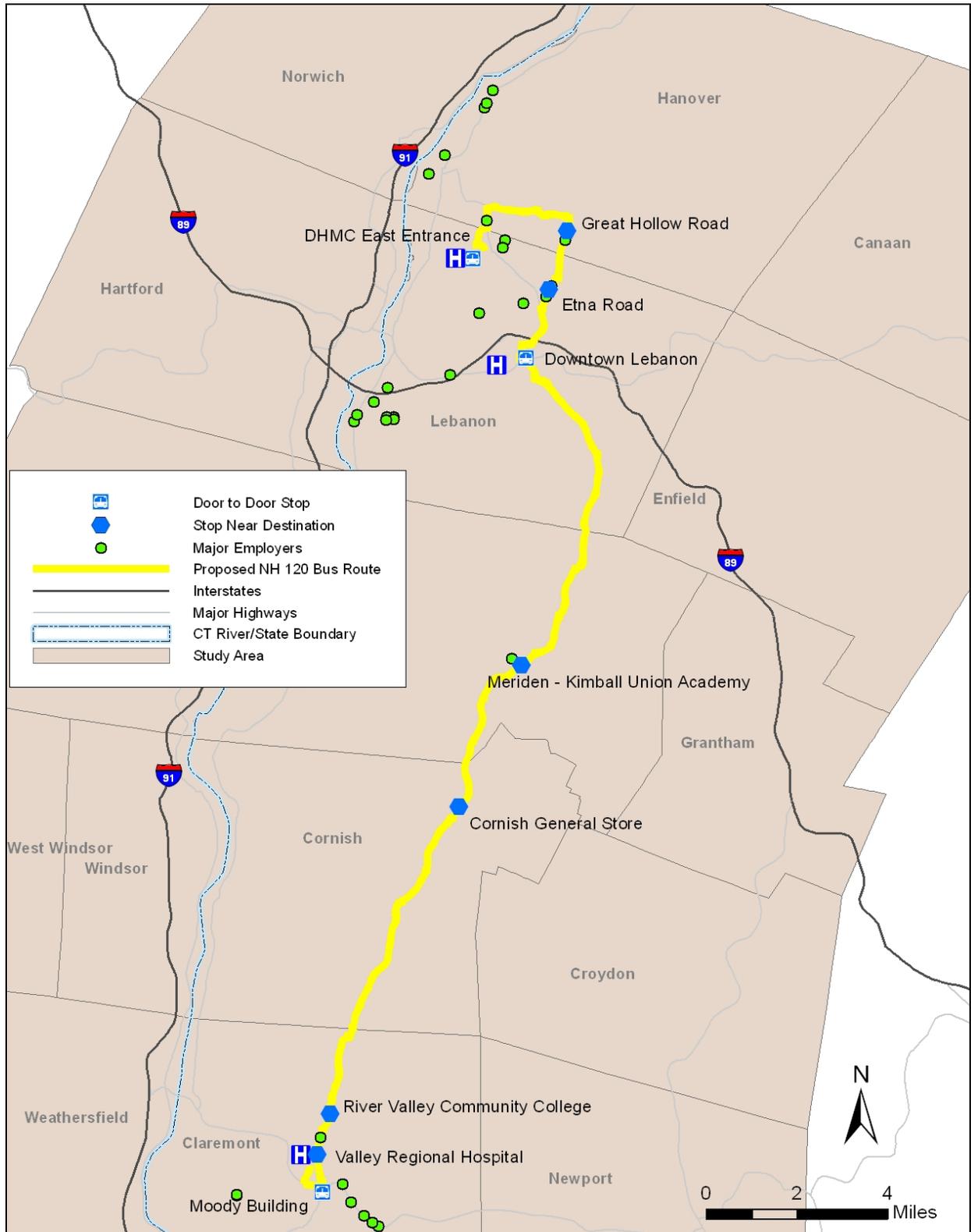
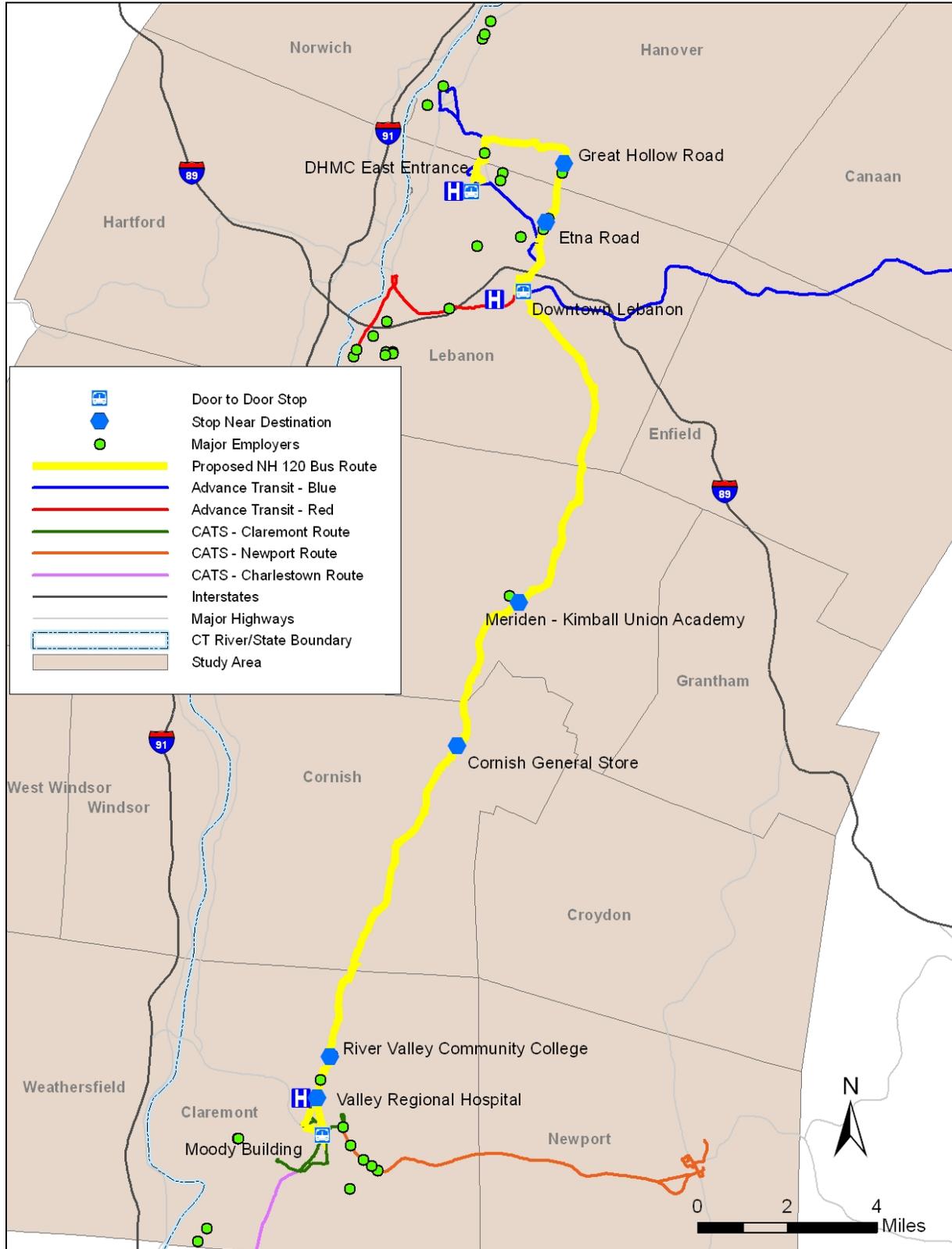


Figure 7-2 Proposed NH 120 Service: Route Alignment



## Indicative Service Schedule (Single bus)

Based on input provided by the Steering Committee and members of the public, the study team revised the service schedule for the NH 120 service. This schedule is designed to meet the employment shifts on Etna Road (6:50 am start time) and at DHMC (7:00 am start). This revised schedule also allows meets an 8:30 am to 9:00 am start time for employees commuting to Claremont. The later morning shift will likewise support some employment shifts on Etna Road and DHMC, as well as travel to medical appointments. The return trips are also designed around employee shift times. As noted previously, while the schedule represents the preferred alternative at this time, the schedules may be changed again once the service nears implementation. It is also important to note that this schedule assumes there is one bus available to operate the service, thus the departure times are constrained by the travel associated with a round trip.

### Northbound

Trip	Moody Building <sup>11</sup>	Valley Regional Hospital	River Valley Community College	Cornish General Store	Meriden	Downtown Lebanon <sup>12</sup>	Etna Road	Great Hollow Road	DHMC East Entrance <sup>13</sup>
Trip 1	5:45 AM	5:52 AM	-	6:08 AM	6:14 AM	6:35 AM	6:41 AM	6:50 AM	7:05 AM
Trip 2	8:30 AM	8:37 AM	8:39 AM	8:53 AM	8:59 AM	9:20 AM	9:26 AM	9:35 AM	9:50 AM
Trip 3	11:15 AM	11:22 AM	11:24 AM	11:38 AM	11:44 AM	12:05 PM	-	-	12:20 PM
Trip 4	2:00 PM	2:07 PM	2:09 PM	2:23 PM	2:29 PM	2:50 PM	2:56 PM	3:05 PM	3:20 PM
Trip 5	4:45 PM	4:52 PM	4:54 PM	5:08 PM	5:14 PM	5:35 PM	5:41 PM	5:50 PM	6:05 PM

### Southbound

Trip	DHMC East Entrance	Great Hollow Road	Etna Road	Downtown Lebanon	Meriden	Cornish General Store	River Valley Community College	Valley Regional Hospital	Moody Building
Trip 1	7:05 AM	7:21 AM	7:27 AM	7:35 AM	7:54 AM	8:00 AM	8:14 AM	8:19 AM	8:25 AM
Trip 2	9:50 AM	10:06 AM	10:12 AM	10:20 AM	10:39 AM	10:45 AM	10:59 AM	11:04 AM	11:10 AM
Trip 3	12:20 PM	-	-	12:35 PM	12:54 PM	1:00 PM	1:14 PM	1:19 PM	1:25 PM
Trip 4	3:20 PM	3:36 PM	3:42 PM	3:50 PM	4:09 PM	4:15 PM	4:29 PM	4:34 PM	4:40 PM
Trip 5	6:05 PM	6:21 PM	6:27 PM	6:35 PM	6:54 PM	7:00 PM	7:14 PM	7:19 PM	7:25 PM

<sup>11</sup> CATS Connections: Newport - AM: 6:25, 8:35, 10:53, PM: 4:30; Claremont - AM: 8:20, 10:51, 11:20, PM: 1:40, 2:25, 4:44, 5:05; Charlestown AM - 11:15, PM: 4:30

<sup>12</sup> Advance Transit Connections: Red Route - Service departs every thirty minutes at :15 and :45 between 8:15 AM and 6:15 PM (also at 6:15 and 7:15 AM); Blue Route - Service times vary, but generally service every half hour, at quarter past and quarter until the hour

<sup>13</sup> Advance Transit Connections: Blue Route - Service times vary, but generally service every 15 minutes, starting on the hour

## Indicative Service Schedule (Two bus)

Recognizing the constraints associated with the operating the NH 120 service with a single bus, we created a potential schedule that takes advantage of the flexibility of having two buses to operate the service. This schedule is intended for reference only.

### Northbound

Trip	Moody Building <sup>14</sup>	Valley Regional Hospital	River Valley Community College	Cornish General Store	Meriden	Downtown Lebanon <sup>15</sup>	Etna Road	Great Hollow Road	DHMC East Entrance <sup>16</sup>
Trip 1	5:45 AM	5:52 AM	-	6:08 AM	6:14 AM	6:35 AM	6:41 AM	6:50 AM	7:05 AM
Trip 2 (Second Bus)	6:55 AM	7:02 AM	7:04 AM	7:18 AM	7:24 AM	7:45 AM	7:51 AM	8:00 AM	8:15 AM
Trip 3	8:30 AM	8:37 AM	8:39 AM	8:53 AM	8:59 AM	9:20 AM	9:26 AM	9:35 AM	9:50 AM
Trip 4	11:15 AM	11:22 AM	11:24 AM	11:38 AM	11:44 AM	12:05 PM	-	-	12:20 PM
Trip 5	2:00 PM	2:07 PM	2:09 PM	2:23 PM	2:29 PM	2:50 PM	2:56 PM	3:05 PM	3:20 PM
Trip 6	4:45 PM	4:52 PM	4:54 PM	5:08 PM	5:14 PM	5:35 PM	5:41 PM	5:50 PM	6:05 PM
Trip 7 (Second Bus)	6:10 PM	6:17 PM	6:19 PM	6:33 PM	6:39 PM	7:00 PM	7:06 PM	7:15 PM	7:30 PM

### Southbound

Trip	DHMC East Entrance	Great Hollow Road	Etna Road	Downtown Lebanon	Meriden	Cornish General Store	River Valley Community College	Valley Regional Hospital	Moody Building
Trip 1 (Second Bus)	5:30 AM	5:46 AM	5:52 AM	6:00 AM	6:19 AM	6:25 AM	6:39 AM	6:44 AM	6:51 AM
Trip 2	7:05 AM	7:21 AM	7:27 AM	7:35 AM	7:54 AM	8:00 AM	8:14 AM	8:19 AM	8:25 AM
Trip 3	9:50 AM	10:06 AM	10:12 AM	10:20 AM	10:39 AM	10:45 AM	10:59 AM	11:04 AM	11:10 AM
Trip 4	12:20 PM	-	-	12:35 PM	12:54 PM	1:00 PM	1:14 PM	1:19 PM	1:25 PM
Trip 5	3:20 PM	3:36 PM	3:42 PM	3:50 PM	4:09 PM	4:15 PM	4:29 PM	4:34 PM	4:40 PM
Trip 6 (Second Bus)	4:45 PM	5:01 PM	5:07 PM	5:15 PM	5:34 PM	5:40 PM	5:54 PM	5:58 PM	6:05 PM
Trip 7	6:05 PM	6:21 PM	6:27 PM	6:35 PM	6:54 PM	7:00 PM	7:14 PM	7:19 PM	7:25 PM

<sup>14</sup> CATS Connections: Newport - AM: 6:25, 8:35, 10:53, PM: 4:30; Claremont - AM: 8:20, 10:51, 11:20, PM: 1:40, 2:25, 4:44, 5:05; Charlestown AM - 11:15, PM: 4:30

<sup>15</sup> Advance Transit Connections: Red Route - Service departs every thirty minutes at :15 and :45 between 8:15 AM and 6:15 PM (also at 6:15 and 7:15 AM); Blue Route - Service times vary, but generally service every half hour, at quarter past and quarter until the hour

<sup>16</sup> Advance Transit Connections: Blue Route - Service times vary, but generally service every 15 minutes, starting on the hour

## Chapter 8 Implementation and Funding

There is considerable support for the NH120 bus route, both among stakeholders and the Steering Committee, as well as members of the general public. Our analysis suggests that the service would attract between 6 and 16 passengers per trip and a cost per passenger trip between \$4.90 and \$12.99; these statistics suggest the route would meet industry standards for a public transportation service operating in a small town environment.

Successful implementation and operation of the service requires consideration of several support strategies, such as vehicles, marketing, and passenger amenities. In addition, a key obstacle to implementation of the NH 120 transit route is funding. This chapter contains an overview of some of strategies related to implementation and funding.

### Implementation

#### Transit Vehicles

As discussed, the preferred alternative for the NH 120 route is based on operating the service with a single vehicle. The study team recognizes that using a single vehicle significantly constrains the service schedule, but at this point in time, given funding challenges, we propose operating the service with a single vehicle.

Based on the experience of other local and regional transit agencies, we recommend operating the route with a heavy duty, mid-size transit vehicle that would be capable of accommodating 34 to 36 passengers. While all trips might not need this much seating, this vehicle size will likely be necessary for peak period trips and would also allow the ridership to grow over time.

There are two potential vehicle types that meet these specifications: larger cut-away vehicles that can carry up to 30 passengers and cost between \$60,000 and \$115,000 and mid-size, heavy duty transit vehicles that carry up to 35 passengers (including some standees) and cost around \$250,000. Although the cut-away vehicle is less expensive, it has an average useful life of about 5 to 7 years, as compared to the average useful life of a heavy duty vehicle, which is twice as long and ranges between 12 and 15 years.

There were several vehicle amenities recommended by the Steering Committee and/or members of the public, including comfortable seating, internet access, and bike racks. These amenities will be considered when the vehicle is being procured and will be included if financially feasible.

#### Marketing and Passenger Information Systems

Information materials have two main purposes: 1) to create awareness about services; and 2) to teach passengers how to use the services. Printed materials have long been the primary tool for transit systems to convey service and schedule information, typically supplemented by telephone based dispatch services. More recently, transit systems have diversified their information systems to provide information via agency web pages, links to Google Transit, and cell phone alerts. There are also opportunities to leverage system infrastructure, such as bus stop signage and shelters that strengthen service awareness and help people use and understand the service. Once created, it is essential that information materials are updated regularly and are produced in a clear, clean manner.

In general, there are two categories for creating system awareness and distributing information:

- General system information that is distributed on a widespread basis, typically with map and schedule brochures, but also information on the system and services overall.
- Targeted, trip-specific information that is available on-demand.

Ultimately, the goal is to provide as much good and useful information about the service as possible. Ideally, transit systems will use both approaches and draw upon techniques within each category.

## Estimated Costs and Funding

Supporting quality transit services on an ongoing basis is one of the biggest hurdles facing rural transit systems. Some resources are available through federal programs; however, these funds must be matched with local or state money. Matching requirements for operating expenses can be as high as 50%. Despite this, by carefully designing services to accommodate a range of populations for which federal funding exists, even small rural areas with little state support can combine funding sources to operate a successful system. In-kind services such as office space and use of existing institutional resources can count towards the required local match, leaving the “out-of-pocket” expenses for sponsoring jurisdictions potentially more manageable. This chapter presents funding requirements for the preferred option and discusses potential funding sources.

### Estimated Cost

Based on the schedule and assuming that the service will operate on weekdays, exclusive of holidays, for approximately 250 days a year with an hourly operating cost of \$60, the annual cost of service is estimated at \$200,950. This cost estimate does not include capital costs associated with purchasing a vehicle, but does include the costs associated with marketing the service.

### Fares and Service Costs

Costs of the service do not include passenger fares and fares can be used to off-set service costs. However, federal formula funding programs fund transit services at 50 percent “net operating deficit.” This means that federal programs deduct revenues generated by fares and fund up to half of the service costs. In the case of the NH 120 route, if annual operating costs are roughly \$200,000 and the service raises \$60,000 through passenger fares, federal funds will provide up to \$70,000 (i.e.  $\$200,000 - \$60,000 = \$140,000$ .  $\$140,000 \times 50\% = \$70,000$ ). Another aspect to charging fares are the federal rules associated with collecting fares; these rules include ensuring secure cash boxes on the vehicles, processes for downloading and counting the fares, and annual audits of fare collecting systems.

Given the federal funding formulas, many transit systems in the United States, especially those operating in rural and small urban areas choose not to charge fares. These systems argue that the cost of collecting and managing fares combined with the fact that half of the fare revenues are deducted from federal funds make charging fares uneconomical. Another clear benefit of fare-free systems is higher ridership.

Other systems are fare free but request donations from their riders. The full value of any donation received is retained by the transit system and there are not audit requirements associated with donations.

Transit fares in the region vary; Advance Transit (AT), which operates primarily local service within Lebanon and Hanover, is a free fare system. The Claremont based Community Alliance Transportation Service (CATS) is also primarily a local service and charges \$1.00 to \$2.00 per trip (depending upon distance). Regional operators, such as Stagecoach and Connecticut River Transit (CRT) that operate longer distance commuter service, charge higher costs. Stagecoach levies a \$3.50 fare, while CRT requests a \$3.00 donation for a one-way trip, respectively.

The NH 120 route may be operated with a fare or donation. Either way, the cost of a one-way trip should be set close to \$3.00 per trip to be consistent with other regional fares. \$3.00 also sets a premium fare for the commuter route as compared with CATS local service. For riders boarding mid-route, in either Cornish or Meriden, the fare would be half for these individuals going in either direction.

Assuming the route is at least partially funded with federal resources, older adults and persons with disabilities would be eligible for the half-fare program and pay \$1.50 for a one-way trip departing from downtown Lebanon or points north, or from Claremont. For those qualifying individuals boarding in Cornish or Meriden, they would pay \$0.75, or half of the fare from those two locations. With this fare structure, and assuming roughly 20 percent of the riders pay half-fare, passenger fares would *roughly* generate between \$40,000 and \$100,000. The revenue would likely be slightly lower if the service is operated with a donation rather than a fare.

## Federal and State Funding Programs

New Hampshire supports public transportation through the administration of federal grants. Most of these programs are administered by the Federal Transit Administration (FTA) and distributed according to funding formulas. The mostly commonly used programs relevant to rural areas are:

- Elderly and Disabled Mobility Assistance (Section 5310) - primarily available for capital assistance (vehicle purchase) to support community organizations in meeting the transportation needs of the elderly and persons with disabilities. Funds are apportioned based on each State's share of population for these groups of people. Federal grants typically pay for 80 percent of capital costs.
- Rural and Small Urban Areas (Section 5311) – provides funding to support public transportation in areas of less than 50,000 populations. Funds may be used for capital, operating, and administrative assistance to state agencies, local public bodies, nonprofit organizations, and operators of public transportation services.
- Job Access and Reverse Commute (JARC) (Section 5316) – provides funding for programs that assist eligible low income individuals with transportation services they may need to access jobs and employment-related activities. JARC funds may also be used to create new reverse commute travel services.
- New Freedom Program (Section 5317) – funds new public transportation services and capital improvements for programs and services for persons with disabilities that go beyond those required by the Americans with Disabilities Act (ADA).
- Congestion Mitigation Air Quality (CMAQ) Improvement Program – allocates funding on a formula basis to states and metropolitan areas that are in non-attainment of federal air

quality standards. The funding may be used to support air quality improvements or transportation services that have demonstrated air quality benefits, such as travel demand management and ridesharing programs.

As discussed, all federal grants have local matching requirements mandating local communities to raise between 20 percent and 50 percent of the costs of new service, depending on the proposed service and funding source.

At this point in time (May, 2011), neither the Lebanon/Hanover nor Claremont are non-attainment areas with regards to federal air quality regulations. Consequently, CMAQ funding is not available. However, it is possible that the region may qualify for CMAQ funds in the future, potential due to deteriorating air quality conditions or a change in the regulatory statutes.

Potential funds that could be used to support the NH 120 service, therefore, are the Rural and Small Urban Areas Section (Section 5311) and because the route support access to employment, JARC (Section 5316). Both programs would offer support for up to 50 percent of the cost of transit service operations.

The New Hampshire Department of Transportation makes JARC funds available for local communities and allows these funds to be used for new services, provided they meet the program criteria. Grant funds are awarded based on a statewide competitive grant program, with the most recent call-for-projects completed in March 2011. JARC funds are intended to support the development of new services and thus can be used to support a transit route for up to three years.

Section 5311 funds are awarded to the State of New Hampshire based on a formula set by the federal government. NHDOT in turn allocates these funds to transit services based on need; funds are limited and priority is typically given to existing services. Using this program to fund a new route, therefore, would be based on availability and other statewide needs.

## **Tax-Free Commuter Benefits**

In the United States, employers can offer their employees tax-free commuter benefits to reduce the costs of commuting. Offering these types of benefits may be beneficial for the employer as well as some of the costs can also be deducted from payroll taxes. This type of program may be applicable to the NH 120 route, as it is designed specifically to serve large regional employers. The following section provides a general overview of this benefit.

Traditionally, benefits have been allowed for transit, vanpooling and parking costs and more recently bicycling was also included in the rule. The benefit is a federal tax benefit authorized under the Internal Revenue Code Section 132(a).

This benefit can be implemented in one of two ways:

An employer purchases a transit pass (or parking cost or vanpool fare) for an employee and the value of the transit pass is not added to an employee's gross income. Employers who provide the benefit as a tax-free fringe benefit may also save on payroll taxes because the employer does not need to income the amount of the fringe benefit in the employee's gross income.

An employee designates a portion of their income to pay for their transit pass (or parking or vanpool fare) from their income and the costs are excluded from income taxes, much like health care costs. Employers also do not pay payroll taxes on the amount that is deducted from an employee's gross income.

There are monthly caps on the amount that can be deducted and these are currently set at \$230 per month. In the case of the NH 120 route, if the fare (or donation) was \$3.00 one-way, a

monthly pass may be on the order of \$120. Assuming an individual is in the 15% tax bracket, the tax-free commuter benefit on a \$120 month commute, could save them \$18 a month, or about \$216 a year.

## Sources for Local Match

In NH, federal funds can be matched with other state or Federal funding programs, as long the funds do not originate from the US Department of Transportation. Potential funding sources for small urban transportation services, therefore, may include other Federal programs, such as Medicaid and Temporary Assistance to Needy Families (TANF). These programs, however, typically reimburse agencies for services provided. This means that funding is not available until services are provided and used. However, both programs will pay the full cost of the service provided.

## Partnerships and Cost-Sharing with Employers

Other sources for transportation services can come through partnerships with private organizations. The private sector, especially institutions and business that will directly benefit from the bus service, represents a potential opportunity to raise local matching resources to support the bus service. Indeed, some members of the private sector participated in this study and contributed ideas to the service design. Their input and involvement as services are developed should be maintained and a dialogue about potential financial contributions continued.

It may be possible to set up universal pass programs with employers. These programs typically work by estimating the number of transit riders at an employer (or institution) and the costs associated with these riders. (Costs may be estimated by a survey.) The employer would then pay the cost of current transit use and receive a free transit pass for all employees. This approach allows employers to encourage transit use by providing a benefit to all employees. Start-up costs are low and are typically negotiated as ridership increases. Transit agencies benefit by receiving lump sum payments at scheduled intervals. These types of program have been very successful at large institutions, such as universities and hospitals, as well as major employers around the country.

## Taxation

A final potential for local match is taxation. Communities in New Hampshire also have limited taxing authority but do have authority to use vehicle licensing fees to raise local funds for transportation projects. In general, local operators in New Hampshire tend to raise local match by providing (for a fee) transportation service for human service agencies and/or special services for other jurisdictions, organizations, or institutions.